



United Nations Environment Programme
The Regional Office for West Asia

ROWA Reports and Publications Series

**Final Report and Proceedings of
The Conference on
BIOLOGICAL DIVERSITY;
Its Conservation and Sustainability
in the Arab World**

Bahrain, 12 - 14 December 1995

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FOREWORD

Thousands of animal and plant species, which form the biological diversity of our planet, are under threat from misuse, loss of habitat, pollution and extinction. This dangerous phenomenon had led the United Nations Environment Programme to promote and facilitate the preparation of the Convention on Biological Diversity which was signed by more than 150 countries at the UN Conference on Environment and Development (the Earth Summit), held in Rio de Janeiro in 1992.

The Convention aims at regulating the use of genetic resources and setting out the responsibilities of governments to use their natural resources sustainably and to protect certain species. Since the signing of the Convention, the importance of maintaining the biological diversity has been realised and several global actions have been taken towards the conservation of species and eco-systems.

In the Arab region, the Council of Arab Ministers Responsible for the Environment (CAMRE) included the issue of biological diversity in its Arab Programme for Sustainable Development as one of five major priority areas which need attention and urgent action. To that end, an Arab Expert Group Meeting on Biodiversity in the Arab World was held in Cairo from 1-5 October, 1995.

Subsequently, and as a follow up to the above meeting, the UNEP Regional Office for West Asia (ROWA) has organized the Conference on "Biological Diversity, Its Conservation and Sustainable Use in the Arab World" which was held in Bahrain from 12-14 December 1995. The objective of this Conference was to review the activities being carried out in the region and to set up an action plan to implement the recommendations adopted in the above-mentioned meeting.

The present publication contains the proceedings of this important Conference and it is with pleasure that these proceedings appear in this first issue of our Series of Reports and Publications, printed and distributed by ROWA to a large number of experts and institutions in and outside the region.

Makram A. Gerges
Director and Regional Representative
UNEP/ROWA

PREFACE

This publication contains the proceedings and the final report of the Conference on "Biological Diversity, its Conservation and Sustainable Use in the Arab World", which was held in Bahrain from the 12-14 December 1995.

The final report consists of the summary of all the presentations delivered at the Conference. At the end of the Conference, a set of recommendations and a proposed action plan to preserve the biological diversity in the region was adopted. These recommendations are included in the final report.

The proceeding consists of the full text of 7 technical presentations delivered at the conference. All in all, these presentations covered the research activities as well as action taken by regional and international organizations to preserve and conserve the biological diversity of the region.

The list of participants together with the technical programme of the conference are included in the annex. The annex also contains the full text of the statements delivered at the opening session.

This Conference was held with the full support and patronage of H.E. Sheikh Khalid Bin Ahmed Al Khalifa, Chairman of Bahrain National Committee for Wildlife Protection. It was, indeed, this support and encouragement that facilitated overcoming last minute problems and difficulties that forced the organizers to change the date and venue of the Conference. For this support and encouragement, the organizers would like to acknowledge with thanks and appreciation The Bahrain National Committee and its Chairman Sheikh Khalid Bin Ahmed Al Khalifa.

Finally, I would like to express the gratitude of UNEP/ROWA to all lecturers, consultants and participants for their valuable presentations and active participation during the meeting. In particular, I would like to acknowledge with thanks the participation of Ms. Fatima Al Mallah from the Technical Secretariat of CAMRE, Mr. Peter Dogse of UNESCO, Mr. A. S. Abdul Salam of AOAD, Mr. Saeed Abdulla of Bahrain National Committee for Wildlife Protection, Mr. Jan Kanopka of ICARDA and Mr. Adel Gouda of ACSAD

Fouad Kanbour
Senior Environmental Affairs Officer
UNEP/ROWA

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**REPORT ON THE ACTIVITIES OF THE
MEETING ON BIOLOGICAL DIVERSITY, ITS
CONSERVATION AND SUSTAINABLE USE IN
THE ARAB WORLD**

12-14th December 1995, Bahrain

Introduction:

The Regional Office for West Asia-of UNEP has organized this meeting on Biological Diversity, aiming at following-up and setting-up an action plan to implement the recommendations of the Expert Group Meeting on Biodiversity in the Arab World that was held in Cairo, Egypt, from 1-5th October 1995, with special emphasis on:

- Utilization of national skills to develop and implement national biodiversity studies, strategies, action plans, or programmes for the conservation and sustainable use of biological diversity.
- Promotion of the ratification of the Biological Diversity Convention and develop a mechanism for regional cooperation in the context of the Convention.
- Definition of specific protocols to regulate access to genetic resources and application and the right to benefit from the exploitation of biological resources.

The proceedings of the meeting held in Manama, Bahrain, during the period 12-14th December 1995, were as follows:--

The meeting started with a recitation from the Holy Quran and speeches presented by:-H.E. Shaikh Khalid bin Ahmed Al-Khalifa, Chairman, National Committee for the Protection of Wildlife; Ms. Fatima El Mallah; Head, Technical Secretariat-CAMRE, League of Arab States and Dr. Fouad Kanbour, Senior Environmental Affairs Officer, UNEP/ROWA.

Participants:

The meeting was attended by representatives of 10 countries, including Bahrain, Egypt, Jordan, Kuwait, Oman, Palestine, Syria, Tunisia, UAE and Yemen. Representatives of AOAD, ACSAD, ICARDA, UNEP/ROWA and UNESCO were also present. A complete list of participants is given in Annex (1).

The Meeting:

At the beginning of the **first working session**, the Plenary lecture and keynote address was presented by Prof. K. H. Batanouny, Consultant to UNEP for this meeting. The lecture covered the following issues: the present status of the biodiversity in the Arab World, the definitions to be adopted for Biological Diversity and other forms, land use in the Arab World, aridity and biodiversity, ecosystem diversity, plant diversity, animal diversity, human activities and biodiversity in the desert and what has been done and what we need to do. It gave information about organizations concerned with the protection of the environment in the Arab countries, participation in regional and international Conventions, workshops on biodiversity in the region and tools and measures to be taken for conservation of biodiversity. Some recommendations on national and regional levels were proposed.

It was followed by a paper presented by Mr. Peter Dogse, UNESCO, on Biosphere reserves for biodiversity conservation, sustainable use and benefit sharing, biosphere concepts, biosphere and biodiversity conservation, biosphere in the Arab world and biodiversity and related UNESCO programme.

A.Safwat Abdel Salem, AOAD, presented a paper on Biodiversity and sustainable development. It included biodiversity definition, importance and human activities, degradation of biodiversity, public awareness, indigenous knowledge, agro-ecosystems, agroforestry and rehabilitation and environmental extension.

A presentation was given by Richard Hornby, U.A.E., on Biodiversity in the U.A.E. It covered geographical characteristics and biodiversity in the U.A.E., and national policy of conservation. This was accompanied by slide presentation showing different hot spots and important endangered animal species.

In the **second session**, country reports were presented. The first country report was given by Egypt. It focused on the status of the biodiversity in the country, activities, proposed action plans, inventory, protected areas, management and supporting measures.

The next country report was presented by Jordan, focusing the status of micro-organisms in the country, prepared studies, NGO importance, teams of studies from universities and research centres, number of recorded species from different groups of biota, causes of deterioration of the biological diversity, management of biodiversity in Jordan and marine protected areas.

This was followed by a country report presented by Oman on such issues as geography and characteristics of the environment in Oman, number of species in some animal groups, endemic species in the flora of the country, national measures and activities since the seventies until now.

The country report presented by Palestine emphasized on the geography of biological conservation on Gaza zone and West Bank, constraints of the conservation of biodiversity and recommended activities.

It was followed by a country report from Syria. It included some activities and thoughts of action, data on the number of animal species of some groups and the number of endangered species.

The **third session** started with a paper prepared by Dr. Saeed Abdulla, National Committee for Wildlife Protection, Bahrain; Dr. Jameel Abbas and Prof. Philip Basson, Department of Biology, University of Bahrain. The paper was presented by Dr. Saeed Abdulla with slides showing: biodiversity in the Arabian Gulf region, diverse biota in the region, physiographic region in the Arabian peninsula, algae in Bahrain and the Gulf, vascular plants (flora), plant communities, mammals, including marine mammals, birds, reptiles, fishes, and other amphibians and coral reefs in the Gulf with emphasis on Bahrain.

This was followed by a presentation by Ms. Fatima Al-Mallah, CAMRE, on an overview of the Arab Expert Group Meeting on Biodiversity in the Arab World. It focused on CAMRE establishment, meetings, activities, programme for combating desertification, programme for environmental pollution from industries and programme for environmental education.

Ms. F. Al Mallah also pointed out to the Biodiversity Meeting held in Cairo on 1-5th October 95 which was attended by 11 Arab countries and experts from regional and international organizations who presented 24 studies on biodiversity.

In the fourth session, Mr. Jan Konopka, ICARDA, presented a paper on the role of ICARDA in Plant Genetic Resources Conservation in the Arab Countries. The paper explained the mission and mandate of ICARDA, genetic resource conservation, ex situ conservation of plant genetic resources, in situ conservation of biodiversity, fertile crescent initiative, other biodiversity conservation activities with Arab countries and ICARDA's approach to biodiversity conservation.

The next presentation was given by Dr. Adel Gouda, ACSAD, who gave a summary on issues of concern on Biodiversity Conservation. He stated that there are various strategies or alternatives to be taken to preserve biodiversity, including intensive direct intervention, indirect intervention and monitoring diversity within various elements of man-made and natural ecosystems. He also stated that the most significant achievement of ACSAD in the field of Biodiversity and sustainable land use is the creation of an Arab Data-bank for Arid Plants (ADAP) which will facilitate the development of arid and semi-arid lands in the Arab region.

The fifth session started with a presentation on "Saving the Arabian Leopard" by Dr. Richard Hornby, Federal Environmental Agency, UAE, who stated that the Arabian Leopard, as an indigenous large mammal, is highly threatened because it is persecuted by farmers due to its predation on goats and other domestic animals. He pointed out to the Arabian Leopard Trust (ALT) which is concerned with the

conservation of the Arabian Leopard and other large mammals in UAE. Together with the National Avian research Centre, ALT has done useful survey work in the mountains regarding the Arabian Leopard and other desert species. Still, it needs more support and encouragement to achieve its tasks.

This was preceded by presentation of the following country reports :

The first country report in this session was presented by Tunisia. It stated that a National Committee for Biodiversity Conservation had been invented in the country in 1993 and it emphasized on issues such as survey of manpower involved in Biodiversity conservation, strategy and action plan for conservation of Biodiversity and network planning.

The second country report was presented by Yemen giving a summary on different institutions involved in Biodiversity conservation such as the Ministry of Agriculture and Water Resources, the Plant Genetic Resource Unit, and the Environmental Protection Committee.

The next country report was presented by Bahrain. After giving general information on the country, the paper dealt with issues concerning conservation of Biodiversity, including Environmental Management, the National Committee for Wildlife Protection, Bahrain, Marine Habitat Survey, State of Flora and Fauna in Bahrain, Protected Areas of Wildlife, oil spill contingency impact assessment and cooperation with national, regional and international organizations.

The sixth session was devoted to a plenary lecture given by Dr. Hisham Baban, Gulf Union Insurance & Reinsurance Co., on Legislation Implications of the Biodiversity Convention. The lecture tackled such issues as policy making, environmental policy and insurance system.

The lecture was followed by group discussion on development of action plan and drafting of recommendations.

The **final working session** was set up for evaluation of the meeting and adoption of the draft of recommendations.

The meeting pinpointed the needs for conserving the Biological Diversity. Draft of recommendations is attached.

RECOMMENDATIONS

I. Taking into account the discussions and interpositions during the meeting, the participants decided to develop an action plan based on the following recommendations:

- To carry out feasibility study to establish a research and training centre on a regional basis to cover different issues relevant to the conservation of biodiversity.
- In the meantime, there is an urgent need for implementing the following training courses, which could be on a regional level and supported by the various regional and international organizations, e.g. Arab League, ICARDA, ACSAD, UNEP, IUCN, UNESCO. The courses could be hosted in any of the Arab countries willing to do so. The proposed training courses include:
 1. Wardens for protected areas.
 2. Special groups of plants or animals, e.g. medicinal plants or marine mammals
 3. GIS and handling of data for biodiversity
 4. Socio-economic aspects of conservation of biodiversity
 5. Management of components of biodiversity
 6. Mass media personnel
 7. Museums
 8. Herbaria (curators)
 9. Aquaria
 10. Botanic Gardens
 11. Captive breeding in zoos
 12. Gene Bank

II. In the field of education covering both formal and informal education, the meeting recommends the following:

- Help preparing awareness programmes on conservation of biodiversity, i.e. TV spots, articles and other audiovisual activities.
- Enrich the education curricula for school education at all levels about biodiversity issues.

- Preparation of booklets in Arabic needed to simplify biodiversity definitions, importance and degradation-conservation and to be available to various sectors in the society.

The participants also recommend the following:

Database

Establishment of database for biodiversity on national level to be supported by regional networking. Unified concepts and standard should be used to promote harmonization and to help exchange of information and data.

Directories

Request UNEP and ACSAD in cooperation with other international and regional organizations to prepare a directory of institutions, organizations and personnel in the region involved in biodiversity.

Research

Support taxonomical studies, especially in the fields of invertebrates and micro-organisms. This could be carried out through post-graduate studies in these fields, supported by travel to work in institutions where excellent reference materials are deposited.

Special emphasis should be made to identify and fill in gaps of knowledge about biodiversity in the region, especially about the endemic species.

Inventories, assessments and conservation for sustainable use:

Based on the national priorities, each country shall identify its hot spots, i.e. sites with particular biota, endemic and/or rare. Examples of these sites are:

Mangroves - refugical sites (including mountains), coral reefs, sea grass, mud flat, oasis, islands, freshwater wet land, lagoons.

Inventories are to be undertaken whenever not present, assessment of the components of biodiversity. The concepts of research studies of the biosphere reserves could be adopted in the hot sites. Also, economic evaluation is necessary. Networking among these hot sites in the national and regional levels is imperative (refer to the Annex of the Biodiversity Convention on importance of ecosystem).

Particular plants and animal groups:

Due to the ecological and economical importance of some groups of biota, there is a greater need to undertake inventory, assessment, economic evaluation, their role in ecoterrorism and other activities: examples of these are medicinal plants and marine mammals

Red Data Book:

It is indispensable that each country has its own Red Data Book based on the criteria of IUCN. In a later stage, there may be Red Data Book on a regional level.

Traditional Land Use and Biodiversity:

The region has a long history of land use. These patterns have been in harmony with the environment. It is recommended to: convene a workshop covering different topics dealing with the various patterns of land use and their impact on biodiversity. By land, is meant, soil, plants, animals and water.

III. GENERAL RECOMMENDATIONS:

The meeting affirms and acknowledges the recommendations adopted at the Expert Meeting on 1-5 October 1995 in Cairo, and emphasizes the following:

1. Prepare country studies.
2. Urge all Arab countries to ratify and join the convention on Biological Diversity. (Refer to Conv.)
3. Promote networking in general, i.e. among protected areas, biosphere reserves, research centres, universities, NGOs. (Refer to Dec.)
4. Request UNEP/ROWA in cooperation with the Bahrain National Committee for Wildlife Protection to follow up the action plan adopted in this meeting through the formation of a specialized scientific committee.
5. Acknowledge the decision of CAMRE for nominating ACSAD to coordinate activities in the Arab countries. (Refer to Dec.)
6. Acknowledge the decision of UNEP Governing Council of 1995 with regard to technical assistance to the Palestinian Institutions in the field of environment.

BIOLOGICAL DIVERSITY IN THE ARAB WORLD

K. H. BATANOUNY

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General Supervisor, Desert Research Centre, Egypt*

INTRODUCTION

The geographic, physiographic, climatic and edaphic diversity in the Arab world is remarkable. Eventually, this diversity is reflected in the biota and the genetic traits of the living organisms. The components of the biological diversity of the region are subjected to considerable attrition due to numerous and complex reasons.

Scientists, institutions and organisations looking through a global lens, focus on biodiversity loss in the tropical countries. They give priority to these countries, overlooking the arid and semi-arid zone belt occupied by the Arab countries. However, these countries, as a part of the Middle East, occupy a region which is the home of many wild relatives of numerous food crops, medicinal plants and feed for animals. The wild progenitors of these plants are native to the Middle East. The 'nuclear area' or the core of first domestication of plants is a part of the region. Plant cultivation in the Old World appeared firstly in a string of early Neolithic farming villages that developed in the Near East by 7500-700 B.C. (Braidwood, 1975). The Arab region comprises areas which are the cradle of many civilizations, e.g. the Fertile Crescent, the Nile Valley and Yemen. These civilizations depended on the region's biodiversity for agriculture and pastoralism. This biodiversity and the genetic heritage that it represents is increasingly at risk. Only limited relics of the region's natural vegetation and associated animal life remain. A variety of biotic elements have disappeared or are at the brink of disappearance. The biological diversity is continuously deteriorating in view of the population explosion, modernization, and innumerable human activities using improper technologies and mismanaging the natural resources. One should consider the loss of say 10 species from the flora or the fauna of the desert ecosystem, which is the most common ecosystem in the region, as relatively drastic and considerable, as compared to the biomes with greater species richness.

It is to be noted that the definition of biological diversity, as well as definitions for other terms given in the Convention of Biological Diversity, Rio de Janeiro, 1992, will be adopted in the present study.

The amount of data on biodiversity and on the functioning of biological systems varies widely from one country to another in the region. Even in countries where we have a reasonable amount of data, this data is not assembled in a meaningful form for the purpose of conservation measures. There is also a lack of data on the socio-economic aspects of biodiversity, for example on its economic and social value and the cost to society of its loss.

One can observe that in the last few years, numerous meetings, workshops and conferences have been held in different countries of the Arab world. These

workshops and conferences were sponsored by various organisations, regional or international. Sometimes participants of these meetings are the same. The data discussed in these meetings is usually that available with no new additions from the field. It seems very important to start putting the good ideas given in these meetings into action plans. It is hoped that the present conference will foster the implementation of the innumerable recommendations.

The present study is a rapid assessment of the biological diversity in the Arab world. The impact of human activities and the attrition of the biological diversity, as well as the necessary actions for the conservation of the biodiversity, and recommendations are presented.

DEFINITIONS ADOPTED

An agreed scientific meaning to biological diversity and other terms are necessary. It seems proper to use the definitions given in the Convention on Biological Diversity in Article 2.

"Biological diversity" means the variability among living organisms from all sources including, inter-alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of the ecosystems.

This means that biodiversity is the variability of life in all forms, levels and combinations. It is an attribute of life, contrasting with biological resources, which are the tangible biotic components of ecosystems.

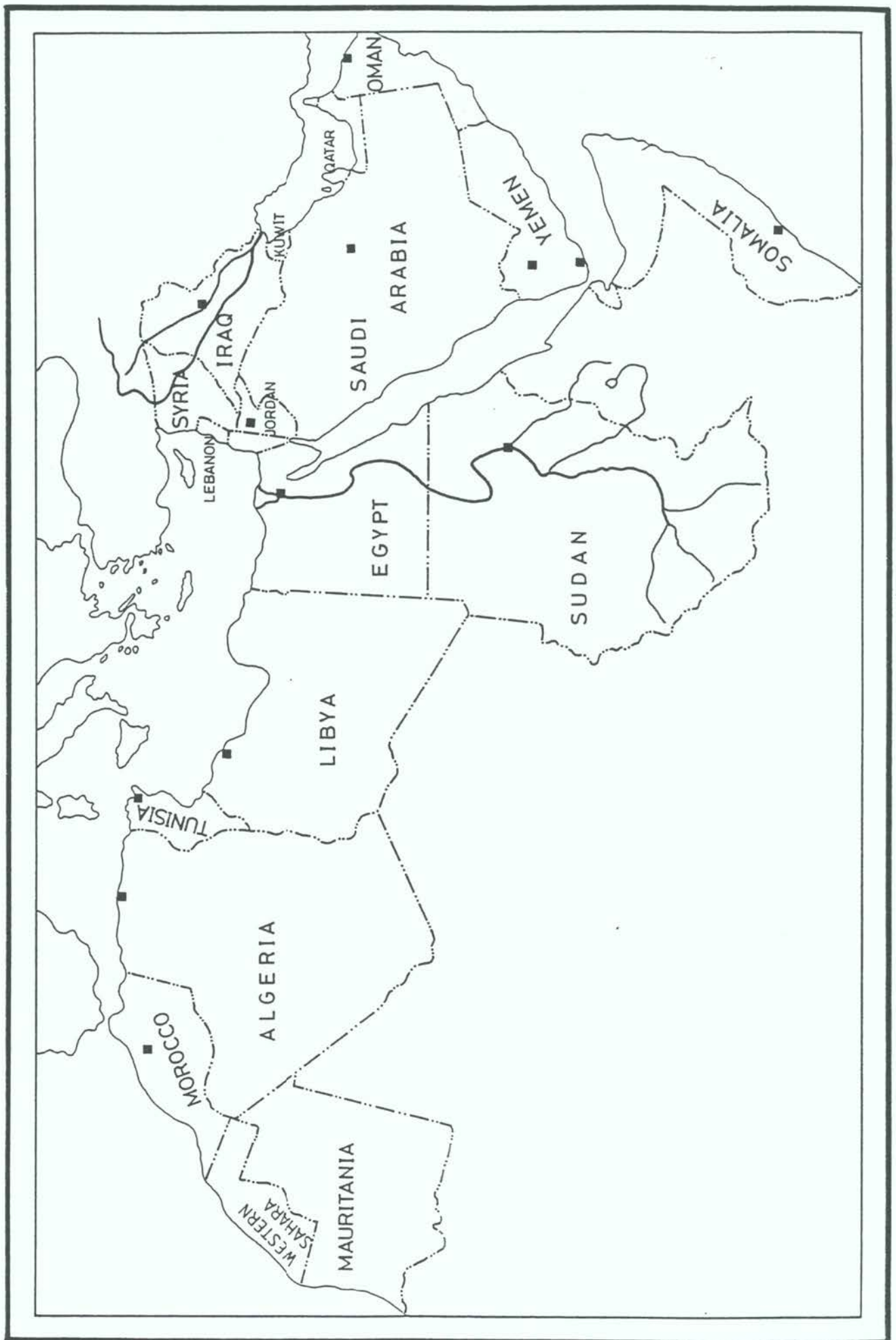
To simplify matters, the biological diversity is meant conventionally, but not exclusively, described in terms of three conceptual levels (Glowing *et al.*, 1994):

- * Ecosystem diversity: the variety and frequency of different ecosystems, the convention gives the definition of the ecosystem as follows: *"Ecosystem means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as functional unit".*
- * Ecospecies diversity: the frequency and diversity of different species, such as the tiger or the date palm.
- * Genetic diversity: the frequency and diversity of different genes and/or genomes.

Other terms used in the field of biodiversity and its conservation have been defined in the Convention. This seems of importance, at least to adopt a unified concept in our approaches to the subject. Some of these could be given here; the following are just examples:

"Ex-situ conservation means the conservation of components of biological diversity outside their natural habitats".

Figure 1



"In-situ conservation means the conservation of ecosystems and natural habitats and the maintenance and recovery of viable population of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distribution properties".

LAND USE IN THE ARAB WORLD

Land use and management are among the main factors affecting the biodiversity in any region. The sustainability of the land use is of prime importance in the conservation of the biological diversity. It is therefore necessary to summarize the different patterns of land use in the Arab world. In general, it is not an easy task to obtain reliable data on the various aspects of land use in the area under consideration. Different sources have been consulted and the data collated is given in Table 1. Examination of the data in this Table reveals the following:

1. Despite the fact that the total area of the Arab countries amounts to 13,652,000 sq. km., yet only 506,000 sq. km., or almost 3.4% is cultivated with field crops, vegetables and fruit trees. Irrigated agriculture is limited in many of the countries of the region, e.g. the cultivated area in the Arab Gulf countries does not exceed 0.18% (cf. Batanouny, 1990, 1994). The Arab countries with more than 30% cultivated lands with crops are Tunisia, Syria and the Gaza Strip (Table 1). On the other hand, the area occupied by rangelands (or as given in some sources as meadows and permanent pastures) is almost 2,560,000 sq. km., or about 18.8% of the total area of the Arab countries. The area covered by forests and woodland is about 1,370,000 sq. km., i.e. about 10%.
2. The total land surface under use amounts to 4,100,000 sq. km. or about 30%. The remainder (almost wetland) covers 9,500,000 sq. km. An extensive area is not used at all due to the environmentally harsh conditions, including scarcity of water resources and salinity of considerable tracts of the region.
3. Besides being limited in area, the rangelands in the Arab region are rapidly deteriorating (Batanouny 1987, 1990, 1994). On the other hand, the population is increasing rapidly in all the Arab countries (Table 1). Estimates of population in the Arab countries were 94,138,000 in 1989, and is expected to reach 281,112,000 in the year 2000.

In view of the continuously increasing population, the increasing demands, the deterioration of resources, and the attrition of genetic resources, the gap in food and other basic needs in the region is ever widening. This evinces the great need for the development of further natural resources and conservation of the existing ones.

Table 1

Area, land use and population in the Arab countries					
Country	Area (100 km ²)	% of total crops	Area (1981-83) range	Population (1000s)	
				1989	2000
<i>African Countries</i>					
Algeria	2382	3	14	25 063	33 444
Djibouti	22	0	9	604	
Egypt	1000	2	0	54 779	63 941
Libya	1760	1	8	4 271	6 082
Mauritania	1031	-	38	1 804	2 998
Morocco	620	19	28	25 380	29 512
Somalia	638	2	46	8 552	6 671
Sudan	2506	5	24	25 008	32 926
Tunisia	146	31	20	7 930	9 429
<i>Asian Countries</i>					
Bahrain	669	3	6	843	693
Gaza (Palestine)	-	45	0	1 481 (1976)	-
Iraq	435	13	9	17 601	25 377
Jordan	98	4	1	3 301	6 437
Kuwait	17.8	-	8	1 967	3 007
Lebanon	10.4	29	1	2 052	3 617
Oman	212.4	-	5	1 389	1 973
Qatar	11.4	-	5	342	569
Saudi Arabia	2150	1	40	12 378	19 824
Syria	185	51	45	12 210	17 809
United Arab Emirates	777	-	2	1 455	1 939
Yemen: South	333	1	27	2 488	3 379
North	195	14	26	6 937	10 881

ARIDITY AND BIODIVERSITY

The Arab countries occupy an area of some 13,652,000 sq. km. extending between longitude 17 E and 60 E, and between latitude 37 30 N and 1 30 S. This area exhibits wide differences as regards surface configuration, climate and vegetation. The climate diversity is reflected in the vegetation; the latter ranges from dense humid forests to dreary plantless deserts. The hyperarid parts occupy vast areas in the region. It is to be noted that almost two-thirds of the area of the Arab world receive an average rainfall of less than 100 mm/year.

The factors affecting the climate of the Arab world are partly global, partly regional, and partly caused by local topography. The climate of the area ranges from cool temperate, to tropical, with a great array of intermediate variant. A considerable part of the region may not receive any rain for one or several consecutive years. In the major part of the region, rainfall is variable and irregular, both temporal and spatial. It is to be noted, that the adaptability of the plants and animals to the desert conditions is closely related to the incidence of rain and to the erratic nature of its distribution throughout the season and the year.

The area is no less diverse with regard to temperature, which is strikingly influential upon the distribution of the variou biota all over the region. The latitudinal distribution of biota is caused primarily by the degree which the organism resists cold.

The distribution of grasses with different photosynthetic pathways has been found to be closely related to the temperature (Batanouny *et al*, 1988). In Egypt, the 103 C3 wild grass species are mainly Mediterranean and/or Irano-Turanin, while the 120 C4 species are mainly tropical.

In the study on the photosynthetic pathways and ecological distribution of *Euphorbia* species in Egypt (Batanouny *et al* 1991), reports that C3 *Euphorbia* species grow under conditions of relatively better water resources and lower temperatures than the C4 plants. The majority of the CAM and C4 species occur in the southern part of the country, where high temperatures are a common feature of the climate.

The geographical distribution of the halophytes in the Arab regions clearly related to the minimum winter temperature (Batanouny, 1994). Thermophilous species, which are Sudanese or tropical, are sensitive to cold winters and are confined to southern latitudes in the region, while others tolerate winter temperature and thus their distribution extends to the most northern latitudes of the region.

Generally, the Arab region represents a meeting point of the main geographical regions of the world: Sahara-Arabian, the Irano-Turanian, the Sudanian, the Mediterranean and the Euro-Siberian regions (*cf.* Zohary, 1973). The meeting of different phytogeographical regions means the presence together of different

elements from different regions. Despite this fact, the region has high percentages of endemic species.

ECOSYSTEM DIVERSITY

The geographical, climatic, physiographic peculiarities of the Arab world create innumerable opportunities for the occurrence of varied and diverse ecosystems. The geographical location of the Arab world between latitudes of 37° 30' N to 1° 30' S results in the presence of numerous phyto- and zoo-geographical zones with diverse ecosystems. The innumerable landforms in the region have their remarkable consequences on the biota of each ecosystem. It is interesting to mention that the numerous habitats within any ecosystem were exactly known to the natives. This is evident from the native Arabic names of the different landforms in the desert and mountainous areas. Even some of these names and terms are latinized and are of widespread use all over the world. One gives examples of these terms as follows: *wadi*, *oued*, *sebkha*, *oioun* (springs), *chotts* (dry lakes), *gilgui* (in Libya, rough channeled and hummocky microrelief), *draa* (geometrically arranged sand mountains), *ghroud* (dunes with pointed peaks), *hamada*, *nakhsh*, *jabal*, *jirri*, *roda*, *khabra*, *tall*, *hdbah*, *serir*, *reg*, *erg*, etc.

The region is characterized by deep depressions reaching more than 300 m below sea level, e.g. the Dead Sea region. The deserts are stippled by a number of oases with artesian water resources. They are featured with their dense palm groves and water springs. They represent a special habitat with particular biota. On the other hand, high mountains rising above 3000 m above sea level are widespread in the region. The vertical variation due to considerable differences in height and the horizontal variation in the environment from north to south, create a conspicuous biological diversity.

The occurrence of long shores along the Atlantic, Mediterranean, Red Sea, Indian Sea, Arabian Sea, Gulf of Oman and the Arabian Gulf, results in the presence of vast areas occupied by wetlands. This is increased by the presence of lakes; both coastal and inland, lagoons, estuaries, marshes, *sharms* (narrow bays), *dohat*, *fasht*, and marshes. These wetlands are habitats for special biota and are essential breeding, rearing and feeding grounds for many species of fish and wildlife.

The Saharan massifs are prominent features with particular environmental conditions and biota. These include massifs of *hoggar*, *Tassili des Algier*, *Adrar des Ifoghas*, *Air*, *Tibesti*, *Ennedi*, and *Gebel Oweinat*. These represent ecosystems with many endemic species.

The presence of Nile crossing Egypt, the Tigris and Euphrates in Iraq, as well as other smaller rivers in Syria, Lebanon and Morocco, create unique fertile areas in the middle of the harsh deserts. Intensive agricultural activities in these areas have their impact on the flora and fauna. Weeds, aquatic plants and fresh water aquatic and amphibian animals, particularly birds, rodents and reptiles, have a species composition different from the neighbouring desert. The construction of dams in these water systems has inevitably changed the biota of these systems. In the Nile, some species disappeared due to the lack of the yearly flooding. However, the

disappearance of biota from the Nile is not new to Egypt. Some animals (Hippopotamus, Crocodiles) and birds (Ibis) have disappeared some time ago. Only relicts of papyrus are recorded in very limited areas.

REFUGIAL SITES

Alternating wet and dry periods are a feature of the palaeoclimate in the region. Increased aridity brought the isolation of the vegetation on some particular sites, e.g. the Saharan massifs. The fascinating isolated fauna on mountain "islands" in the Sahara are the remnant of a wet period (Warren 1984). The deserts of the Arab region, with its mosaic of varied, unconnected habitat, such as massifs, *jebels*, sandy plains separated by stony hamadas, and isolated oases, is the perfect situation for the evolution of morphological variations as well as ecotypic differentiation in the biota.

It is to be noted that these sites, which could be termed as refugial sites, support particular species. These species are usually endemic or rare species. As examples, *Juniperus phoenicea* on a mountain in Sinai, *Cupressus dupreziana* A. Camus recorded in a few localities of Tassilides Ajjer. On the high mountains, which are usually inaccessible, there are many endemic and rare species all over the Arab countries, e.g. the high mountains in Saudi Arabia, Oman and Yemen. One should notice that the isolation of these refugial sites leads to a certain degree of speciation. This phenomenon has been reported by Wickens (1984) who states that this speciation occurs in some sites of the Sahara, especially amongst the Mediterranean elements as *Olea europaea* subsp. *lapperinei*, *Cupressus dupreziana*, etc. resulting in the flora we know today.

Islands, especially Socotra, has the highest number of endemic as well as threatened species. Perhaps as a result of the island's long-time isolation from both Arabia and Africa, there is an exceptionally high level (30%) of endemism found on the island. Of the 815 or so plant species found on Socotra, at least 240 are endemic, i.e. they are found naturally only on Socotra and nowhere else on the plant. Eleven genera of plants are endemic to Socotra and one additional genus is endemic to Socotra and the mainland of Yemen. Seven of Socotra's endemic plants are listed in the IUCN Red Data Book as globally threatened or endangered. Islands in the Red Sea can be important hot refugial sites for their particular biota.

PLANT BIODIVERSITY

The number of plant species recorded in the different Arab countries varies widely from country to country; ranging from about three hundred species in Qatar and Kuwait, to above three thousand in Algeria, Morocco, Somalia, Sudan, Lebanon and Syria. The number of endemic species also varies widely. There are countries without recorded endemic species, while some countries may have more than 600 endemic species in Morocco (Table 2). The number of recorded endangered

TOTAL PLANT SPECIES , ENDEMIC AND THREATENED SPECIES IN THE ARAB COUNTRIES

Country	Total No.	Endemic Species	Threatened Species
AFRICAN			
Algeria	3164	250	147
Djibouti	641	2	3
Egypt	2076	70	98
Libya	1825	134	58
Mauritania	1100	X	3
Morocco	3675	600 - 650	197
Somalia	3028	500	61
Sudan	3137	50	10
Tunisia	2196	x	26
ASIAN			
Iraq	2937	190	3
Jordan	2212	150	12
Kuwait	282	0	1
Lebanon	3000	330	6
Oman	1200	74 - 73	4
Saudi Arabia	2028	34	6
Syria	3000	330	12
United Arab Emirates	347	0	0
Yemen	1415	58 - 77	152

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species is considerable in some countries as Morocco (197), Yemen (152), Algeria (147), Egypt (97), Somalia (61) and Libya (58).

Some Arab countries, especially those representing a part of the fertile crescent, i.e. Iraq, Syria, Jordan and Palestine, are ancient and important centres of biological diversity, with excavations indicating agricultural domestication of wheat, barley, lentil, chickpea and horticultural fruit trees and vegetables about 7000 years ago. Some of these countries harbour many ancient landraces and primitive cultivators and relatives of important crops. In these countries, the following species are recorded:

Triticum dicoccoides - *T. araraticum* - *T. boeoticum* - *T. ururata* - *T. monococcum* subsp. *boeoticum*

Hordeum spontaneum

Lens orientalis - *L. nigricans* - *L. ervoides* - *L. odemensis*

Cicer bijugum - *C. pinnatifidum* - *C. judaicum*

The flora of these countries include numerous tree species, which are of importance as rootstocks in arid zones, e.g. *Prunus kotschinski* - *P. kotschy* - *P. orientalis*. Wild relatives of pear grow in Syria, i.e. *Pyrus syriaca* and *P. bovei*.

Numerous wild important leguminous species grow in many Arab countries, e.g. *Vicia* spp., *Lathyrus* spp., and *Tetragonolobus* sp.

The flora and vegetation of the region include excellent forage species, which have unfortunately become rare by reason of poor management policies over centuries. They have been neglected in range rehabilitation programmes, where preference is often given to exotics of questionable ecological adaptation to the conditions prevailing in the region. The old Arabian reserve system, the *hema*, has been neglected due to the change of the social system supporting it. There is a great need to revive this system for the sake of conservation of biological diversity and the development of an important resource in the region.

Almost every species of shrubs and trees in the region is subject to cutting for fuel, timber, or charcoal making. Some plants are cut for special purposes, e.g. *Salvadora persica* (Arak, tooth brush tree), *Pistacia* spp., *Rhus* spp., *Acacia* spp. (for tanning), etc.. The fruits of many species are edible, e.g. *Ziziphus* spp., *Rhus*, *Argania oxyacantha*, *Ficus salicifolia*, *Balanites aegyptiaca*, *Capparis* spp., *Acacia albia*, *Grewia tenax spinosa* and many others. The grains of several grasses and seeds of some herbs are also sources of food, especially in dry years when cultivated crops fail, e.g. *Panicum turgidum*, *Dactyloctenium aegyptiacum*, *Hyperhennia hirta*, *Amaranthus* spp., and *Plantago* spp.. Leaves, roots or stems of some plants are eaten, e.g. *Rumex vesicarius*, *R. pictus*, *Emix spinosus*, *Portulaca oleracea*, *Schouwia purpurea*, *Diplotaxis harra*, *Glossonema edule*, *Cynomorium coccineum*, *Cistanche tinctoria*, etc..

Hundreds of wild plant species have been used for a long time. These species represent important and endangered components of the biological diversity. Due to the continuous over-exploitation, many species of these plants are threatened and some of them are on the brink of extinction. No means have been undertaken until now to conserve these plants. The disappearance of these plants has an unseen

consequence. This is the knowledge of the medicinal healers. The erosion of such important genetic resources and the deterioration of the biological diversity are accompanied with the disappearance of knowledge and traditional experience. There is a great need to provide a framework for the conservation and sustainable use of the medicinal plants. Ethnobotanical studies should be encouraged and this represents basic studies to help in implementing the conservation.

There is a great problem which is not publicized to a degree matching its value. This is the loss of crop, vegetables and fruit varieties. As an example: the Arab countries were producing countless numbers of varieties and strains of different species of *Cucurbitaceae*. With the advent of the green revolution, which promoted the use of a limited number of high yielding varieties, innumerable local varieties were lost by neglecting them. It is to be noted that these lost varieties and strains had been adapted to the environmental conditions prevailing in our countries, i.e. drought and salinity. There is no doubt that these varieties are less productive than those developed nowadays, but we are in need of the genetic traits of the old, neglected, ones. This may help in breeding and genetic engineering programmes.

It is expected that our region lost thousands of varieties, strains and cultivars of vegetables and crops during the last decades. There is a great need to investigate this phenomenon and establish a mechanism for the conservation of these resources in the region.

The wild desert plants are endowed with mechanisms enabling them to tolerate and/or resist drought. The economic desert plants lost due to human activities would be of high potential in the future as important genetic resources.

The Arab countries are harboring a cultivated (alien) flora from several plant geographical regions. With these intentionally introduced plants, come also many weeds. There are numerous weeds coming to the area from different and far regions of the world. Accompanying these weeds and seeds, numerous micro-organisms pass the frontiers of the area unseen.

Reclamation of the desert and its cultivation have changed the biota in these lands a considerable extent. In the meantime, the indigenous biota are apt to disappear. This change of the flora, vegetation and consequently the animal life, has already reached dimensions never paralleled in the history of the region.

ANIMAL DIVERSITY

Most people usually think of big mammals, songbirds, large reptiles and amphibians when they speak about wild animals. Perhaps this is mainly due to the fact that they have seen these animals in the zoo. They have no idea about the vast numbers of other animals with different grades of evolution and shapes. It is an axiom that man is not a friend of what he ignores. It should be noted that the zoos have the capacity to sustain viable populations of, at most, only 900 species (Conway, 1988). Most people have no idea about the soil fauna, the rich fauna of the mangroves, the coral reefs, etc.. So, how can we ask them to conserve these biota? Coral reefs are

TOTAL MAMMALS SPECIES , ENDEMIC AND THREATENED SPECIES IN THE ARAB COUNTRIES

Country	Total No.	Endemic Species	Threatened Species
AFRICAN			
Algeria	92	2	12
Djibouti	x	0	6
Egypt	102	4	9
Libya	76	4	12
Mauritania	61	1	14
Morocco	105	5	9
Somalia	171	8	17
Sudan	267	7	17
Tunisia	78	1	6
ASIAN			
Iraq	81	1	9
Jordan	x	0	5
Kuwait	x	0	5
Lebanon	52	0	4
Oman	46	3	6
Saudi Arabia	x	1	9
Syria	x	0	4
United Arab Emirates	x	0	4
Yemen	x	1	6

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the ocean's closest counterparts to tropical rainforests in terms of species richness and biological productivity. The coral reefs are among the three most important coastal and nearshore marine habitats of widespread occurrence in many of the Arab countries. However, the major threats to these habitats are remarkable in our region, including dredge and fill projects and pollutant discharges.

The Arab countries have rich and diverse forms of small mammals. The rodents are by far the most successful order in terms of species. Regarding the large mammals, the region is inhabited by a highly-adapted species. However, the large mammals are critically endangered. many of the species have already disappeared from vast parts of their former ranges and few are actually on the verge of extinction (Table 3). In a frighteningly short space of time, overhunting has reduced the population and widespread animals like the oryx and addax have become confined to the most isolated parts of North Africa and the Middle East. The records of the total mammal species in the Arab countries show that their number may reach 267 in Sudan. The number of endemic species may be of the order of 3-5 species. It is to be noted that in every country there are threatened species; ranging from 4-17 species.

The coastal and inland wetlands in the region occupy vast areas. They represent a major road of migratory birds. These wetlands are exposed to deterioration as a result of human activities; especially pollution from pesticides, fertilizers and heavy metals.

The number of birds recorded in the different countries (Table 4) varies widely, with high numbers as in Sudan (938), Somalia (639), the latter country has 11 endemic bird species. There are some threatened bird species in every country; ranging from 5-17 in the different countries.

There is a obvious gap in the knowledge of the arachnids, insects, millipedes, as well as soil fauna. One should stress here the ecological role played by the soil fauna. It should be in mind that it is the importance of species within the ecosystem that counts and not the number of species. The effective species within the food web is more important than others with less effectiveness. In this respect, one may state that long lists of species names are not so important when we do not identify the role of these species in the ecosystem.

Wildlife problems are acute in nearly all the countries of the region. The destruction of wild game over years has been spectacular. As in the case of the wild native plant, the indigenous fauna, including the wild game, is more resistant to heat and drought than the domestic animals. Perhaps in the coming years, game ranching will be potentially one of the most practical and efficient forms of land use available in the desert. Faunal conservation is a way of land management and development.

HUMAN ACTIVITIES AND BIODIVERSITY IN THE DESERT

TOTAL BIRD SPECIES , ENDEMIC AND THREATENED SPECIES IN THE ARAB COUNTRIES

Country	Total No.	Endemic Species	Threatened Species
AFRICAN			
Algeria	192	1	15
Djibouti	311	0	3
Egypt	132	0	16
Libya	80	0	9
Mauritania	49	0	5
Morocco	209	0	14
Somalia	639	11	7
Sudan	938	0	8
Tunisia	173	0	14
ASIAN			
Iraq	145	1	17
Jordan	132	0	11
Kuwait	27	0	7
Lebanon	124	0	15
Oman	x	0	8
Saudi Arabia	59	0	12
Syria	165	0	15
United Arab Emirates	x	0	7
Yemen	x	0	9

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The drought and deficiency of water resources as natural phenomena are recurrent in the deserts of the region. Their impact is aggravated by the human activities and the development projects, which do not consider the fragility of the desert ecosystem. This is evident from the vast areas decertified in the region, with at least 600 sq. km. every year. No doubt the arid conditions and the desertification have their severe effects on the biological diversity of the region.

In the desert ecosystem, there is a precarious balance between the ability of the biotic components to survive and the scanty resources provided by the environment. Minor changes in the physical environment cause dramatic changes in its biotic components; plants and animal lives are obviously affected. Human factors contribute to the disruption of the natural equilibrium among the components of the ecosystem, thus causing its deterioration (Batanouny, 1979).

The human impact on desert vegetation leading to its changes may be of two kinds: (1) direct on the vegetation cover itself, or (2) indirect through its influence on the other components of the ecosystem (Batanouny, 1983). Direct impacts include: (a) cutting and uprooting of ligneous plants for firewood, (b) grazing, and (c) exploitation of raw material for food, shelter, medicine, and other uses.

For over 15 centuries, the Arabs have initiated a reserve system for plants (known as *hema*, denoting protection). Different types of the reserve systems were established to serve various purposes (Batanouny, 1984). All these devices and measures, in addition to the low population with modest basic needs, were in favour of the development of the vegetation and not its deterioration. During that time, the check on grazing throughout the year was not the lack of vegetation, except in some cases, but the lack of water points at which animals may drink during the long summer. Moreover, the tribal system was strong and grazing was controlled by tribal traditions and rules.

In the last few decades, the Arab countries have witnessed remarkable socio-economic changes. Modern technologies have been imported at an unprecedented rate; including 4-wheel drive vehicles, tractors, graders, drillers, as well as innumerable other innovations. In addition to the increase in population, the different processes accompanying the development have their remarkable effect on the physical and biological components of the ecosystem. Housing programmes, establishment of urban centres with modern facilities, development of oil transportation by pipelines, construction of highways instead of track road, and the intensive transport accompanied by off-road vehicles, are resulting in a conspicuous change of the biota of the area. The number of vehicles used by Bedouins in the area is ever-increasing, causing the removal of the plant cover, soil erosion and compaction and serious effects on the animals. Falconry and car racing give the chance for off-road vehicles to destroy more areas. From the air, one can notice that the desert is heavily dissected by tracks of vehicles.

Tourism is a major factor in the disturbance of different habitats. Many natural areas in the Arab countries are now becoming sites of tourist attractions. Intensive development of these areas may lead to the attrition of biological diversity. Another example in almost all the Arab countries is the serious destruction of the coastal dunes. Vast areas of these dunes were occupied by summer resorts and settlements. The disappearance of such habitats results in the disappearance of numerous biota.

**Summary of the protected areas system in the Arab Countries
I - African Countries .**

Country	Area Sq.km	Area in categories I-V	%	Area in Categories VI-VIII & UA	%	Total Area designated	%
Algeria	2381745	127193	5.3	30	0.0	127223	5.3
Djiboti	23000	100	0.4	0	0.0	100	0.4
Egypt	1000250	8004	0.8	0	0.0	8004	0.8
Libya	1759540	1550	0.1	170	0.0	1720	0.1
Mauritania	1030700	17460	1.7	0	0.0	17460	1.7
Morocco	458730	3621	0.8	156	0.0	3777	0.8
Morocco(Saharan Province)	252120	0	0.0	0	0.0	0	0.0
Somalia	630000	1800	0.3	3444	0.5	5244	0.8
Sudan	2505815	93825	3.7	28665	1.1	122490	4.9
Tunisia	164150	449	0.3	1312	0.8	1756	1.1

“ U A “ indicates that no IUCN category has been assigned . IUCN, 1994

**Summary of the protected areas system in the Arab Countries
II - Asian Countries .**

Country	Area Sq.Km	Area in categories I-V	%	Area in categories VI-VIII & UA	%	Total Area designated	%
Bahrain	661	0	0.0	0	0.0	0	0.0
Iraq	438445	0	0.0	0	0.0	0	0.0
Jordan	96000	1004	1.0	0	0.0	1.004	1.0
Kuwait	24280	250	1.0	0	0.0	250	1.0
Lebanon	10400	35	0.3	0	0.0	35	0.3
Oman	271930	540	0.2	0	0.0	540	0.2
Qatar	11435	0	0.0	0	0.0	0	0.0
Saudi Arabia	2400900	211974	8.8	643	0.0	212617	8.9
Syria	185680	0	0.0	150	0.1	150	0.1
United Arab Emirates	75150	0	0.0	127	0.2	127	0.2
Yemen	477530	0	0.0	0	0.0	0	0.0

“ U A “ indicates that no IUCN category has been assigned . IUCN, 1994

Throughout history, the area had major periods of military and civil strife. Doubtless this caused destruction of the biological diversity. However, the region witnessed recently an unprecedented catastrophe: the Gulf War activities. All practices spoiling life have been experienced in the region. Among these, apart from the real killing of human beings; one mentions examples: oil spills on land and in sea, soot, oil rain, destruction of the soil mantle of the area, salinization of land and water logging, either due to lack of power for drainage, or due to putting out fires using saline water from the Gulf. The biological diversity at its levels has been drastically affected. Numerous biota have been endangered and habitats have been altered. The fate of the chemicals in water and on land and their effect on the biota is not well investigated.

More protected areas are required in view of the small areas under protection in the various Arab countries (Table 5). It is also to be noted that the institutions responsible for protected area management vary greatly from one country to another. This is the responsibility of different governmental bodies; hence the management systems are variable and not unified.

Since the early seventies, the Arab countries have established various institutions for environmental protection. Conservation of nature and natural resources is among the aims of these institutions. However, in some cases, such organizations have nothing to do with the conservation of biodiversity. Later, some countries established special institutions for conservation of biological diversity, as biodiversity national units or commissions for the conservation of wildlife. The establishment of some biodiversity units has been initiated through the funds offered by the Global Environmental Facility (GEF). In some countries, the non-governmental organizations (NGO's) play an important role in the field of conservation of biodiversity. The activities of these NGO's vary widely from one country to another. The governmental organizations related to the environmental protection, and partly or mainly to the biological diversity, are shown in Table 6.

WHAT HAS BEEN DONE AND WHAT WE NEED?

Since the term 'Biodiversity' came into the public vocabulary around 1988, there have been many activities all over the world concerned with this issue. The Arab world is no exception. Numerous activities, measures and management ideas have been adopted by the governments and institutions in the Arab countries.

The political will of the Arab governments to take actions in the field of biodiversity conservation is evident from signing and ratification of many international and regional conventions related to the conservation of the biological diversity. The last and most specific is the Convention of Biological Diversity. This was signed by 157 governments at the Earth Summit in June 1992 in Rio de Janeiro, and entered into force at the end of 1993. All the Arab governments signed this Convention, except three governments (Table 7).

Since 1993, many workshops and meetings related to the biological diversity in the Arab countries have been held (Table 8). Though this is a healthy phenomenon, in

Organizations Concerned with the Protection of Environment in the Arab Countries

- Algeria** : Agence National pour la Protection de l'Environnement
- Bahrain** : National Committee for Wildlife Protection
- Egypt** : Egyptian Environmental Affairs Agency :
National Biodiversity Unit
Academy of Scientific Research and Technology
National Committee for IUCN
Council for Environmental Research
- Iraq** : Council for environmental Protection
- Jordan** : Ministry of Municipal, Rural and Environmental Affairs :
Department of Environment
- Kuwait** : Environment Protection Council
- Lebanon** : Ministry of State or the Environment
- Libya** : National Committee for the Protection of the Environment
- Mauritania** : Ministry of Rural Development and Environment
- Morocco** : Ministry of Agriculture and Agrarian Reform:
Nature Protection Division
Dept. of Water resources, Forests and Soil conservation
- Oman** : Ministry of Regional Municipalities and Environment
Council for Conservation of Environment and Water Resources
- Qatar** : Permanent Committee for the Protection of Environment
- Saudi Arabia**: Meteorology and Environment Protection Administration (MEPA)
National Commission for Wildlife Conservation and Development (NCWCD)
Red Sea and Gulf of Aden Environment Programme (PERSGA)
- Somalia** : Ministry of Natural Resources: Environment and Conservation
Division
- Sudan** : Ministry of Agriculture and Natural Resources
- Syria** : Office of Environmental Affairs
- Tunisia** : Ministry of Environment and Land Planning
Agence Nationale de Protection de l'Environnement (ANPE)
- United Arab Emirates**: Ministry of Agriculture and Water
- Yemen** : National Council for Environment Protection in Yemen

Participation of the Arab Countries in Major Global and Regional Conventions in the Field of Wildlife and Habitat Conservation

Convention	African Countries								Asian Countries											
	Algeria	Egypt	Djibouti	Libya	Mauritania	Morocco	Somalia	Sudan	Tunisia	Bahrain	Iraq	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arab.	Syria	U. A. E.	Yemen
African Conv. on conservation of Nature and Natural Resources. Algiers 1968.	R	R	S	S	S	R	S	R	R											
Conv. on Wetlands of International Importance especially as Waterfall habitat. RAMSAR 1971.	R	R	-	-	-	R	-	-	R			R								
Conv. on Protection of World Cultural and Natural Heritage. Paris 1972.	R	R	-	R	R	R	-	-	R			R			R					
Conv. on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Washington 1973.	R	R	-	-	-	R	-	-	R			R	S					R		
Conv. on Conservation of Migratory Species of Wild animals. Bonn 1979.	-	R	-	-	-	S	-	R	R								R			
Conv. of the Red Sea and Gulf of Eden Environment. Jeddah 1982.	R	-	-	-	-	-	R	R	-			R					R			
Conv. on Biological Diversity. Rio de Janeiro 1992.	S	S	S	S	S	S	-	S	S	S	S	S	S	S	S	S	-	-	S	S

Workshops on Biodiversity in the Arab Region

1. The West Asia/North Africa regional members group meeting.
Amman, Jordan. June 6-9,1993.
2. Workshop on biological diversity in North Africa
Tunis, Tunisia. November 1-3,1993
3. The West Asia/North Africa regional members meeting.
Buenos Aires ,Argentina. January 16-17,1994.
4. Workshop on biological diversity and education in North Africa.
Rabat, Morocco. May 10-12,1994.
5. Genetic Resources: An Egypt and United States Workshop.
Cairo, Egypt. June 15-16,1994.
6. Workshop on biological diversity in GCC countries
Kuwait. September 24-26,1994.
7. Workshop on arid lands biodiversity.
Cairo, Egypt. November 14-16,1994
8. Workshop on rural women, biodiversity and development
Marrakech, Morocco. April 25-27, 1995
9. Riyadh Conservation Forum.
Riyadh, Saudi Arabia. October 1-4,1995
10. Arab experts group meeting on biodiversity
Cairo, Egypt. Arab League. October 1-5,1995
- 11 Workshop on biodiversity
Izmir, Turkey. October 2-November 3,1995

many cases there is no coordination among these workshops. In the first week of October 1995, two workshops were convened at the same time; one in Riyadh and the other in Cairo: the latter being organized by the League of Arab States. It is interesting that some participants in these workshops are regular attendants in many of them. This phenomenon emphasizes the importance of coordination on national and regional levels, at least to save time, effort and money.

Conservation measures have been taken in some countries of the region. Some countries are implementing comprehensive system plans for protected areas. On the other hand, other countries may have no such plans. However, site protection is reasonably well implemented in less than one-third of the countries of the region (*cf. McNeely et al, 1994*). One should consider that there are additional protected areas.

In the last few years, considerable information about the biodiversity have been gathered in some Arab countries. However, there is no unified concept for the assessment of this data. Also, there are a lot of gaps, e.g. in the knowledge of the soil fauna, coral reefs, terrestrial Arthropods, etc.. Moreover, the collected data is not available to users, or even many researchers.

If one likes to look into the needs of the region to conserve its biodiversity, it seems proper to look into the dozens of recommendations issued in the already convened workshops and meetings. Some of these are repeated and stressed in every workshop. Others may be concentrating on a particular or local problem. Generally, the available recommendations are useful and represent an asset to start with. There is no need to repeat ourselves, but really we need to think of actions to be taken to bring these recommendations to reality. All these recommendations have the same goal: to conserve biological diversity for the sake of the present and future generations, as assets for food, feed, medicine, industry, etc.

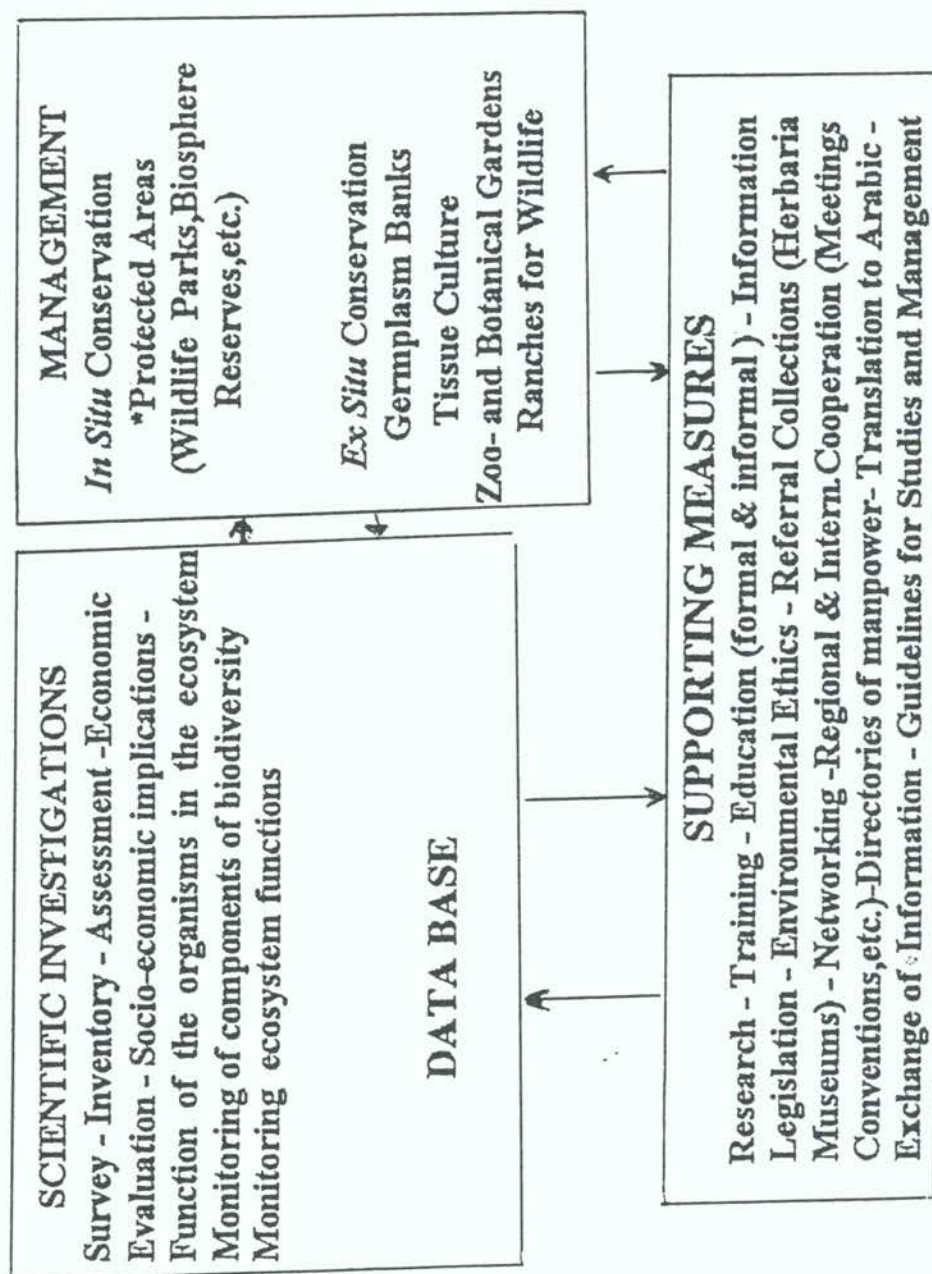
Mismanagement of the resources is the main reason for the attrition of the biological diversity. This means that there should be a rational management for the resources and different land use patterns. Management must depend on solid scientific data. Science should be linked to management, so we can make use of all our knowledge, including the indigenous knowledge, to improve the way our resources are managed. Scientific activities and management are closely inter-related and need supporting measures to increase their efficiency and help to obtain the required success in conservation.

Conservation of biological diversity needs identification of tools, activities and measures to be taken in this field. A summary of these measures is shown in the form of three boxes (Fig. 2). The three main points are: (1) scientific investigations, (2) management, and (3) supporting measures. These inter-related themes could be translated into actions. Putting in mind the dozens of recommendations adopted by the previous workshops, and the present situation as given in this paper, one can recommend the following priorities to be taken into consideration in the field of biological diversity conservation:

I. On the National Level:

- (a) Identify areas of special concern (hot spots, e.g. refugial sites).

TOOLS, MEASURES AND ACTIVITIES FOR CONSERVATION OF BIODIVERSITY FOR SUSTAINABLE USE



- (b) Identify species or taxonomic groups of plants and animals which require *in situ* conservation.
- (c) Identify species that require *ex situ* conservation: germplasm banks, centres for captive breeding, etc.
- (d) Identify mechanisms for supporting measures: education (formal and informal), training, referral collections (museums, herbaria).
- (e) Prepare land use maps for the country, in order to define the different patterns of land use considering the hot sites.

One should consider that a list of organisms, either plants or animals of an area or country, is not the target of biological diversity studies. Not every species in the ecosystem has the same weight in the functions of the ecosystem. Some species play considerable roles in the ecosystem and their absence will lead to drastic changes in the other components of the ecosystem. An example of these, one may mention a species like *Panicum turgidum*, which is a desert perennial grass acting as a sand binders; forming a phytogenic hillock. The formation of this sand hillock causes considerable changes in the biota, soil characteristics and water relations under the prevailing desert conditions. The disappearance of this plant, or at least its overgrazing, leads to a remarkable deterioration in the habitat conditions and consequently, the biota. An annual plant, especially the rare ones, when it disappears for several consecutive seasons, the impact of this disappearance will not be as drastic as that caused by the disappearance of *P. turgidum*. This evinces the importance of the study of the particular role of what one calls: ecologically important species and investigate their function within the ecosystem.

II. On the Regional Level:

- (1) Establishment of a Regional Training Centre for:

Game wardens - curators for herbaria - managers for botanical gardens
- managers for zoos - museum management - breeding in captivity for
both animals and plants.

- 2. Establishment of networks for: referral collections - protected areas.
- 3. Establishment of a regional body for the coordination of the activities in the field of biodiversity conservation and help networking, coordination, and exchange of information. UNEP may take the lead and foster a study for the establishment of a centre.
- 4. Translation of the terms used in the field of environment and conservation of its components. There are numerous new terms which need to be translated into Arabic. This would help unification of concepts.
- 5. Help prepare programmes in the conservation of biodiversity for the mass media.

6. Training journalists and other mass media people in fields of environmental protection and conservation of resources; they are the link between scientists and the people.
7. Enrich the curricula of the courses for the primary schools with adequate, simplified, updated information about the national biodiversity.
8. Encourage taxonomic studies in the fields where we find wide gaps in knowledge, e.g. coral reefs, soil fauna and flora, bivalves, arachnids, and other animal and plant groups.

IUCN CATEGORIES OF PROTECTED AREAS

- I. Scientific Reserve / Strict Nature Reserve.
- II. National Park .
- III. Natural Monument / Natural Landmark .
- IIII. Managed Nature Reserve / Wildlife Sanctuary
- V. Protected Landscapes
- VI. Resource Reserve
- VII. Natural Biotic Area / Anthropological Reserve
- VIII. Multiple-use Management Area / Managed Resource Area

IUCN. 1978. Categories , Criteria, and Objectives for protected areas.

IUCN, Morges, Switzerland . 26 pp.

REFERENCES

- Batanouny, K. H. 1979. Vegetation along Jedda-Mecca Road: Pattern and process as affected by human impact. *Journ. Arid Environments* 2:21-30.
- Batanouny, K. H. 1983. Human impact on desert vegetation. In: *Man's impact on vegetation*. W. Holzner, M. J. Werger and I. Ikusima, eds. Dr. W. Junk Publ. The Hague, pp. 139-149.
- Batanouny, K. H. 1984. Rangelands of the Arabian Peninsula, with a special reference to the history of range management (the *hema*, an old reserve system). Working papers, Second Intern. Rangeland Congress. Adelaide, Australia, May 13-18th 1984.
- Batanouny, K. H. 1987. Ecological consequences of agricultural development in arid and semi-arid regions. *Proc. First Arab Conf. on Scientific Research and Development*. Cairo, 26-29 September 1987 (in Arabic). Publ. by the Ministry of Scientific Research, pp. 26-31.
- Batanouny, K.H., W. Stichler and H. Ziegler. 1988. Photosynthetic pathways, distribution and ecological characteristics of grass species in Egypt. *Oecologia (Berl.)* 75:539-548.
- Batanouny, K.H. 1990. Rangeland ecology of the Arab Gulf countries. In: R. Halwagy, F. Taha and S. Omar, eds. *Advances in Range Management in Aid Lands*. Kegan Paul Intern. London, New York, pp. 33-55.
- Batanouny, K. H., W. Stichler and H. Ziegler. 1991. Photosynthetic pathways and ecological distribution of *Euphorbia* species in Egypt. *Oecologia (Berl.)* 87:565-589.
- Batanouny, K. H. 1994. Halophytes and halophytic plant communities in the Arab region: Their potential as a rangeland resource. In: V. R. Squires and A. T. Ayoub, eds. *Halophytes as a resource for livestock and for rehabilitation of degraded lands*. Kluwer Acad. Publ. The Netherlands. pp. 139-163.
- Braidwood, R. J. 1975. *Prehistoric man*, Scott, Foresman and Comp. Glenview, Illinois, 81st edition, U.S.A.
- IUCN 1993. Status of multilateral treaties in the field of environment and conservation. *Environmental Policy and Law Occasional Paper*.

- IUCN 1994. Protecting nature: regional reviews of protected areas. J. A. McNeely, J. Harrison, P. Dingwall, eds. Ivth World Congress on National Parks and Protected Areas, Caracas, Venezuela.
- IUCN 1994. A guide to the Convention on Biodiversity. Environmental Policy and Law Paper No. 30.
- Warren, A. 1984. The problems of desertification. In: J. L. Cloudsley-Thompson. Sahara Desert. Pergamon Press. Oxford. pp. 335-342.
- Wickens, G. E. 1984. Flora. In: J. L. Cloudsley-Thompson, ed. Sahara Desert. Pergamon Press. Oxford. pp. 67-75.
- Zohary, M. 1973. Geobotanical foundations of the Middle East. Gustav Fischer Verlag. Stuttgart.

BIODIVERSITY IN THE ARABIAN GULF REGION

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The Arabian Gulf region extends from the vast wetlands of the Shat Al Arab and the coastal low lands in the north to the Strait of Hormoz and the high mountains of Oman in the south. The Arabian Peninsula falls within the North African-Eurasian desert zone. Northern Arabia belongs to the Mediterranean climate system and Southern Arabia belongs to the Somali-Chalbi and Southern Arabian climate system. Generally, the region is composed of diverse terrestrial and aquatic ecosystems. Despite its aridity, the Arabian Gulf region encompasses diverse habitats with a highly adapted flora and fauna.

The Arabian Peninsula may be divided into five main physiographic units:

- The coastal zones
- Central Arabia
- Northern region
- The great sandy regions
- The mountains

Various ecosystems can be noticed within these physiographic zones such as plateaus, jabals, coastal plains and sabkhas. Inland waterbodies like the natural fresh water springs, marshes and the extensive mudflats are characteristic wetlands of the Gulf. Marine ecosystems include mangrove swamps, seagrass beds, coral reefs and small offshore islands. The main factor affecting these ecosystems is the major circulation

pattern in the Gulf which has Indian Ocean waters, with a salinity of 31-33 ‰, entering through the Strait of Hormoz, passing up the eastern side of the Gulf and over and down the western side, increasing in salinity to between 45-55 ‰. The heavier more saline waters then pass back and out of the Gulf closely over the sill at the Strait of Hormoz. Because of the shallow nature of the western Gulf, its higher ambient temperatures and high salinity, stressful conditions are normal for its endemic fauna and flora.

The Benthic Marine Algae of the Arabian Gulf

The Arabian Gulf has probably received less attention than other oceanic bodies with regard to its marine algal flora. The reasons for this may be several. The algae of the Gulf have never been seen to be of great economic value. There have never been a large number of indigenous researchers interested in the marine algae as a field of study, the universities of the area only becoming established within the last 25 years, and there is certainly not the great diversity of taxa as is found in other seas and oceans.

In spite of the above, there have been a total of 17 previous publications, the first dating back about 150 years, dealing with the algae of the area. The first was that of Endlicher and Diesing (1845) which listed eight species. There was then a long non-productive period before Borgesen's (1939) publication, which was only a part of the overall Danish scientific investigations of Iran. Borgesen described 103 algal taxa that had been collected in 1937 by Koie. Newton (1955a, 1955b) presented the algal floras of Kuwait and Bahrain (33 species and 59 species respectively) as listed in Dickson's "The Wild Flowers of Kuwait and Bahrain". Newton's specimens had been collected in 1950 by Good. Nizamuddin and Gessner listed 68 taxa in their 1970 publication

which was a part of the "Meteor" expedition results. El Mohsen and Khoja (1973) presented a short paper on certain algenophytes from Saudi Arabia, but failed to identify the taxa to species level. Basson (1979a, 1979b) studied the marine algal flora of the Eastern Province of Saudi Arabia and reported on 84 taxa. Kamel (1981) analyzed three species from the Kuwait coastal area for their chemical composition. In 1984, McCain and McCain *et al* presented two publications on the marine ecology of Saudi Arabia as part of the Fauna of Saudi Arabia series. Jones (1986) gave short descriptions and illustrations of 67 taxa as part of his overall Field Guide to the seashores of Kuwait and the Arabian Gulf. The more recent publications are those of Al-Hasan and Jones (1989), Basson (1989) and Basson *et al* (1989). Al-Hasan and Jones, over a 37 month period, recorded 105 species from Kuwait coastal waters, 89 of which were new records for Kuwait. Basson (1989) discussed in a short note the use of some marine green algae as a bait for fish. Basson *et al* (1989) provided descriptions of 88 taxa from the shores of Bahrain, 13 of which were new records for the Arabian Gulf even at this late date. Heiba *et al* (1990) screened 23 algal species from Qatar for alkaloids, coumarins, flavonoids, saponins and tannins. In addition, moisture, ash, protein, lipid, carbohydrate, minerals and trace element content were determined. Al-Thukair and Golubic (1991a, 1991b) and Al-Thukair *et al* (1994) identified seven new species belonging to the Cyanophyta. A paper is presently being prepared in which additional taxa are reported for the first time in the Gulf. It must be pointed out that no attempt has been made by the present authors to verify records or identifications previously done by other researchers.

As a result of the combined efforts of numerous researchers from a variety of countries over the 150 years period, the presently known number of benthic marine algae of the Arabian Gulf stands at 43 Chlorophyta taxa, 31 Cyanophyta taxa, 50 Phaeophyta taxa

and 92 Rhodophyta taxa - a total of 216 benthic marine algae. That's a far cry from the original eight species which were first described in 1845. By way of comparison, in order to place the biodiversity efforts and their results in the Arabian Gulf in their proper context we should mention the findings from two other bodies of water - the Red Sea and the Indian Ocean. The first record of marine algae from the Red Sea was made by Strand (1756) who was a pupil of Linnaeus's. Three species were listed. Up to 1968 some 781 taxa had been recorded, as follows: 95 Chlorophyta taxa, 34 Cyanophyta taxa, 175 Phaeophyta taxa and 177 Rhodophyta taxa. Over 100 publications are involved. The mid to late 1700's and early 1800's saw the foundations of research into the various algae found in the Indian Ocean. As would be expected, a vast ocean, the size of the Indian Ocean, has a much larger number of marine algae, in fact, some 3263 algae have been described up to the present time. The latter number includes 586 Chlorophyta taxa, 274 Cyanophyta, 601 Phaeophyta and 1791 Rhodophyta taxa. The number of papers dealing with these run into well over 1,000.

We may use new terms and techniques to describe our findings, but it still all boils down to the perseverance of the collector and taxonomist who do the basic research and provide us with the baseline data so that we know what we are working with when we do more in-depth studies on the individual taxa. Such biodiversity studies allow us to determine geographic range distribution, and to determine the tolerance of various parameters such as temperature, salinity and pH as found in these various geographic areas.

Flora and Vegetation of the Arabian Gulf Region

Studies on the flora of Arabia started since the time of Forsskal during the Danish Expedition to Arabia in 1762-1763. However, the first study on vegetation was carried out by Vesey-Fitzgerald in 1955. Since that time, a number of studies on the local floras and plant ecology have been published. Batanouny (1987) reviewed the knowledge of plant ecology in the Arab Gulf countries. Additional information was added to the knowledge of plant ecology through a number of works which were carried out later on.

According to Mandaville (1984), the flora of the Arabian Peninsula belongs to the Saharo-Arabian and the Sudanian phytogeographical regions. There are 4500-5000 species of vascular plants in the Arabian Peninsula. Initial studies identified 23 taxa as endemic to Saudi Arabia; 50 endemic to Oman. No information is available on endemic species from other Arab Gulf countries.

Country	Number of Species	Reference
Flora of Eastern S. A.	565	Mandaville (1990)
Flora of Oman	1100	Miller (1980)
Flora of U. A. E.	380	Western (1989)
Flora of Kuwait	374	Boulos & Al-Dosari (1994)
Flora of Qatar	301	Batanouny (1981)
Flora of Bahrain	307	El-Oqlah & Abbas (1994)

Vegetation:

Three major groups of plant communities have been reported (Batanouny, 1987):

Desert Plant Communities:

1. Communities Dominated by Grasses and Sedges: 6

Panicum turgidum
Pennisetum divisum
Cyperus conglomeratus

2. Communities Dominated by Undershrubs: 17

Hamada elegans
Artemisia inculta
Cassia senna
Francoeuria crispa
Fagonia indica

3. Communities Dominated by Shrubs and Trees: 13

Acacia tortilis
Lycium shawii
Leptadenia pyrotechnica

Halophytic Plant Communities: 10

Avicennia marina
Aeluropus lagopoides
Suaeda vermiculata

Mountainous Plant Communities: 5

Juniperus procera
Olea africana
Acacia asak

Utilization of Plant Resources in the Arabian Gulf Region

A. Food Plants:

<i>Aizoon canariense</i>	leaves eaten as salad
<i>Glossonema edule</i>	fresh fruits edible
<i>Malva parviflora</i>	potted herb
<i>Ziziphus spina-christi</i>	edible fruits

B. Forage Plants:

<i>Anabasis articulata</i>	pasturage for goats and camels
<i>Pennisetum divisum</i>	fodder for camels, horses, donkeys
<i>Calligonum comosum</i>	pasturage for goats and camels

C. Medicinal Plants:

<i>Leptadenia pyrotechnica</i>	diuretic; diffusion of branches to expel uroliths
<i>Anastatica hierochuntica</i>	facilitate childbirth; cold; purgative
<i>Cynomorium coccineum</i>	aphrodisiac; tonic; astringent
<i>Alhagi graecorum</i>	laxative; vermifuge; jaundice; purgative
<i>Phoenix dactylifera</i>	hemorrhage; purgative; cough; aphrodisiac

D. Industrial Plants:

<i>Juncus rigidus</i>	Paper; oil
<i>Phoenix dactylifera</i>	Fences; roofs; fuel; mats
<i>Salvadora persica</i>	Oil
<i>Astragalus</i> spp.	Gums; resins
<i>Teucrium polium</i>	Dyes

E. Dune Stabilization:

<i>Haloxylon persicum</i>
<i>Panicum turgidum</i>
<i>Stipagrostis plumosa</i>
<i>Calligonum comosum</i>

Fauna of the Arabian Gulf

Although surveys and studies of the fauna in the Gulf are limited, the available information in the literature shows the richness of animals and also a good number of endemic species related to the region of which some are globally threatened.

Mammals

Harrison and Dates (1991) produced a recent comprehensive work on mammals of Arabia.

Insectivores:

Erinaceus concolor East European hedgehog. Central and north Iraq.

Hemiechinus auritus Long-eared hedgehog. North and central parts of the Gulf.

Paraechinus aethiopicus Ethiopian hedgehog. All over the region. With two confirmed subspecies in the region.

Paraechinus hypomelas Brandt's hedgehog. Southern part of the Gulf.

Shrews:

Five species are recorded.

e.g. *Suncus murinus* House shrew. East & west Arabia. Length 185 mm.

Suncus etruscus Savi's Pygmy shrew. East & south Arabia. 70 mm.

Bats:

Twenty three species are recorded. Most of them in the north and the south.

e.g. *Taphozous nudiventris* Naked bellied Tomb Bat. East & south west Arabia.

Asellia tridens widely spread in the Gulf.

Rhinopoma muscatellum. Muscat Mouse-tailed Bat. Oman.

Carnivores:

Canis aureus Asiatic Jackal. North and east areas.

Canis lupus Wolf. All over the region except Bahrain.

Vulpes vulpes Red fox. All over the region except Bahrain.

Canis zerda Fannec fox. North areas.

Badgers and Otters:

Mellivora capensis Honey Badger. North and east areas.

Lutra lutra Common Otter. River areas in south Iraq.

Mongoose:

Herpestes edwardi Indian Grey Mongoose. North and east areas of the Gulf.

Ichneumia albicauda White-tailed Mongoose. South areas only.

Hyaenas:

Hyaena hyaena Striped Hyaena. All the region except Bahrain.

Cats:

e.g. *Felis silvestris* Wild Cat.

Caracal caracal Caracal Lynx. North and south areas.

Panthera pardus nimr Arabian Leopard. South areas.

Acinonyx jubata Cheetah. North areas.

Goats, Sheep and Antelopes:

e.g. *Hemitragus jayakari* Arabian Tahr. Endemic to the mountain areas of Oman.

Capra ibex Ibex. South areas.

Capra aegagrus Wild Goat. South mountain areas.

Ovis ammon Red Sheep. Mountain areas of Oman.

Oryx leucoryx Arabian Oryx. Endemic to Arabia.

Gazella subgutturosa Rheem Gazelle. All over the region.

Gazella gazella Mountain Gazelle or Idmi. South areas.

Pigs:

Sus scrofa Wild Boar. North areas.

Hares:

e.g. *Lepus capensis* Cape Hare. All over the region. More than five subspecies are recorded in the region.

Jerboas:

e.g. *Jaculus jaculus* Lesser Jerboa. All over the region.

Rats:

e.g. *Rattus rattus* House Rat. All over the region.

Mus musculus House mouse. All over the region.

Meriones crassus Sundevall's Jird. All over the region.

Sea Cow:

Dugong dugong Sea Cow. Represents the second largest population of this endangered species.

Dolphins and Whales:

e.g. *Tursiops aduncus* Bottled nose Dolphin. Common in the Gulf.

Birds:

More than 360 different species of birds were recorded in the region. The vast majority of them are migrants. This large group of migratory birds includes passage migrants, winter visitors and summer breeding visitors. Previously Meinertzhagen (1954) made a major contribution in the field, however, many recent references are available such as Gallagher (1980), Bundy *et al* (1989), Jennings (1981), Richardson (1990), Mohamed (1993), Hill and Nightingale (1993) and Hirschfeld (1995).

Resident breeders are not more than 35 species. Examples are:

Phalacrocorax nigrogularis Socotra Cormorant. Endemic to the region.
Egretta gularis Reef Heron.
Pandion haliaetus Osprey.
Charadrius alexandrinus Kentish Plover.
Streptopelia decaocto Collared Dove.
Tyto alba Barn Owl.
Ammomanes deserti Desert Lark.
Galerida cristata Crested Lark.
Pycnonotus leucogenys White cheeked Bulbul. Endemic to the region.
Prinia gracilis Graceful Warbler.
Dromas ardeola Crab Plover. Breeds in the south.

Reptiles:

This class includes lizards, snakes and turtles. The desert represents an important habitat for lizards and snakes. More surveys and studies are needed to gather adequate information about species of reptiles occurring in the region. Gallagher (1971) produced a preliminary checklist of Amphibia and Reptiles in Bahrain, while Gasperetti *et al* (1993) made a valuable contribution for the Reptiles in Arabia.

Examples of reptiles can be listed here:

Uromastix microlepis Spiny-tailed Lizard.
Varanus griseus Waral.
Agama pallida
Acanthodactylus scutellatus
Stenodactylus slevini
Hemidactylus flaviviridis House Gecko.
Hemidactylus persicus Persian Gecko.
Agama jayakari Jayakar's Agama.
Scincus scincus Sand Skink.
Diplometopon zarudnyi Worm Lizard.
Eryx jayakari Sand Boa.
Coluber ventromaculatus Rat Snake.
Psammophis schokari Sand Snake.
Cerastes cerastes Sand Viper.
Hydrophis spiralis Sea Snake.
Hydrophis ornatus Sea Snake.
Caretta caretta Loggerhead Turtle.
Chelonia mydas Green Turtle.
Clemmys caspica Fresh water Terrapin.

Amphibians:

Few species are present in the Gulf. Balletto *et al* (1985) produced a valuable document on Amphibians of the Arabian Peninsula. The main species occurring in the Gulf are:

Rana ridibunda Marsh Frog.
Bufo orientalis Oriental Toad.
Bufo viridis Green Toad. Mainly present in the north.

Marine Organisms:

The Arabian Gulf is a shallow body of water connected to the Indian Ocean through the Strait of Hormuz. The surface area of water in the Gulf is around 239000 km². The gulf marine life has Indian Ocean origin. All major groups of marine organisms are present in the Gulf.

Fishes:

More than 400 species of fishes occur in the Gulf. This includes sharks, rays and bony fishes. Literature on fishes of the Gulf includes : Kuroshima & Abe (1972) , Relyea (1981), Fischer & Bianchi (1984), Al Baharna (1986), Al Alawi (1994).

Cartilaginous fishes:

Examples are:

- Carcharinus limbatus* Blachfin Shark.
- Carachrinus melanopterus* Blacktip Reef Shark.
- Chiloscyllium arabicum* Arabian Carpet Shark.
- Sphyrna mokarran* Great Hammerhead.
- Himantura uarnak* Spotted Sting Ray.
- Aetomyleus narinari* Spotted Eagle Ray.
- Pristis zijsron* Longcomb Sawfish.
- Rhynchobatus djiddensis* Giant Guitarfish.
- Torpedo sinuspersci* Mottled Electric Ray.

Bony Fishes:

Examples are:

- Acanthurus sohal* Sohal.
- Zebrasoma xanthurum* Yellowtail Surgeon fish.
- Rhinecanthus assasi* Picasso Triggerfish.
- Tylosurus crocodilus* Crocodile Needlefish.
- Bothus pantherinus* Panther Flounder.
- Callionymus persicus* Persian Dragonet.
- Gnathanodon speciosus* Golden Trevally.
- Centriscus scutatus* Shrimpfish.
- Heniochus acuminatus* Pennant Butterflyfish.
- Chanos chanos* Milkfish.
- Sardinella albella* White Sardine.
- Aphanius dispar* Arabian Killifish.
- Boleophthalmus boddarti* Mudskkiper.
- Istiophorus platypterus* Sailfish.
- Lutjanus fulviflammus* Dory Snapper.
- Upeneus sulphureus* Yellow Goatfish.
- Gymnothorax undulatus* Mottled Moray Eel.
- Pegasus natans* Longtail Seamoith.
- Scarus persicus* Gulf Parrotfish.
- Euthymus affinis* Little Tuna.
- Scomberomorus commerson* Narrow-barred Spanish Mackerel.
- Epinephelus areolatus* Areolated Grouper.

Siganus canaliculatus Pearls spotted Rabbitfish.
Hippocampus kuda Spotted Seahorse.
Saurida tumbil Greater Lizardfish.
Arothron stellatus Blackspotted Puffer.

Invertebrates:

This large animal group has received less attention and investigation compared to the vertebrates. It is expected to have a high ratio of endemic species among the living invertebrates in the region. The figures of Saudi Arabia alone show that among the known 3000 species of invertebrates, more than 18% of them are endemic. This high percentage of endemism indicates the great value of such diversity on the global level. Very few papers have been produced on this large group. A very good key for some groups like crustacea, Annelids and Echinoderms was produced by ARAMCO . Here we are listing some available information on published literature : Biggs (1973), Ahmad (1973), Sharbati (1981), Smyth (1982), Jones (1986), Green and Chouhfeh (1994).

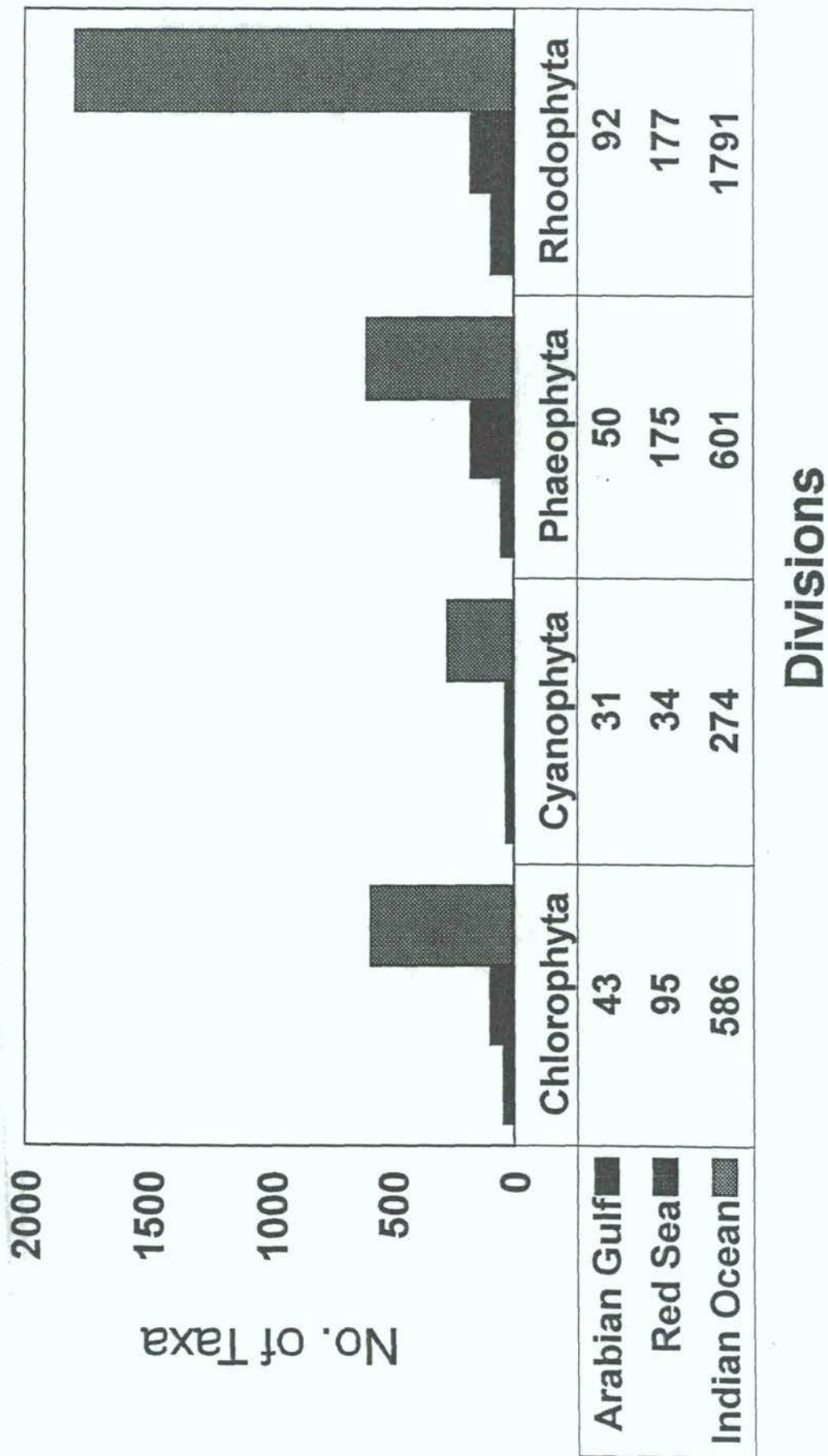
Conservation in the Gulf region:

Conservation of natural habitats in the Gulf region as a part of the Islamic world has received considerable attention from the state and the people for a long time. The "Hima" system was developed in the region even before Islam, but the prophet Mohammed instituted legal proceedings which allowed a greater benefit of the protected areas to all the people rather than selected ones.

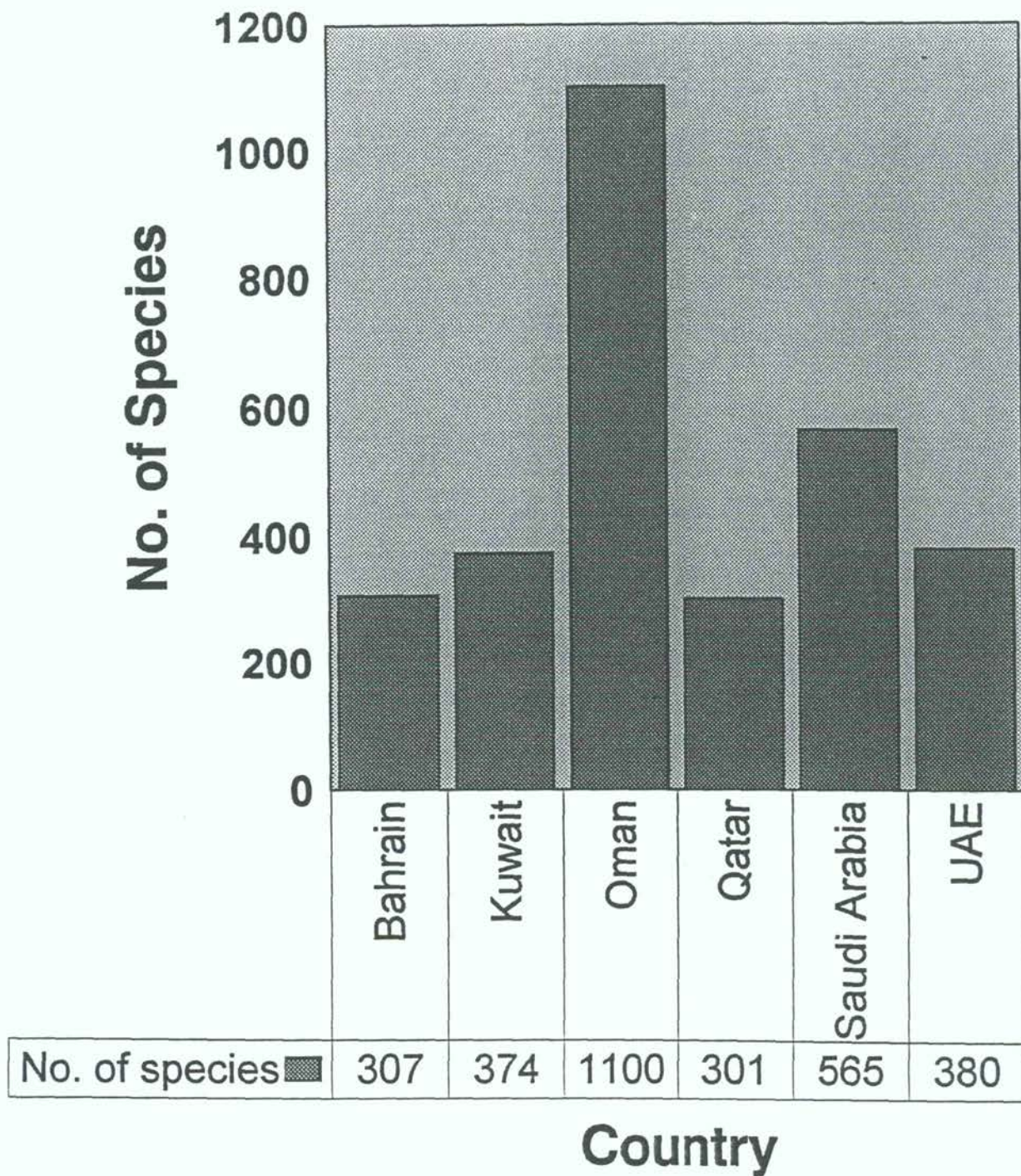
Recently all states in the Arabian Gulf established systems of protected areas. The GCC states are working together on wildlife legislation and a regional wildlife convention.

Moreover, all the states have either a directorate or a designated commission or committee for the protection and development of wildlife and, therefore, the biodiversity. It is extremely important to emphasize here the need for a greater cooperation between those bodies at the Gulf region level and also on the larger scale of the Arab world.

Algal Divisions Occurring in Regional Marine Waters



Flora of Arabian Gulf Region



LEGISLATION IMPLICATIONS OF THE BIODIVERSITY CONVENTION

14th December 1995

Dr. Hisham Baban
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Because of the universal extent of the biosphere and of biological diversity, all legal instruments and agreements which affect how people use their environment have some relevance to our topic,⁽¹⁾ which is a lengthy process if I opt to review and identify their legislative implications.

The Convention on Biological Diversity (CBD), despite the volume of provisions and guidelines introduced therein, avoided to tackle the direct legal issues and mechanisms by which the Contracting Parties would be able to activate the rights and obligations embodied therein; a clear example of this attitude is in paragraph 2 of article 14, when the issues of liability and compensation were hardly touched upon.⁽²⁾

Pending the completion of the studies referred to, two methods may be available to construct a legal framework for the CBD as such. The first: deals with the CBD as a separate unit for which a net set of rules, regulations and guidelines may be drafted on a global level then implemented regionally and at the national level. Following this method is strongly encouraged by the wide acceptance the CBD received and entry into force on December 29, 1993.

The above method, however, has certain drawbacks as it ignores, though not completely, the fact that the CBD is not a stand-alone project, but so much inter-related with other conventions that already exist, a fact which ought to be considered.

The second method, however, bridges the gap indicated above and whilst preparing a legal framework to mobilize the CBD, it relies on the issues and mechanisms already in practice in other biodiversity-related conventions, especially those conventions dealing with the Conservation and Sustainable Use of Biological Diversity and its Components and its relationship with the United Nations Convention of the Law of the Sea (UNCLOS).⁽³⁾

Adoption of either of the above methods will soon reveal the necessity to deal with the following issues which are but the implications of introducing the CBD to the world:

1. Policy-Making

By way of creating a complete set of instruments to deal with, but not limited to, the objectives of the CBD through the coordination with the Conventions concerned, regional cooperation and national environmental strategy (policy) on the domestic level.

1.1. Convention Interlinkages

It has been truly emphasized⁴ that promoting cooperation among Conventions is a long-term process. The aim would be to ensure efficient operation of a number of separate legal instruments administered by different agencies on behalf of the Conferences of Parties whose membership differs.

Therefore it is important in this respect to formulate general guidelines to generate combined interactions amongst the different Conventions, in order to better support the different agencies involved in the implementation of the Conventions at the national level.

1.2 National Strategy (Policy)

It is an international trend to set up environmental strategies on the national level, the objectives of which vary from country to country, but their common goal remains to improve the quality of life for those living therein and to protect the various elements of the environment by maintaining the natural environmental balance to achieve economical and social development sustainably.

The National Environmental Strategy therefore, is a compilation of information and guidelines with specific recommendations and suggested actions, which may tackle but not limited to, the following headlines:

- Constructing a legal framework for Environmental Management.
- Institutional strengthening.
- An expanded role for governmental and non-governmental agencies on issues not highlighted before.

Within this strategy it would not be difficult to identify the agency entrusted to implement the Conventions that are concerned with biological diversity and its components, and to draw an effective national plan of action (See also CBD, Article 6).

2. Environmental Management

Averting, delegating and minimizing environmental risks became a fixed item on the agendas of all Conventions dealing with this issue. Environmental Impact Assessments and Assessments of Benefits of Environmental Measures are becoming a pre-requisite before the legislator decides the framework of the legal system to be suggested, a statement which is equally applicable to the insurer who underwrites the risk.

To avoid confusion and duplication of requirements and actions, it is essential to combine the efforts exerted on the international level in respect of risk management by way of cooperation and harmonization of reports, agendas, and the Secretariats, so that the obligations stipulated in Article 14-1 of the CBD can be easily emerged and readily implemented within these Conventions inter-related with the CBD. On the national level, it is a strategic function on the national plan to overview the management of the risk under consideration having in mind the financial, economical and social impacts.

3. Environmental Liability

Since the introduction of the liability within the legal framework of certain Conventions on the environment,⁵ the principle that the polluter pays became widely recognized, not only on a global level, but was generally accepted on the national level, sometimes even contrary to the legal concepts prevailing in a state party to the Convention.

The basis of liability and limitations thereof, the question of compensation for environmental loss, damage or expense, considerably varied according to the issue in question. Therefore, we only need to tackle the basis on which liability may be established and its implications on the CBD.

3.1 Liability Based on Fault

Where the liability for environmental loss or damage is based on a negligent act or omission of the defendant, three issues have to be satisfied before the claimant can recover the damages, i.e. the type of damage which, by being reasonably

foreseeable in the circumstances, gave rise to the duty of care⁶ on the part of the polluter, and that the negligent act or omission must be the cause of damage and that the damage must not be able to increase. The critical issue in environmental liability based on fault is that the onus of proving the fault rests upon the claimant who is required to satisfy the judge when two questions have to be answered in the affirmative: (i) Is there sufficient evidence to supporting a finding in favour of the claimant? (ii) What weight should be given to it? A task which may be too difficult for the claimant to pursue in most cases, particularly where sophisticated technology and careful investigation need to be applied.

3.2 Res ipsa Loquitur⁷

By applying this Latin maxim "The thing speaks for itself", and the happening of the accident is in itself evidence of negligence, it raises a presumption of fact, in the absence of any other evidence or explanation, that the defendant has been negligent, a step forward for the claimant to establish her case, provided however, that the defendant is not in a situation where he can offer an alternative explanation, even without proving it, of a way in which equally probably, the accident could have happened without negligence,⁸ or where the facts leading to the accident were put before the court in details and the court has to decide on the proved facts, whether the defendant was negligent.

3.3 *Absolute Liability *Strict Liability *Liability Without Proof of Negligence

By reviewing some of the global Conventions dealing with liability for environmental harm, it would not be difficult to identify the nations' acceptance that such liability is founded on more stringent terms than the traditional liability based on the availability of proof of negligence. The lesser the defences available for the defendant to escape liability, the stricter the liability becomes and the better the chances are for the claimant to recover less or damage sustained.⁹

Article 14-2 of the CBD offers no assistance on the nature and extent of liability and compensation the Conference of the Parties shall examine and adopt, a task which is not easy to pursue due to the wide nature of application. Judged, however, by the international trend prevailing it may not be

too wild to expect that COP opts for a mild nature of a strict liability similar to those already accepted on the international level.

4. Insurance System

The introduction of liability and subsequently compensation guidelines within the Conventions on the environment will be far from ideal if not accompanied by an insurance system whereby the cost of the liability will be evenly spread upon all those who are assumed to be environmentally liable.

The insurance requirements may be satisfied in more than one method, the most common of which is the self-insurance or by purchasing an environmental impairment liability policy, or even by a financial guarantee which clearly stipulates the requirements of the environmental cover needed.¹⁰

The cover of insurance granted by the insurer usually runs in line with the nature of the statutory liability and the quantum of compensation availed thereunder, a statement which should be qualified by the fact that the underwriter may trim the risk to the size it becomes insurable. In certain environmental policies, the insurer requires a detailed environmental assessment to be carried out as a pre-condition to an issuance of the policy, a pre-requisite which burdens the insured even before any cover is provided. Furthermore, if environmental problems are detected, these must be remedied to the satisfaction of the insurer before any cover is provided. These issues coupled with the reluctance of reinsurers to participate in shouldering the environmental risks in the international market, make the insurance premiums high and costly, a situation which needs special attention on both global and national levels where issues like insurability of environmental risks and the cost related thereto may be fully discussed.

FOOTNOTES IN THE ARTICLE

1. UNEP/CBD/COP/2/Inf. 2 at p.3
2. Article 14, paragraph 1, deals with import assessment and minimizing adverse impacts, whereas paragraph 2 states that "The Conference of the Parties shall examine, on the basis of studies to be carried out, the issue of liability and redress, including restoration and compensation, for damage to biological diversity, except where such liability is a purely internal matter."
3. E.g. Desertification Convention, Climate Change Convention, the Convention on International Trade in Endangered Species of Fauna and Flora (CITES), the Convention on the Conservation of Migratory Species of Wild Animals (CMS), the World Heritage Convention and the Convention on Wetlands of International Importance as Waterfowl Habitat (The Ramsar Convention).
4. UNEP/CBD/COP/2/Inf. at p.3.
5. E.g. International Convention on Civil Liability for Oil Pollution Damage (CLC, 1969) and the protocols thereto of 1976 and 1992.
6. The Wagon Mound No. 1 (1961) AC 388.
7. Scott v. London Dock Co. (1865) 3H & C 596.
8. Woods v. Duncan (1946) AC 401, Walsh v. Holst & Co. Ltd., (1958) 3 All ER 33.
9. The latest legislation adopted the doctrine of Strict Liability is UK newly introduced Environment Act 1995.
10. CLC 1969, Article 7.

Biosphere Reserves for Biodiversity Conservation, Sustainable Use and Benefit Sharing

Paper prepared for the Conference on Biological Diversity, its Conservation and
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Introduction

This paper provides an overview of the UNESCO biosphere reserve concept and its potential as an instrument in the follow-up to the recommendations adopted at the Arab Expert Meeting on Biodiversity, 1-5 October 1995, Cairo, Egypt.

The paper starts with an introduction to the biosphere reserve concept and highlights its strong support of the objectives of the Convention on Biological Diversity regarding biodiversity conservation, sustainable use and benefit sharing.

The Seville Strategy for Biosphere Reserves, and the Statutory Framework of the World Network of Biosphere Reserves are then introduced, followed by a short presentation of existing biosphere reserves in the Arab region. The role of biosphere reserves in the implementation of the recommendations from the Arab Expert Meeting on Biodiversity is then discussed in more detail.

The conclusion of the paper is that the biosphere concept is highly relevant in the context of biodiversity conservation and sustainable use in the Arab World, and suggest that it could play an important role in the implementation of the recommendations adopted by the Arab Expert Meeting on Biodiversity.

Biosphere Reserves

The biosphere reserve concept dates back to the mid 1970s, and the first biosphere reserves were adopted by UNESCO in 1976. Since then the number of biosphere reserves has grown rapidly and there are now 328 reserves in 82 countries constituting the World Network of Biosphere Reserves.

What is a Biosphere Reserve?

A biosphere reserve is an area designated and managed in order to fulfil three important functions:

- ▶ Conservation: to preserve genetic resources, species, ecosystems and landscapes;
- ▶ Development: to support sustainable economic and human development;
- ▶ Logistics: to support research, inventories, monitoring, training, environmental education and demonstration projects.

For this purpose, biosphere reserves are divided into different zones, based on assessments of conservation values, development opportunities and human settlements. The zones are:

- ▶ Core area: sites with stricter protection of biodiversity of perceived high conservation value;
- ▶ Buffer zone: area which should 'buffer' the core area from unsustainable negative impacts, and where environmentally sound economic activities are promoted;
- ▶ Transition area: zone with the potential of supporting larger populations and more intensive economic activities, but which should safeguard the integrity of the buffer, and core areas.

In terms of management, biosphere reserves are often benefitting from public participation and local conservation and sustainable use initiatives in their management.

In order for a site to be included on the UNESCO list of biosphere reserves, it must be nominated by a government for this purpose, and be viewed by UNESCO to meet a set of criteria established by UNESCO, in the framework of its Man and the Biosphere (MAB) Programme, for a site to be included in the World Network of Biosphere Reserves. It should be stressed, however, that a biosphere reserves. of course, remains under the sole sovereignty of the State where it is situated. UNESCO's role is primarily a supportive and coordinating one.

The Seville Strategy and the Statutory Framework of the World Network of Biosphere Reserves

Largely inspired by UNCED and the entry into force of the Convention on Biological Diversity, UNESCO organized, in cooperation with Spain, a major international Biosphere Reserve Conference in Seville, 20-25 March 1995, to take stock of biosphere reserve experiences around the world and to plan for the future. 387 experts from 102 countries and 15 international organizations participated in the meeting, which produced two significant documents: The Seville Strategy for Biosphere Reserves (see Annex I); and the Statutory Framework of the World Network of Biosphere Reserves (see Annex II).

Later on adopted by the Intergovernmental Coordinating Council of the MAB Programme at its 13th session, 12-16 June 1995, and the 28th session of the UNESCO General Conference, Paris, 25 October-16 November 1995, these two documents now provide important blue prints for the future development of the World Network of Biosphere Reserves (see Box 1).

Box 1.

The Seville Strategy for Biosphere Reserves

The Seville Strategy sets goals and objectives and provide recommendations for the development of effective biosphere reserves:

- | | |
|------------------|--|
| Goal I: | Use Biosphere Reserves to conserve natural and cultural diversity |
| | Objective I.1: Improve the coverage of natural and cultural diversity by means of the World Network of Biosphere Reserves. |
| | Objective I.2: Integrate Biosphere Reserves into conservation planning |
| Goal II: | Utilize Biosphere Reserves as models of land management and of approaches to sustainable development |
| | Objective II.1: Secure the support and involvement of local people |
| | Objective II.2: Ensure better harmonization and interaction among the different biosphere reserve zones |
| | Objective II.3: Integrate biosphere reserves into regional planning |
| Goal III: | Use Biosphere Reserves for research, monitoring, education and training |
| | Objective III.1: Improve knowledge of the interactions between humans and the biosphere |
| | Objective III.2: Improve monitoring activities |
| | Objective III.3: Improve education, public awareness and involvement |
| | Objective III.4: Improve training for specialists and managers |
| Goal IV: | Implement the Biosphere Reserve concept |
| | Objective IV.1: Integrate the functions of biosphere reserves |
| | Objective IV.2: Strengthen the World Biosphere Reserve Network |

Box 2.

Statutory Framework of the World Network of Biosphere Reserves

The Statutory Framework is provided in order to enhance the effectiveness of individual biosphere reserves and to strengthen common understanding, communication and cooperation regionally and internationally. It includes the following articles:

- Article 1. Definition of biosphere reserve
- Article 2. World Network of Biosphere Reserves
- Article 3. Functions of a biosphere reserve
- Article 4. Criteria for designation as a biosphere reserve
- Article 5. Designation procedure
- Article 6. Publicity
- Article 7. Participation in the Network
- Article 8. Regional and thematic sub-networks
- Article 9. Periodic review of biosphere reserve status
- Article 10. Secretariat of the Network

Biosphere Reserves and the Convention on Biological Diversity

The Convention on Biological Diversity provided much of the impetus behind the development of the Seville Strategy, and UNESCO is now working hard to ensure that biosphere reserves develop their full capacity in support of the objectives of the Convention and that synergies are created between the World Network of Biosphere Reserves and the Convention. Due to the multiple focus of biosphere reserves on conservation, development and logistics, many governments and international organization believe that biosphere reserves indeed will play a major role in the implementation of the Convention. The IUCN, for example, thinks that biosphere reserves appears to be especially well suited for the implementation of some provisions of the Convention (Rojas & McNeely, 1995). It is of course clear that biosphere reserves have an important role to play in relation to Article 8 on *in-situ* conservation, which calls for the establishment of protected area systems.

This role was also stressed by the first meeting of The Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), to the Convention, held at UNESCO Headquarter, Paris, 4-8 September 1995, which recommended in relation to their deliberations on coastal and marine biodiversity, that the Conference of the Parties to the Convention (COP) shall 'explore means to incorporate marine and coastal protected areas within a broader framework for multiple use planning, as exemplified by UNESCO MAB Biosphere Reserves' (UNEP 1995a, Recommendation I/8 paragraph 11). The SBSTTA also concluded that, 'Within the context of national and regional efforts to promote integrated marine and coastal area management, networks of marine and coastal protected areas, other conservation areas and biosphere reserves, provide useful and important management tools for different levels of conservation, management and sustainable use of marine and coastal biological diversity and resources, consistent with customary international law.' (UNEP 1995a, Annex, paragraph 9). The Second COP meeting, held in Jakarta 6-17 November 1995, took note of SBSTTA's recommendation I/8 and 'affirms that it represents a solid basis for future elaboration of the issues presented' and 'supports the recommendations in paragraphs 10-19 of recommendation I/8' (UNEP 1995b, decision II/10 paragraph 1).

Besides Article 8, biosphere reserves could also be useful instruments in the implementation of several other Articles, such as Article 5 on cooperation, Article 6 on general measures for conservation and sustainable use, Article 7 on identification and monitoring, Article 9 on *ex-situ* conservation, Article 10 on sustainable use, Article 11 on incentive measures, Article 12 on research and training, Article 13 on public education and awareness, Article 14 on impact assessment, Article 15 on access to genetic resources, Article 16 on access to and transfer of technology, Article 17 on exchange of information, Article 18 on technical and scientific information, Article 19, on handling of biotechnology and distribution of its benefits, Article 20 on financial resources, Article 25 on Subsidiary Body on Scientific, Technical and Technological Advice.

Annex III, which partly draws on Rojas and McNeely (1995), summarizes some concrete options for how biosphere reserves could contribute to the implementation of these articles.

Biosphere Reserves in the Arab world

Today, there are 10 biosphere reserves in 4 countries in the Arab region.
(See Table 1).

These biosphere reserves include a wide spectrum of different ecosystems ranging from coastal wetlands to desert mountains, and are hosts to important biodiversity resources. Like in many parts of the world, beside their biosphere reserve label, most of these sites also carry other designations, such as national park or World Heritage Site labels. As in many parts of the world, these sites are sometimes under pressure from various economic activities. Development projects and land-use changes outside the boundaries of reserves might have indirect negative impacts on the reserve itself. Increased human activities inside the boundaries of the reserves, such as logging, firewood collection, hunting and fishing is also a growing management challenge in many areas.

The fact that biosphere reserves are under pressure from various economic activities, indicates the importance of integrated biodiversity policies and strategies, where the conservation and sustainable use of biodiversity becomes an integral part of activities in different economic sectors, such as transportation, energy, agriculture, forestry and fishery. Biosphere reserves, due to their design and their integrated objectives, stand likely, however, a good chance to withstand growing pressures, and could therefore become increasingly valuable models for biodiversity conservation and sustainable use in the future.

Table 1. Biosphere Reserves in the Arab Region

Country	Name of biosphere reserve	Year of approval
Algeria	Parc national du Tassili	1986
	El Kala	1990
Egypt	Omayed Experimental Research Area	1981
	Wadi Allaqui Biosphere Reserve	1993
Sudan	Dinder National Park	1979
	Radom National Park	1979
Tunisia	Parc national de Djebel Bou-Hedma	1977
	Parc national de Djebel Chambi	1977
	Parc national de Ichkeul	1977
	Parc national de Iles Zembra et Zembretta	1977

Additional information about these, and other sites in the Network, can be found in the UNESCO -MAB Biosphere Reserve Directory (UNESCO, 1995), the UNESCO-MAB - World Conservation Monitoring Centre's Biosphere Reserve Text Data Sheets on computer diskettes, as well as on a number of sites on the Internet, including the UNESCO MABNet on web address: <http://www.unesco.org:80/mab/theMabnet.html>.

The fact that some Arab countries do not host biosphere reserves yet, hides the point that they often are applying the biosphere reserve concept in their management of other types of designated areas, such as national parks or nature reserves. This being said, the advantages an official UNESCO biosphere recognition can provide a site, in terms of participation in a rapidly strengthened World Network of Biosphere Reserves, and access to financial resources, such as via the Global Environment Facility which already provides important financial support to a large number of biosphere reserves, including some in the Arab region, should perhaps not be underestimated.

We will in the following section therefore look closer at how the biosphere reserve concept, and hopefully an increased number of biosphere reserves throughout the Arab World, could contribute to the implementations of the recommendations adopted by the Arab Expert Meeting on Biodiversity, 1-5 October 1995 in Cairo.

Table 2. Recommendations adopted at the Arab Expert Meeting on Biodiversity, Cairo, Egypt, 1-5 October 1995, and the relevance, and possible contributions of biosphere reserves in their implementation

Recommendations adopted at the Arab Expert Meeting	Relevance of biosphere reserves as instruments in the implementation of the recommendations
On the National Level	
Establishment of National Biodiversity Committees, to	• biosphere reserves could be represented in the committees, as appropriate
1. Coordinate different national bodies	
2. Survey manpower	
3. Develop National biodiversity Strategies and Action Plans	<ul style="list-style-type: none"> • biosphere reserves could contribute data, information, and methodologies of relevance in the design and implementation of National Strategies and Action Plans • references to biosphere reserves, the biosphere reserve concept, or the recognition of the potential benefits from creating biosphere reserves could be included in the Strategies and Action plans
4. Preparation of biodiversity database	• biosphere reserves could contribute data, through inventories and monitoring activities
5. Adopt National Plans, including	
* establishment of a network of wildlife parks	<ul style="list-style-type: none"> • biosphere reserves could be important sites in a network of protected areas • transfer of experiences from existing biosphere reserve networks
* establishment of natural history museum	• biosphere reserves could provide samples for museum collections
* Socio-economic studies	• biosphere reserves could provide suitable sites for socio-economic studies under different environmental, cultural and economic conditions

6. Database cooperation and networking using the Internet	• biosphere reserves could be used for database cooperation and networking using the Internet, such as through the UNESCO MABNet
7. Prepare studies and research programmes, scientific cooperation, national, regional and international levels	• biosphere reserves linked to the World Network of Biosphere Reserves facilitates cooperation
8. Establish laboratories for genetic engineering	• biosphere reserves could be associated with and support laboratories for genetic engineering and biodiversity prospecting
9. Set up a plan for training of technical cadres	• biosphere reserves can be used for various training programmes
10. Set up a plan for public awareness, capability and information	• biosphere reserves can help raise public awareness about biodiversity conservation issues
On the Arab Regional level	
1. Give importance to coordination and cooperation among Arab, regional and international organizations, possible through JCEDAR	• an Arab Region Biosphere Reserve Network could contribute to such coordination and cooperation • transboundary biosphere reserves, when appropriate, can facilitate cooperation
* Prepare a data-bank on available data-bases	• biosphere reserves are often holders of important data resources
2. Consider the establishment of a subsidiary committee for biodiversity	• biosphere reserves could be on the agenda for such a committee
3. Hold an Arab meeting of experts in 1996, with the objectives:	
* to exchange experience on biodiversity policies and strategies	• biosphere reserve experiences could contribute to such exchanges, as appropriate
* submit suggestions and proposals to the Council of Arab Ministers Responsible for the Environment (CAMRE) on priority biodiversity activities	• biosphere reserves proposals could be included among proposed priority activities
4. To appeal to Arab countries to support the state of Palestine to set up a national biodiversity strategy	
On the International level	
1. To attend CBD COP meeting	
2. To ensure coordination of Arab countries at COP meetings	• biosphere reserve networking could be included as an item for consideration in this context
3. To take advantage of opportunities given by the CBD, and to take clear position towards the CBD	• biosphere reserves could provide an opportunity to benefit from provisions in the Convention
4. To invite the President of the GEF to a meeting with Arab country officials	• biosphere reserves could be included on the agenda regarding such meetings, as appropriate

The creation of a Regional Arab Network of Biosphere Reserves and similar areas in, could likely be one important step forward in the implementation of many of the recommendations outlined in Table 2. Such a network could strengthen the ties between existing biosphere reserves, as well as with other sites interested in the biosphere reserve approach, throughout the region. The importance of regional biosphere reserve networks is highlighted in the Seville Strategy and UNESCO would therefore strongly encourage such a development.

UNESCO's role

Indeed, as outlined in the Statutory framework for the World Network of Biosphere Reserves, UNESCO's role is very much that of a facilitator and promotor of information and data exchange, and the promotion of best biosphere reserve management practices. MAB National Committees are of course important actors, guiding the UNESCO MAB Secretariat, and its Regional Offices regarding modalities for action. In line with the Seville Strategy, priority is now put on enhancing the networking capacity of individual biosphere reserves, such as through the provision of computer and networking equipment, as well as through training courses on networking using the Internet. Another priority is that of identification and provision of financial resources for biosphere reserves and the World Network. One of the more promising avenues in this context, is the active collaboration between governments and UNESCO in the design of biosphere reserve project proposals for submission to funding agencies, such as the Global Environment Facility.

Besides biosphere reserves, UNESCO has of course a broad range of other biodiversity related activities. Programmes, such as the Man and the Biosphere Programme (besides its biosphere reserve activities), the Intergovernmental Oceanographic Commission (IOC), the Intergovernmental Hydrological Programme (IHP), the World Heritage Center, and the UNESCO associated Observatoire du Sahara et du Sahel (OSS) have many ongoing biodiversity related activities of high relevance to the Arab World. Many of these programmes, are of course also undertaking activities in biosphere reserves. Indeed, biosphere reserves require full participation from a wide range of disciplines and programmes in order to be successful. This is also why UNESCO welcomes collaboration with a large number of international organization, in particular UNEP, FAO, the World Bank and UNDP in its efforts to support biosphere reserves. Clearly, it is only by working together that we can hope to achieve the objectives of the Convention on Biological Diversity. Biosphere Reserves, as instrument for national, regional and international cooperation for biodiversity conservation, sustainable use and benefit sharing, provide, in our opinion, a good reason for optimism in this context.

References

- Rojas M. & J. A. McNeely. 1995. 'The Convention on Biological Diversity: New Roles and Opportunities for Biosphere Reserves'. Paper presented to the International Conference on Biosphere Reserves, Seville, Spain. 20-25 March 1995. IUCN, Gland.
- UNEP, 1995a. Draft Report of the First Meeting of the Subsidiary Body on Scientific, Technical and Technological Advice. First Meeting, Paris, 4-8 September 1995. UNEP/CBD/SBSTTA/1/L.1/Add.2. 8 September 1995.
- UNEP, 1995b. Report of the Second Meeting of the Conference of the Parties to the Convention on Biological Diversity. Jakarta, 6-17 November 1995. UNEP/CBD/COP/2/19. 30 November 1995.
- UNESCO, 1995. UNESCO Biosphere Reserve Directory: A Directory of contacts, environmental databases, and scientific infrastructure on biosphere reserves. UNESCO-MAB, Paris.

ANNEX I

THE SEVILLE STRATEGY FOR BIOSPHERE RESERVES

BIOSPHERE RESERVES: THE FIRST TWENTY YEARS

Biosphere reserves are designed to deal with one of the most important questions the World faces today: How can we reconcile conservation of biodiversity and biological resources with their sustainable use? An effective biosphere reserve involves natural and social scientists; conservation and development groups; management authorities and local communities - all working together on this complex issue.

The concept of biosphere reserves was initiated by a Task Force of UNESCO's Man and the Biosphere (MAB) Programme in 1974. The biosphere reserve network was launched in 1976 and, as of March 1995, had grown to include 324 reserves in 82 countries. The network is a key component in MAB's objective for achieving a sustainable balance between the sometimes conflicting goals of conserving biological diversity, promoting economic development and maintaining associated cultural values. Biosphere reserves are sites where this objective is tested, refined, demonstrated and implemented.

In 1983, UNESCO and the United Nations Environment Programme (UNEP) convened jointly the First International Biosphere Reserve Congress in Minsk (Belarus), in co-operation with the Food and Agriculture Organization of the United Nations (FAO) and the World Conservation Union (IUCN). The Congress's activities gave rise in 1984 to an "Action Plan for Biosphere Reserves", which was formally endorsed by the UNESCO General Conference and by the Governing Council of UNEP. While much of this Action Plan remains valid today, the context in which biosphere reserves operate has changed considerably, as was shown by the United Nations Conference on Environment and Development (UNCED) process and, in particular, the Convention on Biological Diversity. The Convention was signed at the "Earth Summit", in Rio de Janeiro, in June 1992, entered into force in December 1993 and has now been ratified by more than 100 countries. The major objectives of the Convention are: conservation of biological diversity; sustainable use of its components; and fair and equitable sharing of benefits, arising from the utilization of genetic resources. Biosphere reserves promote this integrated approach and are thus well-placed to contribute to the implementation of the Convention.

In the decade since the Minsk Congress, thinking about protected areas as a whole and about the biosphere reserves, has been developing along parallel lines. Most importantly, the link between conservation of biodiversity and the development needs of local communities - a central component of the biosphere reserve approach - is now recognized as a key feature of the successful management of most national parks, nature reserves and other protected areas. At the Fourth World Congress on National Parks and Protected Areas, held in Caracas, Venezuela, in February 1992, the world's protected-area planners and managers adopted many of the ideas (community involvement, the links between conservation and development, the importance of international collaboration) that are

essential aspects of biosphere reserves. The Congress also approved a resolution in support of biosphere reserves.

There have also been important innovations in the management of biosphere reserves themselves. New methodologies for involving stakeholders in decision-making processes and resolving conflicts have been developed, and increased attention has been given to the need to use regional approaches. New kinds of biosphere reserves, such as cluster and transboundary reserves, have been devised and many biosphere reserves have evolved considerably, from a primary focus on conservation to a greater integration of conservation and development, through increasing co-operation among stakeholders. New international networks, fuelled by technological advances, including more powerful computers and Internet, have greatly facilitated communication and co-operation between biosphere reserves in different countries.

In this context, the Executive Board of UNESCO decided, in 1991, to establish an Advisory Committee for Biosphere Reserves. This Advisory Committee considered that it was time to evaluate the effectiveness of the 1984 Action Plan, to analyse its implementation and to develop a strategy for biosphere reserves as we move into the 21st Century.

To this end, and in accordance with 27 C/Resolution 2.3 of the General Conference, UNESCO organized, at the invitation of the Spanish authorities, the International Conference on Biosphere Reserves, held in Seville (Spain), from 20 to 25 March 1995. This Conference was attended by some 400 experts, from 102 countries, and 15 international and regional organizations. The Conference was organized to enable an evaluation of the experience in implementing the 1984 Action Plan, a reflection on the role for biosphere reserves in the context of the 21st century (which gave rise to the vision statement) and the elaboration of a draft Statutory Framework for the World Network. The Conference drew up the Seville Strategy, which is presented below. The International Co-ordinating Council of the Man and the Biosphere (MAB) Programme, meeting for its 13th session (12-16 June 1995), gave its strong support to the Seville Strategy.

THE BIOSPHERE RESERVE CONCEPT

Biosphere reserves are "areas of terrestrial and coastal/marine ecosystems, or a combination thereof, which are internationally recognized within the framework of UNESCO's Programme on Man and the Biosphere (MAB)" (Statutory Framework of the World Network of Biosphere Reserves). Reserves are nominated by national governments; each reserve must meet a minimal set of criteria and adhere to a minimal set of conditions before being admitted to the Network. Each biosphere reserve is intended to fulfil three complementary functions: a conservation function, to preserve genetic resources, species, ecosystems and landscapes; a development function, to foster sustainable economic and human development, and a logistic support function, to support demonstration projects, environmental education and training, and research and

monitoring related to local, national and global issues of conservation and sustainable development.

Physically, each biosphere reserve should contain three elements: one or more core areas, which are securely protected sites for conserving biological diversity, monitoring minimally disturbed ecosystems, and undertaking non-destructive research and other low-impact uses (such as education); a clearly identified buffer zone, which usually surrounds or adjoins the core areas and is used for co-operative activities compatible with sound ecological practices, including environmental education, recreation, ecotourism, and applied and basic research; and a flexible transition area, or area of co-operation, which may contain a variety of agricultural activities, settlements and other uses, and in which local communities, management agencies, scientists, non-governmental organizations (NGO), cultural groups, economic interests and other stakeholders work together to manage and sustainably develop the area's resources. Although originally envisioned as a series of concentric rings, the three zones have been implemented in many different ways in order to meet local needs and conditions. In fact, one of the greatest strengths of the biosphere reserve concept has been the flexibility and creativity with which it has been carried out in various situations.

Some countries have enacted legislation specifically to establish biosphere reserves. In many others, the core areas and buffer zones are designated (in whole or in part) as protected areas under national law. A large number of biosphere reserves simultaneously belong to other national systems of protected areas (such as national parks or nature reserves) and/or other international networks (such as World Heritage or Ramsar sites).

Ownership arrangements may vary too. The core areas of biosphere reserves are mostly public land but can also be privately owned, or belong to non-governmental organizations. In many cases, the buffer zone is in private or community ownership and this is generally the case for the transition area. The Seville Strategy for Biosphere Reserves reflects this wide range of circumstances.

THE VISION FROM SEVILLE FOR THE 21ST CENTURY

What future does the world face as we move towards the 21st century? Current trends in population growth and distribution, increasing demands for energy and natural resources, globalization of the economy and the effects of trade patterns on rural areas, the erosion of cultural distinctiveness, centralization and difficulty of access to relevant information, and uneven spread of technological innovations - all these paint a sobering picture of environment and development prospects in the near future.

The UNCED process laid out the alternative of working towards sustainable development, incorporating care of the environment and greater social equity, including respect for rural communities and their accumulated wisdom. Agenda 21, the Conventions on Biological Diversity, Climate Change and Desertification, and other multi-lateral agreements, show the way forward at the international level.

But the global community also needs working examples that encapsulate the ideas of UNCED for promoting both conservation and sustainable development. These examples can only work if they express all the social, cultural, spiritual and economic needs of society and are also based on sound science.

Biosphere reserves offer such models. Rather than forming islands in a world increasingly affected by severe human impacts, they can become theatres for reconciling people and nature: they can bring knowledge of the past to the needs of the future; and they can demonstrate how to overcome the problems of the sectoral nature of our institutions. In short, biosphere reserves are much more than just protected areas.

Thus, biosphere reserves are poised to take on a new role. Not only will they be a means for the people who live and work within and around them to attain a balanced relationship with the natural world, they will also contribute to the needs of society, as a whole, by showing a way to a more sustainable future. This is at the heart of our vision for biosphere reserves in the 21st century.

The International Conference on Biosphere Reserves, organized by UNESCO, in Seville (Spain), from 20-25 March 1995, adopted a two-pronged approach:

- to examine past experience in implementing the innovative concept of the biosphere reserve;
- to look to the future to identify what emphases should now be given to their three functions of conservation, development and logistical support.

The Seville Conference concluded that, in spite of the problems and limitations encountered with the establishment of biosphere reserves, the programme, as a whole, had been innovative and had had much success. In particular, the three basic functions would be as valid as ever in the coming years. In the implementation of these functions and in the light of the analysis undertaken, the following ten key directions were identified by the Conference and are the foundations of the new Seville Strategy.

1. Strengthen the contribution that biosphere reserves make to the implementation of international agreements promoting conservation and sustainable development, especially to the Convention on Biological Diversity and other agreements, such as those on climate change, desertification and forests.
2. Develop biosphere reserves that include a wide variety of environmental, biological, economic and cultural situations, going from largely undisturbed regions and spreading towards cities. There is a particular potential and need to apply the biosphere reserve concept in the coastal and marine environment.
3. Strengthen the emerging regional, inter-regional and thematic networks of biosphere reserves as components within the World Network of Biosphere Reserves.
4. Reinforce scientific research, monitoring, training and education in biosphere reserves, since conservation and the rational use of resources in these areas require a

sound base in the natural and social sciences, as well as the humanities. This need is particularly acute in countries where biosphere reserves lack human and financial resources, and should receive priority attention.

5. Ensure that all zones of biosphere reserves contribute appropriately to conservation, sustainable development and scientific understanding.
6. Extend the transition area to embrace large areas suitable for approaches such as ecosystem management, and use biosphere reserves to explore and demonstrate approaches to sustainable development at the regional scale. For this, more attention should be given to the transition area.
7. Reflect more fully the human dimensions of biosphere reserves. Connections should be made between cultural and biological diversity. Traditional knowledge and genetic resources should be conserved, and their role in sustainable development should be recognized and encouraged.
8. Promote the management of each biosphere reserve essentially as a "pact" between the local community and society, as a whole. Management should be open, evolving and adaptive. Such an approach will help ensure that biosphere reserves - and their local communities - are better placed to respond to external political, economic and social pressures.
9. Bring together all interested groups and sectors in a partnership approach to biosphere reserves, both at site and network levels. Information should flow freely among all concerned.
10. Invest in the future. Biosphere reserves should be used to further our understanding of humanity's relationship with the natural world, through programmes of public awareness, information, formal and informal education, based on a long-term, inter-generational perspective.

In sum, biosphere reserves should preserve and generate natural and cultural values, through management that is scientifically correct, culturally creative and operationally sustainable. The World Network of Biosphere Reserves, as implemented through the Seville Strategy, is thus an integrating tool which can help to create greater solidarity among peoples and nations of the world.

THE STRATEGY

The following Strategy provides recommendations for developing effective biosphere reserves and for setting out the conditions for the appropriate functioning of the World Network of Biosphere Reserves. It does not repeat the general principles of the Convention on Biological Diversity, nor Agenda 21, but instead identifies the specific role

of biosphere reserves in developing a new vision of the relationship between conservation and development. Thus, the document is deliberately focused on a few priorities.

The Strategy suggests the level (international, national, individual biosphere reserve) at which each recommendation will be most effective. However, given the large variety of different national and local management situations, these recommended levels of actions should be seen merely as guidelines and adapted to fit the situation at hand. Note especially that the "national" level should be interpreted to include other governmental levels higher than the individual reserve (e.g., provincial, state, county, etc.). In some countries, national or local NGOs may also be appropriate substitutes for this level. Similarly, the "international" level often includes regional and inter-regional activities.

The Strategy also includes recommended Implementation Indicators, i.e. a check-list of actions that will enable all involved to follow and evaluate the implementation of the Strategy. Criteria used in developing the Indicators were: availability (Can the information be gathered relatively easily?), simplicity (Are the data unambiguous?), and usefulness (Will the information be useful to reserve managers, National Committees, and/or the network at large?). One role of the Implementation Indicators is to assemble a database of successful implementation mechanisms and to exchange this information among all members of the network.

GOAL I: USE BIOSPHERE RESERVES TO CONSERVE NATURAL AND CULTURAL DIVERSITY

OBJECTIVE I.1: Improve the coverage of natural and cultural biodiversity by means of the World Network of Biosphere Reserves.

Recommended at the international level:

1. Promote biosphere reserves as a means of implementing the goals of the Convention on Biological Diversity.
2. Promote a comprehensive approach to biogeographical classification that takes into account such ideas as vulnerability analysis, in order to develop a system encompassing socio-ecological factors.

Recommended at the national level:

3. Prepare a biogeographical analysis of the country as a basis, inter alia, for assessing coverage of the World Network of Biosphere Reserves.
4. In light of the analysis, and taking into account existing protected areas, establish, strengthen or extend biosphere reserves as necessary, giving special attention to fragmented habitats, threatened ecosystems, and fragile and vulnerable environments, both natural and cultural.

OBJECTIVE 1.2: INTEGRATE BIOSPHERE RESERVES INTO CONSERVATION PLANNING

Recommended at the international level:

1. Encourage the establishment of transboundary biosphere reserves as a means of dealing with the conservation of organisms, ecosystems, and genetic resources that cross national boundaries.

Recommended at the national level:

2. Integrate biosphere reserves in strategies for biodiversity conservation and sustainable use, in plans for protected areas, and in the national biodiversity strategies and action plans provided for in Article 6 of the Convention on Biological Diversity.
3. When applicable, include projects to strengthen and develop biosphere reserves in programmes, to be initiated and funded under the Convention on Biological Diversity, and other multilateral conventions.
4. Link biosphere reserves with each other, and with other protected areas, through green corridors and in other ways that enhance biodiversity conservation, and ensure that these links are maintained.
5. Use biosphere reserves for in situ conservation of genetic resources, including wild relatives of cultivated and domesticated species, and consider using the reserves as rehabilitation/re-introduction sites, and link them as appropriate with ex situ conservation and use programmes.

GOAL II: UTILIZE BIOSPHERE RESERVES AS MODELS OF LAND MANAGEMENT AND OF APPROACHES TO SUSTAINABLE DEVELOPMENT

OBJECTIVE II.1: Secure the support and involvement of local people

Recommended at the international level:

1. Prepare guidelines for key aspects of biosphere reserve management, including the resolution of conflicts, provision of local benefits, and involvement of stakeholders in decision-making and in responsibility for management.

Recommended at the national level:

2. Incorporate biosphere reserves into plans for implementing the sustainable-use goals of Agenda 21 and the Convention on Biological Diversity.
3. Establish, strengthen or extend biosphere reserves to include areas where traditional lifestyles and indigenous uses of biodiversity are practiced (including sacred sites).

and/or where there are critical interactions between people and their environment (e.g. peri-urban areas, degraded rural areas, coastal areas, freshwater environments and wetlands).

4. Identify and promote the establishment of activities compatible with the goals of conservation, through the transfer of appropriate technologies which include traditional knowledge, and which promote sustainable development in the buffer and transition zones.

Recommended at the individual reserve level:

5. Survey the interests of the various stakeholders and fully involve them in planning and decision-making regarding the management and use of the reserve.
6. Identify and address factors that lead to environmental degradation and unsustainable use of biological resources.
7. Evaluate the natural products and services of the reserve, and use these evaluations to promote environmentally sound and economically sustainable income opportunities for local people.
8. Develop incentives for the conservation and sustainable use of natural resources, and develop alternative means of livelihood for local populations, when existing activities are limited or prohibited within the biosphere reserve.
9. Ensure that the benefits derived from the use of natural resources are equitably shared with the stakeholders, by such means as sharing the entrance fees, sale of natural products or handicrafts, use of local construction techniques and labour, and development of sustainable activities (e.g. agriculture, forestry, etc.).

OBJECTIVE II.2: Ensure better harmonization and interaction among the different biosphere reserve zones

Recommended at the national level:

1. Ensure that each biosphere reserve has an effective management policy or plan and an appropriate authority or mechanism to implement it.
2. Develop means of identifying incompatibilities between the conservation and sustainable-use functions of biosphere reserves, and take measures to ensure that an appropriate balance between the functions is maintained.

Recommended at the individual reserve level:

3. Develop and establish institutional mechanisms to manage, co-ordinate and integrate the biosphere reserve's programmes and activities.

4. Establish a local consultative framework in which the reserve's economic and social stakeholders are represented, including the full range of interests (e.g. agriculture, forestry, hunting and extracting, water and energy supply, fisheries, tourism, recreation, research).

OBJECTIVE II.3: Integrate biosphere reserves into regional planning

Recommended at the national level:

1. Include biosphere reserves in regional development policies and in regional land-use planning projects.
2. Encourage the major land-use sectors near each biosphere reserve to adopt practices favouring sustainable land-use.

Recommended at the individual reserve level:

3. Organize forums and set up demonstration sites for the examination of socio-economic and environmental problems of the region, and for the sustainable utilization of biological resources important to the region.

GOAL III: USE BIOSPHERE RESERVES FOR RESEARCH, MONITORING, EDUCATION, AND TRAINING

OBJECTIVE III.1: Improve knowledge of the interactions between humans and the biosphere

Recommended at the international level:

1. Use the World Biosphere Reserve Network to conduct comparative environmental and socio-economic research, including long-term research that will require decades to complete.
2. Use the World Biosphere Reserve Network for international research programmes that deal with topics such as biological diversity, desertification, water cycles, ethnobiology and global change.
3. Use the World Biosphere Reserve Network for co-operative research programmes at the regional and inter-regional levels, such as those existing for the Southern Hemisphere, East Asia and Latin America.
4. Encourage the development of innovative, interdisciplinary research tools for biosphere reserves, including flexible modelling systems for integrating social, economic and ecological data.
5. Develop a clearing-house for research tools and methodologies in biosphere reserves.

6. Encourage interactions between the World Biosphere Reserve Network and other research and education networks. Facilitate the use of biosphere reserves for collaborative research projects of consortia of universities and other institutions of higher learning and research, in the private as well as public sector, and at non-governmental, as well as governmental levels.

Recommended at the national level:

7. Integrate biosphere reserves with national and regional scientific research programmes, and link these research activities to national and regional policies on conservation and sustainable development.

Recommended at the individual reserve level:

8. Use biosphere reserves for basic and applied research, particularly projects with a focus on local issues, interdisciplinary projects incorporating both the natural and the social sciences, and projects involving the rehabilitation of degraded ecosystems, the conservation of soils and water and the sustainable use of natural resources.
9. Develop a functional system of data management for the rational use of research and monitoring results in the management of the biosphere reserve.

OBJECTIVE III.2: Improve monitoring activities

Recommended at the international level:

1. Use the World Biosphere Reserve Network, at the international, regional, national and local levels, as priority long-term monitoring sites for international programmes, focused on topics such as terrestrial and marine observing systems, global change, biodiversity and forest health.
2. Encourage the adoption of standardized protocols for meta-data concerning the description of flora and fauna, to facilitate the interchange, accessibility and utilization of scientific information generated in biosphere reserves.

Recommended at the national level:

3. Encourage the participation of biosphere reserves in national programmes of ecological and environmental monitoring, and development of linkages between biosphere reserves and other monitoring sites and networks.

Recommended at the individual reserve level:

4. Use the reserve for making inventories of fauna and flora, collecting ecological and socio-economic data, making meteorological and hydrological observations, studying the effects of pollution, etc., for scientific purposes and as the basis for sound site management.

5. Use the reserve as an experimental area for the development and testing of methods and approaches for the evaluation and monitoring of biodiversity, sustainability and quality of life of its inhabitants.
6. Use the reserve for developing indicators of sustainability (in ecological, economic, social and institutional terms) for the different productive activities carried out within the buffer zones and transition areas.
7. Develop a functional system of data management for rational use of research and monitoring results in the management of the biosphere reserve.

OBJECTIVE III.3: Improve education, public awareness and involvement

Recommended at the international level:

1. Facilitate the exchange of experience and information between biosphere reserves, with a view to strengthening the involvement of volunteers and local people in biosphere reserve activities.
2. Promote the development of communication systems for diffusing information on biosphere reserves and on experiences at the field level.

Recommended at the national level:

3. Include information on conservation and sustainable use, as practiced in biosphere reserves, in school programmes and teaching manuals, and in media efforts.
4. Encourage participation of biosphere reserves in international networks and programmes, to promote cross-cutting linkages in education and public awareness.

Recommended at the individual reserve level:

5. Encourage involvement of local communities, school children and other stakeholders in education and training programmes and in research and monitoring activities within biosphere reserves.
6. Produce visitors' information about the reserve, its importance for conservation and the sustainable use of biodiversity, its socio-cultural aspects, and its recreational and educational programmes and resources.
7. Promote the development of ecology field educational centres, within individual reserves, as facilities for contributing to the education of school children and other groups.

OBJECTIVE III.4: Improve training for specialists and managers

Recommended at the international level:

1. Utilize the World Biosphere Reserve Network to support and encourage international training opportunities and programmes.
2. Identify representative biosphere reserves to serve as regional training centres.

Recommended at the national level:

3. Define the training needed by biosphere reserve managers in the 21st century and develop model training programmes on such topics as how to design and implement inventory and monitoring programmes in biosphere reserves, how to analyze and study socio-cultural conditions, how to solve conflicts, and how to manage resources co-operatively in an ecosystem or landscape context.

Recommended at the individual reserve level:

4. Use the reserve for on-site training and for national, regional and local seminars.
5. Encourage appropriate training and employment of local people and other stakeholders to enable their full participation in inventory, monitoring and research in programmes in biosphere reserves.
6. Encourage training programmes for local communities and other local agents (such as decision-makers, local leaders and agents working in production, technology transfer and community development programmes) in order to enable their full participation in the planning, management and monitoring processes of biosphere reserves.

GOAL IV: IMPLEMENT THE BIOSPHERE RESERVE CONCEPT

OBJECTIVE IV.1: Integrate the functions of biosphere reserves

Recommended at the international level:

1. Identify and publicize demonstration (model or illustrative examples of) biosphere reserves, whose experiences will be beneficial to others at the national, regional and international levels.
2. Give guidance/advice on the elaboration and periodic review of strategies and national action plans for biosphere reserves.
3. Organize forums and other information exchange mechanisms for biosphere reserve managers.

4. Prepare and disseminate information on how to develop management plans or policies for biosphere reserves.
5. Prepare guidance on management issues at biosphere reserve sites, including, inter alia, methods to ensure local participation, case studies of various management options and techniques of conflict resolution.

Recommended at the national level:

6. Ensure that each biosphere reserve has an effective management policy or plan and an appropriate authority or mechanism to implement it.
7. Encourage private sector initiatives to establish and maintain environmentally and socially sustainable activities in appropriate zones of biosphere reserves and in surrounding areas, in order to stimulate community development.
8. Develop and periodically review strategies and national action plans for biosphere reserves. These strategies should strive for complementarity and added value of biosphere reserves, with respect to other national instruments for conservation.
9. Organize forums and other information exchange mechanisms for biosphere reserve managers.

Recommended at the individual reserve level:

10. Identify and map the different zones of biosphere reserves and define their respective status.
11. Prepare, implement and monitor an overall management plan, or policy, that includes all of the zones of biosphere reserves.
12. Where necessary, in order to preserve the core area, re-plan the buffer and transition zones, according to sustainable development criteria.
13. Define and establish institutional mechanisms to manage, co-ordinate and integrate the reserve's programmes and activities.
14. Ensure that the local community participate in the planning and management of biosphere reserves.
15. Encourage private sector initiatives to establish and maintain environmentally and socially sustainable activities in the reserve and surrounding areas.

OBJECTIVE IV.2: Strengthen the World Biosphere Reserve Network

Recommended at the international level:

1. Facilitate provision of adequate resources for implementation of the Statutory Framework of the World Network of Biosphere Reserves.
2. Facilitate the periodic review, by each country, of its biosphere reserves, as required in the Statutory Framework of the World Network of Biosphere Reserves and assist countries in taking measures to make their biosphere reserves functional.
3. Support the functioning of the Advisory Committee for Biosphere Reserves, and fully consider and utilize its recommendations and guidance.
4. Lead the development of communication among biosphere reserves, taking into account their communication and technical capabilities, and strengthen existing and planned regional or thematic networks.
5. Develop creative connections and partnerships with other networks of similar managed areas, and with international governmental and non-governmental organizations, with goals congruent with those of biosphere reserves.
6. Promote and facilitate twinning between biosphere reserve sites and foster transboundary reserves.
7. Give biosphere reserves more visibility by disseminating information materials, developing communication policies and highlighting their roles as members of the World Biosphere Reserve Network.
8. Wherever possible, advocate the inclusion of biosphere reserves in projects financed by bilateral and multilateral aid organizations
9. Mobilize private funds, from businesses, NGOs and foundations, for the benefit of biosphere reserves.
10. Develop standards and methodologies for collecting and exchanging various types of data and assist their application across the network of biosphere reserves.
11. Monitor, assess and follow up on the implementation of the Seville Strategy, utilizing the Implementation Indicators and analyze the factors that aid in attainment of the indicators, as well as those that hinder such attainment.

Recommended at the national level:

12. Facilitate provision of adequate resources for implementation of the Statutory Framework of the World Network of Biosphere Reserves.

13. Develop a national-level mechanism to advise and co-ordinate the biosphere reserves; and fully consider and utilize its recommendations and guidance.
14. Prepare an evaluation of the status and operations of each of the country's biosphere reserves, as required in the Statutory Framework and provide appropriate resources to address any deficiencies.
15. Develop creative connections and partnerships with other networks of similar managed areas, and with international governmental and non-governmental organizations, with goals congruent with those of the biosphere reserves.
16. Seek opportunities for twinning between biosphere reserves and establish transboundary biosphere reserves, where appropriate.
17. Give biosphere reserves more visibility by disseminating information materials, developing communication policies and highlighting their roles as members of the Network.
18. Include biosphere reserves in proposals for financing from international and bilateral funding mechanisms, including the Global Environment Facility.
19. Mobilize private funds, from businesses, NGOs and foundations, for the benefit of biosphere reserves.
20. Monitor, assess and follow up on the implementation of the Seville Strategy, utilizing the Implementation Indicators and analyze the factors that aid in attainment of the indicators, as well as those that hinder such attainment.

Recommended at the individual reserve level:

21. Give biosphere reserves more visibility by disseminating information materials, developing communication policies and highlighting their roles as members of the Network.
22. Mobilize private funds, from businesses, NGOs and foundations, for the benefit of biosphere reserves.
23. Monitor, assess and follow up on the implementation of the Seville Strategy, utilizing the Implementation Indicators and analyze the factors that aid in attainment of the indicators, as well as those that hinder such attainment.

Implementation Indicators

Cross Reference

INTERNATIONAL LEVEL

Biosphere reserves included in implementation of the Convention	
on Biological Diversity	I.1.1
Improved biogeographical system developed	I.1.2
New transboundary reserves developed	I.2.1; IV.2.6
Guidelines developed and published	II.1.1; IV.1.4; IV.1.5
Network-wide research programmes implemented	III.1.1
Biosphere reserves incorporated into international research programmes	III.1.2
Regional and inter-regional research programmes developed	III.1.3
Interdisciplinary research tools developed	III.1.4
Clearing-house for research tools and methodologies developed	III.1.5
Interactions developed with other research and education networks	III.1.6
Biosphere reserves incorporated into international monitoring programmes	III.2.1
Standardized protocols and methodologies adopted	
for data and for data exchange	III.2.2; IV.2.10
Mechanism developed for exchanging experiences and information	
between biosphere reserves	III.3.1
Biosphere reserve communication system implemented	III.3.2; IV.2.4; IV.2.7
International training opportunities and programmes developed	III.4.1
Regional training centres identified and developed	III.4.2
Demonstration biosphere reserves identified and publicized	IV.1.1
Guidance provided on elaboration and review of strategies	
and national action plans for biosphere reserves	IV.1.2
Mechanisms developed for information exchange among reserve managers	IV.1.3
Statutory Framework of the World Network of Biosphere Reserves	
are implemented at the international and national levels	IV.2.1; IV.2.2
Advisory Committee for Biosphere Reserves is functional and effective	IV.2.3
Regional or thematic networks developed or strengthened	IV.2.4
Interactions developed between biosphere reserves and similar managed areas	
and organizations	IV.2.5
Mechanisms developed to foster twinning between biosphere reserves	IV.2.6
Information and promotional materials developed	
for the Biosphere Reserve Network	IV.2.7
Strategies developed for including biosphere reserves in bilateral	
and multilateral aid projects	IV.2.8
Strategies developed for mobilizing funds from businesses,	
NGOs and foundations	IV.2.9
Data standards and methodologies applied across the World Network	IV.2.10
Mechanisms developed for monitoring and assessing	
the implementation of the Seville Strategy	IV.2.11

NATIONAL LEVEL

Biogeographical analysis prepared	I.1.3
Analysis of need for new or extended biosphere reserves is completed.....	I.1.4; II.1.3
Biosphere reserves included in national strategies and other responses to the Convention on Biological Diversity and other conventions.....	I.2.2; I.1.3
Links developed between biosphere reserves.....	I.2.4
In situ conservation plans for genetic resources in biosphere reserves.....	I.2.5
Biosphere reserves incorporated into sustainable development plans.....	II.1.2
Biosphere reserves developed or strengthened to include traditional life-styles and in areas of critical people-environment interactions.....	II.1.3
Conservation and sustainable use activities identified and promoted	II.1.4
Effective management plans or policies in place at all reserves	II.2.1; IV.1.6
Mechanisms developed for identifying incompatibilities between conservation and sustainable use functions, and to ensure an appropriate balance between these functions.....	II.2.2
Biosphere reserves included in regional development and land-use planning projects	II.3.1
Land-use sectors, near biosphere reserves, are encouraged to adopt sustainable practices.....	II.3.2; IV.1.7
Biosphere reserves are integrated into national and regional research programmes, which are linked to conservation and development policies	III.1.7
Biosphere reserves are integrated into national monitoring programmes, and are linked to similar monitoring sites and networks	III.2.3
Principles of conservation and sustainable use, as practiced in biosphere reserves, integrated into school programmes.....	III.3.3
Biosphere reserves participate in international education networks and programmes.....	III.3.4
Model training programmes for biosphere reserve managers are developed.....	III.4.3
Mechanisms developed to review national strategies and action plans for biosphere reserves.....	IV.1.8
Mechanisms developed for information exchange among reserve managers.....	IV.1.9
Statutory Framework of the World Network of Biosphere Reserves are implemented at the national level	IV.2.12; IV.2.14
National level mechanism developed to advise and co-ordinate biosphere reserves	IV.2.13
Interactions developed between biosphere reserves and similar managed areas, and organizations with congruent goals	IV.2.15
Mechanisms developed to foster twinning between biosphere reserves	IV.2.16
Information and promotional materials developed for the Biosphere Reserve Network.....	IV.2.17
Strategies developed for including biosphere reserves in bilateral and multilateral aid projects.....	IV.2.18
Strategies developed for mobilizing funds from businesses, NGOs and foundations	IV.2.19
Mechanisms developed for monitoring and assessing the implementation of the Seville Strategy	IV.2.20

INDIVIDUAL RESERVE LEVEL	
Survey made of stakeholders' interests.....	II.1.5
Factors leading to environmental degradation and unsustainable use are identified	II.1.6
Survey made of the natural products and services of the biosphere reserve	II.1.7
Incentives identified for sustainable use by local populations.....	II.1.8
Plan prepared for equitable sharing of benefits	II.1.9
Mechanisms developed to manage, co-ordinate and integrate the reserve's programmes and activities.....	II.2.3; IV.1.10; IV.1.12
Local consultative framework implemented.....	II.2.4
Regional demonstration sites developed.....	II.3.3
Co-ordinated research and monitoring plan implemented	III.1.8; III.2.4
Functional data management system implemented.....	III.1.9; III.2.7
Reserve is used for developing and testing of monitoring methods.....	III.2.5
Reserve is used for developing indicators of sustainability relevant to local populations.....	III.2.5; II.2.6
Local stakeholders are included in education, training, research and monitoring programmes.....	III.3.5; III.4.5
Information for visitors to the reserve developed	III.3.6
Ecology field centre developed at the reserve.....	III.3.7
Reserve is used for on-site training activities.....	III.4.4
A local educational and training programme is in place	III.4.6
Different zones of biosphere reserves identified and mapped.....	IV.1.10.
Buffer and transitions reformulated to promote sustainable development and preserve the core area.....	IV.1.12
Local community involved in planning and managing reserve	IV.1.14
Private sector initiatives to establish and maintain environmentally and socially sustainable activities are encouraged.....	IV.1.15
Information and promotional materials developed for the Biosphere Reserve Network.....	IV.2.21
Strategies developed for mobilizing funds from businesses, NGOs and foundations	IV.2.22
Mechanisms developed for monitoring and assessing the implementation of the Seville Strategy	IV.2.23

ANNEX II

DRAFT
STATUTORY FRAMEWORK OF THE WORLD NETWORK
OF BIOSPHERE RESERVES

as approved by the International Co-ordinating Council of MAB
at its 13th session (12-16 June 1995)

INTRODUCTION

Within UNESCO's Man and the Biosphere (MAB) Programme, Biosphere Reserves are established to promote and demonstrate a balanced relationship between humans and the biosphere. Biosphere reserves are designated by the International Co-ordinating Council of the MAB Programme, at the request of the State concerned. Biosphere reserves, each of which remains under the sole sovereignty of the State where it is situated and thereby submitted to state legislation only, form a World Network in which participation by the States is voluntary.

The present Statutory Framework of the World Network of Biosphere Reserves has been formulated with the objectives of enhancing the effectiveness of individual biosphere reserves and strengthening common understanding, communication and co-operation at regional and international levels.

This Statutory Framework is intended to contribute to the widespread recognition of biosphere reserves and to encourage and promote good working examples. The delisting procedure foreseen should be considered as an exception to this basically positive approach, and should be applied only after careful examination, paying due respect to the cultural and socio-economic situation of the country, and after consulting the government concerned.

The text provides for the designation, support and promotion of biosphere reserves, while taking account of the diversity of national and local situations. States are encouraged to elaborate and implement national criteria for biosphere reserves which take into account the special conditions of the State concerned.

ARTICLE I. DEFINITION

Biosphere Reserves are areas of terrestrial and coastal/marine ecosystems or a combination thereof, which are internationally recognized within the framework of UNESCO's Programme on Man and the Biosphere (MAB), in accordance with the present Statutory Framework.

ARTICLE 2. WORLD NETWORK OF BIOSPHERE RESERVES

1. Biosphere Reserves form a worldwide network, known as the World Network of Biosphere Reserves, hereafter called the Network.
2. The Network constitutes a tool for the conservation of biological diversity and the sustainable use of its components, thus contributing to the objectives of the Convention on Biological Diversity and other pertinent Conventions and instruments.
3. Individual Biosphere Reserves remain under the sovereign jurisdiction of the States where they are situated. Under the present Statutory framework, States take the measures which they deem necessary according to their national legislation.

ARTICLE 3. FUNCTIONS

In combining the three functions below, Biosphere Reserves should strive to be sites of excellence to explore and demonstrate approaches to conservation and sustainable development on a regional scale:

- (i) Conservation - contribute to the conservation of landscapes, ecosystems, species and genetic variation;
- (ii) Development - foster economic and human development which is socio-culturally and ecologically sustainable;
- (iii) Logistic support - support for demonstration projects, environmental education and training, research and monitoring related to local, regional, national and global issues of conservation and sustainable development.

ARTICLE 4. CRITERIA

General criteria for an area to be qualified for designation as a Biosphere Reserve:

1. It should encompass a mosaic of ecological systems representative of major biogeographic regions, including a gradation of human interventions
2. It should be of significance for biological diversity conservation.
3. It should provide an opportunity to explore and demonstrate approaches to sustainable development on a regional scale.
4. It should have an appropriate size to serve the three functions of Biosphere Reserves, as set out in Article 3.
5. It should include these functions, through appropriate zonation, recognizing:
 - a) a legally constituted core area or areas devoted to long-term protection, according to the conservation objectives of the Biosphere Reserve, and of sufficient size to meet these objectives;

- (b) a buffer zone or zones clearly identified and surrounding or contiguous to the core area or areas, where only activities compatible with the conservation objectives can take place;
 - (c) an outer transition area where sustainable resource management practices are promoted and developed.
6. Organizational arrangements should be provided for the involvement and participation of a suitable range of *inter alia* public authorities, local communities and private interests in the design and carrying out the functions of a Biosphere Reserve.
7. In addition, provisions should be made for:
- (a) mechanisms to manage human use and activities in the buffer zone or zones;
 - (b) a management policy or plan for the area as a Biosphere Reserve;
 - (c) a designated authority or mechanism to implement this policy or plan;
 - (d) programmes for research, monitoring, education and training.

ARTICLE 5. DESIGNATION PROCEDURE

1. Biosphere Reserves are designated for inclusion in the Network by the International Co-ordinating Council (ICC) of the MAB Programme in accordance with the following procedure:
 - (a) States, through National MAB Committees where appropriate, forward nominations with supporting documentation to the Secretariat, after having reviewed potential sites, taking into account the criteria as defined in Article 4;
 - (b) the Secretariat verifies the content and supporting documentation: in the case of incomplete nomination, the Secretariat requests the missing information from the nominating State;
 - (c) nominations will be considered by the Advisory Committee for Biosphere Reserves for recommendation to the ICC;
 - (d) the ICC of the MAB Programme takes a decision on nominations for designation.

The Director-General of UNESCO notifies the State concerned of the decision of the ICC.

2. States are encouraged to examine and improve the adequacy of any existing Biosphere Reserve, and to propose extension as appropriate, to enable it to function fully within the Network. Proposals for extension follow the same procedure as described above for new designations.

3. Biosphere Reserves which have been designated before the adoption of the present Statutory Framework are considered to be already part of the Network. The provisions of the Statutory Framework therefore apply to them.

ARTICLE 6. PUBLICITY

1. The designation of an area as a Biosphere Reserve should be given appropriate publicity by the State and authorities concerned, including commemorative plaques and dissemination of information material.
2. Biosphere Reserves within the Network, as well as the objectives, should be given appropriate and continuing promotion.

ARTICLE 7. PARTICIPATION IN THE NETWORK

1. States participate in or facilitate co-operative activities of the Network, including scientific research and monitoring, at the global, regional and sub-regional levels.
2. The appropriate authorities should make available the results of research, associated publications and other data, taking into account intellectual property rights, in order to ensure the proper functioning of the Network and maximize the benefits from information exchanges.
3. States and appropriate authorities should promote environmental education and training, as well as the development of human resources, in co-operation with other Biosphere Reserves in the Network.

ARTICLE 8. REGIONAL AND THEMATIC SUB-NETWORKS

States should encourage the constitution and co-operative operation of regional and/or thematic sub-networks of Biosphere Reserves, and promote development of information exchanges, including electronic information, within the framework of these sub-networks.

ARTICLE 9. PERIODIC REVIEW

1. The status of each Biosphere Reserve should be subject to a periodic review every ten years, based on a report prepared by the concerned authority, on the basis of the criteria of Article 4, and forwarded to the Secretariat by the State concerned.
2. The report will be considered by the Advisory Committee for Biosphere Reserves for recommendation to the ICC.
3. The ICC will examine the periodic reports from States concerned.
4. If the ICC considers that the status or management of the Biosphere Reserve is satisfactory, or has improved since designation or the last review, this will be formally recognized by the ICC.
5. If the ICC considers that the Biosphere Reserve no longer satisfies the criteria contained in Article 4, it may recommend that the State concerned take measures to ensure conformity with the provisions of Article 4, taking into account the cultural and socio-economic context of the State concerned. The ICC indicates to the Secretariat actions that it should take to assist the State concerned in the implementation of such measures.

6. Should the ICC find that the Biosphere Reserve in question still does not satisfy the criteria contained in Article 4, within a reasonable period, the area will no longer be referred to as a Biosphere Reserve which is part of the Network.

7. The Director-General of UNESCO notifies the State concerned of the decision of the ICC.

8. Should a State wish to remove a Biosphere Reserve under its jurisdiction from the Network, it notifies the Secretariat. This notification shall be transmitted to the ICC for information. The area will then no longer be referred to as a Biosphere Reserve which is part of the Network.

ARTICLE 10. SECRETARIAT

1. UNESCO shall act as the Secretariat of the Network and be responsible for its functioning and promotion. The Secretariat shall facilitate communication and interaction among individual Biosphere Reserves and among experts. UNESCO shall also develop and maintain a worldwide accessible information system on Biosphere Reserves, to be linked to other relevant initiatives.

2. In order to reinforce individual Biosphere Reserves and the functioning of the Network and sub-networks, UNESCO shall seek financial support from bilateral and multilateral sources.

3. The list of Biosphere Reserves forming part of the Network, their objectives and descriptive details, shall be updated, published and distributed by the Secretariat periodically.

Annex III.
Biosphere reserves in the implementation of provisions in the Convention on
Biological Diversity (CBD)

CBD article	BR Role*	Example on Biosphere Reserve contributions
6. general measures for conservation and sustainable use	L	<ul style="list-style-type: none"> • generate data and methodologies, through research and management experience, on which to base the development of national strategies and action plans and the inclusion of biodiversity aspects in cross-sectoral plans.
7. identification and monitoring	L	<ul style="list-style-type: none"> • sites for biodiversity identification and monitoring • sites for early identification of processes and activities with negative impacts • sites for data storage
8. <i>in-situ</i> conservation	C,S,L	<ul style="list-style-type: none"> • sites as key nodes in systems of protected areas • sites generating valuable experience for design of effective protected area guidelines • sites conserving valuable biodiversity areas • sites supporting environmentally sound development in buffer and transition zones • sites for rehabilitation projects in transition areas • research sites on ways and means to manage risks associated with living modified organisms • administrative and public programmes in support of preventing introduction of, control or eradication of alien species • sites providing conditions needed for compatibility between present uses and conservation and sustainable use • sites protecting the knowledge, innovation and practises of indigenous and local communities through active participation in management • sites for testing and designing legislation and regulations • transboundary sites for comprehensive ecosystem protection • sites attracting conservation funds
9. <i>ex-situ</i> conservation	C,L	<ul style="list-style-type: none"> • sites for laboratories, collections, rehabilitation and reintroduction programmes
10. sustainable use	D,L	<ul style="list-style-type: none"> • sites for development of integrated biodiversity conservation and sustainable use approaches on a national level • sites supporting customary uses by promoting such uses • sites empowering local communities to restore degraded areas • sites encouraging private sector involvement in conservation and sustainable use through joint ventures
11. Incentive measures	D,L	<ul style="list-style-type: none"> • sites for testing and designing appropriate incentive measures
12. Research and training	L	<ul style="list-style-type: none"> • sites for research and training programmes, such as the <i>Diversitas</i> Programme
13. Public education and awareness	L	<ul style="list-style-type: none"> • sites for education and awareness campaigns, including cooperation with international organizations for this purpose

14. Impact assessment	L	<ul style="list-style-type: none"> • sites for testing and designing environmental impact assessments of proposed activities, allowing for public participation
15. Access to genetic resources	L	<ul style="list-style-type: none"> • sites for provision of access to genetic resources under mutually agreed terms • sites for reinvestment of benefits generated from use of genetic resources
16. Access to and transfer of technology	L	<ul style="list-style-type: none"> • networking among sites for the promotion of technology transfers
17. Exchange of information	L	<ul style="list-style-type: none"> • networking between sites for exchange of information, such as the UNESCO MABNet linked to Internet
18. Technical and scientific cooperation	L	<ul style="list-style-type: none"> • sites with priority access to international scientific programmes, such as the Diversitas Programme • networking between sites for the development of joint research programmes and joint ventures • development of transboundary sites
19. Handling of biotechnology and distribution of its benefits	L	<ul style="list-style-type: none"> • sites for testing and designing administrative or policy measures for providing access to biotechnologies and its benefits to areas providing genetic resources.
20. Financial resources	L	<ul style="list-style-type: none"> • sites generating conservation and sustainable use investments with the long-term objective of self financing
25. Subsidiary Body on Scientific, Technical and Technological Advice	L	<ul style="list-style-type: none"> • sites providing information and data on which the SBSTTA can prepare scientific and technical assessments on the status of biodiversity and identify technologies and know-how

* C=conservation; D=development/ sustainable use; L=logistic

The Arab League

**The Arab Center for the Studies of
Arid Zones and Dry Lands
ACSAD**

**ISSUES OF CONCERN ON BIODIVERSITY
CONSERVATION**

by

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**BIOLOGICAL DIVERSITY, IT'S CONSERVATION AND
SUSTAINABLE USE IN THE ARAB WORLD
12-14 DECEMBER, 1995, MANAMA, BAHRAIN**

ISSUES OF CONCERN ON BIODIVERSITY CONSERVATION

Two main subjects, throughout this paper will be discussed. First, some critical issues related to biodiversity and some managerial problems will be addressed. Secondly, the experience of the Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD) on biodiversity will be stressed. With that, we hope to clarify few points with regards to formulating a strategy or a plan of action on biodiversity in the Arab Region.

First, what is meant by diversity or biodiversity? Biodiversity in simple words is the variations of existed life forms on planet earth. This variation takes different levels and forms. It begins with variations between individuals within a species and ends with variations among ecosystems on the earth. This in itself poses a managerial problem when we try to define goals and objectives of preservation or conservation strategies for the various resources we are dealing with.

Conservation or preservation is another issue which fit in the contest of management. The careful management of natural resources to prevent exploitation or destruction, in other words to keep these resources in sound state and maintain their entity, should be the aim of managerial strategies of various bodies concerned with diversity.

Of course, the targeted resources are surrounded by a socioeconomic frame which in most cases dictates the status and usability of these resources. As such, the biophysical and social aspects of these resources must be considered carefully in the processes of planning strategies on biodiversity.

The biophysical aspects of the resources include quantity, quality, availability, flexibility, and their future. Where as the socio-economic features may include the status of indigenous inhabitants, in terms of the standard of living, their knowledge about the resource, willingness of participation in terms of accepting or rejecting new ideas, and the benefits which may result of their participation.

Institutional establishments; such as existing facilities, laboratories or units manned with highly and medium level experts which may contribute to the success of the plan should be addressed. With this in mind, a complete and comprehensive survey work should be conducted to evaluate the status of the management unit, and then a proper management strategy could be devised to meet the goals of the plan.

It is clear that there is a close relationship between diversity and management. For example, when we are talking about conservation of certain species within their natural range we have to tailor our management plan to fit that goal, which is to preserve the dynamical capacity of these species to evolve and to preserve their genetic variability as well as ensuring or enhancing the sustainability of the agricultural practices of the affected community. In this case we have to develop a reliable approach to ensure survival and evolution of the biotic components of the whole ecosystem.

Defining the criteria of success is also very important, and in order to set these criteria properly, we have to define what is meant by diversity precisely. It seems that the first goal is very difficult to be achieved because of the variability of our experimenting materials in addition to the dynamic character of it (evolution). But, in essence these criteria must be established on the various levels of organization from species level up to the entire ecosystem.

There are various well known strategies or alternatives might be taken to preserve diversity; of these are the followings:

1. An intensive direct intervention, which on the environmental scale may vary between selecting natural areas (nature reserves) (in-situ conservation) to constructing botanical gardens, or alteration of genetic frequencies of a taxon (ex-situ conservation) on the biotic level for example.
2. An indirect intervention which would mean applying the concept of ecological or environmental management, which involves in this context selecting the size of an area, number of areas and developing a proper management plan which in turns would affect biodiversity in one way or another.

3. Monitoring diversity or variability within and among various elements of man made or natural ecosystem and between various ecosystems. With this regard setting priorities is very important especially on species level, where management can make a difference.

Whatever the strategy of management is followed, the plan of action must be set with an inter-disciplinary approach, and the proper management strategy should consider the following points:

1. Defining the objectives or specifying the principal targets of the plan, whether to conserve species or an association, a community, or ecosystems, etc.
2. The time required to implement such a plan (time scale). It is well known that the broader the objectives the longer the implementing time will be.
3. The impact of the management itself and its effect on the target (species, community, etc.). A feed-back mechanism should be devised to adjust or mitigate for the encountered problems.

The Arab region with its broad geographic dimension possesses a great wealth of genetic resources which deserve preservation. Recognizing the importance of developing renewable natural resources, and the delicate relationship between these resources and management in arid and semi-arid lands of the Arab countries, ACSAD concentrates its effort on different aspects of conservation issues such as land use sustainability, biodiversity, and combating desertification. Its work was carried out either independently or jointly with Arab governments and other regional organizations. Significant contributions have been made toward achieving the balance between these issues. Indeed ACSAD can be considered as a focal center between Arab countries with regards to previous issues for the work it has done and the experience it acquires.

Applying an intensive direct approach of management on biodiversity (in-situ conservation), ACSAD launched an ambitious program on biodiversity since 1979. Work is still on progress on different types of drought and/or salt

tolerant fruit trees where some of wild stocks were surveyed, seeds were collected, and gene bank fields of almond, olive, grape, pistacio, and fig trees were established. Their traits have been documented according to international standards, and all related information on them was documented and disseminated to interested governments and regional agencies.

In the field of rainfed crops, ACSAD has hundreds of accessions of wheat and barely. Through its program of breeding, selection and multiplication ACSAD developed a highly productive and drought tolerance cultivars of wheat and barley. Information on these cultivars and the proper cultivated techniques were transferred into some Arab countries. Also ACSAD cooperated with IFAD on developing a proper integrated farming system for better exploitation of arid and semi-arid lands areas in a number of Arab countries.

In the field of range and forage plants, ACSAD involves on a monitoring program, which includes a complete survey and evaluation the status of natural range lands in the Arab region.

Also, an In and Ex-situ conservation program for important species are developed. More than a hundred species were collected for evaluation and conservation. Special care is given to endangered species. A new varieties of Atriplex, and salsola were developed. A revegetation program was established and produced seeds of mentioned species were distributed to some Arab countries for trials and production of forage. Off course these activities very well fit in the course of search for better ways of conservation and sustainable development of arid and semi-arid ecosystems.

The most significant achievement of ACSAD in the field of biodiversity and sustainable land use is the creation of an Arab Data-bank for Arid Plants (ADAP) which documents existed diversity of over 1312 plant species grow naturally on more than 16000 geographic locations in arid and semi-arid areas of the Arab countries. It is aimed that this data bank will facilitate the development of arid and semi-arid lands in the Arab region. Information on species taxonomy, ecology, life forms, geographic distribution, biology, methods of reproduction, time of flowering as well as economic value to the local people is documented. These information are to be put on the disposal of interested Arab countries as well as other interested organization. ADAP can be considered as a nuclei for data collection and a convenient way of documenting

information of arid and semi-arid plant species. This nuclei can be broadened and expanded to serve as a real tool in understanding the nature of biodiversity conservation.

ACSAD has established a data base containing a wealth of information on the different breeds of mammal and avian species in each of the Arab countries. accordingly, animals are classified into 3 categories. Included in the first category are animals that economically important and widely distributed in one or more countries in the region. The second category includes animal breeds that are decreasing in number and are of economical use globally. The third category includes breeds which are in the process of becoming extinct due to sever eradication or cross breeding with exotic genetic materials.

ACSAD has established live gene banks for certain breeds of 3 animal species namely sheep, goats and camels in 6 countries in the Near East and North Africa. Other gene banks are planned to be established in other countries. Massive information about diversity of domestic animals in the Arab Countries were published by ACSAD. The Following activities are involved:

- . Encyclopedia of Animal Resources in Arab Countries. 16 volumes. 1980-1990.
- . Goat Resources in Arab Counries. 7 volumes, 1989-1994.
- . Sheep Breeds in Arab Countries, 1978.
- . Camel Breed and Ecotypes in Arab Countries, 1990-1994.
- . Egyptian Sheep Breeds. 1994.

This study high lights the present status of the genetic resources of domestic animals in the Arab Countries.

ACSAD sees that any strategy on biodiversity conservation should be implemented in collective measure which insures compatibility of In-situ, Ex-situ conservation with enhanced current land use practices of the affected community. In arid and semi-arid areas where local people use available resources to the limit to conserve themselves, care must be taken not to deprive native people of might be the only source which sustains their existence.

Finally, a formulated strategy on Biodiversity conservation should take into consideration the plant genetic wealth and the different forms of existed ecosystems in the region. Close cooperation between Arab countries through their national programs must be established. Coordination among different parties can be established and maintained through the presence of international and regional organization. These organizations can also offer training programs on land use sustainability and biodiversity conservation for the trainees of these countries.

جامعة الدول العربية
المنظمة العربية للتنمية الزراعية
League of Arab States
Arab Organization For Agricultural Development

BIODIVERSITY AND SUSTAINABLE DEVELOPMENT

Prepared By
**ARAB ORGANIZATION FOR
AGRICUTLRUAL DEVELOPMENT**

Presented to
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In The Arab World**

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Introduction :

Man has ignored, for a long-time, the strong links and natural balance that have been occurring in the environment surrounding him. Most recently, at the turn of this century, he discovered the unrecoverable destruction he made to the different ecosystems that were created by the mighty god to serve human needs. These negative environmental impacts comprises desertification of areas which were very productive and followed by sand encroachment, in many parts of arid regions of the world that endangered, both agricultural areas and the inhabited villages and towns. Other negative environmental effects comprise of soil and water salinization, water logging, pollution, spread of pests and diseases and loss of valuable genetic materials.

The high rate of increase in population, due to natural increase in birth rate and low death rate that has been brought-out by the advancement in medicine that cure the devastating diseases that were known to have taken appreciable toll of lives from time to time, increased the burden on the environment to yield more food to feed these masses, in both developed and underdeveloped countries of the world. This forced man to invade territories of other natural resources, that comprise of land, forests, rangelandsetc, to avail food needs for him and his animals, by tyrant cut of forest trees, use of agricultural machineries to plant millions of hectares, in sometime, very marginal land. In addition to this a fearfull rate of decrease in the areas of agricultural lands is occurring due to the creep urbanization.

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All the above factors had to a dreadful decrease and loss of biodiversity that is needed, by man, to furnish him with food, shelter, medicine and other needs.

Inspite of the awareness of the poor nations to what is going to happen to them, in the near future, as a result of depletion of the component of their biodiversity, yet they are using their meager resources in establishment of nonfeasible and shortliving food production schemes so as to meet the demand of their hungry people for food. This short-term solution will have a long-term devastating effect on the economy of such nation, due to loss of valuable biodiversity which may foster a desperately needed solution of a problem that is determinant to agricultural production or any other human need in some area of the world.

Biodiversity :

Biodiversity is the state of distinction of groups or levels of the different living organisms in the universe. It comprises all levels in the biosphere, that start with the gene and end up with a comprehensive ecosystem, where different living organisms live and interact with each other and with the surroundings (soil, water and climate) in harmony and natural balance. It is considered as a product of both area and time. In a nut-shell biodiversity refers to diversity of life on earth in the different ecosystems.

Importance of Biodiversity:

Biodiversity is considered as the base for availing different human needs. Few thousand different species of plants have been used as food for man, but only, very few of them are counted as main feed source.

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Similarly very few species of animals are eaten by man as protein food source. On the other hand microorganisms and insects play important positive as well as negative role in agricultural production.

The importance of biodiversity stems from the fact that different living organisms serve as living gene banks for storage and preservation of valuable genes that serve different needs of humanbeings. This importance comprises the following :

1. Biodiversity is the main source of genes needed for improvement of crops in yield, quality, resistance to pests and diseases.
- 2- Source of variety of medicines used in traditional as well as modern medicine.
3. It is used as a direct source of food that supply the nutritional needs like vitamins, minerals, sugars etc. for the people living under variety of environmental conditions.
4. Some plants and organisms have ability to fix atmospheric nitrogen and made it available as a fertilizer to the cultivated crops. This character has special importance in maintaining productivity under traditional agriculture.
- 5- it serves the needs of humanbeing for energy, shelter, transport, furniture, utencils etc..
- 6- Biodiversity serve in yield of substitutes of valuable materials obtained from endangered species. e.g. Oil of jojoba is used as a substitute for code-liver oil which is obtained from the endangered code species.

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- 7- Biodiversity is essential for maintenance of the ecological balance necessary for human communities to adapt to change now and in the future.

Factors affecting biodiversity :

1. Change in consumption pattern of people due to social or economical factors.
2. Expansion in agricultural areas to increase crop production lead to the disappearance of large areas of natural plants and large numbers of wild animals.
3. The use of high yielding varieties of crop in modern agriculture cause the narrowing of the gene-pool that safe-guard against any change in the environment.
4. Tyrant cut of forests for energy or other uses lead to loss of valuable genetic materials in natural forests.
5. The change in climate associated with draught, high temperature and winds , increased the rate of desert encroachment on marginal lands and lead to disappearance of valuable grazing plants adapted to arid regions.
6. Environmental pollution e.g. in the form of acid rains or dust from industrial areas, lead to extinction of many important wild plants.

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The concept of sustainable development :

The World Commission on Environment and Development (WCED), which was formed by the United Nations general Secretary to study environmental stresses and damages resulted from economic development and planning policies practiced by various countries, published a very important book, namely " Our Common Future " in 1987 which has become very strong support to enhance the call for " Sustainable Development " approach to be adopted by the Third World countries. The commission emphasized the need to redefine the concept of development to cater for the attainment of the basic needs of people and to improve their opportunity to fulfil their objectives for a better life and to maximize their interests , without depriving the future generations of their rights to meet their aspirations.

This concept of sustainable development focuses attention on the urgency of managing natural resources. It calls for creating some sustainable measures of protecting, conserving and developing the existing natural resources. The concept also, pays special attention to participation of people in planning for/and implementing of development and especially national development. It also attempts to achieve stable population growth to ease the situation by improving the incomes of the people and entitlement and access to food. Finally, this concept of sustainable development attempts to reduce the present levels of energy consumption and aims, in long-run, at substituting non renewable resources with renewable sources of energy.

It is very clear from the above-mentioned discussion that sustainable development is a very complex concept that worries directly about the environmental, cultural, social, ecological, economic, technological, humanitarian as well as political aspects of life of the people of the third world. Thus, it becomes very difficult to define, measure or quantify this

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concept due to the strong interlinkages between its qualitative and quantitative dimensions.

To achieve sustainable agricultural development people have to think about the environment, ecology, socio-economic systems, indigenous know-how, do-how and culture, in terms, of complex interactions, processes, adjustments under every changing circumstances.

A recent call for supporting " Low External Input and Sustainable Agriculture (LEISA) ", which is developed by number of institutions and scholars around the world, aims at optimization the use of the locally available resources in an integrative and complementary way to maximize benefits, minimize cost of production and enhance sustainability and regeneration of resources in the farming systems. It tries to seek the best alternative approach of using and applying external inputs in the most efficient way and in the most critically needed situations to enhance sustainability of the ecosystem. The diversification of crops and preservation of animals and crop species can also be secured by the adoption of various sustainable farming methods, practices, knowledge and activities. In a nut-shell, sustainable agriculture aims at enhancing productivity of farming in the traditional subsector together with the production and preservation of the environment.

Development policies and biodiversity :

Most of the developing countries follow two main approaches to guide their development policies and investments. The first approach described as transformation approach, puts emphasis on total restructuring of both the local society and the ecosystem. The second type is the improvement approach , where only minor inputs are defused at the local environmental level to bring about gradual change without serious intervension that will lead to complete change in means of production or environment.

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The first approach concentrates on few large schemes to achieve quick returns. Closer look into the farming practices that resulted from such policies reveals that monoculture practices are dominant in modern agricultural sector which is concerned mainly with production to satisfy international markets. Under such circumstances high yield varieties and hybrids developed in the highly developed countries have forced-out local varieties and lead to their disappearance. This process has far reached consequences on genetic diversity and decrease the use of local species.

In addition to this, the introduction of new varieties is associated with other input technologies e.g. chemical fertilizers, herbicides and insecticides which has negative impact on the total biodiversity and natural balance in the ecosystem and lead to rapid genetic erosion in the local adopted material.

Usually, when the existing modern agricultural technologies, practices and inputs were developed and adopted, the interest of poor farmers in the traditional sector were not taken into consideration by the concerned government planners or decision-makers. Therefore the traditional sector and the small producers had not benefitted from these policy measures and technologies, thus a strong barrier is formed between the traditional farmers and the modern technology used in modern agriculture.

Biodiversity and Sustainable Development :

Availing the knowledge on biodiversity and how people, in rural areas, are utilizing it, is very essential for development planners, policy makers and scientists to focus their attention on it and learn from the wise use of the indigenous knowledge to attain sustainability.

Indigenous knowledge of farmers has proven, over the years, that they are economically viable, socially desirable, environmentally sound and

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dynamic, and culturally adaptable. It successfully solved the problems and provided the answers for very complex challenges in the traditional farming sector. Traditional farmers have been, over the years, working as the custodians and savers of seeds of valuable cultivars, which have been lost and forgotten by modern scientists.

The potential of indigenous knowledge related to biodiversity is very important for the welfare of the majority of population, specially those living in the traditional rural sector since it will be the base for development of appropriate technology that would maximize the social benefits of the poor people without endangering their valuable heritage. Thus, the optimal utilization of indigenous knowledge for sustainable development offers an excellent alternative for development in poor countries.

In traditional rain-fed farming system in rural areas of the savana region, farmers practice land rotation and alternating cropping on two or more farm plots, in a time sequence that permits the soil to regain its fertility besides avoiding soil degradation by giving chance to natural vegetation and associated soil micro-organisms to enrich the soil. The cultivars grown under such farming system fit well into the whole system and adapted to the local ecological conditions as well as to the socio-economic and cultural set-up in the region.

Farmers practicing such system indirectly enhance diversity of crops and their cultivars. Such diversity allows versatility and contributes to household food security. It is very common, in such areas to find different crops growing in one plot or even one hole and giving very reasonable yields. The traditional farmer's philosophy behind this is to avoid taking chances with the ever unpredictable climatic conditions, specially rains, and to obtain some harvest in cases of insects or disease attacks. On the other hand science back this idea of sustainability by exploitation of

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nutrients from different strata of soil by the different root systems of the different crops and by efficient utilization of sun light by the different leaves and plants heights. Another advantage of such system is that it is adequate with regard to labour demand.

Farmers in such areas learnt to care for certain trees in their farms and avoid cutting them and consider their stand in their fields is essential. These trees are Balanites aegyptiaca and Acacia albida since both on them do not shade the crops and thus not sacrificing reduction in yield of his crops, besides they offer him a resting place during mid-day. The first tree provides the farmer with fruits that are eaten and used as medicine in traditional medicine in addition to extraction of some edible oil from its seed. The Acacia albida tree increases soil fertility by fixation of nitrogen besides offering the farmers domestic animals high quality fodder from its fruits.

Nomades of the dry areas are usually very keen in conservation of trees and shrubs, they tend to use them as feeds their animals, during dry seasons, especially the preferal branches of the trees without cutting the whole tree. Some of those owning few animals usually erect enclosures around trees rich in fodder to keep their animals in to achieve protection for the animals as well as for the fodder producing trees.

Slash and burn agriculture was a common practice of the forest dweller, which was sustainable at that time, but with the increase in population in recent years, the land available for shifting cultivation is reduced thus causing shorter fallow periods and over use that turn the traditional sustainable methods into destructive ones.

Introduction of agroforestry system, as a new system of forest management, that combines trees, crops and livestock enables farmers to diversify their agricultural production and reclaim degraded land. Usually

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the farmers in such system coordinate their forest related activities with that of agriculture to avoid overlapping. Usually forest related activities e.g. Gum tapping and collection, honey collection ...etc. are practiced during the periods when farmers are free from agricultural activities. By so doing the farmer ensures food for his family as well as some cash earnings to satisfy his other needs and at the same time not disturbing the natural balance around him which in other words means sustainable development.

Recommendations :

- 1- Study and preservation of indigenous knowledge related to biodiversity and sustainable development.
- 2- Encouragement of the participation of local people in all activities concerning conservation of biodiversity and sustainable development.
- 3- Attention must be paid to environmental extension via information media and schools.
- 4- Enlightenment of the decision maker about the importance of conservation of biodiversity and its relation to sustainable development.
- 5- The holistic approach and the integrated use and management of all natural resources should be taken into consideration in order to increase the cost effectiveness and improve productivity to provide all the basic needs of the people in rural areas and to strike a balance between socio-economic needs and environmental integrity.

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Efforts of AOAD in biodiversity and sustainable Development :-

Background:

The Arab Organization for Agricultural Development (AOAD) in its numerous efforts to develop the agricultural sector in the Arab countries to narrow the gap in food shortage, has been tapping a wide range knowledge, some are genuine agriculture in nature, like increasing agricultural production and productivity and development of natural resources, while others are drawn from related disciplines like agricultural economics, engineering, food processing, protection of environment etc.. that lead to real sustainable development.

To fulfil its objectives, AOAD adopts different and integrated approaches including the following programmes :

a- Supporting and coordinating development efforts in the following areas:

I. Technical agricultural research.

II. Economic and social studies.

III. Rural communities development.

IV. Promotion of agricultural institutions and services.

v. Conservation of natural resources.

VI. Improvement of the agricultural production-enhancing tools like marketing and agro-industries.

VII. Exchange of agricultural expertise.

b. Compilation and publication of the agricultural data and information.

c. Providing technical assistance, on request of member states.

d. Monitoring recent development and innovations in international agriculture.

e. Preparation, evaluation, implementation and supervision of developmental agricultural projects and programmes.

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- f. Securing the financial needs of developmental projects and programmes.
- g. Coordination of agricultural legislations, laws, systems and standardization of agricultural specifications, measurements and terminology.
- h. Cooperation with the different organizations and institutions concerned with agricultural development issues .

Since its inception in 1970 the scope of AOAD activities , in the field of agricultural development is designed to cover the following levels:-

- Arab regional level.
- Semi regional or joint level.
- Country level .
- Training .
- Conferences and seminars.
- Execution of projects .

In this respect, AOAD carries out developmental studies, training courses, seminars and conferences in addition to providing technical assistance to member countries. It also designs and implements pilot agricultural projects aiming at disseminating knowledge of modern agricultural techniques. Furthermore AOAD supervises the execution of certain production or service oriented developmental agricultural projects at both the country and regional levels. Moreover, in conducting its programmes and some other activities, AOAD adheres to a system of multi-disciplinary and well integrated research and executive teams. Members of these teams are, usually chosen from different Arab States.

The followings are few examples of studies and projects related to biodiversity and sustainable development :-

1- Environmental Impact on Agriculture Development in the Arab Countries (1991):

This study attempted the investigation of the environmental problems associated with agricultural development in the Arab countries considering its causes , features and spatial extent , together with their impacts on agricultural development. The study also considered the mitigation measures taken to address these problems and costs and benefits of these measures and recommended action which are socially, economically, politically and institutionally possible and acceptable to help decision and

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policy makers in their efforts to achieve sustainable development.

The approach followed in the study is considered positive in the sense that it describes the problems and recommends possible solutions so as to arrive to a situation which is optimum.

2- Interrelated Impacts between the Environment and Agricultural Development and Problems of Sustainable Development (1994):

The Arab Organization for Agricultural Development (AOAD) commissioned in 1991 a study of the "Environmental problems associated with the impacts of agricultural development in the Arab Region". Along the same lines of its interest in environment and development in order to fill in certain emerging gaps, the AOAD organized a team of experts to prepare a study on the Interrelated impacts between the Environment and Agricultural Development.

The main objectives of the study were :

- (1) To study the impacts of agricultural development on the environment and also the environmental influence on the agricultural development process.
- (2) To investigate establishing a balanced relation between agricultural development and the environment which guarantees sustainable agricultural development on one hand and preserves environmental capacity as a renewable resource on the other hand.
- (3) To prepare a framework for sustainable agricultural development including policies and legal instruments as well as project proposals based on the principles of sustainable agricultural development.

Eight country reports from Iraq, Syria, Sultanate of Oman, Yemen, Egypt, Sudan, Tunisia and Morocco provided the main source of information and data for the study. In addition the study consulted more than 70 relevant references.

3- Forests Resources in Arab Countries (1991) :

This study has dealt with the present situation of the forest resources of the Arab Countries in general and also in the individual countries. The study included the following:

1. General description of the situation of the Arab region, its climate,

3. To develop a suitable extension system for adoption of the technologies developed by the project.

4. To develop credit facilities that help in production of technologies that reduce the tyrant cut of forests.

5. To encourage the involvement of local people and other NGO's in activities dealing with conservation and development of forests.

Project Components:

1. Technical and financial support for government agencies involved in conservation and development of forests.

2. Development of technologies related to development of forests.

3. Development of technologies that can substitute the needs for tyrant cut of forests.

4. Selection of sites for the project in each of the three countries ,

5. Establishment of forest extension unit.

6. Development of credit facilities .

9- Establishment of A National Center for Conservation of Plant Genetic Material in the Sudan.

Background:

Biological diversity plays very important role in the insurance of food security and the welfare of humanbeings. Adverse environmental factors like desertification , negative side effects associated with urbanization, tyrant cut of forests and over grazing have drastic negative impacts on quality and quantity of living material in the biosphere , these in turn have negative effects on the economical, scientific & cultural aspects represented by the biodiversity.

Sudan with its largest land area of all Arab countries, encompasses wide variety of bioclimatic regions; extending from the desert to the equatorial region, thus furnishing excellent condition for the growth of wide variety of plants. In recent years this wealth of plants has been endangered by many of the adverse environmental factors mentioned

above. The preservation of such genetic material is not only important for Sudan but also for all Arab countries.

Objectives of the project :

1. To preserve the genetic diversity in agricultural, pastoral and forest plants.
2. To formulate a comprehensive and effective mechanism, with financial and legislative powers to ensure the protection of the genetic diversity in food crops and other endangered plants in Sudan.
3. To avail the collected material to the welfare of the people of the Sudan, Arab countries and other parts of the world .
4. To collect and store all the available sudanese genetic resource enteries .

Project components :

1. Establishment of :
 - Refrigerated storage rooms
 - Data collection & analysis rooms with computers.
 - Laboratories
 - Offices.
 - Any other buildings.
- 2- Survey and collection of samples
- 3- Training
- 4-Research and classification of the collected material .

10- Genetic Resources Protectorates Project For the Endangered Wild Animal Species of Desert Areas :

Background:

Sound plans for combatting deserification should take into consideration all the basic elements of production, including soil,

vegetative cover and the general objectives of the various forest administrations.

2. Administration , manpower, training and research in the field of forestry .

3. Forest products and the related industries .

4. The development of the forest resources.

5. Cooperation between the various Arab countries .

4- Study of Rehabilitation of Degenerated Natural Plant Flora in Saudi Arabia (1985) :

The natural ecosystems of Saudi Arabia have suffered from overgrazing , wood-cutting and expansion of agricultural area , which lead to severe degradation of vegetation and depletion of valuable species. This study aims at listing those species in their natural habitats and communities , and proposing a program for their propagation.

5- The Technical and Economic Feasibility Study for the State Forests Development of Zimbabwe (1992) :

The study covered so many aspects, like forests development, conservation of forests environment, improvement of wild life management systems in the state forests, improvement and conservation of forest pasture resources and adoption of well studied-systems of range management and practices : On the other hand the feasibility study covered the technical , financial and economic aspects related to state forests of Zimbabwe. Now AOAD is formulating, (depending on the outcome of the study) projects and plans for efficient and profitable management of the indigenous forest resources in Zimbabwe.

6- Environmental Impact on Range lands in the Arab Region(1994):

Most development plans of the rangelands in the Arab Countries and the attempts to help the pastoralists failed to accomplish real human development or sustainable use of pastoral resources. The national pastoral resources plans usually, lack the unified approach and based on contradictory statistical data.

This study aims at determining the physical, biological and soil factors affecting pastoral resources and their sustainable use . The study is also meant to shed light on the principle components and major constraints of sustainable development for the pastoral resources in the Arab Countries.

7- Medicinal , Aromatic and Poisonous plants of the Arab Countries (1988):

The book comprises three main chapters in addition to the introduction and detailed annexes of the plants of special importance pertaining to the subject of the book, listed according to their Arabic as well as scientific names and according to their pharmacological constituents and active ingredients .

8- Conservation and Development of Forests Project (Morocco, Sudan & Yemen) :

The deterioration of the environmental systems and natural resources jeopardised the development perspectives of many developing countries . Forests are considered as one of the important pillars of this system, in addition to what they are producing as food for the natives or wood to be used for different human needs. When the forests are degraded by tyrant cut of trees or complete removal of the forest in face of organized agriculture or urbanization, this will ultimately lead, not only to loss of the wood, but most importantly the productive capacity of the soil; through salanization, laterization, draught and erosion. Other echoes to this catastrophe, usually occur away from the removed forest, specially at areas of rivers discharges where the flow of water become so high during the rainy season and very low during the dry season. Also water erosion becomes so severe in such away that it washes out the rest of the few left trees and grasses.

This will lead to the problem of silting out the dams lakes and ultimately affect the effeciency of the dam and also the generated electricity .

Objectives of the project :

1. To provide technical & institutional support for government agencies involved in development of forests in the three countries.
2. To develop an environmentally feasible technologies that substitute the tyrant cut of forests.

BIODIVERSITY AND SUSTAINABLE DEVELOPMENT

water, plant and wild animals. The genetic resource protectorate for wild animals should receive special attention, since it was subjected to severe negligence and misuse, during the few last decades, due to the deterioration of the natural habitat, draught, tyrant hunting and removal of plant cover.

The importance of preservation of indigenous wild animal species is stemming from some national, regional as well as international considerations. The value of wild animals species as an international wealth besides their environmental, economic, scientific and recreational values are increasing from one day to the other.

Saudi Arabia, Sudan and Eriteria are suggested to host this project, since all of the three are encompassed within the Afro-tropical realm, and have similar environments as well as animals. This helps in setting a common administrative plan under which the extinct animals in one country can be substituted by the same species from any of the other two countries contributing in the project, besides exchange of experts.

This project is based on the outcomes of the World Strategy for Conservation of Nature (1990) and Earth Summit (1992) conferences, which call for establishment and support of natural protectorates within the framework of attention paid to all elements of natural resources at the national, regional or international levels.

In spite of the fact that the deserts in Sudan constitutes about 35% of the total country area, yet there is no single natural protectorate established in the area. Many of the endangered animal species live in this habitat. Despite the fact that Sudan established some protectorates in Eastern Sudan. Unfortunately they are lacking protection as well as scientific administration needed for conservation of its biological diversity.

As for the newly independent country of Eriteria which was fighting its independence war for the last 20 years, suffered a lot from the loss of its wild wealth. The long list of priorities competing for its limited financial resources gave no chance to pay any attention to the endangered animal resources.

On the other hand the fast economic growth of Saudi Arabia, after the discovery of petroleum, had some negative effects on the natural

habitat, specially wild life. The National Corporation for Protection of Wild Life was established in Saudi Arabia in 1986 and since then it finalized many of the conservation projects for wild animals . Besides this the corporation has active research programmes dealing with biological research and multiplication of wild animals as step before their release in the protectorates established in their natural habitat .

1-Establishment of wild animal potectorates in Saudi Arabia , Sudan and Eriterria to conserve the endangered species of wild animal .

2-To supply the extinct animal species in one country from those available in any of the other two countries contributing in the project.

3- To exchange information and expertise in the field of conservation of endangered wild animal species of the deserts.

1. Preliminary surveys of the selected areas of the project.

2. Management plan of the project .

3. Extension and education to the target groups of local people in the project area and to the decision makers.

4. Establishment of wild animal protectorates in the desert regions of the three countries .

BIODIVERSITY AND SUSTAINABLE DEVELOPMENT

المراجع

1- دور المنظمة العربية للتنمية الزراعية في الحفاظ على التنوع الأحيائي.
ورقة مقدمة للنشرة دون الإقليمية لإدارة المحميات الطبيعية التي نظمتها اللجنة الوطنية للينسكو
بالسودان في الفترة 15-17 مايو 1995 .

2- دراسة الآثار البيئية على الموارد الرعوية في الوطن العربي (1994) المنظمة العربية للتنمية
الزراعية .

3- Indigenous knowledge for Sustainable Development In The Sudan
(1994).

Ed. by M.M. Ahmed .

Inst. of African & Asian Studies (Univ. of Khartoum)

4- Indigenous Farming systems, Knowledge and practices In The
Sudan (1994).

Ed. by M.M. Ahmed .

Inst. of African & Asian Studies (Univ. of Khartoum).

5- Harvesting Natures Diversity

F.A.O. publication for World Food Day (1992)

Role of ICARDA in plant genetic resources conservation in Arab countries

J. Valkoun and J. Konopka, The International Center for Agricultural Research in the Dry Areas, ICARDA, Aleppo, Syria

ICARDA's mission and mandate.

The International Center for Agricultural Research (ICARDA) is one of 16 international centers supported by the Consultative Group on International Agricultural Research (CGIAR). ICARDA was established in 1977, and is based in Aleppo, Syria. The Center exists to meet the challenge posed by a harsh, stressful and variable environment in which the productivity of winter rainfed agricultural systems must be increased to higher sustainable levels; in which soil degradation must be arrested and, possibly reversed; and in which the quality of the environment is assured. The Center has a world responsibility for the improvement of barley, faba bean and lentil and a regional responsibility in West Asia and North Africa (WANA) for the improvement of wheat, chickpea, and pasture and forage crops and their associated farming systems.

Although biodiversity conservation is not explicitly mentioned in ICARDA's mission and mandate, this issue has always been of high priority on the research agenda. After the 1992 United Nations Conference on Environment and Development (UNCED), natural resources conservation, including biodiversity, received a new dimension. ICARDA, jointly with other CGIAR centers, responded with new initiatives and adjustments of research plans.

Genetic resources conservation

Genetic resources of our mandate crops species, including their wild relatives, are perhaps the most important component of biodiversity. Maintaining the diversity of these resources

is essential not only for present needs, but as the basis for expanding food production to meet needs of the rapidly growing human population. Concerted action to conserve genetic resources must be an integral part of sustainable development. *Ex situ* collections in gene banks are still the most practical way for genetic resources conservation.

During its relatively short existence, ICARDA assembled the largest *ex situ* collections of its mandate crops in the West Asia and North Africa (WANA) region. Under the agreement signed with FAO in 1994, these collections are held in trust under the auspices of FAO for benefits of the global community.

- Center's collection strategy is based on two criteria:
 - (i) relevance to breeding programs at ICARDA and/or national programs in WANA; and
 - (ii) the danger of genetic erosion.

Consequently, most genebank accessions are landraces, selections from landraces, primitive forms, crop wild relatives and other wild species, indigenous to West Asia and North Africa. It is well documented that this type of germplasm possesses much higher genetic diversity than products of the modern plant breeding. ICARDA's genebank is, therefore, a rich reservoir of genes for present and future needs.

Arab countries may benefit most from ICARDA's collections, since 82.1% accessions, collected by ICARDA in collaboration with the national programs, originate from Arab countries (Table 1).

Proximity to ICARDA and low costs involved account for the high share of Syria in the Center's collecting activities and output. Nevertheless, in the period from 1980 to 1995, 44 collection missions were targeted to other Arab countries, in which 9182 accessions were collected. According to ICARDA's policy, the national program always keeps a duplicate of all materials collected. However, if for some reason this duplicate is lost by the country, ICARDA provides a backup from its gene bank.

Table 1. Germplasm collected by ICARDA in Arab countries in joint collection missions with national programs

Country collected	No. of missions	No. of accessions
Algeria	4	1619
Egypt	4	375
Iraq	3	212
Jordan	12	2995
Lebanon	6	362
Libya	3	63
Morocco	9	2229
Syria	47	8008
Tunisia	3	1327
Total	91	17190

The collection missions have yielded not only new and unique germplasm accessions but are also an invaluable source of information on ecosystem and species biodiversity, species habitat, biodiversity and genetic erosion and other data essential for biodiversity conservation. This information is stored in the ICARDA Genetic Resources Unit database and, when the computerization of the collection site information is completed, the national program receives a copy of the data either on a diskette or as a hard copy. In the near future, Arab countries may benefit from this genetic resources database, when they start developing their national geographical information systems (GIS) on biodiversity. Thus, the ICARDA's database of collection site information could be as important for biodiversity GIS as its genebank is for breeding programs.

***Ex situ* conservation of plant genetic resources**

Representation of Arab countries in ICARDA germplasm collections is high; about one fifth of cereals, a quarter of food legumes and a half of the total holdings of forage and pasture species (Table 2). In addition to germplasm collected in the joint missions with national programs (Table 1), ICARDA has acquired the major part of its holdings by donations from other gene banks. The most valuable materials are those collected in the Arab countries in the first part of this century by the pioneer plant explorers, including Vavilov. Some landraces may no longer be cultivated in the countries of their origin and exist only in gene banks. ICARDA has systematically searched for available information in international and major national databases and other information sources to identify the germplasm from early exploration missions and bring it back to the WANA region. This germplasm is now shared with the Arab countries of origin. The duplicate samples at ICARDA's gene bank may be considered as a safety duplication.

Rhizobia collection

Approximately half of the ICARDA gene bank accessions are legumes, which may require inoculation with compatible and adapted rhizobial strains, especially if they are introduced to new environments. Collecting rhizobial biodiversity associated with host plants is a parallel activity in legume collection trips conducted by ICARDA. Later in the laboratory, bacterial strains are isolated from nodules or soil samples and maintained temporarily on agar slants and also long-term conserved as lyophilized cultures. In total, ICARDA holds 1,500 strains isolated from different legume species of West Asia and North Africa origin. This Rhizobium biodiversity may be essential for the development of sustainable farming systems in Arab countries.

Table 2. ICARDA gene bank germplasm accessions originating from Arab countries

Country	No. of accessions			Total
	Cereals	Food legumes	Forage legumes	
Algeria	1753	166	1712	3631
Bahrain	-	-	2	2
Egypt	500	352	210	1062
Iraq	508	232	275	1015
Jordan	1270	610	2137	4017
Lebanon	381	266	372	1019
Libya	188	15	247	450
Morocco	1260	824	1724	3808
Oman	113	4	105	222
Palestine	1042	75	70	1187
Saudi Arabia	35	3	9	47
Somalia	-	1	-	1
Sudan	8	172	33	213
Syria	1934	4057	5808	11799
Tunisia	2272	381	1439	4092
UAE	4	-	-	4
Yemen	193	100	18	311
Total (Arab countries)	11461	7258	14161	32880
% of ICARDA genebank total holdings	21.0	26.5	50.9	29.9

In situ conservation of biodiversity

Genebanks are convenient sources of germplasm, from which seed can be distributed to users any time of the year. For example, in the last five years ICARDA distributed over 100,000 germplasm samples to users at ICARDA and national programs worldwide.

The *ex situ* genebanks are most suitable for conservation of homogenous, single-genotype accessions, i.e. breeding lines and improved germplasm. However, maintenance of heterogenous accessions, such as landraces and wild species, in a genebank

is questioned for several reasons:

- i) genetic diversity of highly diverse natural populations cannot be adequately sampled;
- ii) heterogenous populations are subjected to genetic erosion in the genebank during multiplication, regeneration and sample aging;
- iii) conservation is static and does not allow dynamic response to a changing environment and further evolution.

To overcome these limitations of *ex situ* genebank conservation, a complementary method, *in situ* conservation in the original habitat, is recommended.

Fertile Crescent initiative

Agenda 21, a plan of action adopted by the UNCED in Rio, in June 1992 and subsequent international meetings to the Convention on Biological Diversity emphasized the importance of the *in situ* approach for biodiversity conservation. In response to this, in November 1993, ICARDA, with its sister center, IPGRI (The International Plant Genetic Resources Institute) and more recently ACSAD (The Arab Center for the Studies of Arid Zones in and Dry Lands) took an initiative to develop, jointly with national research institutes (NRIs) and NGO's, a regional project on Biodiversity and Natural resource Management and Conservation for Sustainable Agricultural Production in the Fertile Crescent. The participating Arab countries include Jordan, Iraq, Lebanon, Syria and the Occupied Palestinian Territories of the West Bank and Gaza. This project focuses on 'agricultural biodiversity', referring to the indigenous genetic resources within agriculturally important plant species (including cultivated species and non-domesticated vegetation utilized productively) and their wild relatives, and the diversity of these species within an ecosystem. It is anticipated that the project will be implemented by a Consortium comprised of partners in national

institutions and international research centers, having expertise in the areas of resource management and biodiversity of the Fertile Crescent. ICARDA is willing to act as the 'convening' center in this eco-regional initiative.

Other biodiversity conservation activities with Arab countries

ICARDA has been involved in a number of other research activities related to *in situ* conservation of biodiversity in Arab countries. These include:

- i) three experiments in Syria simulating *in situ* conservation of crop wild progenitors and relatives;
- ii) ecogeographic surveys of forage and pasture legumes in Iraq, Jordan, Morocco and Tunisia; and
- iii) surveys and genetic diversity studies of natural populations of wild progenitors of cereals and lentil in Lebanon, Jordan and Syria for identification of most appropriate sites for their conservation *in situ*.

In May 1992, the WANA Plant Genetic Resources Network (WANANET) was established to promote genetic resources activities and collaboration in the WANA region. The network was initiated and has been supported by ICARDA, IPGRI and FAO and the WANA Regional Office of IPGRI serves as a secretariat to the network. Biodiversity conservation is one of the WANANET's primary concerns and a separate working group 'Biodiversity and *in situ* conservation' was set up to deal with this issue. Arab countries make up the bulk of the members of WANANET.

ICARDA's holistic approach to biodiversity conservation

Biodiversity conservation is a complex issue which requires different scientific expertise and interaction and concerted action of a number of institutions at the national, regional and international level to be successful. ICARDA has in the 20 years of its existence established collaborative partnership

with the national research institutions and regional organizations in most Arab countries. The Center has expertise in essential components of biodiversity conservation projects, such as: *ex situ* genetic resources conservation, *in situ* conservation methodology, germplasm improvement methodology, natural resource management and conservation and socio-economic aspects of natural resources use. This and close collaboration with sister centers, IPGRI in particular, and links with advanced institutions elsewhere, enable ICARDA to take a holistic approach to biodiversity conservation. The ultimate goal is to integrate the biodiversity conservation technology with the development of sustainable and productive farming systems in the WANA region, including Arab countries. ICARDA is there, ready and willing, to assist them in achieving this objective.



برنامج الأمم المتحدة للبيئة
UNITED NATIONS ENVIRONMENT PROGRAMME
REGIONAL OFFICE FOR WEST ASIA



ANNEXURE II

*BIOLOGICAL DIVERSITY,
ITS CONSERVATION AND SUSTAINABLE USE
IN THE ARAB WORLD*

12-14 December 1995, Bahrain

CONFERENCE
PROGRAMME

*MEETING ON BIOLOGICAL DIVERSITY,
IT'S CONSERVATION AND
SUSTAINABLE USE IN THE ARAB WORLD
12-14 December 1995, Bahrain*

AGENDA

Day One	Tuesday, December 12
08.30 - 09.00	Registration
09.00 - 10.00	<i>Opening Session</i>
10.00 - 10.30	Coffee Break
10.30 - 11.30	Conservation of Bio-Diversity in the Arab World Prof. Kamal Batanouny
11.30 - 13.00	Biosphere Reserves for Bio-Diversity Conservation, Sustainable Use and Benefit Sharing Mr. Peter Dogse, UNESCO
	Saving the Arabian Leopard Mr. Richard Hornby Federal Environmental Agency, UAE
	Bio-Diversity and Sustainable Development Mr. Ahmed Safwat Abdul Salam Arab Org. for Agricultural Development, Bahrain
13.00 - 14.30	Lunch
14.30 - 15.45	Presentation of Country Reports (Egypt, Jordan, Oman)
15.45 - 16.15	Coffee Break
16.15 - 17.30	Presentation of Country Reports (Continued) (Palestine, S. Arabia, Syria, Tunisia)

Day Two	Wednesday, December 13
08.30 - 09.30	Bio-Diversity in the Arabian Gulf Region Mr. Saeed Abdulla, Bahrain National Committee for Wildlife Protection
09.30 - 10.30	Overview of the Arab Expert Group Meeting on Bio-Diversity in the Arab World Ms. Fatma Al-Mallah, CAMRE, League of Arab States
10.30 - 11.00	Coffee Break
11.00 - 12.20	Role of ICARDA in Plant Genetic Resources Conservation in Arab Countries. Mr. Jan Kanopka, ICARDA Issues of Concern on Biological Diversity Conservation ACSAD - Mr. Adel Jouda
12.20 - 13.00	An Action Plan of Bio-Diversity for the Arab World General Discussion
13.00 - 14.30	Lunch
14.30 - 15.30	Presentation of Country Reports (UAE, Yemen, Bahrain)
15.30 - 16.00	Coffee Break
16.00 - 17.30	Group discussion to develop action plan and recommendations
Day Three	Thursday, December 14
08.30 - 09.30	Plenary Lecture - Mr. Hisham Baban Legislation Implications of the Biodiversity Convention
09.30 - 10.30	Development of Action Plan - Group Discussion
10.30 - 11.00	Coffee Break
11.00 - 12.00	Drafting of Recommendations
13.00	Evaluation of the meeting and adoption of recommendations
13.00	The Final and Closing Session

ANNEXURE III

BIOLOGICAL DIVERSITY, ITS CONSERVATION AND SUSTAINABLE USE IN THE ARAB WORLD

Bahrain, 12-14 December 1995

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وفي الختام اود ان اقدم شكري وتقديري لحكومة البحرين ووزارة الاسكان والبلديات
والبيئة بدعمهم المتواصل والمستمر والى سعادة الشيخ خالد بن احمد آل خليفة رئيس
اللجنة الوطنية لحماية الحياة الفطرية لرعايته هذا الاجتماع كما واود ان اقدم شكره
وامتناني لاعضاء اللجنة الوطنية لحماية الحياة الفطرية لمساعدتهم في التحضير
واحتضان هذه الندوة . وفقكم الله والسلام عليكم

الدكتور/ فؤاد قنبر
المسؤول الاقدم لشؤون البيئة
المكتب الاقليمي لغرب آسيا لبرنامج
الامم المتحدة للبيئة

لقد كان للفعاليات الانسانية دور بارز ومتزايد على انقراض الانواع المختلفة من الحيوانات والنباتات . ورغم عدم وجود احصائيات متكاملة الا انه من المتوقع ان يتعرض ربع مجموع التنوع البيولوجي في الارض الى خطر الانقراض خلال العقود الثلاثة القادمة نتيجة لاجتثاث الاحراج والفعاليات الانسانية الاخرى . ورغم كل الجهود الناجحة والتقدم الملموس في مجال حماية البيئة وفي محاولة لوقف عملية الانقراض تخوض بعض الدول الصناعية والنامية جدلا حاميا حول التكنولوجيا الوراثية والحيوية والمساعدات الفنية والمالية المطلوبة وقضية براءات الاختراع حول البذور والكانات الحية ، حيث تشير بعض الدراسات العلمية ان ازالة الغابات مثلا قد تدمر والى الابد نباتات تحتوي على مواد قد تساعد على شفاء المرضى بالسرطان والامراض الخبيثة الاخرى .

وفي وطننا العربي يزداد الاهتمام بالتنوع البيولوجي وطرق الحفاظ عليه حيث كثرت المحميات الوطنية البحرية منها والبرية ، وازدادت النشاطات المؤدية للحفاظ على الانواع الحيوانية النادرة مثل المها العربي . وهناك محاولات لانقاذ الفهد العربي من الانقراض .

ان العوامل الاقتصادية اضافة الى العوامل الاخلاقية والبيئية هي التي دفعت دول العالم في سنة ١٩٩٢ خلال مؤتمر الامم المتحدة للبيئة والتنمية على التوقيع على معاهدة ملزمة للحفاظ على التنوع البيولوجي . وفي هذا الاجتماع قامت اكثر من ١٥٥ دولة بالتوقيع على هذه الاتفاقية بضمنها ستة عشر دولة عربية . وخلال السنين الثلاثة الماضية اعلنت اكثر من ١٣٠ دولة مصادقتها على هذه الاتفاقية . ورغم شمول هذه الاتفاقية على مساعدات فنية ومالية للدول النامية الا ان عدد الدول العربية التي صادقت على هذه الاتفاقية ستة فقط وهي الاردن ومصر ولبنان وسلطنة عمان والمغرب والجزائر . ومن المؤمل ان توقع جميع دول مجلس التعاون لدول الخليج العربية على هذه الاتفاقية في القريب العاجل .

ويأتي اجتماعنا هذا لمناقشة التوصيات التي تم اتخاذها في اجتماع الخبراء العرب الذي نظّمته الجامعة العربية والذي تم عقده في القاهرة للفترة من ١ - ٥ اكتوبر/ تشرين اول . ومن المؤمل ان يتم التوصل الى وضع خطة عمل عربية للحفاظ على التنوع البيولوجي في البلاد العربية . ويشارك في هذا الاجتماع ممثلون من عشرة دول عربية اضافة الى ستة منظمات دولية وعربية . ومن الجانب الآخر سيقوم البرنامج البيئي للامم المتحدة بدوره الاساسي والمناط به الا وهو تحفيز وتنشيط الفعاليات الملائمة للوصول الى النتائج المطلوبة .

سعادة الشيخ خالد بن احمد آل خليفه رئيس اللجنة الوطنية لحماية الحياة الفطرية
الموقر

السيدة فاطمه الملاح - مسؤولة الامانة البيئية لمجلس الوزراء العرب
المسؤولين عن شؤون البيئة

سيداتي سادتي

أنه لمن دواعي سروري ونياية عن السيدة اليزابيث داودسويل المديرية التنفيذية
لبرنامج الامم المتحدة للبيئة ان ارحب بكم في هذا اللقاء المهم لوضع خطة عمل
المحافظة على التنوع البيولوجي واستخدامه المستدام في الوطن العربي .

لقد دأب البرنامج البيئي لمنظمة الامم المتحدة منذ تأسيسه في سنة ١٩٧٢ على القيام
بالمهام المناطة به الا وهي تنسيق وتحفيز الجهود والفعاليات البيئية بين منظمات الامم
المتحدة من جهة وبين المنظمات العالمية والاقليمية والوطنية المهتمة بشؤون البيئة
من الجهة الاخرى . ويأتي هذا النشاط الذي نحضره هذا اليوم كأحد الامثلة للفعاليات
المشتركة التي يتم تنظيمها بالتعاون بين برنامج الامم المتحدة للبيئة واللجنة الوطنية
لحماية الحياة الفطرية في البحرين .

وتعتبر مسألة التنوع البيولوجي من القضايا البيئية المهمة التي تتطلب تعاوننا دوليا
مشتركا من أجل المحافظة عليها ، حيث اصبحت الموارد البيولوجية مهددة وبشكل
متزايد نتيجة لعمليات التصنيع ، وتلوث الهواء والماء والتربة واستخدام المبيدات ،
والامطار الحمضية وتأثيرها على الغابات والبحيرات ، والاستغلال المفرط والصيد
الجائر .

وفي تقرير لبرنامج الامم المتحدة للبيئة أظهرت بعض الدراسات الحالية ان ما لا يقل
عن ٣٩٥٦ نوعا من الحيوانات والنباتات مهددة بخطر الانقراض وأن ٣٦٤٧ نوعا
معرض للخطر كما وأن ٧٢٤٠ نوعا يعتبر نادرا . ويشير تقرير البرنامج ان كل يوم
يمر يصبح نحو خمسين نوعا من النبات والحيوان في عداد الانواع المنقرضة .

كلمة الدكتور فؤاد قتيبي
الخبير الأقدم لشؤون البيئة
المكتب الاقليمي لبرنامج الأمم المتحدة للبيئة

في

اجتماع الحفاظ على التنوع البيولوجي
الحماية والاستخدام المستدام في العالم العربي

البحرين ١٢ - ١٤ ديسمبر ١٩٩٥

وقد اعتمد مجلس الوزراء العرب المسؤولين عن شؤون البيئة في دورته السابعة التي انعقدت بمقر الأمانة العامة لجامعة الدول العربية يوم ٢٧ نوفمبر ١٩٩٥ تقرير وتوصيات الاجتماع وطلب من الدول العربية العمل على تنفيذها والاستفادة من ما تضمنته الوثائق من آراء ومقترحات فيما يتم تنفيذه من سياسات وأنشطة وبرامج للحفاظ على التنوع البيولوجي . كما دعى المركز العربي لدراسات المناطق الجافة والاراضي القاحلة لتولى مهمة التخطيط والتنسيق وتبادل المعلومات بين الدول العربية والمنظمات العربية والاقليمية والدولية المعنية في مجال التنوع البيولوجي ، ومتابعة الاجتماعات الخاصة بالاتفاقية الدولية للتنوع البيولوجي واتخاذ ما يلزم لتفصيل المشاركة العربية في هذه الاجتماعات . ومما يدل ايضا على اهتمام مجلس الوزراء العرب المسؤولين عن شؤون البيئة على الحفاظ على التنوع البيولوجي في منطقتنا العربية حرص أن يكون موضوع جائزة المجلس لعام ١٩٩٦ "صون التنوع البيولوجي في البيئة الصحراوية والبراري" وقيمة الجائزة خمسة آلاف دولار والتقدم اليها مكفول لكل فرد ومؤسسة عربية .

معالي رئيس اللجنة الوطنية لحماية الحياة الفطرية

الاخوه والاخوات

أنى علي يقين من أننا سنتمكن بنهاية هذا الاجتماع وفي ضوء ما سيتم طرحه من أوراق عمل وفي هذه الصلابة المميزة من الخبراء من التوصل الى جملة من الآراء البناءة التي ستساعد على مزيد من الجهد المشترك لتحقيق ما نصبو اليه من الحفاظ على التنوع البيولوجي واستخدامه المستدام في منطقتنا العربية .

وفي ختام كلمتي أود أن أتوجه بخالص الشكر والامتنان الى سعادة الشيخ خالد بن أحمد آل خليفة راعي الاجتماع والجهة المنظمة له المكتب الاقليمي لغرب آسيا لبرنامج الامم المتحدة للبيئة .

مرة أخرى اكرر تمنياتي لكم ولاجتماعكم بالنجاح والتوفيق والسلام عليكم ورحمة الله وبركاته .

الدول العربية ووضع أولويات لتنفيذها وركز نشاطه في ثلاثة برامج اعطاها الأولوية وهي برنامج مكافحة التصحر وزيادة الرقعة الخضراء وبرنامج مكافحة التلوث الصناعي وبرنامج التربية والتوعية والاعلام البيئي ، وتشمل الأنشطة التي يتم تنفيذها في إطار البرامج الثلاث اعداد الدراسات وعقد حلقات العمل والدورات التدريبية حول القضايا البيئية المحورية بهدف تبادل الخبرة والمعرفة وإيجاد الحلول الملانمة في ضوء الامكانيات والظروف التي يعيشها الوطن العربي . ويتم تنفيذ هذه الأنشطة بالتعاون مع المنظمات العربية والدولية المعنية وخاصة برنامج الامم المتحدة للبيئة . وتم تعزيز الاعلان بالبلاد العربية عن البيئة والتنمية وأفاق المستقبل ووثيقة محاور وبرامج العمل العربي للتنمية المستدامة . وأهتم المجلس بدعم التعاون وتنسيق الجهود بين المنظمات العربية والدولية المعنية بالعمل البيئي التنموي في المنطقة العربية . فأنشأ لهذا الغرض عام ١٩٩٣ اللجنة المشتركة للبيئة والتنمية في الوطن العربي والتي تضم في عضويتها حوال ٣٠ منظمة عربية واقليلية ودولية . وتتبع هذه اللجنة التعرف على الأنشطة التي يقوم بها كل عضو وامكانية المشاركة في تنفيذها لمنع الازدواجية والتكرار ولتحقيق الاستفادة القصوى من الموارد والامكانيات المتاحة . وقد تم في إطار أنشطة هذه اللجنة والتي تتولى أمانتها الفنية ايضا الامانة العامة لجامعة الدول العربية عقد اجتماع الخبراء حول التنوع البيولوجي في الوطن العربي والذي انعقد في مقر الامانة العامة للجامعة بالقاهرة في الفترة ١-٥ اكتوبر ١٩٩٥ وأعدت له المنظمات العربية والدولية المعنية وقام بالامانة الفنية للجنة التحضيرية المركز العربي لدراسات المناطق الجافة والأراضي القاحلة واستهدف الاجتماع :

- التعرف على حالة التنوع البيولوجي في الوطن العربي وتقديم المعلومات المتوفرة عنه.
- اقتراح الاعمال ذات الأولوية الضرورية لصيانة التنوع البيولوجي واستخدام مكوّناته بصورة مستدامة في الوطن العربي .
- تبادل الخبرة والمعرفة والمشورة في مجالات اعداد استراتيجيات وخطط وبرامج وسياسات الحفاظ على التنوع البيولوجي واستجابة لمحاور وبرامج العمل العربي للتنمية المستدامة وجدول اعمال القرن ٢١ .
- تعزيز التعاون وتنسيق الجهود بين المنظمات العربية والاقليمية والدولية .

وشارك في الاجتماع فضلا عن خبراء المنظمات خبراء ١١ دولة عربية وخلص الى جملة من التوصيات البناءة العملية على المستوى الوطني والاقليمي والدولي وأمل أن تنال اهتمامكم وجانب من مناقشاتكم لتتبلور الرؤى والتوجيهات بشأن وضعها موضع التنفيذ .

بسم الله الرحمن الرحيم

سعادة الشيخ خالد بن احمد آل خليفة
رئيس ديوان سمو ولي العهد
رئيس اللجنة الوطنية لحماية الحياة الفطرية بدولة البحرين

السيد فؤاد قنبرور
ممثل المكتب الاقليمي لغرب آسيا لبرنامج الامم المتحدة للبيئة

الأخوة والأخوات

يسعدني أن أمثل الأمانة العامة لجامعة الدول العربية في اجتماع الحفاظ على التنوع البيولوجي واستخدامه المستدام وقد كلفني معالي الأمين العام لجامعة الدول العربية الدكتور أحمد عصمت عبدالمجيد أن ابليكم تحياته وتمنياته الطيبة .

ولقد تبلور اهتمام جامعة الدول العربية بقضايا البيئة في منتصف الثمانينات ، حيث انعقد عام ١٩٨٦ المؤتمر العربي الوزاري الأول حول الاعتبارات البيئية في التنمية ، وأعدت له الأمانة العامة للجامعة بالمشاركة مع المنظمة العربية للتربية والثقافة والعلوم وبرنامج الامم المتحدة للبيئة ، وهو أول مؤتمر عربي وزاري يناقش الترابط والتداخل بين قضايا البيئة والتنمية وتأثير كل منهما وانعكاساته على الآخر وقد خلص المؤتمر الى اقرار الاعلان العربي عن البيئة والتنمية والذي يتضمن المبادئ والتوجيهات الاساسية للعمل القطري والتعاون العربي والدولي في مجال حماية البيئة وتحسينها ، واعتمد المؤتمر يوم صدور قراراته ، في ١٤ اكتوبر ، يوما عربيا للبيئة ، تحتفل به الدول العربية كل عام بصورة تحقق مزيدا من الوعي بقضايا البيئة وارتباطها الوثيق ببرامج التنمية ، كما كان من ابرز نتائجه الايجابية انشاء مجلس الوزراء العرب المسؤولين عن شئون البيئة.

ويهدف المجلس الى تنمية التعاون العربي في مجالات شئون البيئة ، وتحديد المشكلات البيئية الرئيسية في الوطن العربي وأولويات العمل اللازمة لمواجهتها ، فضلا عن الاهتمام بالعلاقات المتشابهة بين البيئة والتنمية خاصة التي يتطلب تناولها بعدا اقليميا ولا تدرج بشكل مباشر ضمن مهام واختصاصات المنظمات العربية المتخصصة وتقوم الأمانة العامة للجامعة بمهام الأمانة الفنية للمجلس في اجتماعه التأسيسي عام ١٩٨٧ عددا من البرامج لترجمة الاعلان العربي عن البيئة والتنمية الى مجالات عمل مشتركة بين

كلمة السيدة / فاطمة الملاح

ممثلة الامانة العامة لجامعة الدول العربية

في

اجتماع الحفاظ على التنوع البيولوجي
الحماية والاستخدام المستدام في العالم العربي

البحرين ١٢-١٤ ديسمبر ١٩٩٥

عمليات الدفن والرّدْم في خليج تبلي ، لجعله نموذجاً
للمحمّيات الطبيعية الهامّة في البلاد .

وفي الختام ، أتقدّم بخالص الشكر والتقدير لكلّ من
ساهم في تنظيم هذا المؤتمر الهام ، متمنياً لكم التوفيق في
مؤتمركم ، والخروج بتوصيات عملية تسهم في الحفاظ على
التنوع البيولوجي في بلادنا العربية ، كما أتمنى لكم طيب
الإقامة في بلدكم الثاني البحرين ، والسلام عليكم ورحمة الله
وبركاته .

والوطنية لتُساهم في برامج تنمية الحياة الفطرية والحفاظ على التنوع البيولوجي ان كان على مستوى الأنظمة البيئية أو الأنواع العديدة من نباتات وحيوانات ، وبالذات المهددة منها بالانقراض .

ورغم صغر مساحة دولة البحرين ، والضغط الشديد الذي تواجهه أمام متطلبات التنمية المختلفة ، إلا أن اهتمام سيدي حضرة صاحب السمو أمير البلاد المفدى وحكومته الرشيدة بالبيئات الطبيعية المتميزة ، جعل البحرين كشقيقاتها في المنطقة تتوجّه لإنشاء مؤسسات خاصة بالحياة الفطرية وانمائها وسنّ التشريعات المناسبة لها .

وكان صدور المرسوم بقانون رقم (٢) لعام ١٩٩٥ لحماية الحياة الفطرية في البحرين ، خطوة رائدة في هذا المجال ، وقد ساهم في دفع البرامج التي تقوم بها اللجنة الوطنية لحماية الحياة الفطرية ، من أجل حماية البيئات الطبيعية في البحرين ، والعمل على إنشاء منظومة المحميات الطبيعية التي استُهلّت بقرار سمو رئيس الوزراء المتعلق بإيقاف

والاستخدام الأمثل لمكونات البيئة الطبيعية ليُضيف حجراً آخر
 في برامج البيئة التي تعتزُّ البحرينُ بالاهتمام بها.
 وكلُّنا يعلمُ أيها الأخوة ما كان للعرب الأوائل من اهتمام
 متميز وحرص شديد ، على إبقاء التوازن في البيئات الطبيعية
 لما تُمثله من موردٍ أساسيٍّ في الصحراء ، وبالذات في مواسم
 الجفاف .

لقد أسَّس العربُ قبل قرونٍ عديدةٍ نظاماً رائعاً يبيِّن
 إدراكهم لضرورة الاستخدام الأمثل للموارد الطبيعية ، ان
 كانت عشباً أو مياهاً ، فقد كان نظامُ الحمى الذي عرفته
 القبائل العربية وجاء الإسلام لينظِّمه ويعمِّم الاستفادة من
 ميزاته نموذجاً رائعاً لحماية الحياة الفطرية والتنوع البيولوجي
 الذي نعرفه في وقتنا الحاضر .

أيها الأخوة الحضور

لقد شهدت السنوات القليلة الماضية ، تصاعداً ملحوظاً
 في الوعي المتعلق بحماية الحياة الفطرية في منطقتنا العربية . فقد
 تنامت أعداد المحميات الطبيعية وتبلورت المؤسسات الرسمية

بسم الله الرحمن الرحيم

أيها الأخوة الحضور

إنّه لمن دواعي السرور أن تستضيف البحرين في هذه الأيام المباركة هذا التجمّع الخيّر الذي يضمّ أبناءاً لأمتنا العربية حرصوا على العمل في مجال ليس من السهل الوصول إلى غاياته نظراً للمصاعب الجسام التي تقف في طريق الإبقاء عليه وأعني بذلك تراثنا الطبيعي وكيفية حمايته .

إنّ تنظيم هذا المؤتمر يُشكل إضافةً نوعية في اللقاءات التي عرفتها البحرين في الفترة الأخيرة ، ولذا فإنني أودُّ أن أبيّن تقديرنا للجهد الطيب الذي يقوم به الأخوة في برنامج الأمم المتحدة للبيئة ، من خلال تنظيم البرامج والمشاريع التي ساهمت في التواصل والتنسيق بين المختصين في دول المنطقة ، للتعرف على القضايا المشتركة وطرح الحلول المناسبة لعلاجها . ويأتي هذا المؤتمر الهام الذي يتحاور فيه خبراء التنوع البيولوجي بالمنطقة العربية ، لتبيان الوضع الراهن

كلمة الشيخ خالد بن أحمد آل خليفة
رئيس اللجنة الوطنية لحماية الحياة الفطرية

في

اجتماع الحفاظ على التنوع البيولوجي
الحماية والاستخدام المستدام في العالم العربي

البحرين ١٢ - ١٤ ديسمبر ١٩٩٥

ANNEXURE I

OPENING STATEMENTS

- *H.E. Shaikh Khalid Bin Ahmed Al-Khalifa*
(Chairman, NCPW)
- *Ms. Fatima El Mallah*
(Technical Secretary, CAMRE)
- *Dr. Fouad Kanbour*
(Senior Environmental Affairs Officer, UNEP/ROWA)

تمهيد

تحتوى هذه النشرة التقرير النهائي ووقائع المؤتمر حول "التنوع البيولوجي ، المحافظة عليه ، واستخدامه المستدام في الوطن العربي" الذي انعقد في البحرين في الفترة من ١٢-١٤ ديسمبر / كانون أول ١٩٩٥ .

ويشمل التقرير النهائي ملخص لجميع الأوراق المقدمة إلى المؤتمر إضافة الى مجموعة من التوصيات وخطة العمل المقترحة حول المحافظة على التنوع البيولوجي في المنطقة.

أما الوقائع ، فإنها تتضمن نصوصا كاملة لسبع دراسات فنية قدمت في المؤتمر. وبصورة عامة غطت هذه الدراسات النشاطات العلمية في المنطقة ، إضافة الى الخطوات العملية التي تم إتخاذها من قبل المنظمات الإقليمية والدولية من اجل المحافظة على التنوع البيولوجي وحمايته في المنطقة.

ويتضمن الملحق قائمة المشاركين وبرنامج عمل المؤتمر إضافة الى كلمات الافتتاح التي تم إلقاؤها.

وقد انعقد هذا المؤتمر تحت رعاية ودعم سعادة الشيخ خالد بن أحمد آل خليفة ، رئيس اللجنة الوطنية لحماية الحياة الفطرية في البحرين. ان هذا الدعم والتشجيع من قبل سعادته هما اللذان ساعدا على التغلب على المشاكل والصعوبات التي ظهرت في اللحظات الأخيرة قبيل انعقاد المؤتمر وأرغمت المنظمين على تغيير زمان ومكان انعقاده. ويود المنظمون التعبير عن جزيل شكرهم وامتنانهم لسعادة الشيخ خالد بن أحمد آل خليفة على هذا الدعم والتشجيع.

كما أود ، في النهاية ، أن اعبر أيضا عن إمتنان المكتب الإقليمي لغرب آسيا لبرنامج الأمم المتحدة للبيئة لجميع المحاضرين والمستشارين والمشاركين لمساهماتهم القيمة للمؤتمر ومشاركاتهم الفعالة خلال جلسات المؤتمر. وبصورة خاصة ، أود ان اعبر عن شكري لكل من السيدة فاطمة الملاح ، ممثلة الأمانة العامة لجامعة الدول العربية ، والسيد بيتر دوغس ، ممثل اليونسكو ، والسيد أحمد صفوت عبدالسلام ، ممثل المنظمة العربية للتنمية الزراعية ، والدكتور سعيد عبدالله ، أمين عام اللجنة الوطنية لحماية الحياة الفطرية وعميد كلية العلوم بجامعة البحرين ، والسيد جان كنوبكه ، ممثل المركز الدولي للبحوث الزراعية في المناطق الجافة (إيكاردا) ، والدكتور عادل جوده ، ممثل المركز العربي لدراسات المناطق الجافة والأراضي القاحلة (أكساد).

الدكتور فؤاد قنبور

مسؤول أقدم للشؤون البيئية

برنامج الأمم المتحدة للبيئة لغرب آسيا

مقدمة

إن آلاف من الحيوانات والنباتات التي تشكل التنوع البيولوجي لكوئنا الأرضي معرضة لتهديدات بسبب الاستخدام غير الرشيد وفقدان المأوى والتلوث والانقراض. وقد حدثت هذه الظاهرة الخطيرة ببرنامج الأمم المتحدة للبيئة بأن يقوم بتعزيز وتسهيل عملية الإعداد لإتفاقية دولية حول التنوع البيولوجي التي تم التوقيع عليها من قبل أكثر من ١٥٠ دولة أثناء مؤتمر الأمم المتحدة حول البيئة والتنمية المسمى "بقمة الأرض" والذي عقد في ريو دي جانيرو عام ١٩٩٢.

وتهدف هذه الإتفاقية الى تنظيم إستخدام الموارد الوراثية وتحديد مسؤوليات الحكومات عن إستخدام مواردها الطبيعية استخداما مستداما والمحافظة على فصائل معينة من الكائنات الحية. ومنذ التوقيع على هذه الإتفاقية بدأ الإدراك بأهمية المحافظة على التنوع البيولوجي يزداد أكثر فأكثر ، وقد تم إتخاذ العديد من الخطوات العملية الدولية تجاه حماية أنواع الكائنات الحية والأنظمة البيئية.

ففي المنطقة العربية أوصى مجلس الوزراء العرب المسؤولين عن شئون البيئة بإدخال مسألة التنوع البيولوجي في 'البرنامج العربي للتنمية المستدامة' التابع للمجلس ، وذلك باعتبارها إحدى المسائل الخمس الرئيسية ذات الأولوية والتي تتطلب الاهتمام والتحرك العاجل. ولهذا الغرض تم عقد إجتماع لمجموعة الخبراء العرب حول "التنوع البيولوجي في العالم العربي" في القاهرة في الفترة ١-٥ أكتوبر ١٩٩٥.

وكمتابعة للإجتماع المذكور أنفا ، قام المكتب الإقليمي لغرب آسيا لبرنامج الأمم المتحدة للبيئة بتنظيم مؤتمر حول "التنوع البيولوجي، المحافظة عليه ، واستخدامه المستدام في الوطن العربي" والذي انعقد في البحرين في الفترة ١٢-١٤ ديسمبر ١٩٩٥. وكان هذا المؤتمر يهدف الى مراجعة النشاطات والفعاليات التي تم القيام بها في المنطقة ، وإيجاد خطة عمل لتنفيذ التوصيات التي تبناها إجتماع الخبراء في القاهرة.

إن هذه النشرة تحتوى على وقائع هذا المؤتمر الهام ، وانه مما يبعث السرور أن تظهر هذه الوقائع في أول اصدار من سلسلة التقارير والمطبوعات التي يقوم مكتبنا بطبعتها وتوزيعها على عدد كبير من المتخصصين والخبراء والمؤسسات داخل المنطقة وخارجها.

الدكتور مكرم أمين جرجس
المدير الإقليمي
برنامج الأمم المتحدة للبيئة لغرب آسيا

برنامج الأمم المتحدة للبيئة المكتب الإقليمي لغرب آسيا



التقرير النهائي ووقائع مؤتمر

التنوع البيولوجي؛
واستخدامه المستدام في الوطن العربي

البحرين ١٢-١٤ ديسمبر / كانون أول ١٩٩٥

١٩٩٦

سلسلة المطبوعات والثقافة



برنامج الأمم المتحدة للبيئة المكتب الإقليمي لغرب آسيا

التقرير النهائي ووقائع مؤتمر

التنوع البيولوجي؛
واستخدامه المستدام في الوطن العربي

البحرين ١٢-١٤ ديسمبر / كانون أول ١٩٩٥

سلسلة المخطوطات والوثائق العربية

١٩٩٦