

No. 65

Unesco activities in the field of science and technology in the Arab region

Science policy studies and documents



unesco

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Preface

The Unesco series "Science policy studies and documents" forms part of a programme initiated by the General Conference of Unesco at its eleventh session in 1960, which aims at making available factual information concerning the science and technology policies of various Members States of the Organization as well as technical studies of interest to policy-makers and managers.

The country studies are carried out by the government authorities responsible for policy-making in the field of science and technology in the Member States concerned.

The selection of the countries in which studies on the national science and technology policy are undertaken is made in accordance with the following criteria : the originality of the methods used in the planning and execution of such policy, the extent of the practical experience acquired, and the level of economic and social development attained. The geographical coverage of the studies published in the series is also taken into account.

The technical studies cover planning of science and technology policy, organization and administration of scientific and technological research, and other questions relating to science and technology policy.

This same series also includes reports of international meetings on science and technology policy convened by Unesco.

As a general rule, the country studies are published in one language only, either English, French or Spanish, whereas some of the technical studies and the reports of meetings are published in several official languages of the Organization.

The present publication describes briefly the activities carried out by Unesco in the field of science and technology in the Arab region. As a rule mention is made only of the most significant current activities carried out by the Organization in 1984-1985. The activities described are those carried out by the eight specialized Programme Divisions of the Science Sector of the Organization, working in close co-operation with the operational Division of the same sector ; a Division of Science, Technical and Vocational Education of the Education Sector ; the operational Division of the same Sector ; a Division for Statistics on Science and Technology ; a Division of the General Information Programme and the Regional Office for Science and Technology in the Arab States.

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Introduction

A. PRINCIPLES OF ACTION

Unesco is the Specialized Agency of the United Nations entrusted with the international promotion of education, science, culture and communication with a view to furthering peace among nations and enhancing the well-being of all peoples of the world. This objective of furthering peace and development gives Unesco's action both an **ethical** and a **practical** dimension which are characteristic of programmes carried out by the Organization.

In the execution of its tasks, Unesco works in two main ways : encouraging **intellectual co-operation** and developing **operational projects**. Intellectual cooperation is fostered through programmes concerning the promotion of ideas and the advancement of knowledge in the fields falling within Unesco's constitutional responsibilities. This is done mainly by conducting international cooperative research projects, by organizing international conferences and seminars, and by issuing publications. The operations function is essentially performed through the technical assistance programmes of the Organization.

Furthermore, Unesco's activities in the various regions of the world have as their primary purpose that of giving the countries concerned in those regions the benefit of the worldwide experience acquired by the Organization in the areas of education, science and culture while also helping them to solve their related problems. Seen from this angle, activities at world, regional and national level are complementary and mutually supportive. They reflect one aspect of mankind's organized effort towards peaceful co-existence, mutual assistance and intellectual cooperation.

B. ORGANIZATIONAL STRUCTURE

At the present time, Unesco's activities concerning science and technology are primarily the responsibility of eight programme divisions belonging to the Science Sector of the Organization. Working in close cooperation with these programme divisions is a special division responsible for implementing 'operational' projects, and a division for international statistics on science and technology. The Regional Office for Science and Technology in the Arab States, with its Head-

quarters at present in Paris, cooperates closely with these various units and provides them with the necessary support.

C. AIMS AND SCOPE OF THIS REPORT

This report gives a brief description of Unesco's activities in the Arab States in the field of science and technology for development. For the sake of brevity mention is made only of the most important and significant current activities.

The report concerns the activities of (1) the eight programme divisions of the Science Sector, of its Operational Division and of the Regional Office for Science and Technology in the Arab States (ROSTAS) ; (2) the Division of Science, Technical and Vocational Education of the Education Sector ; (3) the Division of Statistics on Science and Technology of the Office of Statistics ; and (4) the Division of the General Information Programme (Scientific and Technological Information).

D. STRUCTURE OF THIS REPORT

Part I of the report gives a synopsis of activities according to three levels : world, regional and national. Part II contains a description of programme activities in Divisional sequence and carried out at world, regional and national levels. For each programme activity entry, the information generally appears under the following headings :

- . Title
- . Brief description
- . Principles of action
- . Main aims
- . Achievements
- . Linkages (if any) with other activities
- . Background information (origins, date of launching, etc.)
- . Organization(s) responsible (other than Unesco)
- . Organizational machinery (responsible for planning/coordination/implementation)
- . Participating countries.

Part I

Synopsis of activities

1. ACTIVITIES OF WORLDWIDE SCOPE

Unesco's worldwide programmes aim at combining the efforts of all its Member States towards the achievement of common goals. It is in this spirit that the Unesco Secretariat never loses sight of the need to associate all its Member States as closely as possible with the activities undertaken by the Organization as part of its worldwide scientific and technological programmes.

2. ACTIVITIES OF A REGIONAL NATURE

(a) Role of the Regional Office for Science and Technology in the Arab States (ROSTAS)

Unesco's regional programmes in the Arab States are mainly implemented through the ROSTAS office which opened in Cairo (Arab Republic of Egypt) in 1947. This office is now temporarily based at the Organization's headquarters in Paris, and serves the following countries : Algeria, Bahrain, Arab Republic of Egypt, Iraq, Jordan, Kuwait, Lebanon, Malta, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Socialist People's Libyan Arab Jamahiriya, Somalia, Sudan, Syrian Arab Republic, Tunisia, United Arab Emirates, Yemen Arab Republic and People's Democratic Republic of Yemen.

This Office has the task of encouraging, preparing, carrying out and supervising Unesco's Arab regional programmes in the scientific field, whether financed under the Regular Programme or under the United Nations Development Programme. At the request of the divisions concerned, it also assists Headquarters specialists in undertaking national programmes and bringing them to a successful conclusion.

The ROSTAS office accordingly keeps in close touch with scientific and technological developments in the countries it serves, so as to facilitate the planning of scientific activities by Unesco in this region. It serves as a centre for the exchange of information and documentation on the organization and development of scientific and technological activities and resources in the Member States of the region. It further advises the countries it serves as to what they should do to facilitate scientific and technological research, training, services and transfers, and it assists governments in preparing their requests to the United Nations Development Programme for assistance in those fields for which it is responsible.

This Regional Office is an integral part of the Unesco Secretariat as regards its Programme

and Budget, its administrative structure and the composition of its staff. For this reason, there will be no separate chapter about the contribution of the Office to the various matters of concern to Unesco. This report therefore contains a large number of references in various places to the work done by the Office, work which is too considerable and too varied to try and recapitulate here. It should, nevertheless, be stressed that in accordance with the decisions adopted by various sessions of the General Conference of Unesco the Office plays an important part in the organization of the regional meetings of ministers and governmental experts responsible for science and technology policy, and in the implementation of the recommendations adopted by them. Finally, the Office organizes many training courses, study courses and symposia in the region on scientific and technical topics.

(b) Unesco Regional Technical Assistance Programme

Regional or subregional projects supported by extra-budgetary funds (funds-in-trust) derive from requests submitted by groups of Member States addressed directly to Unesco and the funding source. Some examples are given in Table I overleaf.

(c) Unesco's relations with regional and sub-regional scientific and professional bodies in the Arab States

Unesco has established working links with a large number of these bodies. Some of them are inter-governmental, like the League of Arab States, established in 1945, and its Educational, Cultural and Scientific Organization (ALECSO) set up in 1970, with which Unesco has concluded agreements in due form. With the cooperation of ALECSO, Unesco organizes many meetings of very varied kinds (ministerial conferences, symposia, seminars, training courses, study courses, etc.) on scientific topics of common interest. Other bodies are non-governmental, such as the Association of Arab Universities (set up in 1964), the Federation of Arab Engineers (FAE) or the Federation of Arab Scientific Research Councils (FASRC).

3. ACTIVITIES AT THE NATIONAL LEVEL

When a Member State, Associate Member or particular group of States so requests, Unesco can provide assistance for the implementation of

TABLE I

Regional/Sub-regional science and technology projects supported by extra-budgetary funds (funds-in-trust) planned, implemented and/or terminated in 1983 or 1984

Code	Title	Duration	Source of Funds	Total contribution in 1000 US\$
705-RAB-40	Feasibility Study for the Assessment and Mitigation of Earthquake Risk in the Arab Region	1981-84	AFESD/IDB Arab Fund for Economic Development	248
926-RAB-40	Arabian Gulf University	1983	Arab Bureau of Education for the Gulf States	50

projects, programmes or other activities forming part of an operation to develop education, science or culture. The funds necessary for this assistance may come from the Organization's regular budget, from extra-budgetary sources such as those provided by the United Nations Development Programme (UNDP), the United Nations Financing System for Science and Technology for Development (UNFSSTD) or from funds-in-trust provided by Member States themselves.

(a) Unesco's Regular Programme

Many activities described in this report are financed under Unesco's Regular Programme. Without going into detail, it is fair to say that they represent a considerable proportion of Unesco's activities aimed at the Arab States in the field of science and technology.

It should, nevertheless, be recalled that the activities financed under the Regular Programme include those covered by the Organization's Programme of Participation. In this instance, the activities are undertaken by the countries themselves with Unesco's cooperation which frequently takes the form of fellowships, travel awards and subventions for the organization of meetings granted to Member States or international organizations at their request.

(b) Unesco/UNDP Technical Assistance Programme

With financial backing from the United Nations Development Programme (UNDP) Unesco is able to provide its Member States and Associate Members, at their request, with technical assistance in the fields of science and technology. This is naturally subject to the necessary funds being made available by UNDP. These technical assistance activities form part of the "National UNDP Country Programme".

At the present time, under these UNDP country programming arrangements, Unesco is assisting a number of its Member States in the Arab States region in many fields of science and technology. A list of current national science and technology projects for development financed by UNDP is given in Table II.

(c) Unesco Technical Assistance Programme financed through Funds-in-Trust Agreement and/or through Sources other than UNDP

Table III lists current large-scale national projects financed through self-benefiting funds-in-trust agreements and/or sources other than UNDP. The importance attached by the Arab States to Marine Resources is reflected by the large number of projects in this field.

TABLE II

National science and technology projects for development, current or planned up to 1984, financed by UNDP and executed in cooperation with Unesco

Country	Code	Project Title	Duration	UNDP contribution in 1,000 US\$
Algeria	ALG/75/037	Assistance to the "Centre National de Recherche des Zones Arides"	1977-83	135
	ALG/75/038	Development of the Applications of Solar Energy	1978-83	204
	ALG/75/039	Assistance to the "Centre de Recherche Océanographique et des Pêches"	1979-83	164
	ALG/75/40	Training and Planning in Research and Science Policy	1978-83	100
	ALG/82/003	Microzonation	1982-83	5
	ALG/83/004	Seismic Microzoning of El Chlef	1983	20
Egypt	EGY/73/041	Advancement of Post-graduate studies in Engineering Sciences, Cairo University	1972-83	933
	EGY/81/007	" " (Phase II)	1982-83	400
	EGY/73/058	Aquatic and Environmental Pollution Protection	1980-84	477
Jordan	JOR/81/001	Fellowship in Mechanical Engineering	1981-83	50
Lebanon	LEB/72/012	Faculty of Engineering, Lebanese University	1980-85	320
Morocco	MOR/80/004	Assistance to the "Ecole Hassania des Travaux Publics, Casablanca"	1981-85	933
	MOR/80/002	Assistance to the "Ecole Nationale de l'Industrie Minérale, Rabat"	1981-85	2,294
Sudan	SUD/72/549	Establishment of Hydraulic Research Station	1974-84	2,331
	SUD/83/007	Strengthening of the Hydraulic Research Station (planned Phase II of SUD/72/549)	1984-86	445

TABLE III

National science and technology large-scale projects for development, current or planned up to 1984, executed by Unesco and financed through funds-in-trust agreements and/or through sources other than UNDP

Country	Code	Project Title	Duration	Source of funds	Total contribution in 1000 US\$
Iraq	909/IRQ/42	Staff Development Centre	1979-85	Self-benefiting	1,939
	909/IRQ/43	Marine Science Centre	1979-85	"	2,587
Libya	901/LIB/40	Marine Fisheries Research Centre	1978-84	"	1,939
	901/LIB/42	Marine Biological Research Centre, El Fateh	1981-open	Self-benefiting Revolving fund	200
	901/LIB/43	Faculty of Engineering, Garyounis University	1981-84	Self-benefiting	22,383
	901/LIB/44	Scientific Research	1983-	"	150
	901/LIB/45	Bright Star University of Technology	1984-86	"	3,000
Oman	920/OMA/40	Marine Science Centre	1983-86	"	548
Qatar	920/QAT/42	Oceanographic Research Vessel for the University of Qatar	1981-84	"	2,909
Sudan	SUD/SI/001	Support to the National Desertification Control Coordinating and Monitoring Unit	1982-84	Unesco/UNSO/UNDP	120
Tunisia	1101/78/001	UNEP-MAB Integrated Project on Arid Lands (IPAL), Section Tunisia (Phase I)	1979-83	UNEP	534
	SP/3090	One month's consultancy mission on equipment for scientific research laboratories	1982	Special Account for aid to developing countries	
	SP/3309	Three months fellowship - Solar Energy	1981	"	
Yemen (PDR)	703/PDY/40	Marine Science Institute	1977-86	IDB	1,779

Part II

Description of programme activities by administrative units

Section I: Division of Science and Technology Policies

A. ACTIVITIES AT WORLD LEVEL

1. Title : Science and technology policy programme

Principles of Action : Unesco's activities in this field are based in particular on the following facts and principles :

- (i) a nation's science and technology policy is one of the most dynamic factors in its overall national development and security ;
- (ii) support to creative research and experimental development lies at the basis of a nation's self-reliance and fosters endogenous development ;
- (iii) the rationally planned and innovative application of science and technology enables countries to take advantage of recent discoveries and inventions more rapidly ;
- (iv) scientific and technological interdependence which is based on judicious transfer of knowledge and know-how, and which respects the dignity and interests of all, contributes in an effective way to the maintenance of peace between nations.

Main aims and functions : the activities of the Division of Science and Technology Policies can be divided into the following main functional areas :

- (i) **Standard-setting and methodological activities** the purpose of which is to support, and also to justify, certain norms or methods of action that could usefully be adopted/applied by the Member States and the international community, in the field of policy-making for science and technology. Examples are :
 - . the responsibilities and rights of scientific workers, such as described in the Recommendation concerning the Status of Scientific Researchers (as adopted by the General Conference of Unesco at its eighteenth session in 1974) and the extent to which that standard-setting text has found application in the Member States ;

- . the human values and ethical criteria to be taken into consideration in selecting the objectives of scientific research and experimental development (R&D) at both the national and international levels ;
- . the multilingual terminology used in policy-making for science and technology as exemplified by the SPINES Thesaurus, a controlled and structured vocabulary for planning, management and practical application to development, of which English and French versions have been produced (Spanish, Portuguese, Arabic and Russian versions are also envisaged) ;
- . a trilingual glossary (English/French/Spanish) of terms in common usage in science and technology policy ;
- . planning, programming and budgeting techniques applicable to scientific and technological activities at national level. Examples are the Unesco manuals for establishing national budgets, and for determining priorities in the field of science and technology ; and for building up a data base on the national scientific and technological potential.

These standard-setting and methodological activities constitute the intellectual and operational basis for the Organization's technical cooperation with its Member States in the sphere of science and technology policies (see vii below).

- (ii) **'Forum' activities** designed to enhance international exchange of information relating to Member States' policies for science and technology. Some examples of these activities are the periodical Unesco conferences which bring together the ministers in charge of science and technology policies at the regional level ; mention should be made in this connection of the MINESPOL and CAST type conferences, on the application of science and technology to development. The main current activity in this field is the preparation and holding of the second Conference of Ministers Responsible for Science and Technology in the Arab States and a

similar conference in Latin America and the Caribbean.

At government expert level, mechanisms may be established for continuing concertation among the Member States of a given region, the Secretariat of which rests with Unesco; a case in point is the Standing Conference of National Science and Technology Policy-Making Bodies for Latin America and the Caribbean which has held six sessions since its establishment in 1966. A similar mechanism is also envisaged for Africa.

(iii) **Activities in support of organized scientific and technological cooperation among Member States in a given region.**

The growing trend towards close association of countries belonging to the same (sub)region raises the problem of harmonizing or even integrating their national policies in many fields which are normally the sovereign province of the partner governments. Unesco assists these associations of Member States upon request, sometimes with the financial support of UNDP, with a view to speeding up the formulation and implementation of joint science and technology policies for such communities of states. Examples that may be cited in this respect are the West African Economic Community (CEAO), the Convenio "Andrés Bello" (SECAB) for the Andean countries, the Caribbean Council for Science and Technology (CCST) and the Association of South-East Asian Nations (ASEAN).

(iv) **International comparative studies and research** on contemporary problems of interest to Member States' science and technology policies. The following may be listed among such ongoing activities :

- . the international comparative study on the organization and performance of research units (ICSOPRU), in which more than twelve Member States from Asia, the Arab States region, Europe and Latin America have participated ;
- . the research project on societal utilization of research and experimental development (R&D) ;
- . the construction of meaningful indicators of scientific and especially of technological development, the definition and utilization of which may help improve the selection and assessment of operative technologies ;
- . the stimulation of national demand for technological progress, i.e. by appropriate reorientation of the states' purchasing power and by the use of fiscal or other techniques aimed at promoting national R&D activities.

(v) **Development and promotion of information exchange for policy-making in the field of science and technology.** This type of activity comprises, *inter alia* :

- . the preparation of regional compendia (Africa, Arab States, Asia, Europe,

Latin America) on the science and technology policies of Member States ; such compendia are normally published on the occasion of the ministerial conferences mentioned under section (ii) above. Detailed national monographs on the same subject are also published at irregular intervals at the request of the Member States concerned ;

- . maintenance of a data base concerning national science and technology policies ;
- . the publication of directories on teaching and research units dealing with subjects related to policy-making for science and technology existing in the Member States of Unesco, and on their national science and technology policy-making bodies (Ministries, Federal Councils for Science and Technology, National Research Councils, etc.) ;
- . the setting up of bibliographic and factual data bases at national level in support of policy-making for science and technology ; their possible interconnection through the international information system SPINES, proposed by Unesco ;
- . the publication of more than sixty books and monographs in the Unesco series 'Science Policy Studies and Documents' and elsewhere.

(vi) **Training of qualified personnel in the field of planning, organization and management of national science and technology policy.** These activities encompass the following :

- . the granting of observation fellowships and study fellowships (about 15 per year) awarded respectively to high officials and to students wishing to specialize, by means of foreign travel, in questions concerning science and technology policies ;
- . the organization of national symposia, regional training seminars and summer courses for science policy-makers and research managers ;
- . the preparation of teaching modules and syllabi for those training courses ;
- . the publication of a book aimed at a young and informed readership, on the life and work of scientific researchers ;
- . the publication of an 'Introduction to policy analysis in science and technology', No.46 in the series "Science Policy Studies and Documents" for specialized readers.

(vii) **Advisory services to Member States** for the formulation and implementation of national science and technology policies for development.

Unesco's technical cooperation normally relates to the following activities, according to requests received from the Member States concerned :

- . the design, establishment and functioning of science and technology policy-making machinery ;

- . the preparation of scientific and technological development plans and budgets consonant with the overall development plans of the countries concerned ;
- . survey and analysis of the national scientific and technological potential ;
- . the identification and priorities for the national R&D system and related scientific services, and evaluation of their level of performance and effectiveness ;
- . development of the countries' institutional base for science and technology, through systematic assessment of the needs linked with national development goals and with existing obstacles ;
- . the identification and formulation of projects which meet those needs, with a view to securing their long-term financing from extra-budgetary sources ;
- . the improvement of laws and regulations governing the working conditions of scientific researchers.

Approximately two hundred advisory missions of this kind have been carried out over the past 17 years, followed by reports and recommendations for action addressed to the governments concerned. Such technical cooperation extended by Unesco to its Member States is at present financed out of the Organization's regular budget, and also under the United Nations Development Programme (UNDP), the United Nations Financing System for Science and Technology (UNFSSTD), and under funds-in-trust agreements.

- (viii) **Cooperation with non-governmental organizations** active in the field of science and technology policy, for example :
- . the International Council for Science Policy Studies (ICSPPS/ICSU) ;
 - . the Research Committee on 'Science and Politics' of the International Political Science Association (IPSA) ;
 - . the Science Policy Committee of the World Federation of Scientific Workers ;
 - . the ICSU Committee on the Safeguard of the Pursuit of Science.
- (ix) **The setting up of international or regional instruments or mechanisms for the financing of scientific and technological development of Member States.** An important feature of Unesco's Science and Technology Policies programme concerns the **financing** of research programmes and projects of developing countries, in the field of science and technology. Illustrative examples of these activities are the establishment of the Unesco Special Fund for Research and Experimental Development (R&E) in Africa and the drawing up of an integrated programme for the scientific and technological development of the Caribbean region.

- (x) **Participation in the formulation of a harmonized and gradually integrated science and technology policy for the organizations belonging to the United Nations system.** This implies a close collaboration on the part of Unesco, with the United Nations Intergovernmental Committee on Science and Technology for Development, its Advisory Committee (ACSTD) and with the United Nations Centre for Science and Technology for Development (UNCSTD).

Principal achievements :

- (i) Organization of Regional Conferences of Ministers responsible for the Application of Science and Technology to Development :
- . 1965 CASTALA Latin America (Santiago, Chile) ;
 - . 1968 CASTASIA Asia (New Delhi, India) ;
 - . 1970 MINESPOL Europe (Paris, France) ;
 - . 1974 CASTAFRICA Africa (Dakar, Senegal) ;
 - . 1976 CASTARAB Arab States (Rabat, Morocco) ;
 - . 1978 MINESPOL II (Belgrade, Yugoslavia) ;
 - . 1982 CASTASIA II (Manila, Philippines) ;
 - . 1985 CASTALAC II (Brasilia, Brazil) ;
 - . Preparation of CASTARAB II.

Establishment, with Unesco's assistance, of governmental organizations for science and technology policy-making in more than 20 Member States.

- (iii) Submission of more than 160 Expert reports (since 1969) to the governments of Member States on problems concerning national policies in the field of science and technology.
- (iv) Adoption by the eighteenth session of Unesco's General Conference of the Recommendation on the Status of Scientific Researchers (1974).
- (v) Publication of over sixty volumes (since 1965) in the series 'Science Policy Studies and Documents' ; publication of 'Science and Development' (Unesco, 1971) ; publication of 'Scientific productivity - the effectiveness of research groups in six countries' (Cambridge University Press/Unesco, 1979).

Background information :

Programme launched in 1960 (11C/Resolution 2.113/b) ;
 19C/Resolutions 2.121, 2.122 and 2.123 ;
 20C/Resolutions 2/4.2 and 2/10.1 ;
 21C/Resolutions 2/01/4.2 ;
 Unesco's Medium-Term Plan for 1977-1982, objective 4.2 ;
 Unesco's Approved Programme and Budget

for 1984-1985 (22C/5), Programme IX.2.
Unesco's Medium-Term Plan for 1984-1989,
Programme IX.2.

Organizations responsible :

Unesco, in collaboration with certain international non-governmental organizations. In addition, Unesco's programme on science and technology policy takes fully into consideration the resolutions adopted in this field by the General Assembly of the United Nations, by the United Nations Intergovernmental Committee on Science and Technology for Development and by the United Nations Conference on Science and Technology for Development (UNCSTD, Vienna, 1979).

Organizational machinery :

Unesco's General Conference, Executive Board and Secretariat.

Participants :

All Member States of Unesco, and in particular the national bodies responsible for science and technology policy.

B. ACTIVITIES AT REGIONAL LEVEL

Title : Promotion of science and technology policies in the Arab States region

Principles of action and main aims :

Regional conferences of ministers and other regional meetings are convened with the following objectives in mind :

- . to allow Member States to exchange information on national science and technology policies aimed at the solving of their development problems ;
- . to allow for periodic and collective assessment by Member States of current trends in their national science and technology policies ;
- . to allow for thorough discussion of current problems of common interest to policy-makers in science and technology in the region concerned ;
- . to evaluate results and devise a strategy of regional cooperation in priority fields of science and technology ;
- . to provide information and policy guidance to potential partners in cooperation and aid-giving agencies ;
- . to promote a systematic orientation on international cooperative research activities towards the solution of world problems.

Specific activities and principal achievements :

- (i) The holding of regional meetings and the implementation of the recommendations adopted.

As far as these meetings are concerned, particular mention should be made of the following :

- . Regional Science and Technology Workshop (Paris, August 1980) which reviewed the implementation of CASTARAB I recommendations and discussed the preparation of CASTARAB II. The meeting was undertaken in pursuance of resolution 2.122 adopted by the General Conference of Unesco at its nineteenth session.
- . Seminar on Technology Policies in the Arab States (Paris, December 1981) organized by ECWA with the cooperation of Unesco which was designed to discuss how technology has contributed to the attainment of national socio-economic objectives.
- . Regional training seminar on the application of the Unesco methodology on priority determination for science and technology (Amman, November 1982), which was organized by the Federation of Arab Scientific Research Councils with Unesco assistance. Unesco provided a consultant to lead discussions at this seminar.

Publications :

An Arabic version of a book entitled "Science and Scientific Researchers in Modern Society" is in preparation and will be published in 1986.

- (ii) Unesco's Secretariat assisted the CASTARAB Continuing Committee (CCC) which is a ministerial body set up in accordance with the CASTARAB I recommendations, in the organization of the following meetings :

- . the fifth session of CCC (Paris, January 1981) which discussed the draft agreement for establishing the Arab Fund for Scientific and Technological Research for Development ;
- . the first meeting of CASTARAB experts (Baghdad, April 1981), the convening of which was decided during the above-mentioned session of CCC for the purpose of reviewing the implementation of CASTARAB I recommendations and the preparation of CASTARAB II ;
- . the second meeting of CASTARAB experts (Paris, September 1981) which was designed to contribute to the preparation of CASTARAB II and the outline of Country Reports for that Conference ;
- . the sixth session of CCC (Paris, September 1981) which discussed the Budget, timetable and other questions related to the CASTARAB II preparations and decided on the steps necessary for the setting up of the Arab

Fund for Scientific and Technological Research for Development ;

- . the seventh session of CCC (Rabat, November 1982) which discussed the necessary amendments in the text of the Fund's agreement ;
- . the eighth session of CCC (Rabat, February 1983) which examined the project for the establishment of the Fund mentioned above and drafted the Agreement. The session decided on the dates of the meeting of the Governmental Plenipotentiaries for signing the Fund's final agreement ;
- . the meeting of Governmental Plenipotentiaries from Arab States to adopt the agreement establishing the Arab Fund for Scientific and Technological Research for Development (Tunis, November 1983) ;
- . the ninth session of CCC (Tunis, November 1983) which decided to submit to CASTARAB II the results of its efforts to establish the Fund ;
- . the tenth session of CCC (Rabat, May 1984) which formulated the Committee's views on the holding of CASTARAB II and discussed questions related to its preparation.

- (iii) Participation in the missions of the CCC Secretariat : a Unesco staff member, acting on behalf of the CCC Secretariat, took part in several missions to a number of Arab countries to participate in consultations relating to decisions taken by the CASTARAB Continuing Committee.

C. ACTIVITIES AT NATIONAL LEVEL

1. **Title :** Technical assistance to the Arab States for the framing, implementation and evaluation of their national science and technology policies.

(i) **Egypt**

A mission undertaken in April 1982 analysed science and technology policy in Egypt and advised on the choice of research projects related to the implementation of national socio-economic objectives. The report "Science and Technology Policy : Inventory and Orientation of Research Projects" was submitted in Arabic to the Government of Egypt in January 1983. The reference of the report is Serial No. FMR/SC/STP/82/175.

(ii) **Jordan**

A mission was undertaken in February 1983 with the purpose of assisting the Jordanian authorities in the analysis of national policy and formulating priorities in the field of science and technology. The report entitled "Science and

Technology Policy" was submitted to the Government of Jordan in November 1983. The reference of the report is Serial No. FMR/SC/STP/83/143.

(iii) **Libya**

A mission was undertaken in August 1984 for the launching of a programme of cooperation between Unesco and the Libyan National Academy for Scientific Research in the field of science and technology policy for 1984-1985. The programme has started with the surveying of scientific and technological potential.

(iv) **Morocco**

A mission was undertaken in July 1981 to consult with the national authorities on the surveying of scientific and technological potential.

(v) **Somalia**

A mission was undertaken in September 1984, the aim of which was to assist the government in analysing their science and technology policy and in preparing the national report for CASTARAB II.

(vi) **Sudan**

Within the framework of Sudan's nationwide programme "Building the Modern Science-based State", the following four missions were undertaken :

- . **October 1981 :** a mission to assist the competent authorities in the launching of the above-mentioned programme. As a result, a project document entitled "Enhancing the coordinating role and responsibilities of the National Council for Research in implementing the Programme of Building the Modern Science-based State" was prepared and submitted to the Government of Sudan in January 1982 ;
- . **August 1982 :** a mission to advise the Government on improving the national teaching and research capabilities in the field of science and technology policy. The report entitled "The Establishment of a Teaching and Research Unit in Science and Technology Policy at the University of Khartoum" was submitted to the Government of the Sudan in January 1983. The reference of the report is Serial No. FMR/SC/STP/82/170 ;
- . **January 1983 :** a mission to implement the sub-programme "Preparation of a consolidated budget for scientific research". In this connection, a three-day seminar on budgeting techniques of scientific and technological activities was organized for the national specialists working in this field.
A report entitled "Preparation of a

Consolidated Budget for Scientific and Technological Activities" was submitted to the Government of the Sudan in November 1983. The reference number of this report is Serial No. FMR/SC/STP/83/138 ;

February 1984 : a mission to organize a technical workshop with leading scientific, juridical and administrative authorities of the Sudan, with a view to preparing for legislative or other measures designed to enhance the status of the national community of scientific researchers, was organized, notably with a view to stemming, and ultimately reversing, the serious national problem of the "brain-drain".

(vii) **Yemen A.R.**

A mission was undertaken in May 1981 to prepare a feasibility study on the establishment of a national Centre for Science and Technology in the Yemen A.R. The study and a project document entitled "Planning start-up of the National Centre for Science and Technology" was submitted to the Government of Y.A.R. in November 1981. The reference of the study and project is Serial No. FMR/SC/STP/81/195.

(viii) Furthermore, a number of missions were carried out in 1983-1985 in the following Member States in order to inform the national authorities of CASTARAB II preparations and to assist them in the launching of preparatory activities for the Conference :

Algeria, Bahrain, Egypt, Iraq, Kuwait, Jordan, Libya, Malta, Mauritania, Saudi Arabia, Somalia, Qatar, Syria, Tunisia, Yemen (Arab Republic), Yemen (Peoples' Democratic Republic), United Arab Emirates.

2. The following assistance was provided on request under Unesco's Participation Programme and Special Account for Increased Aid to Developing Countries :

- A sum of \$4,000 was contributed in August 1984 to the organization of a National Seminar "Towards a technology for Egypt".
- A three-weeks' consultancy mission to Malta was organized to assist the government in devising a scientific research policy.
- A one-month regional fellowship in the field of planning scientific and technological research (\$3,300) was granted in 1984 for a staff member of the Ministry of Higher Education of Algeria.

Section II: Division of Scientific Research and Higher Education

A. ACTIVITIES AT WORLD LEVEL

1. **Title :** Dissemination of information on the interactions between science and society

Brief description : publication of a quarterly journal "Impact of science on society", in the six official languages of the organization. Each issue of the publication deals with a different theme.

Specific activities : editing, production, distribution and promotion of the journal.

Linkage : science and technology policies (Section I above).

Background information : 19C/Resolutions 2.111 and 2.112 ; 20C/Resolution 2.41 ; 21C/Resolution 2.01 in Unesco's Approved Programme and Budget for 1981-1983 (Document 21 C/5) ; Unesco's Medium-Term Plan for 1977-1982, Objective 4.1 ; Unesco's Approved Programme and Budget for 1984-1985, Programme IX.1 ; Unesco's Medium-Term Plan for 1984-1989, Programme IX.1.

2. **Title :** International Organization for Chemical Sciences in Development (IOCD)

Brief description : the main aim of IOCD is to direct effort and expertise in the chemical sciences toward the solutions of problems of the Third World. In a first phase, IOCD is initiating activities in a number of priority areas. These include chemical education, a chemical synthesis programme directed to the development of potential new drugs for the treatment of tropical diseases, and a wide-ranging service programme.

Principles of action : to carry out international multidisciplinary research and service activities in the area of chemical sciences on selected topics related to the above-mentioned domains, to exchange scien-

tific information and experience, to train young specialists from developing countries through project working group meetings, workshops, seminars, symposia and research programmes.

Main aims :

- (a) to assist in searching for answers to interrelated theoretical and practical problems in the chemical sciences, through cooperative projects ;
- (b) to help locate, through collaborative programmes, research chemists and institutions in developing countries ;
- (c) to develop worldwide channels of communication and information between chemists and biologists ;
- (d) to refine and broaden the application of new research tools, techniques and methods to help solve fundamental problems of developing countries and, if possible, develop new industries.

The programme has come to have a strong emphasis on the transfer of scientific knowledge and research techniques to developing countries.

Specific activities and achievements :

- (a) scientific meetings of project working groups, workshops and seminars, which are being organized by IOCD advisers, are constantly encouraged and supported in the areas of chemical education and research. These are effective mechanisms for the dissemination of new scientific information and techniques ;
- (b) the impact of the programme is enhanced by supported publications like proceedings of meetings, scientific papers, etc.

Current information about these programmes and projects is published in "Information Letters" issued at regular intervals.

Background information : Unesco's Approved Programme and Budget for 1984-1985 (22 C/5), Programme VI.1. ; Unesco's Medium-Term Plan for 1984-1989, Programme VI.1.

3. **Title :** International cooperation for the development of informatics

Brief description : the Organization is undertaking the necessary steps towards the establishment of an intergovernmental programme on informatics that will reinforce international cooperation in the field and cater for north-south, south-south cooperation in computer science and technology.

Principles of action : strengthening international, regional and sub-regional cooperation. Making use of the research and training programmes carried out between industrialized and developing countries in the light of local conditions and needs.

Specific activities : the session of the Interim Committee for the Intergovernmental Informatics Programme, established by the General Conference at its twenty-second session, was held in November 1984. The outcome of the deliberations of the Interim Committee was submitted to the General Conference at its twenty-third session in 1985. In addition the Organization maintained its collaboration with IGOs and NGOs competent in informatics, such as the Intergovernmental Bureau for Informatics (IBI) and the International Federation for Information Processing (IFIP). The 9th World Computer Congress organized by IFIP and held in Paris, France, 19-23 September 1983, was supported. The support facilitated the participation of informaticians from developing countries at the congress.

Background information : Unesco's Approved Programme and Budget for 1984-1985 (22 C/5), Sub-programme VI.3.1. ; Unesco's Medium-Term Plan for 1984-1989, Programme VI.3.

B. ACTIVITIES AT REGIONAL LEVEL

1. **Title :** Training and further training in science and technology extension work

Brief description : in collaboration with the Club of Vienna and the International Development Research Centre (Ottawa), as well as the newspaper Al-Ahram (Cairo), a workshop on "The Role of Mass Media in Promoting Science and Technology for Development, including Rural Problems" was held in Cairo in February 1985.

Main aim : training of science journalists in the Arab states.

Specific activities : organization of a meeting/training course and publication of discussions and keynote papers.

Background information : recommendation of the Club of Vienna and Unesco joint preparatory meeting, Paris, June 1983.

Organization responsible : Club of Vienna for planning ; Unesco's Division of Scientific Research and Higher Education for coordination ; Unesco and an Egyptian host institution for implementation.

Participants : participants are expected from at least five or six Arab states.

2. **Title :** Major regional project on applied microbiology for Africa and the Arab states

Brief description : the role of applied microbiology in technological progress and the development of resources calls for regional and interregional cooperation. For this reason, and taking into account the developing and endogenous capacities in microbiology, revealed through the holding of training courses in Africa and the Arab States, and in order to strengthen existing educational and research infrastructures, a major regional project was carried out in Africa and the Arab States in the fields of biotechnology and applied microbiology with a view to formulating an integrated approach to the application of science and technology to development.

The themes envisaged for research and training include nitrogen-fixation from the atmosphere and biofertilizer production for agricultural applications ; the recycling of biodegradable waste materials and biogas production, as well as food production and the supply of staple commodities. The application of research findings will be effected chiefly in the food and nutritional areas of agriculture.

Principles of action : postgraduate training within the major project is applied in the following fields : the conservation of microbial cultures of economic importance, nitrogen-fixation, enzyme regulation, photosynthesis, fermentation technology and metabolism. The research, as well as the training and application capabilities of universities are also supported.

In addition to the provision of regional study grants and fellowships and the supply of equipment, research grants are made available to researchers for the purpose of strengthening local endogenous capabilities. Special consideration is given to further study and to training in and the utilization of appropriate low-cost, low-waste technologies that have a significant impact on the scientific, technological and socio-economic development of the regions concerned.

In order to facilitate the exchange of up-to-date information, a variety of newsletters, periodicals and other publications for different types of readers are disseminated.

Main aims : the project is aimed at developing the research potential and technological capacity already existing in the Arab states. This effort, stemming from the recommendations of the CASTAFRICA and UNCSTD conferences, reinforces greater co-operation between existing institutions and takes advantage of the infrastructure and networks of national research and training centres in the region. In brief, the sub-aims are listed below :

- (a) stimulation of the cooperation with research institutes on national and regional level ;
- (b) exchange of scientists among the countries in the region in all directions ;
- (c) organization of regional training courses, seminars, symposia and workshops ;
- (d) developing of long and short-term fellowship programmes for young scholars to work in the selected research field.

Specific activities and achievements : collection, identification, maintenance, testing and distribution of industrial cultures. Identification of problems pertinent to the deployment of local rhizobia inoculant technology and promotion of research are other activities at the Microbiological Research Centre (MIRCEN) in Egypt. Cooperative laboratories are in Sudan and Morocco.

Advice and research guidance are provided to individuals and institutions engaged in the application of microbiology. The MIRCEN also provides short- and long-term training in the development of scientific and technical manpower required for the use of rhizobial inoculants. The centre disseminates information in the region to agricultural workers and microbiologists, through bulletins, newsletters and demonstrations.

Regional training courses have been held in Egypt, Morocco, Sudan and Iraq. Consultant missions have been made to Kuwait, Saudi Arabia and Algeria.

Background information : 21 C/5, Objective 4.3 ; 22 C/5, Programme VI.3.

Organizations responsible : the above-mentioned activities for the Arab states were carried out with the close collaborative support of the United Nations Environment

Programme (UNEP) within the framework of the UNEP/Unesco project "Development of an Integrated Programme in the Use and Preservation of Microbial Strains for Deployment in Environmental Management" (FP-1108-75-003). Support for some of the activities was also provided by the Organization of African Unity and the Food and Agriculture Organization of the United Nations (FAO). In addition, several local organizations - academic and governmental - made additional resources available.

Organizational machinery : the machinery involved a strong element of decentralization in the planning, coordination and organization of activities such as training courses, symposia and fellowships. Consequently, the Unesco Regional Office for Science and Technology in the Arab States (ROSTAS) played a major role in the implementation of activities and, when necessary, in close cooperation with the Unesco National Commissions of Member States.

Participating countries : all countries in the region of the Arab states.

3. Title : Informatics

Regional and subregional cooperation in informatics is pursued through training activities, seminars, workshops, meetings and study of the priority applications of informatics, organized within the framework of the network of informatics institutions established in Africa, the Arab states, Latin America and the Caribbean, and Asia and the Pacific.

In the Arab states in particular, a Regional Seminar for the Directors of Computer Centres was held in Amman, Jordan, in March 1981. A regional symposium on Research Activities and the Use of Arabic Characters in Informatics was organized in Tunis from 2-5 May 1983.

As far as training and education in informatics are concerned, several young Arab scientists are receiving assistance through the informatics training programme which offers fellowships for training abroad or at home. In addition, efforts are being made to establish a long-term postgraduate training course in computer science within the Arab Region in collaboration with some Arab Centre of Excellence during 1984-1985.

Section III: Division of Technological Research and Higher Education

A. ACTIVITIES AT WORLD LEVEL

1. **Title :** Training of engineers and technicians with special emphasis on the increased participation of women

Brief description : postgraduate courses in the engineering sciences.

Principles of action : support is provided to universities and technological training institutions to allow engineers and scientists from developing countries to participate in their courses.

Main aim : training of staff of engineering schools and institutions in developing countries by means of seminars and postgraduate courses.

Specific activities and achievements : candidates were admitted to the following yearly international postgraduate courses :

- Chemical Engineering, Tokyo Institute of Technology, Japan ;
- Chemical Engineering, University of Karlsruhe, Federal Republic of Germany ;
- Petroleum Technology, Institute of Petroleum and Gas, Bucharest, Romania ;
- Analysis and Design of Machine Foundations, University of Roorkee, India ;
- International Centre for Mechanical Sciences, Udine, Italy ;
- Environmental Science and Technology, International Institute for Hydraulic and Environmental Engineering, Delft, Netherlands ;
- Solar Energy, University of Perpignan, France.

Background information : Date of launching - January 1981. 21 C/5 Resolution 2/01 ; 22 C/5, Programme VI.2.

Organization responsible : the above-mentioned institutions.

Organizational machinery : the financial support is provided to the responsible institutions under contract ; they are responsible for the selection of candidates, as well as travel and lodgings during the courses. Unesco assists in publicizing the courses through the Regional Offices for Science and Technology.

Participating countries : all Member States ; in the 1981-1983 period, 33 engineers and scientists from Algeria, Egypt, Iraq, Morocco, Somalia, Sudan and Tunisia participated in these courses.

2. **Title :** Utilization of new and renewable sources of energy

Brief description : contribution towards the promotion of wider utilization of new and renewable sources in Arab countries. Training of specialists in energy R&D.

Principles of action : the programme activities are being carried out through the Regional Office for Science and Technology in the Arab States in cooperation with regional non-governmental organizations or appropriate national institutions.

Specific activities and achievements :

- (a) Sponsorship of the First Arab International Solar Energy Conference, Kuwait, December 1983.
- (b) Sponsorship of the Second Arab International Solar Energy Conference, Bahrain, February 1986.
- (c) Sponsorship of the publication of the Arab Journal on Solar and Wind Technology.
- (d) Organization of three demonstration research projects on new and renewable sources of energy.

Organization responsible :

- (a) Arab international solar energy conferences are organized in cooperation with the Arab Section of the International Solar Energy Society (ISES).

- (b) Arab Section of the ISES is responsible for publication of the Arab Journal on Solar and Wind Technology.
- (c) Demonstration research projects are organized in cooperation with the Sudanese Energy Research Council and with the Yemen Association of Engineers, Yemen.

Organizational machinery : the activities are being implemented through the Regional Office for Science Technology in the Arab States. Corresponding contracts, ranging from US \$3,000 to US \$10,000, have been and will be established with responsible organizations.

Participating countries : Arab Member States.

Reference of the project : 22 C/5, paras. 06342-06345.

3. Title : Information networks on new and renewable sources of energy

Brief description : to launch at least one regional or sub-regional pilot project in each of the five different regions of the world aimed at strengthening national information capabilities of participating Member States towards the establishment of the required machinery for the effective operation of regional and sub-regional networks which will ultimately be linked to form the worldwide renewable energy information network.

Main aims : to promote the accessibility and use of information on new and renewable sources of energy, especially in developing countries. To assist Member States in collecting, organizing and processing indigenous information on new and renewable sources of energy with a view to improving their flow and accessibility from within and outside the country.

Specific activities and achievements :

- (a) Organization of meetings (seminars, workshops), advisory missions, training courses, fellowships/travel grants, special studies towards strengthening the network linkages.
- (b) Issuing of publications : reports of meetings and seminars ; repackaged information in NRSE ; indexes, directories and other secondary information ; primary publications generated in the region.

Background information : a preliminary study on new and renewable energy information was proposed by the Director-General of Unesco to the Organization's Executive Board. The Board authorized the study. Its findings were presented to the Unesco General Conference at its twenty-first session in

September-October 1980 and to the United Nations Conference on New and Renewable Sources of Energy held in Nairobi in 1981. The authors of the study, having considered the recommendations arising from UNCSTD in 1979, and the resolution of the United Nations General Assembly adopted at its 34th session in December 1979, in relation to the new energy sources and information transfer, and together with Unesco's long years of involvement in research and development in the energy field and its experience in the development of general information principles under its UNISIST programme, recommended as a long-range goal the establishment of a global network of information systems and services for new and renewable energy. The twenty-first session of the General Conference of Unesco adopted the Recommendation under Resolution No. 2/07 and provided for its execution in the Programme and Budget for 1981-1983 (21 C/5) under paragraphs 2712-2716.

Organizations responsible : the regional pilot projects are managed by their respective regional host centres, which are chosen on the basis of their capabilities to render regional services in energy information. At the national level, effective links to the RPP are created through the national focal point and the national group consisting of individuals and institutions from public and private organizations in the academic, research, industry and rural communities, engaged in the production, development and use of NRSE. In the case of the Arab region, negotiations have been underway to establish a regional pilot project, with both the Kuwait Institute for Scientific Research (KISR) and with ALECSO.

B. ACTIVITIES AT REGIONAL LEVEL

- 1. Title :** promotion of regional cooperation and establishment of national research and training infrastructures in the engineering sciences, in particular those leading to the solution of problems arising from choice of appropriate technologies

Brief description : the programme contained the following action of interest to the Arab region : Infrastructure for the application of technology.

Principles of action : the activities under this project were recognized and carried out in collaboration with the Arab Organization for Standardization and Metrology (ASMO).

Main aims : strengthening of the technological infrastructure in developing countries, in particular technical information services, metrology, instrument maintenance, testing and analysis, calibration, etc., which are essential to all applications of science.

Specific activities and achievements :

- (a) Training workshop on Documentation of Standard for Engineers and Scientists in the Arab Region (contract \$7,000).
- (b) Support to the improvement of the information and documentation services of the Arab Organization for Standardization and Metrology (ASMO) (contract \$8,000).

Background information : origin - negotiations between the Regional Office for Science and Technology in the Arab States and ASMO.

Date of launching : May 1982. 21 C/5, Resolution 2/01.

Organization responsible : The Arab Organization for Standardization and Metrology (ASMO), Amman, Jordan.

Organizational machinery : ROSTAS issued two contracts to ASMO for the organization of activities (a) and (b) above.

Participating countries : Arab Member States.

2. **Title :** strengthening of national potential for research and technological adaptation, and improvement of infrastructures and technological facilities

Brief description : contribution towards strengthening technological services in the field of metrology and quality control, and improving engineering consultancy services. Promotion of technological research and adaptation in areas of interest for rural development (civil engineering and environment-adapted housing, the upgrading of traditional technologies). Contribution towards adapting technological programmes in higher education with a view to offering technological choices which will be more relevant to the particular conditions of the natural, economic and socio-cultural environment.

Principles of action : the programme activities will mainly be carried out through the Regional Office for Science and Technology in the Arab States in collaboration with international and regional non-governmental organizations or appropriate national institutions.

Main aims : establishment, within technological training institutions, of technical and advisory services in the engineering sciences with a view to adapting training programmes to the needs of the productive sectors. Collection and dissemination of data which could contribute towards the adaptation and assimilation of technologies.

Upgrading of certain traditional technologies and the application of appropriate technologies to rural development.

Specific activities and achievements :

- (a) Regional workshop on metrology, standardization and quality control.
- (b) Regional symposium on construction of houses adapted to their environment.

Organizational machinery : the activities will be implemented through the Regional Office for Science and Technology in the Arab States. A contract for \$9,000 will be issued to ASMO and the cost of the regional symposium is estimated at \$13,500 for 12 participants.

Participating countries : Arab Member States.

References of the project : 22 C/5, paras. 06211-06215.

3. **Title :** Promotion of international cooperation in research and development in priority fields of the engineering sciences

Brief description : the programme envisages two programme actions :

- (a) development of endogenous technologies ;
- (b) innovation in technology.

Principles of action :

- (a) Financial support was provided to international and regional organizations to organize regional training seminars/workshops and for the preparation of reports and documents.
- (b) Contracts were concluded in the region for the purpose of supporting promising projects involving new technological applications.

Main aims : the programme aimed at identification and dissemination of information on application of endogenous and innovative technological approaches in the developing countries.

Specific activities : regional seminar on Building and Construction Technology, Faculty of Engineering, University of Khartoum, Sudan.

Background information :

Origin - negotiations between the Sudan Engineering Society and ROSTAS.
Date of launching - 8 July 1983.
21 C/5, Resolution 2/01.

Organizations responsible : Sudan Engineering Society, Khartoum, Sudan, in collaboration with the Faculty of Engineering, University of Khartoum, Sudan.

Organizational machinery : the Regional Office for Science and Technology in the Arab States has established a contract with the Sudan Engineering Society (\$8,000) for the organization of the meeting which took place in December 1984.

Participating countries : Arab Member States.

References of the project : 21 C/5, para. 2124.

4. **Title :** Cooperation with international, regional and national non-governmental organizations active in the fields of science and technology as well as with the world scientific and engineering communities in general

Brief description : activities in the field of technological research and education were carried out in collaboration with international and regional non-governmental organizations under contract.

Main aims : dissemination of scientific and technological progress through congresses and publications ; advancement of research applied to development and execution of joint scientific undertakings involving the developing countries.

Specific activities and achievements : financial support to a publication entitled "Quality Control in Industry" issued by the Arab Organization for Standardization and Metrology (ASMO).

Background information :

Origin - negotiations between the Regional Office for Science and Technology in the Arab States and ASMO.

Date of launching - 22 June 1981.
21 C/5 Resolution 2/01.

Organization responsible : ASMO, Amman, Jordan.

Organizational machinery : the Regional Office for Science and Technology in the Arab States established a contract (\$2,000 with ASMO) for the work.

Project references : 21 C/5, para. 2135.

5. **Title :** Promotion of the education of technicians

Brief description : a regional seminar on the use of production units in technical education and for a training seminar on administration and development of technical institutes.

Principles of action :

- (a) holding of a regional seminar on production units of technical institutes (5 days) ;
- (b) seminar on the administration and development of technical institutes (7 days), 20-25 participants in Baghdad, Iraq (\$14,000).

Main aims : promotion and exchange of experiences and information in cooperation with the Arab Federation for Technical Education (AFTE).

Specific activities and achievements : reports, meetings ; missions ; publications.

6. **Title :** Arab network of engineering education institutes (ARNE)

Brief description : establishing a positive linkage between the colleges of engineering in the Arab States for the exchange of information and experiences, for staff and student exchange, and for promoting cooperative action regarding postgraduate studies and research in the engineering field.

Principles of action : as a follow-up of the planning meeting to establish the Arab Regional Network of Engineering Education and Research Institutions which was held in August 1982, the following activities will be pursued :

- (a) preparation and publishing of the first issue of the ARNEER Newsletter ;
- (b) cooperation with an engineering college in holding a regional conference on engineering education with particular reference to university/industry interactions. A seminar was held in Amman in October 1983 ;
- (c) implementation of a regional professor exchange programme.

Main aims : strengthening regional cooperation in engineering training and research.

Specific activities and achievements :

- (a) organization of meeting ;
- (b) conference ;
- (c) special studies to strengthen the Network linkage.

7. **Title :** Strengthening of regional co-operation in engineering training and research

Brief description : the regional professor exchange programmes will be implemented in such a way as to support the activities of the appropriate regional engineering associations, strengthen links and support other activities.

Main aims : to encourage exchange of use and experiences in teaching and to link cooperative research.

Specific activities and achievements : financial support for the publication of a Newsletter by the Arab Federation for Technical Education (AFTE).

Background information :

Origin - negotiations between ROSTAS and AFTE.
Launched - 1982.

Organization responsible : AFTE.

Organizational machinery : ROSTAS.

Participating countries : All Arab States.

Project references : 21 C/5, para. 2139-2140.

C. ACTIVITIES AT NATIONAL LEVEL

1. **Title :** Promotion of international cooperation in research and development in priority fields of the engineering sciences

Brief description : The programme contains two programme actions :

- (a) development of endogenous technologies ;
(b) innovations in technology.

Principles of action : contracts were concluded in the Arab region for the purpose of supporting promising projects involving new technological applications.

Main aims : the programme was aimed at the identification and dissemination of information of endogenous and innovative technological approaches in the developing countries.

Specific activities and achievements :

- (a) compilation of information on innovative technological activities ;

- (b) awarding of research grants for the support of promising projects involving new technological applications.

Background information :

- (a) Origin - consultant recommended by ROSTAS.
Date of launching - 7 October 1981.
21 C/5, Resolution 2/01.
(b) Origin - candidates recommended by ROSTAS.
Date of launching - May 1981.
21 C/5, Resolution 2/01.

Organizational machinery : Unesco's Division of Technological Research and Higher Education in conjunction with Unesco's Regional Office for Science and Technology in the Arab States (ROSTAS).

Participating country : Egypt.

2. **Title :** Promotion of regional cooperation and establishment of national research and training infrastructures in the engineering sciences, in particular those leading to the solution of problems arising from choice of appropriate technologies

Brief description : the programme contained the following activity which permitted action at the national level : support to Member States in developing facilities for technological training and research.

Principles of action : a consultant mission was carried out at the request of the Government of Egypt.

Main aims : strengthening of the technological infrastructures in developing countries, including training and research facilities.

Specific activities and achievements : statistical survey of scientific instruments and procurement policy.

Background information :

Origin - request from the Government of Egypt.
Date of launching - 11 October 1982.
21 C/5, Resolution 2/01.

Organization responsible : Unesco sent a consultant to the Scientific Instruments Centre, Cairo, where he carried out the study. The duration of the mission was one month, starting 22 November 1982.

Participating country : Egypt.

Section IV: Division of Ecological Sciences

A. ACTIVITIES AT WORLD LEVEL

1. Title : Man and the Biosphere (MAB)

Main aims : the main objective of MAB is to provide the scientific basis for the long-term use and conservation of natural resources to enable mankind to manage the natural resources of the biosphere more efficiently. To this end, the programme consists of networks of interdisciplinary field research and training activities in order to study and understand better the impact of man on the environment but also the impact of the environment on man, considered as a biological and adaptive entity and as a social, cultural and economic being. Such studies depend on close cooperation between natural and social scientists in the field.

Specific activities : the MAB programme includes the following fourteen major research themes :

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

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

MAB Project 3 - Impact of human activities and land use practices on grazing lands ; savannah and grassland (from temperate to arid areas).

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

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

MAB Project 6 - Impact of human activities on mountain and tundra ecosystems.

MAB Project 7 - Ecology and rational use of island ecosystems.

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

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

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

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

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

MAB Project 13 - Perception of environmental quality.

MAB Project 14 - Research on environmental pollution and its effect on the biosphere.

Project areas 1, 2, 3, 4, 5, 6, 7 and 11 have a specific geographic basis while the others relate to human intervention and other processes occurring in all parts of the biosphere ; there is therefore an interaction between these two types of project areas. In the last few years emphasis has been placed on four priority areas :

- humid tropical ecosystems ;
- arid and semi-arid ecosystems and marginal lands ;
- human settlements ;
- biosphere reserves.

Major field activities have been developed in these areas of concentration. To strengthen the research programme, MAB includes among its objectives the training of scientists and technicians willing and able to participate in multi-disciplinary research teams. This is achieved by means of international and regional training courses, fellowships and exchanges of personnel with special emphasis on on-site training in places where MAB projects are already in progress.

Background information : MAB was officially launched in 1970 at the sixteenth session of the General Conference of Unesco and the broad outlines of the programme were esta-

blished in November 1971 at the first session of the MAB International Co-ordinating Council which proposed thirteen project areas for cooperative research. A fourteenth project, on environmental pollution, was added at the eighteenth session of the General Conference in 1974.

Unesco's Medium-Term Plan for 1977-1982, objectives 7.2, 7.5, 7.6, 7.7 ; 19 C/Resolutions 2.151, 2.152, 2.153 ; 20 C/Resolutions 2/7.2/1, 2/7.5/1, 2/7.6/1, 2/7.7/1 ; 21 C/5, paragraphs 2375-2492 ; Unesco's Medium-Term Plan for 1984-1989, Programme X.6 ; 22 C/5, paragraphs 10601-10661.

Linkages : endorsed by the United Nations Conference on the Human Environment, in Stockholm in 1972, MAB enjoys the continuing support of the United Nations Environment Programme (UNEP). The United Nations Specialized Agencies concerned (FAO, WHO, WMO) as well as the international scientific community, particularly through IUCN and ICSU, take part in its implementation.

Organization : the MAB International Co-ordinating Council consists of scientific representatives from thirty nations, selected every two years by the Unesco General Conference, along with representatives from the above-mentioned United Nations and non-governmental organizations. It guides and supervises the programme. Unesco provides the secretariat.

In each country a National Committee defines and organizes research activities on particular national problems which relate to the international programme. Special ad hoc advisory panels and a number of temporarily appointed consultants help to coordinate national contributions and to define international core programmes, ensuring that compatible methodology is used for various projects. Thus countries work together on a series of ecological problems of common concern so as to provide comparable results capable of generalization and synthesis. Since the major focus of MAB projects is concerned with man's interactions with particular ecosystems or geographic units, much of this cooperative work is being developed at the regional and subregional levels. The programme is basically funded by participating countries themselves. Apart from Unesco's contribution, bilateral funds are the most important additional funding source for the programme activities. UNEP funds were also significant in the early stages of MAB, and joint activities with UNEP continue in such fields as tropical forests and biosphere reserves.

Participants : 100 countries have established MAB National Committees. Among the Member States of the Arab region, eleven have set up a MAB National Committee.

B. ACTIVITIES AT REGIONAL LEVEL

Activities in the field of ecological sciences in general and that of the MAB Programme in particular have been concerned mainly with such aspects as :

- integrated and ecological approaches to rural development ;
- rational land use and management of grazing lands ;
- protection and conservation of arid and semi-arid ecosystems through establishment of biosphere reserves ;
- monitoring of desertification processes and desertification control methods ;
- human settlement problems.

Among the activities undertaken, mention can be made of the most important seminars and meetings which have been organized over the last five years to encourage exchange of information and experience, to develop research and training activities and to strengthen regional scientific cooperation :

- (i) International workshop on ecological problems of human settlements in arid lands organized jointly by Unesco and the MAB National Committee of Sudan, and the Institute of Environmental Studies, University of Khartoum, 7-12 March 1981.
- (ii) Training course on arid land ecology and range management for technicians, organized jointly with ACSAD, and held at ACSAD's headquarters in Damascus and field stations from 17 October to 6 November 1981.
- (iii) International seminar on problems of the management of irrigated land in areas of traditional and modern cultivation (El Minia, Egypt, 22-31 March 1982), organized by the IGU working group on resource management in dry-lands and co-sponsored by Unesco-MAB and UNU.
- (iv) Regional workshop for scientists and decision-makers on arid land range management problems, organized jointly by Unesco, ACSAD and ALECSO's green belt project (Tunis, 15-22 May 1982).
- (v) Seminar on Human Settlements for Arab and African countries held in Cairo, Egypt, from 13 to 26 November 1982, and organized by the Egyptian National Centre for Social and Criminological Research (NCSRC).
- (vi) Third symposium for environmental sciences in developing countries, held in Cairo, Egypt, from 16 to 21 April 1983, organized by the African Research and Studies, Cairo University, and co-sponsored by Unesco-MAB and SCOPE.
- (vii) International Conference on environmental hazards of agro-chemicals in developing countries, held in Alexandria, Egypt, from 8 to 12 November 1983, and organized by the University of Alexandria Research Centre (UNARC).
- (viii) Regional workshop on the role of national parks and other protected areas in the conservation and the management of natural resources in Arab countries, held in Alkuf National Park (Libya), from 10 to 16 October 1983 and organized jointly by ACSAD, Unesco and the Libyan authorities.
- (ix) The first Arab seminar on sand dune fixation and desertification control held in Baghdad (Iraq) from 14 to 22 October 1984, organized by ACSAD and the Scientific Research Council of Iraq with the participation of the MAB Programme.

In addition there are other activities which deserve a mention. These activities have an

inter-regional character but are of direct interest to countries in the Arab region :

- the seminar on the integrated and ecological approaches to rural development in arid and semi-arid zones held in Djerba, Tunisia, from 4 to 12 December 1979 with participants from Sahelian and Arab countries ;
- the inter-regional seminar on research and training problems of grazing lands in Sahelian and North-African countries held in Dakar, Senegal, from 23 to 31 October 1980 ;
- the seminar on wind erosion problems in fringe desert areas held in Djerba, Tunisia, from 21 to 26 November 1983 ;
- the meeting on the establishment of a Mediterranean network of ecological information systems held in Montpellier, France, from 2 to 5 December 1980.

It should be emphasized that many of these activities were undertaken in close cooperation with regional organizations such as ACSAD (the Arab Centre for Studies of Arid Zones and Dry Lands) and ALECSO (Arab Educational, Cultural and Scientific Organization), and with the support or the participation of international organizations such as UNDP, UNEP and FAO which are also interested in these activities.

C. ACTIVITIES AT NATIONAL LEVEL

Activities undertaken at the national level, within the framework of MAB, vary in scope and importance from one country to another. It should be emphasized that out of 21 Member States in the Arab region, only eleven have set up an official national committee. Consequently efforts must be made to encourage countries to set up such committees and to help them to develop activities undertaken under the aegis of these committees.

Some committees, as for example the Committee of the Arab Republic of Egypt, regularly publish a news-sheet to liaise with the scientific community and to diffuse news about their activities.

Apart from the activities undertaken by countries using their own means, certain operational projects must be mentioned which have benefited or continue to benefit from outside support :

Algeria : Assistance to the National Research Centre of Arid Zones (ALG/75/037) followed by the project ALG/82/023, "Saharan Research Stations in the El Golea Oasis".

Egypt : Projects on the development of the Western Mediterranean desert of Egypt research and management. The SAMDENE project (Systems Analysis of the Mediterranean Desert Ecosystems of Northern Egypt) initiated in 1974 and followed in 1979 by the REMDENE project (Regional Environmental Management of Mediterranean Desert Ecosystems of Northern Egypt).

Sudan : Strengthening of national desertification control coordinating and monitor-

ing unit (UNSO/DES/SUD/79/001). Project document for the strengthening of the Institute of Environmental Studies of the University of Khartoum (April 1982).

Syria : Feasibility study on the creation of a centre for pastoral research and the development of arid zones in the Syrian Arab Republic (September-October 1982).

Tunisia : Integrated Project on Arid Lands (IPAL-Tunisia FP/1101-78-01) followed by a pilot project on desertification control in Southern Tunisia. Draft programme on research related to integrated management of coastal zones. Studies on the management of island ecosystems (Kerkennah and Zembra Islands).

(i) Problems of arid zones and grazing lands

Most of the projects mentioned above are part of Unesco's major project of research, training and demonstration applied to the integrated management of arid and semi-arid zones.

These projects provide a suitable framework for the implementation of programmes of integrated research on the management of natural resources and the appropriate sites for training and demonstration activities suited to the needs of the areas in question.

As far as past or current research is concerned, particular emphasis is put on the study of the different types of degradation which can affect grazing lands, with a view to working out some solutions which would help to improve the productivity of the land and confront the problems linked to accelerating desertification.

More attention must be paid to studying the interactions between pastoral and agricultural activities in an arid and semi-arid environment, taking into account in particular the effects of modern techniques of land use and land development (mechanization, irrigation, fertilization).

In the fields of training and demonstration priority is being given to on-the-spot training and popularization directly linked to research activities. At the same time a wider public is being made aware of and being given general information on these projects with a view to increasing their impact and ensuring that their results are made known more widely.

Apart from the integrated projects, which also aim to help countries strengthen or set up permanent structures suited to the specific needs of the areas where they are implanted, some actions have also been undertaken to launch specialized training courses in environmental studies. For example, the Institut agronomique et vétérinaire Hassan II in Rabat received some support under the Participation Programme and the Regular Programme of Unesco to set up an advanced course for the training of specialists in this field.

Efforts must be made to encourage such initiatives and to help countries find the necessary finances for new projects such as :

- the strengthening of the Institute of Environmental Studies of the University of Khartoum (Sudan) ;

- the creation of a centre for pastoral research and the development of arid zones in the Syrian Arab Republic ;
- the creation of a research and training centre on range arid ecosystems in Eastern Morocco (Missour region).

(ii) Biosphere reserves

In the field of conservation of natural resources, it should be emphasized that up to now only seven biosphere reserves (theme MAB 8) have been officially created in the Arab countries - in Egypt, Sudan and Tunisia. Other sites have been identified, such as El Kouf National Park in Libya, El Azrak National Park in Jordan and Tassili National Park in Algeria. Proposals to add these to the list should be forthcoming from these two countries, as well as from other countries in the region.

A special effort is needed to refine and apply methods for ensuring the rational

utilization of natural renewable resources and the regeneration of degraded ecosystems.

(iii) Other fields

Activities undertaken in the Arab region in other fields of the MAB Programme have been quite limited. However, certain work on human settlements and urban ecosystems in the Sudan can be mentioned, as well as preliminary studies concerning the management of coastal zones in Egypt and Tunisia.

Another important field which has not received all the attention it deserves is that of the impact of irrigation on arid and semi-arid ecosystems (MAB Project Area 4).

In fact, the extension of irrigation, which is an essential factor in developing agriculture in Arab countries, poses several problems in the agro-economic sense as well as in the sociological and ecological senses. The study of these problems can help to ensure the rational and long-lasting use of water and soil resources.

Section V: Division of Earth Sciences

A. ACTIVITIES AT WORLD LEVEL

1. **Title :** International Geological Correlation Programme (IGCP)

Brief description : the programme is a co-operative effort between the International Union of Geological Sciences (IUGS) and Unesco, designed to encourage international research on geological problems related to the identification and assessment of natural resources and the improvement of man's environment.

Principles of action : to carry out internationally coordinated research on selected topics (projects) related to the major domains of geological sciences, to exchange scientific information and experience, to train young specialists, especially from developing countries, through project working group meetings, workshops, seminars and symposia.

Main aims :

- (a) to assist in obtaining answers to inter-related theoretical and practical problems in the geological sciences, through international cooperation ;
- (b) to help locate, through improved geological knowledge and prospecting methods new mineral and energy resources ;
- (c) to develop worldwide standards and nomenclature for defining the relationship between rock units and geological time ;
- (d) to refine and geographically broaden the application of new research tools and methods to help solve fundamental problems in geological correlation.

The programme has come to have a strong emphasis on the transfer of scientific knowledge and research techniques to developing countries.

Specific activities and achievements :

- (a) Scientific meetings of project working groups, workshops and seminars, which

are being most successfully organized by IGCP project leaders, are constantly encouraged and supported as effective mechanisms for the dissemination of new scientific information and techniques and for training. With Unesco's financial support, thirty-five meetings, seminars and workshops were organized in various parts of the world in 1982. A similar amount of activity is planned for the coming years.

- (b) The considerable effectiveness of the programme is proved by the constant flow of scientific publications resulting from or related to IGCP projects. By 1983, some 10,000 items were published, among which were fundamental monographs as well as specialists' newsletters of interest to particular communities of experts at the international level.

Current information about the programme and projects is published in the series 'Geological correlation' and in the quarterly periodicals 'Nature and resources' (of Unesco) and 'Episodes' (of IUGS).

Background information : in November 1966, the Unesco General Conference supported geological correlation as a key element of its earth science programme. In October 1967, the principles and statutes of the programme were elaborated by an IUGS/Unesco Ad Hoc Committee in Prague. The scientific content of the programme and ways and means of carrying it out were developed by a meeting of experts in Budapest in 1969. On the basis of a report of the Intergovernmental Conference of Experts for Preparing an International Geological Correlation Programme, held in October 1971 and its recommendations (document 17 C/66), the General Conference of Unesco approved the programme at its seventeenth session in November 1972 (resolution 2.313).

Organizations responsible : the programme is a joint enterprise of Unesco and the International Union of Geological Sciences (IUGS), a member of ICSU.

Organizational machinery : the development and management of the programme are the responsibility of the IGCP Board, which draws on

the evaluations and recommendations of the Scientific Committee. One board member out of fifteen has been appointed from the region, as well as one scientist out of twenty on the Scientific Committee. The co-ordination of the programme and maintenance of liaison with national and international bodies concerned with the IGCP are ensured by the IGCP Secretariat (at Unesco) which also acts as a secretariat for the IGCP Board and as a receiving office, clearing house and distribution centre for all IGCP matters.

Participating countries : there are at present eighty National Committees for the IGCP and thirty-six official contacts, bringing the total number of Member States involved in the programme to 116 including thirteen countries from the Arab region, i.e. Algeria, Egypt, Iraq, Jordan, Morocco, Saudi Arabia, Libya, Somalia, Sudan, Syria, Tunisia, Yemen A.R. and P.R. Yemen. Scientists from the region participate in some of the ongoing projects, one of which is led by a scientist from the Arab region, Project 164 "Pan-African crustal evolution". Other important projects are being executed in the region, such as IGCP Projects

- 27 'The Caledonide Orogen' ;
- 146 'River flood and lake-level change' ;
- 156 'Phosphorites' ;
- 183 'West African Mesozoic and Cenozoic correlations' ;
- 184 'Palaeohydrology of low-latitude deserts' ;
- 210 'Continental sediments in Africa'.

2. **Title :** Processing and dissemination of data relating to earth sciences

Brief description : to contribute to the development of and training in more effective and, in particular, computerized methods of interpreting and processing data on the earth sciences, including data obtained with the aid of remote-sensing techniques.

Principles of action : promotion of international scientific projects aimed at the development and improvement of related techniques on the one hand, and the organization of relevant training activities on the other.

Main aims :

- (a) to promote the utilization of new techniques such as remote sensing and computer-based data processing in the field of earth sciences ;
- (b) to develop relevant new approaches for mineral and energy resource assessment and for improving the environment ;
- (c) to transfer these new techniques to developing countries by organizing training seminars, workshops and courses.

Specific activities and achievements :

- (a) A Unesco-COGEODATA expert meeting was held in 1984 to study the feasibility of launching a project on resource modeling through the integration of geological, geochemical and geophysical data by means of computers ; this will be executed in cooperation with the Commission on Storage, Automatic Processing, and Retrieval of Geological Data (COGEODATA) of the International Union of Geological Sciences (IUGS).
- (b) The Unesco-IUGS Programme on Geological Applications of Remote Sensing (GARS) has been in operation since 1984. It includes working groups on Geological Mapping and Resource Assessment.
- (c) A regional training course on geological remote sensing is to be organized in 1985 for Arab countries.

3. **Title :** Study on the creation of international experimental sites for earthquake prediction research

Brief description : selection of experimental sites throughout the world where different techniques for earthquake prediction research could be developed and compared.

Principles of action : investigation of the desirable geotectonic conditions for the experimental sites, approach to possible host governments and agreement on one or two specific sites.

Main aims : provide a situation for broad participation of different teams studying in earthquake prediction area and dissemination of results for the improvement of earthquake prediction.

Specific activities and achievements : advisory missions ; working group meetings ; issuing of published results.

Background information : a recommendation on establishing international experimental sites for research on earthquake prediction was made by the panel of experts on the Scientific, Social and Economic Aspects of Earthquake Prediction held at Unesco Headquarters in 1979. The proposal was approved by the General Conference of Unesco at its twenty-first session.

B. ACTIVITIES AT REGIONAL LEVEL

1. **Title :** Feasibility study for a Programme for Assessment and Mitigation of Earthquake Risk in the Arab Region (PAMERAR)

Brief description : a programme has been designed for purposes of assessing earthquake

risk in the Arab region with a view to mitigating the risk by adopting preparedness measures.

Principles of action : define the needs of the region and suggest implementation of programme in appropriate phasing.

Main aims :

- establishment and upgrading of seismological networks and research institutions ;
- enforcing measures for adequate design of constructions ;
- upgrading civil defence capabilities ;
- training in related disciplines.

References of the project : the study was commissioned to Unesco and funded under Project 705/RAB/40 by the Arab Fund for Economic and Social Development and the Islamic Development Bank.

C. ACTIVITIES AT NATIONAL LEVEL

1. **Title :** Seismic microzoning study of Ech-Chlef (ex El-Asnam) area in Algeria

Brief description : Algeria is undertaking a microzoning of the Chlef area to determine the more or less dangerous zones as regards earthquake risk. Unesco is assisting the Algerian institutions in the control of this project.

Principles of action : to assist the national competent scientists in getting optimal advantage from the project and its results.

Main aims : ensure that the results of the microzoning are adequate and that they meet the required transfer of technology.

Specific activities and achievements : workshops, control of progress reports, training seminars.

Background information : following the El-Asnam earthquake in 1980, the Algerian authorities undertook, in 1982, to elaborate a seismic microzoning study of the area, starting June 1983.

Organizational machinery : the Algerian "Contrôle Technique de la Construction" (CTC), part of the Ministry of Housing, is responsible for the project. Unesco's role consists of an assisting adviser to the CTC.

Reference of the project : the budget allocated for Unesco's assistance is provided jointly by UNDP and Unesco (Project ALG/83/001).

2. **Title :** Monitoring seismic activity in Aswan region in Egypt

Brief description : Unesco has sent out four consecutive study missions to Egypt following the series of earthquakes that occurred in Aswan in November 1981.

Main aims : to assist the local scientists in monitoring seismic activity around the dam.

Specific activities and achievements : study missions, setting up of an observatory network.

Section VI: Division of Water Sciences

A. ACTIVITIES AT WORLD LEVEL

1. Title : Water resources programme

Principles of action : the main courses of action which are complementary are :

- the stimulation and coordination of studies concerning the assessment, exploitation, conservation and management of water resources through the International Hydrological Programme ;
- the promotion and improvement of methods of teaching the water sciences and water engineering and the development of training in this field ;
- the promotion of regional cooperation through support to regional cooperative activities ;
- the strengthening of the capacity of Member States to assess their water resources and to manage them on a scientific basis through technical assistance.

The International Hydrological Programme (IHP) is focused on the scientific and educational aspects of hydrology and has the following basic objectives :

- (a) to provide a scientific framework for the general development of hydrological activities ;
- (b) to improve the study of the hydrological cycle and the scientific methodology for the assessment of water resources throughout the world, thus contributing to their rational use ;
- (c) to evaluate the influence of man's activities on the water cycle, considered in relation to environmental conditions as a whole ;
- (d) to promote the exchange of information on hydrological research and on new developments in hydrology ;
- (e) to promote education and training in hydrology ;
- (f) to assist Member States in the organizing and development of their national hydrological activities.

The IHP is executed through medium-term successive phases of a duration of six years. The present third phase of IHP extends from 1984 to 1989.

The contents of each phase are determined by the General Conference in accordance with the general objectives of the IHP and following recommendations adopted by ad hoc inter-governmental conferences at which all Member States are represented.

Such a conference, organized jointly by Unesco and the World Meteorological Organization (WMO), took place in August 1981 in order to determine the contents of the third phase of the IHP.

The IHP is a long-term intergovernmental programme which aims to promote international co-operation with regard to water resources. It is a hydrological programme centred first of all on a study of water resources and their interaction with the natural environment and human society. It is also concerned with the applications of hydrology to the practical problems of water use.

Main aims :

- (a) to improve the evaluation of potential water resources ;
- (b) to improve the planning of water management ;
- (c) to evaluate the influence of human activities on the water cycle ;
- (d) to promote education in hydrology ;
- (e) to assist Member States in developing their hydrological activities.

Specific activities :

- (a) activities undertaken as part of the IHP consist principally of :
 - ensuring the participation of the IHP by establishing national committees, by developing national and regional hydrological programmes and by setting up working groups or nominating rapporteurs ;
 - the execution of research projects and the publication of technical reports and guides on methods concerning :
 - . computing and determining water balances and their elements at national, regional and international level ;
 - . the characteristics of the water cycle and the hydrological regime ;

. evaluation of changes in the water cycle and the hydrological regime as a result of man's activities, and their impact on the environment ;

- the organization of training courses, symposia and workshops, the reports and conclusions of which are published ;
- the organization of regional meetings of members of the national committees so as to adapt the contents of the IHP to the needs of each region and to develop regional cooperation ;

(b) multidisciplinary studies and the development of new methods of analysis and prediction concerning :

- the optimization of water systems ;
- the development of water resources ;
- the social and economic aspects of water management in urban environments ;
- hydrological and ecological aspects of water pollution ;
- effect of urbanization on the hydrological regime and on water quality ;
- long-term regime of groundwater ;
- rational water management ;

(c) assistance to Member States, particularly developing countries, with regard to :

- the organization and implementation of training and research programmes in the field of water resources ;
- improvement of their training, study and research facilities in this field.

Achievements : the evaluation of the results of the first phase, carried out in August 1981 (report of the International Conference on Hydrology and the Scientific Bases for the Rational Management of Water Resources) showed the progress which it had made possible in scientific knowledge, the practical training of hydrologists, international and regional cooperation in hydrology and the expansion of hydrological activities in developing countries. The programme had been specially directed towards meeting the needs of these countries. Shortcomings were nevertheless noted, particularly with regard to the application of scientific advances, at the international level, to solve the practical problems of developing countries. The main results are the scientific outcome of symposia, seminars, training courses and the publication of scientific works. Most of the publications have been issued in English and are thus easily accessible in the region. Some twenty training courses provide for the training of some 150 students from developing countries.

Background information : the basic documents are the 22 C/5, Programme X.3, paragraphs 10301-10368 and the report of the sixth session of the Intergovernmental Council of the IHP, Paris, March 1984.

Organization responsible : Unesco.

Organizational machinery : the organization of the IHP :

(a) IHP Intergovernmental Council

The role of this council is to ensure the unitary planning and coordinated implementation of the programme. It is composed of representatives from thirty Member States of Unesco ; fifteen new members are elected by the General Conference of Unesco every two years. It is assisted in its work by :

- committees composed of representatives of the Member States, responsible for preparing recommendations on the implementation of some of the programme's major aspects ;
- working groups composed of specialists working in a personal capacity and responsible for studying individual projects.

(b) IHP National Committees

These Committees prepare the programmes of participation of their respective countries in the IHP and supervise the implementation of these programmes. They may also act as the national coordinators of the hydrological activities of their respective countries.

IHP Regional Committees may be established at the initiative of Member States in a region who have similar hydrological interests.

Participants : all Member States of Unesco; appropriate organizations of the United Nations system such as ESCAP, UNEP, WMO, FAO, WHO and IAEA ; non-governmental organizations such as ICSU, IAH, IAHR, IAHS, ICID and ICOLD.

Participating countries : 126 countries have established National Committees.

References to projects

I. Hydrological processes and parameters for water projects

Theme 1 : Investigation of elements of the hydrological cycle and determination of water balances.

Theme 2 : Methods for the investigation of surface and groundwater regimes and for the determination of hydrological parameters for water projects.

Theme 3 : Interaction between climatic variability and change, and hydrological processes.

Theme 4 : Hydrology of particular regions and land areas.

Theme 5 : Application of special technologies for the study of water resources.

II. Influence of Man on the hydrological cycle

Theme 6 : Methods for assessing the changes in the hydrological regime due to Man's influence.

Theme 7 : Environmental impact studies of water projects.

Theme 8 : Specific influences of man on the hydrological regime.

III. Rational water resources assessment and management

Theme 9 : Methodologies for water resource assessment.

Theme 10: Methodologies for integrated planning and management of water resources.

Theme 11: Systems management for reduction of negative side-effects of water resource developments.

Theme 12: Development and presentation of information for planners and decision-makers concerning the implications of modern water resource planning and management approaches.

IV. Education and training, public information and scientific information systems

Theme 13: Promotion of formal education and training in the field of water resources.

Theme 14: Preparation of guidance material to be used for the establishment of training courses in hydrology and water resource management, addressed to various categories of personnel.

Theme 15: Improvement of teaching methods in hydrology and water resource management.

Theme 16: Comparative methodologies for public information and the promotion of public participation in the proper utilization, protection and conservation of water resources.

Theme 17: Scientific information systems : to facilitate the flow and utilization of scientific and technical information in the field of water resources.

Theme 18: Methods for the effective transfer of knowledge and technology related to water resources, and for the evaluation of their impacts in developing countries.

B. ACTIVITIES AT REGIONAL LEVEL

At the regional and subregional levels, cooperation is continuing, in close collaboration with ACSAD and ALECSO, within the framework of the IHP.

Aims :

- strengthening cooperation between the Arab region and the international machinery through the IHP ;
- promoting the institutions for enabling adequate training and education of manpower in both quantity and quality ;
- establishing the relevant large-scale hydrogeological and hydrological maps which are considered basic requirements for the execution of economical development projects ;
- establishing methodology and criteria for a continued assessment of water resources in the Arab region, thus leading to its rational utilization.

Specific activities and achievements 1981-1983 :

1. Major projects

Major Regional Project on the Rational Utilization and Conservation of Water Resources in Rural Areas of the Arab States with Emphasis on Traditional Water Works :

This project is being implemented in close cooperation between Unesco and ACSAD. The inventory reports on the traditional water works have been received from thirteen Arab countries (Algeria, Egypt, Iraq, Lebanon, Libya, Morocco, Oman, Qatar, Sudan, Syria, Tunisia, United Arab Emirates, and Yemen PDR). Inventory reports from Jordan and Yemen AR are in preparation. Unesco, in collaboration with ACSAD, convened a meeting for an Arab Working Group which was held in Paris (13-24 June 1983). The Working Group, which was composed of experts from Syria, Egypt, Tunisia and Morocco along with ACSAD and Unesco, worked out an analysis and evaluation of all traditional water systems in the light of the country inventory reports. The regional report, as prepared by the Arab Working Group, is being edited in collaboration with ACSAD. The regional meeting held in Paris, November 1983, discussed and approved the report submitted by the Arab Working Group on the regional inventory of the traditional water works in Arab countries.

2. Meetings

Within the framework of the regional cooperation, two major regional meetings are to be recorded. These are : (i) the IHP Arab Committee, organized by ALECSO with the participation of Unesco and thirteen Arab countries which was held in Tunis on 23-26 March 1983, and (ii) the regional meeting for water resources for the Arab countries, organized by

Unesco with the participation of ALECSO, ACSAD and twelve Arab countries, which was held in Paris from 21-28 November 1983. At the former meeting, some ten working documents were presented which reflected the great interest of the IHP Arab Committee members in Unesco's activities pertaining particularly to the IHP III (1984-1989). At the latter meeting, three main subjects were discussed : water resources assessment, the major regional project and the hydrogeological map in Arab countries.

3. Courses

In the field of education and training in water sciences, three courses were organized.

The first course was organized in collaboration with ACSAD and was held in Damascus for a period of three weeks (4-23 December 1982). The course was aimed at the training of technicians on the technology of water resources and was attended by fourteen participants from seven Arab countries.

The second course was organized by Unesco in collaboration with Ain Shams University and was held at the Faculty of Engineering in Cairo for a period of two months (May-June 1983). The course was at postgraduate level and was aimed at the training of hydrologists, hydrogeologists and water science engineers on the hydrology of arid and semi-arid regions. It was attended by seventeen participants from four Arab countries and three African countries.

The third course was organized within the framework of the major regional project on the rational utilization and conservation of water resources in rural areas. It was sponsored by Unesco in collaboration with the Tunisian Government Centre de Recherche du Génie Rural (CRGR) and was held in Tunis for two weeks (3-15 October 1983). The course was attended by seventeen participants from five Arab countries and ten African countries. The purpose of the course was to train water engineers in the technology of traditional water systems.

4. Preparation of hydrogeological maps

Within the framework of an activity pertaining to the establishment of a hydrogeological map for the Arab countries on a large scale (1:200,000), which is considered essential for development purposes, in collaboration with ALECSO and ACSAD, Unesco held two meetings : the first in Tunis (18-21 October 1982) and the second in Damascus (3-6 February 1983). Also during the regional meeting held at Unesco, Paris in November 1983, a recommendation to unify the legend and terminologies used in preparing hydrological and hydrogeological maps of Arab countries was put forward ; the study of appropriate programmes through which an integrated project for the establishment of a large-scale hydrogeological map in the Arab region could be realized. Unesco has introduced provisions for establishing a regional small-scale hydrogeological map (1:5 million) in its 1984-1985 programme activities which will conform with the African regional map

and the international geological map, both of which are on the same scale. Unesco organized a meeting for an Arab Working Group which was held at ALECSO Headquarters in Tunis (24-27 September 1984) with the participation of ACSAD and ALECSO for the purpose of drawing up a legend for the small-scale hydrological map.

5. Technical documents

With regard to translation into Arabic of the technical documents, studies and reports currently published by Unesco in the field of water resources, a document entitled "Aquifer Contamination and Protection" has been translated in collaboration with the IHP National Committee of Egypt. Another document entitled "Water and City" has been translated in collaboration with ACSAD and is awaiting publication.

Specific activities planned (1984-1985) :

- Within the framework of the strengthening of regional cooperation, two documents will be edited and published in collaboration with ACSAD, one on the water resources assessment in the Arab countries and the other a directory of Arab water scientists and institutions.
- A seminar on regional hydrogeological basins with emphasis on the technology of deep wells will be organized in collaboration with ALECSO.
- Unesco supports two regional training courses annually. One is a postgraduate course on the hydrology of arid and semi-arid regions which is currently organized by Ain Shams University (Cairo, Egypt), and the other is a technician training course in collaboration with ACSAD. Furthermore, arrangements are being made to organize a postgraduate course in the French language and another for technician teachers.
- An Arab Expert Workshop for the revision of legend and terminologies for large-scale hydrogeological maps will be held in 1984. Also, preparation for the co-publication of hydrogeological maps of the Arab region on a scale of 1:5 million will take place in 1984-1986.
- As regards the translation of technical documents, studies and reports into Arabic which have been currently published by Unesco IHP, two documents will be printed during 1984/1985 : one on aquifer contamination and protection and the other on water and the city.
- Within the framework of the Major Regional Project on the Rational Utilization and Conservation of Water Resources in Rural Areas of the Arab States with emphasis on Traditional Water Works, Unesco, in collaboration with ACSAD, will continue to implement the project in accordance with the recommendations and directions given by the Arab representatives during the regional meeting held in Paris in November 1983. Unesco will continue to participate in the regional and national meetings which are currently organized by the regional organizations, e.g. ALECSO and ACSAD.

C. ACTIVITIES AT NATIONAL LEVEL

Although major Unesco activities in the field of water sciences are being implemented with a regional scope, some important actions are also being carried out at the national level. These consist of :

- encouraging the Arab countries which have not yet formed their IHP National Committees to give this matter the highest consideration.

For the period 1984/1985, the following five Arab countries have been elected members in the IHP Intergovernmental Council : Egypt, Jordan, Sudan, Syria and Tunisia ;

- continuing to provide advisory services to Arab countries, whenever needed, and upon their request, in order to solve specific problems. Some of these have been considered, e.g. recycling of waste water in Yemen AR, mineral water and natural springs in Yemen PDR, use of saline water in Libya, the Nubian aquifer in Egypt and Sudan.

Section VII: Division of Marine Sciences

A. ACTIVITIES AT WORLD LEVEL

The activities of the Unesco Division of Marine Sciences, in co-operation with the Regional Office for Science and Technology in the Arab States (ROSTAS) at world level involve the Arab Member States and contribute directly or indirectly to the promotion of marine sciences in the Arab region.

Specific activities and achievements at world level

1. **Title :** Major interregional project for research and training in view of the integrated management of coastal systems (COMAR)

Brief description : COMAR is one of the 'Major Projects' of Unesco. It concentrates on the coastal environment, the socio-economic and scientific importance of which has been increasingly appreciated in recent years in coastal countries, developing and developed alike. Understanding of the functioning of coastal systems, however, is not only relatively sparse and fragmentary, but lags behind scientific knowledge of the adjacent terrestrial and marine ecosystems.

Principles of action : sound management of the coastal environment and its resources requires proper understanding of this environment and of the functioning of its various systems, including their responses to the impact of man's use on them. During the initial stage of COMAR, the main systems, such as mangroves, coastal lagoons, estuaries, coral reefs, etc., are considered separately in view of the great complexity of the coastal environment, the scarcity of means and the need to consider various aspects in depth. Besides reviewing and trying to synthesize the scattered existing knowledge, the project promotes further research activities of these systems, especially on a regional basis, to secure a firm basis for the required management guidelines and programmes.

Main aims :

- (a) to assist Member States in :
 - defining their needs and priorities regarding coastal environment, research and management ;
 - training teams of specialists as needed, and acquiring the necessary manpower and supporting facilities ;
 - acquiring and completing the necessary scientific knowledge on the functioning of the natural coastal systems and on the consequences of impacts from socio-economic origin ;
- (b) to develop in the different regions field programmes responding to the different needs for surveys, research and training concerning scientific research and management policies and guidelines, including the need for public information.

2. **Title :** Open University/Unesco course in marine sciences

With the support of Unesco, the Open University of the U.K. has developed an advanced self-study oceanography course composed of a series of books and relevant audiovisual material to assist the teaching of the marine sciences at universities. The courses are applied in accordance with the needs of each university. Several universities in the Arab States have expressed their interest. The course is presently being installed at the University of Alexandria, Egypt.

3. **Title :** Support for participation of Arab Marine Scientists in international meetings and conferences

Many scientists in the Arab States have received financial support to enable them to participate in technical meetings, conferences and general assemblies of large non-governmental organizations, such as the Joint Oceanographic Assembly in Halifax, 1982, the International Union of Geodesy and Geophysics (IUGG) in Hamburg, 1983, and the Third International Congress on the History of Oceanography in Alexandria, 1984.

graphy in Woods Hole, 1980. In addition, many seminars, symposia and workshops have been held on the world level, and in which Arab scientists have participated.

4. **Title :** Training of Arab marine scientists

Unesco's Division of Marine Sciences gives special attention to training marine scientists and technicians throughout the world. Several technical workshops have been held, and the resulting reports have been made available to the Arab States, such as : Teaching Marine Sciences at the University level, Teaching Marine Sciences in Schools, Training of Technicians in Marine Sciences, Teaching Fishery Science, and Teaching Ocean Engineering.

5. **Title :** The Mabahiss/John Murray International Symposium, Alexandria, 3-7 September 1983

Activities have been supported to commemorate the 50th Anniversary of the John Murray Expedition in the Indian Ocean, which was undertaken on the Egyptian Research Vessel "Mabahiss" in 1933-1934. Firstly, the Mabahiss/John Murray International Symposium "Marine Science of the North-West Indian Ocean and Adjacent Waters" was convened by the University of Alexandria from 3 to 7 September 1983, and was co-sponsored by the Egyptian Academy of Scientific Research and Technology, the United Kingdom, Unesco and IOC. The Symposium was attended by one hundred participants from Canada, Egypt, France, the Federal Republic of Germany, Greece, India, Iraq, Kuwait, Monaco, Norway, Pakistan, Qatar, Saudi Arabia, Sudan, Turkey, the United Kingdom and the United States of America, and by representatives of Unesco, IOC, FAO and the Saudi-Sudanese Red Sea Joint Commission. The Symposium included a special round table, the purpose of which was to identify gaps in the knowledge of the oceanography of the region and to make suggestions for initiating future international and regional cooperation to fill in those gaps. Secondly, Unesco has provided assistance to Egypt to promote the restoration of the "Mabahiss" as a museum. Thirdly, an unpublished manuscript containing the narrative of the Expedition by its leader will be published by Unesco in English and Arabic. In addition, the translation of a literary book "Un Sindbad Moderne" by an Arab scientist who participated in the Expedition, will be published by Unesco in its series "Oeuvres représentatives".

B. **ACTIVITIES AT REGIONAL LEVEL**

Following the CASTARAB Conference in Rabat in August 1976, the Unesco Division of Marine Sciences has continued its support of marine science at the regional level, as well as its collaboration with regional organizations to

implement the programme. Due to the extent of the Arab States region which lies between the Atlantic and the Indian Ocean, three subregions have emerged, defined by their natural geographical limitations and their environmental characteristics. These subregions are :

- (a) the Mediterranean ;
- (b) the Red Sea and Gulf of Aden ;
- (c) the Gulf and Gulf of Oman.

However, before reviewing the activities in the three subregions mentioned above, reference should be made to regional activities covering the entire Arab region.

Specific activities

1. **Title :** The Arab Committee for the Marine Environment, Damascus, December 1983

Unesco participated in this meeting which brought together representatives of Arab Member States from the three afore-mentioned subregions. Contact is being maintained with ALECSO to ensure better coordination at the regional as well as subregional level.

Specific activities in subregions

(i) **Mediterranean subregion**

As a result of the interest shown during the CASTARAB I Conference in the development of marine biological reference collections, special attention has been given to this problem. In addition, particular support has also been given to research in coastal lagoons and lakes of the North African region, as well as general support to modeling of the Mediterranean ecosystem that brought together scientists from the Arab and European Mediterranean countries.

1. **Title :** Marine Biological Reference Collections in the Arab countries of the Mediterranean

The project started in 1977 with the visit of two Unesco consultants to Algeria, Libya, Tunisia and Egypt. In 1978, a meeting was held in Tunis, Tunisia, and was attended by the two consultants and invited scientists from the region. This meeting resulted in the publication of Unesco Reports in Marine Sciences No.6 (in Arabic, English and French). Subsequently a team visited the four Arab Mediterranean countries in 1982 to provide follow-up advice and initiate further activities. Study grants were offered to a number of candidates from Arab Mediterranean countries to pursue research and development in marine biological reference collections in Europe, particularly with the British and French Natural History Museums.

The following publications have been produced under the project :

- Organization of Marine Biological Reference Collections in the Mediterranean Arab Countries, and
- Guidelines for Marine Biological Reference Collections.

Several Arab scientists from Algeria, Libya, Tunisia, Egypt and Morocco are involved in activities relating to the development of marine biological reference collections, the majority from universities, research institutions and government ministries in those countries.

2. Title : Coastal Lagoons of the Southern Mediterranean

Due to the great vulnerability of the coastal zone and its sensitivity to man-made effects, particularly industrial and urban pollution, and to the high productivity of most coastal lagoons and lakes in the southern Mediterranean, special attention has been given to this problem and support through the exchange of expertise and personnel among countries involved has been considered. As a result, the following activities have been carried out :

- (a) Workshop on Eutrophication with Application to Lake Tunis and adjacent Coastal Waters, Tunis, 6-18 September 1982 (Unesco Reports in Marine Science, No.29, in English).
- (b) Training course on Biomass and Primary Productivity Measurements in Coastal Waters, Alexandria, Egypt, 22 January to 11 February 1983. Subsequent training of two candidates from Egypt and Tunis at the International Agency for ¹⁴C determination and the Marine Pollution Laboratory of the National Agency of Environmental Protection (Danish Isotope Centre).
- (c) Setting up of a Bibliographical List on Coastal Lagoons and Salt Marshes along the Southern Mediterranean Coast (to be published in 1985 as No.34, Unesco Reports in Marine Science, in English, French and Arabic).

3. Title : Modelling of the Mediterranean Ecosystem

This scientific activity was supported at the request of many marine scientists in the Mediterranean, since ecosystem modelling is considered an adequate tool for the assessment of the interrelationship of the complex ecosystem and the man-made effects on the ecosystem, which in turn may lead to a better understanding and management of the ecosystem.

Specific activities

- 1. Title :** Workshop on Quantitative Analysis and Simulation of Mediterranean Coastal Ecosystems: The Gulf of Naples, a case study, Ischia (Naples), 28 March to 10 April 1981

Further training was given, either on an individual basis or through participation in a Training Course on Application of Mathematical Models in Management of Aquatic Ecosystems, Dubrovnik, 27 September to 8 October 1982.

- 2. Title :** Congress and Plenary Assembly of the International Commission for the Scientific Exploration of the Mediterranean Sea (ICSEM)

This Congress is a very important event which takes place every two years, and gathers scientists from Mediterranean countries. Initially, the participation of Arab countries was very low, but due to the recent efforts of the Unesco Division of Marine Sciences their participation has become more significant with the help of travel grants awarded to candidates with a scientific contribution to these meetings. Travel grants were also awarded to the participants of the congress in Lucerne, Switzerland, in October 1984.

(ii) Red Sea and Gulf of Aden subregion

The Unesco Division of Marine Sciences has based its activities in this subregion on direct cooperation and coordination with the ALECSO Programme on the Environment of the Red Sea and Gulf of Aden, now known as PERSGA. Unesco initiated this cooperation by convening a Workshop on a Marine Science Programme for the Red Sea, in Bremerhaven, Federal Republic of Germany, 22-23 October 1974, which recommended specific topics of priority for research in this area (Unesco Technical Papers in Marine Sciences, No.25).

Following this, Unesco participated in the Jeddah I (November/December 1974) and Jeddah II (January 1976) meetings, as well as in the Jeddah Plenipotentiary Conference, 12-15 February 1982.

In addition, Unesco and ALECSO cooperate in developing training opportunities and scientific meetings in this subregion.

(iii) Kuwait Action Plan (KAP) subregion (the Gulf and Gulf of Oman)

The CASTARAB I Conference approved in 1976 a regional project for the study of the Gulf region. For the sake of unity in the implementation of this project, Unesco cooperated with UNEP in activities which led to the

convening of the Kuwait Regional Conference of Plenipotentiaries on the protection of the Marine Environment and the Coastal Areas, Kuwait, 15-24 April 1978 and to the adoption of the Kuwait Action Plan. Unesco has cooperated with the Regional Organization for the Protection of the Marine Environment (ROPME), UNEP and other UN Agencies in many activities within the framework of the Kuwait Action Plan, the most recent of which are given below.

Specific activities

1. **Title :** Symposium/Workshop on Oceanographic Modelling of the KAP Region

According to a Project Document signed between ROPME, UNEP and Unesco, with Unesco as executing agency, the above mentioned Symposium/Workshop was organized and hosted by the University of Petroleum and Minerals (UPM), Dharhan, Saudi Arabia, 15-18 October 1983. Sixty-five marine scientists, meteorologists and engineers working in the region attended the symposium, and eighteen research papers were presented and discussed during the scientific sessions of the symposium.

2. **Title :** Task Team Meeting of the Kuwait Action Plan of ROPME, Kuwait, 18-20 April 1984

Unesco, as an executing Agency for some of the KAP activities, participated in the above Task Team Meeting, where Unesco achievements were reported and reviewed. The successful implementation of the KAP activities entrusted to Unesco encouraged the acceptance by the ROPME Council of new initiatives made by Unesco and the IOC to carry further activities in the region, namely a Workshop on Physical Oceanography, a Workshop on Oil and Non-oil Pollutants Sampling and Analysis, and an International Symposium on the Marine Environment of the KAP Sea Region. These activities are to be carried out during 1984-1985.

C. ACTIVITIES AT NATIONAL LEVEL

Bahrain

1. **Title :** Advisory Mission to the Arabian Gulf University

A high-level Unesco mission was organized, and visited the Gulf region between 4 and 24 February 1983, at the request of the Arab Bureau of Education for the Gulf States, to advise on the subject matter, including education in the marine sciences at the University.

Iraq

1. **Title :** Establishment of the Marine Science Centre of the University of Basrah (Project 909/IRQ/42)

Aim : under the terms of a funds-in-trust agreement, Unesco is assisting the University of Basrah to strengthen the Marine Science Centre. This project comprises the transformation of a fishing boat into a research vessel, the establishment of a remote sensing unit and computer centre. Unesco is also providing expertise to prepare the scientific plans of the centre and assumes the responsibility of training.

2. **Title :** Training of Iraqi marine scientists

Through Unesco, two Iraqi marine scientists were invited to attend the Training Course on Biomass and Primary Productivity Measurements, held in Alexandria, Egypt, from 22 January to 13 February 1983, sponsored by the University of Alexandria, Unesco and the Danish International Development Agency (DANIDA). Furthermore, training in the field of chemical analysis of hydrocarbons in seawater, sediments and tissues was provided to an Iraqi marine chemist from the Marine Science Centre of Basrah University, at Bedford Institute of Oceanography in Dartmouth, Canada, from 28 January to 16 March 1983.

Kuwait

1. Unesco has cooperated with Kuwait within the context of the Kuwait Action Plan.
2. In the framework of technical cooperation between developing countries, the Kuwait Institute for Scientific Research (KISR) has, through Unesco, provided West African countries with a computerized bibliographical list relevant to Unesco's project on "Control of Coastal Erosion in West and Central Africa (WACAF/3)".

Oman

1. **Title :** Establishment of Marine Science and Fisheries Centre, Muscat, for the Ministry of Agriculture and Fisheries of the Sultanate of Oman (Project 920/OMA/40).

Aim : This project consists of providing technical assistance to the Ministry of Agriculture and Fisheries with a view to creating a marine science centre. Unesco provides the services of architects and scientists to assist in the preparation of the necessary specification, preliminary drawings and supervision of the construction of the building. At a later stage, Unesco will provide

the services of a Chief Technical Adviser who will assume the responsibility of organizing the scientific activities of the centre and organize training programme for the national staff.

Saudi Arabia

1. Unesco participated in the Meeting of Directors of Oceanographic Institutions in the Red Sea and the Gulf Region, held at King Abdulaziz University, Faculty of Marine Science, Jeddah, from 16 to 20 January 1982.
2. Unesco provided a financial contribution of US \$15,000 under Unesco's Participation Programme, towards the convening of a Symposium on Coral Reef Environment of the Red Sea, which was held in King Abdulaziz University in Jeddah, from 14 to 18 January 1984. There has been further cooperation with the University, as well as with King Faisal University.

Qatar

1. **Title :** Multipurpose Oceanographic Research Research Vessel
(Project 900/QAT/42)

Aim : Unesco helped the University of Qatar to acquire a 25m multipurpose oceanographic research vessel. Unesco's assistance included preparation of technical specification, tender document, evaluation of offers, selection of shipbuilder, and supervision during construction, up to the final delivery of the vessel to the National authorities. Unesco also provided the necessary scientific and research equipment and organized training programmes for a Qatari captain and a chief engineer.

United Arab Emirates

1. **Title :** Feasibility study of a Regional Marine Resources Research Centre and a Research Vessel
(Project 902/UAE/40)

Aim : A Funds-in-trust project was carried out with the objective of updating an earlier study for the establishment of a Marine Resources Centre in the United Arab Emirates. A feasibility study was prepared which contained "conceptual designs" for the building and the research vessel, with two alternatives for the building of the Centre, as a national or as a regional centre.

Egypt

1. A project on Aquatic Environment Pollution is supported at the University of Alexandria

Research Centre (Unesco/UNDP Project EGY/73/058).

2. A regional training course on "Biomass and Primary Productivity Measurements in Coastal Waters" was held at Alexandria University, from 22 January to 13 February 1983.
3. A number of scientists were supported for short-term training in European laboratories or on-board research vessels.

Jordan

1. Support for participation in the ¹⁴C course in Alexandria, January-February 1983, and in other scientific meetings.

Lebanon

1. Support was given for participation in the First Copepoda Conference in Belgium (August 1981), in the ICSEM Meetings, and for carrying out long-term (nine months) training at the Université d'Aix-Marseille II (January 1983).

S.P. Libyan Arab Jamahiriya

1. **Title :** Strengthening of the Marine Research Centre, Tripoli
(Project 901/LIB/40)

Aim : under the terms of a funds-in-trust agreement signed between Unesco and the Government of the Libyan Arab Jamahiriya, Unesco assisted the Ministry of Light Industry in strengthening the Marine Science Centre, by providing the necessary expertise, equipment and publications. Unesco also organized a training programme for the national staff. The Centre became fully operational in 1980, and it is currently conducting research activities in fields such as oil pollution, fisheries research, mariculture, physical oceanography, etc. The results of these research activities are published in the Centre's Bulletin, which was initiated by the Project.

2. **Title :** The Marine Biological Research Centre, Tajoura

Aim : to strengthen the teaching and research capabilities of El-Fateh University in the field of marine biology. Unesco provides the Centre with consultants, scientific and research equipment ; it also assists in preparing and implementing scientific programmes.

Somalia

1. **Title :** Advisory missions

Aim : consultants and missions have been supported for the preparation of a project document and discussions for the establishment of a Marine Research Institute.

Sudan

A Symposium on the Red Sea, Gulf of Aden and Coastal North West Indian Ocean, January 1980, and publication of the proceedings were supported in cooperation with ALECSO and the Saudi-Sudanese Red Sea Joint Commission.

Syria

1. **Title :** Advisory mission

Aim : to advise on the building of the Marine Research Centre at Lattakia.

Yemen Arab Republic

1. **Title :** Consultancy missions

Aim : consultants and missions for the preparation of a project document, under the Funds-in-Trust programme, for the establishment of a Marine Science Centre at Sanaa.

P.D.R. Yemen

1. **Title :** Marine Science and Marine Resources Research Centre, Aden (Project 703/PDY/40 funded by the Islamic Development Bank)

Aim : the main objective of this project was to establish in little Aden a marine science centre, attached to the Ministry of Fish-wealth. The Centre assumes the responsibility of conducting oceanographic research and providing the scientific information required for a rational use and exploitation of the country's marine resources.

The project consisted of the following activities : construction of the Centre itself, purchase and installation of scientific and research equipment, recruitment of international staff and the training of national scientists. The Centre was officially inaugurated in October 1983.

Algeria

1. **Title :** Establishment of the Institute of Marine Sciences and Coastal Management

Aim : consultancy missions by an expert-architect were carried out to establish plans for the above Institute (1983-present).

2. **Title :** Research vessel

Aim : assistance was given by Unesco to the Algerian authorities for procuring an oceanographic research vessel.

3. **Title :** Training and Education of Algerian marine scientists

Aim : study grants were provided for obtaining a Ph.D. in phytoplankton of the Mediterranean Sea, and for participation in the Symposium on Environment and Coastal Management (Rotterdam, 1982).

Morocco

1. **Title :** Training and education of marine scientists

Aim : several travel and study grants were provided to Moroccan scientists to enable them to carry out scientific research on the estuarine zone of the Mediterranean and the Atlantic, to prepare the Geological Map of the Continental Margin of North West Africa and to participate in "Colloque sur les bases biologiques de l'aquaculture" (12-16 December 1983).

2. **Planned activity :** travel grant for a representative of the Société nationale d'études du Détroit, given in 1984.

Tunisia

1. **Title :** Symposium "L'entreprise océanique"

Aim : upon the request of the "Association des études internationales", Unesco supported a symposium, "L'entreprise océanique", which took place in Tunis from 12 to 14 May 1982 and the participation of some experts invited to the Symposium.

2. **Title :** Workshop on Eutrophication with application to Lake Tunis and its Adjacent Coastal Waters, Tunis, 6-18 September 1982

Aim : This Workshop was convened following the recommendations of two expert meetings in September 1978 and included scientists from

the Mediterranean. The contract between Unesco and Tunisia provided a large quantity of equipment for the "Institut national scientifique et technique d'océanographie et de pêche (INSTOP)".

3. Title : Advisory mission

Aim : a Unesco consultant in architecture was sent on mission to Tunis, from 23 to 31 January 1983, to consult with and advise the Tunisian authorities on the building plans for a new Marine Science Institute.

4. Title : Training and education of Tunisian marine scientists

Aim : on several occasions travel and/or study grants were provided to Tunisian marine scientists to enable them to (a) pursue their research work in advanced laboratories abroad : at the Université des sciences et techniques du Languedoc, Montpellier (June 1981-February 1982) and in the British Museum (Natural History) in London (December 1983) ; (b) receive training through participation in two training courses in Alexandria (1981) and Copenhagen (1983), and (c) participate in scientific meetings of ICSEM (in Cagliari, 1980, Cannes, 1982 and Lucerne, Switzerland in 1984).

Section VIII: Secretariat of the Intergovernmental Oceanographic Commission (IOC)

1. **Title :** Marine Science and Technology

Aim : "to promote scientific co-operative investigations with a view to learning more about the nature and resources of the ocean through the concerted action of its Members" (Article 1.2 of the IOC Statutes).

A. SPECIFIC ACTIVITIES AT WORLD LEVEL

1. **Global Investigation of Pollution in the Marine Environment (GIPME) :**

- (a) studies and international meetings on the entry, distribution and transfer processes of pollutants ;
- (b) basic regional studies on the levels of the most important pollutants in each ocean region and in each element (water, organisms, sediments, atmosphere) of the marine environment ; cooperation in the implementation of the UNDP Mediterranean Action Plan ;
- (c) studies on dose/response relationships and on methods used to assess marine pollution (preparation of standards and methods of analysis) with a view to regulatory and monitoring activities ;
- (d) development and trial of models based on observational data collected.

2. **International Oceanographic Data Exchange (IODE) :**

- (a) preparation of international guides and handbooks, and standardized formulae for recording and encoding data ;
- (b) the establishment of a Marine Environmental Data and Information referral system (MEDI) ;
- (c) development, in conjunction with FAO, of an Aquatic Sciences and Fisheries Information System (ASFIS) ;
- (d) provision of assistance for the development of national centres for the collection of oceanographic data, particularly in the developing countries.

3. **Integrated Global Ocean Services System (IGOSS) :**

- (a) development of :
 - an IGOSS observation system ;
 - the use of the WMO/GTS (WMO/GTS : WMO's Global Telecommunication system) meteorological, oceanographic and marine observation techniques ;
 - data exchange and archiving ;
 - a related education and training programme ;
- (b) assistance to regional ocean monitoring programmes ;
- (c) assistance with the training of specialists in developing countries and with the various aspects of work undertaken as part of IGOSS.

4. **Training, Education and Mutual Assistance (TEMA) :**

- (a) evaluation of the resources and needs of Member States with regard to facilities, equipment and staff for training ;
- (b) establishment, coordination and evaluation of training, education and mutual assistance programmes, and the promotion of projects and activities aimed at helping Member States to develop their capabilities in the relevant fields.

The Intergovernmental Oceanographic Commission expands the above-mentioned global activities and systems to respond to the needs and interests of the Arab countries whenever appropriate, as described below.

1. Following the decision of the Unesco General Conference at its twenty-first session in 1980 to support activities associated with the 50th Anniversary of the joint Anglo-Egyptian John Murray Expedition which took place in 1933-34 on board the Egyptian research vessel *Mabahiss*, the IOC Assembly at its twelfth session adopted Resolution XII-19 "Mabahiss/John Murray International Symposium, Alexandria, 1983". The IOC, having accepted the invitation to co-sponsor the Symposium, decided to use its outcome as a basis for the plan-

ning of future regional marine scientific activities of the IOC in the North Western Indian Ocean, the Red Sea, the Gulf of Aden, the Arabian Sea, the Gulf of Oman and the Gulf regions.

The Symposium was organized by the University of Alexandria from 3-7 September 1983. It was attended by one hundred participants from seventeen countries : Canada, Egypt, France, Federal Republic of Germany, Greece, India, Iraq, Kuwait, Monaco, Norway, Pakistan, Qatar, Saudi Arabia, Sudan, Turkey, U.K., U.S.A., and by representatives of Unesco, IOC, FAO and the Saudi-Sudanese Red Sea Commission.

Apart from the 32 original scientific contributions presented at the Symposium, pursuant to IOC Resolution XII-19, the Symposium held a special Round-Table Discussion. The purpose of this discussion was to identify gaps in the knowledge of oceanography of the above regions and to make suggestions for initiating future international and regional cooperation to fill those gaps.

The recommendations of this Round-Table Discussion, including several identified research proposals, were brought to the attention of the Seventeenth Session of the IOC Executive Council (Paris, 21 January-9 February 1984). The Council favourably considered the outcome of the Round-Table and its recommendations. The appropriate Programme Group of the relevant IOC regional subsidiary bodies will thus consider the implementation of these recommendations which will eventually involve several Arab countries in the above-mentioned regions.

2. The global ocean service activities of the IOC, in particular the Integrated Global Ocean Services System (IGOSS), and the International Oceanographic Data Exchange System (IODE), which provide for the collection, processing, archiving and exchange of oceanographic data and data products, have been expanded to cover most of the Arab States. Countries such as Egypt, Lebanon and Morocco have been participating for some years in the above activities. Other countries such as Algeria, Libya, Jordan, Syria and Iraq have recently expressed interest in participating. On the other hand, the IOC provides assistance to Arab countries for the establishment of their National Oceanographic Data Centres (NODCs), to be later integrated in the above-mentioned system of the IODE.

3. At the Fourth Session of the Working Committee for Training, Education and Mutual Assistance (TEMA) held in Lisbon, Portugal, from 4 to 9 June 1984, Algeria, the Islamic Republic of Mauritania and the Sultanate of Oman were represented and thus participated in its activities.

4. At the IODE-X Meeting held in Hamburg, Federal Republic of Germany, in August 1981, Libya was represented, and at IODE-XI held in New York in January 1984, Egypt was represented.

5. Three Arab countries, namely Algeria, Tunisia and Morocco, were invited to attend a specialized training course of the Joint FAO/IOC/UN (OETB) Aquatic Sciences and Fisheries Information System (ASFIS) held in Brest, France (28 November-9 December 1983) for Francophone countries of the Western coast of Africa. The training course was on "Management and Processing of Marine Scientific and Technological Information Relation to Oceanography". Four Arab participants attended the course : two from Morocco and two from Tunisia.

B. ACTIVITIES AT REGIONAL LEVEL

The IOC, through the convening and co-sponsorship of scientific symposia in the Arab countries on various topics, particularly on marine pollution monitoring and research, has greatly contributed to the process of dissemination of marine scientific knowledge in the Arab region and among Arab scientists. On the other hand, through the organization of regional training Workshops in the Arab Member States in various fields of Oceanography, the IOC has provided significant assistance in the transfer of marine technology.

During 1981-1983, the IOC continued its support to various regional activities in the Arab region, as well as its cooperation with regional organizations to implement relevant activities which lie in the sphere of competence of the IOC. The following are the specific activities which have been carried out in the regions which consist of or include Arab Member States, namely : (i) the Mediterranean , (ii) the Red Sea and the Gulf of Aden, and (iii) the Gulf regions.

(i) The Mediterranean region

1. The IOC, in cooperation with UNEP and other UN organizations, implemented as executing agency two of the seven Pilot Projects constituting the first phase (1975-1980) of the pollution monitoring and research programme, known as MEDPOL, of the Mediterranean Action Plan. Most of the Arab countries bordering the Mediterranean have participated in this programme. During MEDPOL - Phase I, Egypt was selected as one of the Regional Activity Centres to assist IOC and UNEP in the implementation and co-ordination of specific activities for MEDPOL-VI (Pilot Project on Coastal Transport of Pollutants). IOC is also participating in the present Long-term Programme for Pollution Monitoring and Research in the Mediterranean (MEDPOL - Phase II) which started in 1981 and in which some Arab countries of the Mediterranean are involved.

2. The International Bathymetric Chart of the Mediterranean (IBCM) on 1:1 million scale sheets was published under the auspices of the IOC in 1982 by the USSR, as a contribution to the work of the Commission. Several Arab countries were involved in the process of preparation of this series of sheets by providing necessary bathymetric information. The corresponding six overlay sheets which include gravimetric, magnetic, seismic, plio-quaternary, messinian and recent sedimentation sheets are to be published in the future, the first during 1984. These charts will provide all the Mediterranean States, including the Arab countries bordering the Mediterranean, with invaluable information and data related to environmental studies, mineral and oil exploitation and cable and pipe laying.

(ii) The Red Sea and Gulf of Aden region

Contacts have been established with ALECSO's Programme on the Environment of the Red Sea and Gulf

of Aden (PERGSA) to initiate a regional activity, similar to the IBCM mentioned above, for the bathymetric charting of the Red Sea and Gulf of Aden. This will also involve several Arab countries bordering the Red Sea basin.

(iii) The Gulf (the Kuwait Action Plan "KAP" region)

Within the framework of cooperation between IOC, UNEP and the Regional Organization for the Protection of the Marine Environment "of the Gulf" (ROPME), the IOC as executing agency has been entrusted through Project KA/0503-82-08 to provide assistance to ROPME in the implementation of the Kuwait Action Plan by carrying out the following activities :

(a) Consultancy missions

In November-December 1982, a Joint Unesco/IOC/ROPME five-member mission visited the Gulf Region to advise on the organization of regional training workshops and scientific symposia to be held in various countries of the Region under KAP/ROPME during 1982-83.

(b) Training Workshop on Oceanographic Sampling, Analysis, Data Handling and Care of Oceanographic Equipment

The above-mentioned workshop, co-sponsored by Unesco's IOC, was hosted by Qatar University, in Doha, from 3-15 December 1983. Twenty-two trainees from seven Gulf States participated. They were trained through lectures, laboratory sessions and two field cruises on board the Qatari research vessel "Mukhtabar Al-Bihar", which was built in cooperation with Unesco.

(c) Symposium/Workshop on Fate and Fluxes of Oil Pollutants in the KAP Region

The above-mentioned symposium was held at Basrah University, Basrah, Iraq, from 8-12 January 1984. A hundred participants attended, and twenty-two research papers on oil pollution and related problems were presented and discussed during the technical sessions of the Symposium. In addition, four *ad hoc* Working Groups were formed to formulate scientific proposals for future research activities, to be carried out in the KAP Region, relating to the problems of oil pollution in the Gulf. The recommendations of these Working Groups were analysed and followed up by the IOC, and suggestions for possible future cooperation in the Gulf Region through ROPME were submitted to ROPME/UNEP Secretariat for consideration by the ROPME Council Meeting in April 1984.

C. ACTIVITIES AT NATIONAL LEVEL

In spite of the fact that the IOC, as an inter-governmental body, is mainly interested in developing global activities and mechanisms as well as in promoting regional and sub-regional cooperative investigations, the Commission, in close cooperation with the Unesco Division of Marine Sciences, has provided assistance to several Arab countries to strengthen their marine scientific capabilities. In this regard, the IOC plays its role mainly through its scheme of Training, Education and Mutual Assistance (TEMA). The training of Arab scientific personnel has consequently led to their effective participation in regional and international activities as described below :

(a) Training of scientific personnel

The IOC arranged for training of two marine scientists from the Marine Science Centre of Basrah University, Iraq. They were trained in the fields of Marine Biology and Phytoplankton at the National Institute of Oceanography, Goa, one of the leading oceanographic institutions in India with extensive experience and expertise.

(b) Formation of National Oceanographic Commissions (NOCs)

The IOC Secretariat has encouraged the establishment of National Oceanographic Commissions or coordinating bodies in the Arab Member States. This is in accordance with the spirit of the IOC Assembly Resolution X-19, as a fundamental step towards improvement of the national structures in these countries and towards effective coordination and support for national growth and development in marine science. The establishment of these NOCs in some Arab countries has obviously helped in the creation of a national machinery in the field of ocean affairs, and further in the development of their contacts with the marine science programmes of both Unesco and IOC.

(c) The IOC's Comprehensive Plan

The Arab Member States, as developing countries, are expected to benefit greatly from the Unesco/IOC Comprehensive Plan for a Major Assistance Programme to Enhance the Marine Science Capabilities of Developing Countries, through the implementation of its regional and sub-regional components. The purpose of this Major Assistance Programme is to strengthen the marine science infrastructures in developing Member States, and is designed to enable those States :

- to achieve their national goals in the field of ocean affairs, and
- to participate fully in global, regional and sub-regional oceanographic research programmes of the IOC.

Section IX: Division of Science, Technical and Vocational Education

A. ACTIVITIES AT WORLD LEVEL

1. **Title :** International Exchange of Ideas and Information on Science and Technology Education (mathematics, integrated science, biology, chemistry, physics, nutrition, health and home economics) as well as Environmental, Technical and Vocational Education

Brief description : organization of conferences, meetings and workshops on science and technology education ; preparation and dissemination of bibliographical materials and reference documents on science and technology education ; technical and financial support for the publication of international newsletters and case-studies.

Principles of action : conferences, workshops, case-studies, advisory and consultative services including financial assistance.

Main aims : better knowledge of new requirements in respect of science and technology education :

- to encourage exchange of ideas and information on research concerning science and technology education, including environmental, nutrition, health and home economics education, as well as technical and vocational education ;
- to increase capability of Member States to develop their science and technology education, especially through improved training opportunities for key personnel.

Specific activities and achievements :

Meetings :

International Conference on Science and Technology Education for Development (23 November-2 December 1981) ;

Expert meeting to review and assess Unesco activities in the exchange of ideas and information on teaching of science and technology (October 1982) ;

Symposium to review ways and means to incorporate the environmental dimension in school curricula and teacher training ;

Expert meeting on Unesco's future programmes in environmental education ;

Expert meeting on the goals of mathematics education (May 1980) ;

Expert meeting on science and technology in the primary school curriculum (June 1980) ;

Expert meeting on adapting science and technology education to changing societies and to the diversity of Member States (August 1980) ;

Workshop on competency-based technical teacher education, Turin (1980) ;

Expert meeting on low-cost equipment for science and technology education (November 1981).

Publications and studies :

Financial assistance to various international commissions on science education in organizing meetings as well as planning, publication and distribution of newsletters in different science disciplines ;

Studies in Mathematics Education, vol. 1 (1980), vol. 2 (1981), and vol. 3 (1982) ;

Science and Technology Education and National Development (1983) ; Arabic version to appear in 1985 ;

New Trends in Primary School Science Education (1983)

New Trends in Physics Teaching, vol. IV (1984) ;

Sourcebook on Out-of-School Science Education (1985) ;

New Trends in School Science Equipment (1983) ;

Information Bulletins on Innovations in Technical Education (quarterly) ;

Initiation of Technology in General Education (1983) ;

Directory of National Technical and Vocational Education Institutions ;

Directory of Environmental Education Institutions ;

Directory of Environmental Education Periodicals ;

"Connect" - Environmental Education Newsletter (quarterly) (Al Rabitta, the Arabic version) ;

Survey on Environmental Education.

Training :

International Training Course in Environmental Education ;

International Training Workshop on Competency-Based Technical Teacher Education, Turin (1980).

Background information : 21 C/5 Approved, objectives 4.4, 5.8 and 7.7. 22 C/5 Approved, Programme V.2.

Participating countries : different countries including some from the Arab States.

2. **Title :** Cooperation with Member States for implementation of the Revised Recommendation concerning Technical and Vocational Education

Brief description : it deals with objectives, policy, planning and administration of technical and vocational education as part of general education as well as preparation for an occupational field, etc.

Principles of action : case and comparative studies, meeting, reporting and procedures on implementation and advisory services.

Main aim : to cooperate and help Member States in implementing revised recommendations.

Specific activities :

- (a) Expert meeting on implementation of the revised recommendation.
- (b) Preparation of guidelines for studies on policy (including access of women), planning, administration and cost efficiency of technical and vocational education ;

- (c) Preparation of a draft study on reporting procedures on implementation of the revised recommendation.

Background information : 21 C/5 Approved, objective 5.8 and Revised Recommendation concerning Technical and Vocational Education (adopted by the General Conference of Unesco, 1974). 22 C/5 Approved, Programme V.2.

3. **Title :** Improvement of Content, Methods and Materials for Science, Environmental, Technical and Vocational Education

Brief description : development of teaching-learning materials and techniques for teaching science (integrated science, biology, chemistry, physics, mathematics, nutrition, health and home economics, environmental, technical and vocational education, including out-of-school education).

Principles of action : financial assistance to national and international organizations for the development of the said materials and methods ; research studies applied to science and technology education ; making available to Member States technical knowledge, information and materials.

Main aims : to improve the learning-teaching of science and technical subjects in and out of school education systems ; making available to Member States knowledge, information and materials on science and technology education, environmental education and technical and vocational education.

Specific activities :

- contracts with educational organizations (including science teaching equipment and methods) ;
- establishment of a bank of illustrations for technical and vocational education ;
- preparation of a guide for organization of production units ;
- case-studies on organization of productive work in technical and vocational education ;
- experimentation of technical drawing course for general education ;
- studies on non-formal environmental education ;
- teacher's manual on environmental education ;
- sourcebook on formal environmental education ;
- sourcebook on non-formal environmental education ;
- publication of interdisciplinary prototype modules in environmental education ;
- publication of teacher training modules in environmental education.

Background information : 21 C/5 Approved, objectives 4.4, 5.8 and 7.7. 22 C/5 Approved, Programme V.2.

Publication of manual "L'approche écologique des sciences de la vie et de la terre" ;

Unesco handbook for biology teachers in the Arab States' schools ;

Project on environmental education regarding problems of water pollution and purification ;

Subregional seminar and training workshop on methodological innovations in physical science and mathematics teaching and development of teaching-learning materials and low cost teaching equipment (Tunisia, 1983).

B. ACTIVITIES AT REGIONAL LEVEL

1. **Title :** Regional Cooperation on Science and Technology Education (including mathematics, nutrition, health and home economics) as well as Environmental, Technical and Vocational Education

Brief description : the Regional Office for Education in the Arab States (LINEDBAS) is to intensify its efforts in preparing and disseminating the regional newsletter and bibliographical materials on science and technology education activities to be carried out through the Asian regional network of educational innovation for development.

Principles of action : promotion of pilot/experimental projects, training programmes and development of science curricular materials and equipment, etc., for science and technology education. Financial assistance for workshops and development of curricular materials ; consultative and advisory services.

Main aims :

- improvement of science and technology education, environmental education and technical and vocational education ;
- exchange of ideas and experience in the above fields ;
- development and dissemination of teaching/learning materials in the above fields.

Specific activities :

Meeting on linking science and technology education with productive work (Morocco, 1981) ;

Seminar on home economics and nutrition education (Amman, 1981) ;

Seminar on integrated science education (Cairo, 1982) ;

Sub-regional seminar for practical work supervisors (1982) ;

Seminar on health education through biology teaching (Irbid, Jordan, 1983) ;

Training workshop in science and technology education, including mathematics and education in respect to nutrition, health, home economics and the environment ;

Pilot project on science and technology education and productive work (Algeria, Morocco and Tunisia) ;

Participating countries : different countries in the region.

Background information : 21 C/5 Approved, objectives 4.4, 5.8 and 7.7. 22 C/5 Approved, Programme V.2.

C. ACTIVITIES AT NATIONAL LEVEL

1. **Title :** Improvement of Content, Methods and Materials for Science and Technology Education (mathematics, integrated science, biology, chemistry, physics, nutrition, home economics and health) as well as Environmental, Technical and Vocational Education

Principles of Action : support for :

- (a) organization of workshops, meetings and training courses at national level ;
- (b) development of teaching/learning materials (including audio-visual aids, etc.).

Main aims : improvement of learning-teaching of science and technology in the context of local socio-cultural patterns, as well as its popularization in the general public.

Specific activities :

Support for the development of nutritional instructional materials for teacher training in Algeria ;

Development of studies on technology education as a component of general education (Egypt, Tunisia, Kuwait, Sudan) ;

Short-term consultant missions for the improvement of curricula in biology, chemistry, physics, mathematics, home economics and environmental education to different Member States in the region ;

Two-week mission for technical backstopping to the Science Education Centre, Cairo, 1982 ;

Distribution of the Arabic version of the graphic communication course developed by Unesco to the various Arab Member States ;

Participation in the pilot project on "linking science and technology education and productive work" (Algeria, Morocco and Tunisia) ;

Development of general awareness of problems of water pollution and purification in Jordan ;

Increasing youth participation in the national environment and land preservation programme of Egypt ;

Provision of "Revised Recommendations concerning Technical and Vocational Education" to different Arab Member States ;

Preparation of guide to assess the present situation and help develop future plans for technical and vocational education in the Arab States (Iraq, Jordan, Libya and Sudan) ;

Provision of financial and technical support for international and regional fellowships, consultancy missions to improve science and teacher-training curricula, technical and vocational education and environmental education in different Arab Member States ;

Support for training activities to promote the effective use of environmental education for school and out-of-school populations in Lebanon ;

Workshop on popularization of science and training of science personnel particularly in rural areas, Syria (February, 1982).

Section X: Division of Statistics on Science and Technology

A. ACTIVITIES AT WORLD LEVEL

- (e) training of personnel and improving the science statistics infrastructure in Member States.

1. Title : Statistics on science and technology

Principles of action : activities of the Office of Statistics in this field are based essentially on the following principles :

- (a) statistics on science and technology constitute useful management tools for the assessment, policy-making, planning, evaluation and control of the development of scientific and technological activities, which in turn contribute to the general socio-economic development ;
- (b) internationally comparable science statistics can be used to indicate the relative position of the country in comparison with other countries and consequently aid in national science policy-making. By revealing the imbalance in the distribution of world resources devoted to scientific and technological activities, and by facilitating the identification of areas likely to be of interest for some common actions, comparable science statistics serve to promote international cooperation in this field.

Main aims and functions :

- (a) collection, publication and dissemination of statistical data on scientific and technological activities and improvement of techniques for processing them ;
- (b) continued expansion of the scope of the collection of science statistics, which has so far been limited to R&D, to encompass other aspects of scientific and technological activities such as scientific and technological information and documentation (STID) and scientific and technological education and training (STET) at broadly the third level ;
- (c) preparation of analytical studies, and statistical support for international and regional conferences ;
- (d) amelioration of the international comparability of data by establishing international statistical standards and

Specific activities :

- (a) systematic collection of data concerning qualified manpower and human and financial resources devoted to R&D, and computerization of these data ;
- (b) expansion of the scope of statistics on science and technology to cover, apart from research and experimental development (R&D) activities, also scientific and technological information and documentation (STID) and scientific and technological education and training (STET), at broadly the third level, by setting up the conceptual framework and the fundamental international methodologies and standard classifications ; pilot surveys on these two activities (i.e. STID and STET activities) ;
- (c) preparation of analytical studies such as estimates of inter-regional disparities in the human and financial resources devoted to R&D, various indicators based on the most recent information and correlating science and technology data with other economic and social statistics. Imputation of mission data and projections of qualified manpower potential. Preparation of statistical documents for international or regional ministerial conferences on science and technology (UNCSTD, CASTARAB, CASTASIA, CASTALAC) ;
- (d) establishment of international standard classifications in statistics on science and technology. Publication and distribution of a manual which incorporates these standards, to national bodies in charge of the collection of science statistics. Undertaking of methodological studies and preparation of practical guides and manuals for data collection with a view to improving the scope, accuracy and reliability of basic data. Advice to national statistical services on survey methodology and on the application of basic international concepts. Holding of regional seminars to present the international methodology. Maintaining and developing

cooperation with other United Nations agencies as well as intergovernmental organizations such as CMEA, EEC, OAS and OECD ; and

- (e) assistance to Member States in the form of advisory missions, pilot projects and regional as well as national training seminars, with the intention of building up their statistical capacities and harmonizing their national practices with the international concepts. Exchange of information by means of the annual publication of the 'Annotated accessions list of studies and reports in the field of science statistics'.

Principal achievements :

Publication of comprehensive worldwide statistics on R&D in the Unesco Statistical Yearbook, the Unesco Statistical Digest, the United Nations Statistical Yearbook, and in the Current Surveys and Research in Statistics (CSR-S) series of the Unesco Office of Statistics.

In preparation for the collection of statistics on scientific and technological information and documentation (STID) activities, the basic conceptual framework and preliminary methodology conceived by Unesco have been field-tested in Sudan, Poland, Australia and Mexico. The results obtained from these field tests were used as input in the preparation of a preliminary Guide to statistics on STID. Pilot surveys applying the methodology proposed in the Guide have been conducted in Sudan, China, Poland and Bangladesh. Based on the results of these surveys and on the comments of national experts, a revised version of the Guide has been prepared and will be disseminated to all Member States for their comments and/or eventual application. In the long run, the Unesco Office of Statistics will provide direct technical assistance to countries intending to launch STID surveys, through advisory missions and national seminars.

Concerning statistics on scientific and technological education and training (STET), at broadly the third level, a meeting of experts (Category VI) was organized to discuss the scope and methodology of collection of statistical information on this activity. As a follow-up to this meeting, feasibility studies will be carried out, such as the testing of a model questionnaire for the collection of data on life-long training of scientists and engineers in scientific and technological institutions.

Publication of analytical studies, reports and selected international statistics on science and technology in the CSR-S- series 'Current Surveys and Research in Statistics'. Contribution in the supply of statistics to UNCSTD and various regional intergovernmental conferences and meetings such as CASTASIA II, CASTALAC II, etc.

As a follow-up to the adoption by the Unesco General Conference at its twentieth session of the Recommendation concerning the International Standardization of Statistics on

Science and Technology, the preparation and publication of the Provisional Manual for Statistics on Scientific and Technological Activities has been finalized. The Manual has been distributed to national and territorial authorities for comments and implementation. A revised version of the Manual, as well as the Guide to the collection of Statistics on Science and Technology are in the final stages of preparation.

Collaboration with ECE in organizing a meeting of statisticians on the Development of Science and Technology Statistics.

Efforts in harmonizing existing national practices in the collection of statistics on science and technology are being increased. So far, comparative studies of methodologies adopted by a number of Latin American countries such as Argentina, Brazil, Chile, Colombia, Cuba, Mexico, Peru, Uruguay and Venezuela have been completed. Similar studies will be extended to other regions of the world. The ultimate goal is to be able to advise Member States on how to align their principal methodologies to the international standard, based on the result of these comparative studies.

Holding of five regional training seminars (Category VII) on science statistics in Rabat, Nairobi, Dakar, Montevideo and Kingston for specialists from the Arab, English-speaking African, French-speaking African, Latin American and Caribbean Member States, respectively. Three other seminars on survey methods modelled on international standards are organized for the English-speaking Asian countries (in 1984) and for the English-speaking African and Arab countries (in 1985). While *ad hoc* national workshops on the application of Unesco international standards took place in 1981 and 1983, a national training seminar on the implementation of international statistical standards and methods of data collection on scientific and technological activities will be organized in Tsingtao (China) in August 1985. Similar advisory services will be provided on the occasion of staff missions.

Collaboration with Member States (Egypt and Sudan) in launching pilot surveys on the collection of statistical data on scientific and technological activities, particularly on R&D activities.

Annual publication of the "Annotated Accessions List of Studies and Reports in the Field of Science Statistics".

Background information : the programme was launched in the early sixties based on the resolutions adopted by the General Conference of Unesco which authorize the Director-General to collect, analyse and disseminate statistical information relevant to Unesco programmes in education, science and culture, to promote international comparability, to improve statistical methodologies, and to cooperate with Member States in the development of their related statistical services and infrastructure.

Unesco's Medium-Term Plan for 1977-1982, objective 10.2 ; 21 C/5 Approved, objective 10.2.
Unesco's Medium-Term Plan for 1984-1989, Chapter XV.2 ; 22 C/5 Approved, Part II.B, chapter 2.

Organization responsible : Unesco, Office of Statistics.

Organizational machinery : Unesco's General Conference, Executive Board and Secretariat.

Participants : all Member States of Unesco, particularly the national bodies responsible for statistics on science and technology ; international, intergovernmental and regional organizations dealing with science statistics such as the OECD, CMEA and OAS.

B. ACTIVITIES AT REGIONAL LEVEL

A regional training seminar on the implementation of international standards and methods of data

collection on scientific and technological activities was conducted in Rabat, Morocco, from 7-11 September 1981 with eight participants from six Arab Member States (Arab Republic of Egypt, Iraq, Jordan, Morocco, Qatar and Tunisia) and an observer from ALECSO. Another training seminar for the Arab Member States was organized in 1985. Pilot projects will be undertaken in a number of countries in the Arab Member States for the purpose of helping them to develop their data collection systems based on international standards.

C. ACTIVITIES AT NATIONAL LEVEL

Financial and technical assistance was provided to the Arab Republic of Egypt and Sudan in connection with their surveys on scientific and technological activities.

Section XI: Division of General Information Programme

GENERAL INTRODUCTION

The promotion of cooperation in the field of information is one of the major objectives of Unesco. The General Information Programme, an intergovernmental programme which includes UNISIST,* is responsible for activities of the Organization which concern documentation, library and archives services and specialized information systems.

The General Information Programme aims at encouraging the establishment and use of information systems at all levels and in all sectors, particularly in developing countries, so as to make information available to a great number of users and to facilitate its application to development. Programme activities focus on standardization in the information field; use of modern technologies; regional and international cooperation; and development of infrastructures, policies and training required for the processing and dissemination of specialized information.

It is within this framework that the General Information Programme's action oriented towards Arab countries should be understood; it is worth adding, before presenting particular objectives and achievements concerning these countries, that many of the general activities of the Programme which are not specifically described below, such as the elaboration of methods and standards for the processing of information, are also relevant to improving access to information on science and technology in the Arab States at the regional and national levels.

A. ACTIVITIES AT WORLD LEVEL

1. **Title :** Development of National Focal Points and National Information Committees

Brief description : to encourage Member States to name national information focal

* a conceptual framework promoted by Unesco for the development of standards, methods and guiding principles for the processing and transfer of specialized information and for the application of such normative tools in the creation of compatible information systems.

points responsible for development and co-ordination of information policy at the national level and National Committees which maintain liaison with the General Information Programme, and to improve the functions and performance of existing focal points and national committees.

Specific activities and achievements : to date, eight out of twenty-one countries of the Arab States region (Egypt, Iraq, Malta, Morocco, Qatar, Sudan, Tunisia, United Arab Emirates) have established such bodies, not all of which are equally active.

2. **Title :** Science and Technology Information: Analytical Case-Studies

Brief description : eight case-studies (two per region) on the provision and use of scientific and technological information.

Principle of action : each country was visited by an independent expert working in close cooperation with a nationally appointed liaison officer.

Main aims :

- (a) to diagnose the needs and study the available options for information provision and use in developing countries;
- (b) to foster a better understanding of the nature of both needs and options;
- (c) to build up greater capabilities for developing suitable plans and policies;
- (d) to identify more clearly the various actions which the organizations of the United Nations system could undertake to promote the improvement and better use of information.

Specific activities and achievements : the first findings of the study were made available to the Intergovernmental Committee on Science and Technology for Development at its third session held in New York from 27 May to 5 June 1981.

Background information : as a result of the United Nations Conference on Science and Technology for Development (1979), the United Nations Interim Fund for Science and Technology for Development and Unesco launched the case studies as a preliminary step in implementing the Conference's recommendations on the improvement of global information exchange.

Participating countries : Jordan and Morocco were among the eight case-study countries.

- consider possibilities for regional cooperation in the area of scientific and technological data.

Principles of action : the meeting included presentations and demonstrations of international access to data, a study on specific data banks which could be established or used to support scientific research and development in the region and discussions on policy options for promotion of scientific and technological data services in the Arab States. The report with recommendations for future action is being widely disseminated.

B. ACTIVITIES AT REGIONAL LEVEL

1. **Title :** Regional Seminar on the Use of New Technologies and the Application of Standardized Procedures in Information Handling

Brief description and aim : training activity to be organized in Rabat, in Spring 1985, on the use of computers and related telecommunication technology as well as standards and internationally-accepted procedures, in information processing and exchange.

Background information : follow-up of the joint Unesco/ALECSO meeting, Paris, 18-20 April 1984, which had identified areas of common interest and projects to be undertaken jointly (22 C/5, Programme VII.1).

Organization responsible : ALECSO, with the cooperation of Unesco.

Participating countries : librarians and documentalists from the Arab States (to be selected by ALECSO).

Background information : although computerized bibliographic services are increasingly provided by libraries and documentation centres in the Arab States, there is as of yet relatively little appreciation of the potential impact of information services providing numerical or factual data in science and technology. The present activity is part of a larger Unesco programme to promote the development and use of data services for development through the assistance to Member States, training, promotion of regional cooperation and facilitation of international access to data, taking account of the recommendations of a 1981 Unesco Meeting of Experts on this problem.

Organizations responsible : the Centre National de Coordination et de Planification de la Recherche Scientifique et Technique of Morocco, with the collaboration of Unesco.

Participating countries : scientists and information specialists from Libya, Morocco, Saudi Arabia and Tunisia, as well as representatives of the Arab Organization for Mineral Resources (AOMR) and the Islamic Educational, Scientific and Cultural Organization (ISESCO).

2. **Title :** Seminar on Numerical and Factual Data Banks for Research and Development

Brief description : this meeting which took place in Rabat, Morocco, in February 1984, brought together scientists and information specialists from several countries of the region and a team of international consultants in order to :

- sensitize the national and regional scientific community to the various types of data services and data banks now available in the area of science and technology ;
- study the data needs and resources of the host country and region ;
- develop a plan for improvement of access to scientific and technological data at the national level which could serve as a model for future action by the countries of the region ;

3. **Title :** Assistance in the development of regional networks for scientific and technological information in the Arab States

Brief description : consultant services have been provided in 1981-1983 to the Arab Centre for Studies of Arid Zones and Dry Lands (ACSAD) in Damascus for the creation of a documentation unit and to the Federation of Arab Scientific Research Councils (FASRC) in Baghdad on plans for a regional scientific and technological information network. Technical reports have been submitted and further advice will be available on the development of these and other regional systems and services.

Background information : the first CASTARAB Conference recommended (Recommendation No.5) the creation of an "Arab Regional Information Centre" connected with the national information systems. Subsequent consultations in

the region, including a Meeting of Experts on the Development of Scientific and Technological Information Systems in the Arab States convened by Unesco in 1978, have indicated that the most feasible approach towards this goal involves the encouragement and harmonization of regional initiatives covering the various Member States and fields of knowledge. In addition to promoting the efforts of ACSAD and FASRC, Unesco is providing considerable support to the Arab League Documentation Centre (ALDOC) in the development of regional information activities (see project No.4).

Participating countries : Member States of Arab region and accredited regional organizations.

4. **Title :** Documentation and Information Centre for the Arab League (ALDOC)

Brief description : to improve information systems and services and develop documentation and information infrastructure in Arab countries.

Main aims : to provide training programmes for staff at all levels and to develop computerized services for the effective processing and dissemination of information to enable participation in the Arab regional information network.

Participating countries : Member States of the Arab League (22 countries).

Specific activities and achievements : installation of a computer ; more than ten on-the-job training courses by consultant. Fellowships and study tours. A number of consultant missions in various fields of information activities.

Reference : RAB/79/030.

5. **Title :** Regional Programme for the development of water resources in the Arab countries of North Africa

Brief description : assessment of regional information needs on water resources in Maghreb countries.

Specific activities and achievements : provision of a consultant mission on the planning of a hydrological documentation centre.

Participating countries : Algeria, Morocco, Tunisia.

Reference : RAB/80/011.

C. ACTIVITIES AT NATIONAL LEVEL

1. **Title :** Automation in the National Bibliographic and Scientific Computer Centre of Egypt

Brief description : as a follow-up to the consultant mission implemented in 1981 by the same consultant for the same organization, Unesco provided a one-month consultancy service.

Main aims : to evaluate the progress made in automation activities at the National Bibliographic and Scientific Computer Centre of the General Egyptian Book Organization (GEBO) since the consultant's first mission in 1981, to assess the minimum requirements for full computerization of the national library and to provide lectures and on-the-job training to national staff.

Specific activities and achievements :

- (a) organization of a training course on :
- (i) retrospective conversion of catalogues to machine-readable form,
 - (ii) micro-computers, and
 - (iii) on-line searching ;
- (b) publication of a technical report entitled "Automation in the National Bibliographic and Scientific Computer Centre" (Ser. No.FMR/PGI/83/125).

Participating country : Egypt.

Reference : Egypt Participation Programme 1981/1983, No.7031.

2. **Title :** Computerization of the Scientific Documentation Centre in Iraq

Brief description : at the request of the Iraqi Government, a Funds-in-Trust agreement for US\$2.5 million was concluded, aimed at the computerization of the Scientific Documentation Centre.

Main aims : establishment of a scientific and technological information network to promote national research and information activities through the setting-up of an integrated on-line information network.

Specific activities and achievements : computerization of the Centre to permit the automation of all library operations and documentation services and facilitate exchanges of information at an international level. The following activities have so far been achieved :

- (a) installation and operation of an IBM 4341 computer and peripherals ;
- (b) installation of IBM-licensed software and the CDS/ISIS package of Unesco ;
- (c) elaboration of the overall plan and definition and manpower requirements for the computerized library and information system of the Centre ;
- (d) survey of products and services of the Centre to be computerized ;
- (e) training of Iraqi computer specialists ;
- (f) on-line connection with several commercial databases.

Background information : at the request of the Iraqi Government, a Unesco staff member was sent to Baghdad in 1980 for project formulation. After exchange of correspondence and visits of Iraqi Government officials to Paris, a Funds-in-Trust Agreement was signed in September 1982. The originally planned provision of four international experts was replaced by one international expert for overall project coordination and subcontracting of training activities. In addition to the activities within the framework of the Funds-in-Trust Agreement, a consultant was sent to the Documentation Centre under Unesco's Regular Programme in 1983.

Organizational machinery : the Scientific Documentation Centre is an organ within the Council of Scientific Research, which is directly under the Cabinet of Ministers.

Participating country : Iraq.

Reference : 909/IRQ/84/FIT.

3. Title : Training of information science specialists in Morocco

Brief description : Unesco has been assisting the Moroccan Government in establishing and developing the Information Science School in Rabat, which provides post-graduate training in information science to specialists in other disciplines as well as persons having undergraduate training in information science.

Main aims : improving the level of training offered by the national school of information science through the training of its professors and the strengthening of the newly created post-graduate course.

Specific activities and achievements : provision of highly qualified information/library specialists as lecturers, *ad hoc* consultants, etc. Provision of international/regional fellowships to teaching staff of the school. Financial assistance to the school's library.

Background information : continuation of project MOR/74/003 which launched the establishment of the school.

Participating country : Morocco.

Reference : MOR/81/005 (follow-up of MOR/73/003).

4. Title : Assistance to the Institute for Studies and Research of Arabization (IERA - Rabat - Morocco)

Brief description and principal aims : the project covers two programmes :

- (a) ASV-CODAR programme (vowelled standard Arabic and Arabic coding) programme : set of standardized characters designed for text composition and text transmission in the Arabic language, using current processes and techniques current in the field of printing, typewriting, data-processing and telecommunications. With the improvement of composition procedures, the substantial reduction of printing costs and the availability of total vowelization, the ASV-CODAR system brings printed works within easy reach of the widest public and favours education and culture ;
- (b) LEXAR programme : multilingual lexicographic databank (Arabic, French, scientific Latin and, to some extent English) to be used as a tool for harmonizing scientific and technical Arabic terminology and for the production of specialized vocabularies and dictionaries in all fields of knowledge.

Specific activities and achievements :

- (a) within the framework of the ASV-CODAR programme, the Institute has actively participated, with Unesco, IBI, ALECSO and ASMO, in the organization of a number of expert meetings on the coding of Arabic characters. The latest meeting was convened by ALECSO and ASMO in Rabat (22-23 April 1982), which produced a revision of the CODAR-U (Codage arabe unifié) ;
- (b) the CODAR-U was submitted for registration with the International Organization for Standardization (ISO) in 1980 and officially registered in 1982 ;
- (c) in the meantime, the testing and the study of CODAR-U within the professional community in the Arab world led to the elaboration, during the above-mentioned Rabat meeting, of a revised version : the CODAR-U/FD (Codage arabe unifié/ Forme Définitive) ;
- (d) this version was adopted by ASMO (Arab Organization for Standardization and Metrology) as the official standard for Arabic coding (ASMO standard 449/1982) and its registration with ISO is presently under way ;

- (e) the LEXAR databank already contains a substantial nucleus of data : 200,000 semantic relations have already been inputted, out of the million initially foreseen.

Background information : international assistance to the IERA started in 1974, within the framework of two UNDP-financed projects (MOR/77/024 and MOR/77/001) administered by Unesco before initiation of the present project in 1982.

With regard to the ASV-CODAR programme, several supportive recommendations were formulated by various regional/international meetings : fourth meeting of the Maghreb Ministers of Education (Tunis, 1975), Regional meeting on information (Bizerta, 1976), second permanent consultation meeting of the Committee on Documentation and Information (Rabat, 17-21 October 1977), Second Extraordinary Conference of the Arab National Commissions for Education, Science and Culture (Unesco and ALECSO, Rabat, June 1978), General Conference of ALECSO (extraordinary session, Khartoum, 1978 ; Fifth ordinary session, Tunis, 1979) ; Meeting of the Arab Organization for Administrative Sciences (Rabat, 1980) ; and by CASTARAB itself at its first meeting in 1976 (Recommendation No.18).

Organizations responsible : IERA has also received assistance from the European Economic Commission and from ALECSO for the development of its activities.

Participating country : Morocco.

Reference : Self-benefiting Funds-in-trust Project No. 924/MOR/84.

5. **Title :** Integrated Information Centre of the Ministry of Foreign Affairs of Saudi Arabia

Background information : Unesco has been assisting in the overall computerization programme for the routine procedures of the Ministry of Foreign Affairs. The present project is an extension and follow-up of project SAU/80/009 which was terminated in 1983.

Principles of action : at the request of the Government, Unesco assessed the requirements for overall computerization of the Ministry's routine work. Based on this assessment, preparatory assistance was provided by UNDP/Unesco under which international experts are to be placed.

Main aims : to establish data bases for the Ministry's day-to-day work and make them operational. To establish a plan for a telecommunication network between foreign embassies and the Ministry of Foreign Affairs.

Specific activities :

- (a) installation of an IBM 4341 computer and a set of commercial software packages ;
(b) installation of a microform search system ;
(c) on-the-job training of local staff.

Participating country : Saudi Arabia.

Reference : SAU/80/011.

6. **Title :** Development of the National Documentation Centre in Sudan

Brief description : provision of a consultant for on-the-job training in abstracting and indexing. Several visits of another consultant for the establishment of national scientific information policy including strategy for manpower and infrastructure development.

Participating country : Sudan.

Reference : Sudan Participation Programme 1981/1983 Request No.7055 ; Sudan SA No. 7088,7089.

7. **Title :** Pilot Project on Information Services on Research in Progress (Sudan)

Brief description : Unesco assistance has been provided to the National Documentation Centre of Sudan to develop a national register of research as a basis for regular information services to scientists, managers and policy-makers on the research projects in progress in the country.

Principles of action : financial assistance and consultant services were provided to the national authorities during 1981-1983. The results and methodology of the project had been widely disseminated to Member States in 1984, and are expected to be particularly useful for the creation of other national information systems on research in progress in the Arab States region.

Specific activities and achievements : a research register describing more than 1,000 projects being undertaken by Sudanese researchers has been compiled in cooperation with national research bodies and users of the register. A national symposium was organized to promote the use of this information resource and to invite suggestions on future improvements in information services. Two advisory missions were provided during 1981-1983 and the project report became available in 1984.

Background information : this project forms part of a larger Unesco programme, given particular support during the deliberations of the General Conference at its twenty-first session and a Meeting of Experts convened by Unesco in 1980, which aims at promoting the development of information services on research in progress as an integral part of national scientific and technological information systems, as well as the exchange of, and access to, information in this important area. The activities are being carried out within the Unesco General Information Programme in close collaboration with the Programme on Science and Technology Policy within the Unesco Science Sector.

Organizations responsible : the National Documentation Centre of Sudan in collaboration with Unesco.

Participating country : Sudan.

8. **Title :** Unesco assistance to "Institut de presse et des sciences de l'information (IPSI)", Tunis

Brief description : IPSI submitted a request for two consultant missions, one to teach a course in the conservation of archival material, the other to advise on the Arabization of the teaching programmes.

Principles of action : two one-month consultant missions were organized under the Regular Programme in 1984.

Background information : 21 C/5, para. 5087 ; 22 C/5, Programme VII.1.

Participating country : Tunisia.

9. **Title :** Manpower needs for documentalists, librarians and archivists (Tunisia)

Brief description : a consultant was sent to assess the manpower requirements in various fields of information activities in the country.

Specific activities and achievements :

- (a) curriculum development : IPSI (Institut de presse et des sciences de l'information) was proposed and an assessment carried out at national level of manpower requirements in the information field ;
- (b) publication : technical report entitled "La formation des documentalistes, de bibliothécaires et d'archivistes" (Ser.N° FMR/PGI/82/136).

Participating country : Tunisia.

Reference : Tunisia Participation Programme 1981/1983 No. 7241.

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