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PREFACE

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The texts in this series are prepared in co-operation with non-governmental scientific organizations. Many of the texts result from research activities of the Scientific Committee on Oceanic Research (SCOR) and are submitted to Unesco for printing following final approval by SCOR of the relevant working group report.

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RESUME

Ce rapport présente les activités du Projet interrégional sur les écosystèmes côtiers (COMAR) de l'Unesco pour la période 1987-1988, ainsi que les recommandations pour le développement futur du Projet, telles que les a formulées le Comité Consultatif conjoint Unesco/SCOR/IABO sur les systèmes côtiers lors de sa cinquième session tenue du 15 au 20 décembre 1988 à Sao Luis, Maranhao (Brésil). En plus d'une analyse détaillée des activités en cours dans les différentes régions, l'accent est mis sur les nouveaux programmes mis en oeuvre dans le courant du biennum 1987-1988. Celles-ci concernent plus particulièrement l'Afrique avec le commencement du "Projet régional sur les systèmes côtiers d'Afrique" (COMARAF) en coopération avec le Programme des Nations Unies pour le Développement (PNUD), l'établissement du Comité de coordination et le début des activités du sous-projet consacré aux systèmes tempérés d'Amérique latine, et l'examen des sujets pouvant éventuellement être l'objet d'une coopération entre le COMAR et le Programme International sur la Géosphère et la Biosphère (PIGB) de l'ICSU.

ABSTRACT

This report presents activities of the Unesco Interregional Project on Coastal Systems (COMAR) for the period 1987-1988 and the recommendations that the Unesco/SCOR/IABO Consultative Panel on coastal systems has formulated for the future development of the Project at its fifth session held in Sao Luis, Maranhao, (Brazil), 15-20 December 1988. In addition of making a detailed analysis of the on-going activities in the different regions, the emphasis was put on the activities newly developed during the biennum 1987-1988. Amongst these ones are : the launching of the "Regional Project on Coastal Systems of Africa" (COMARAF) in cooperation with the United Nations Development Programme (UNDP); the establishement of the Coordinating Committee and the starting of the activities of the sub-regional project on temperate coastal systems of Latin America and the review of the subject areas for a possible cooperation with the International Geosphere Biosphère Programme (IGBP).

RESUMEN

Este informe da cuenta de las actividades del Proyecto Interregional sobre Sistemas Costeros (COMAR) de la Unesco durante el periodo de 1987-1988 y de las recomendaciones para el desarrollo futuro de dicho proyecto formuladas por el Panel Consultivo sobre Sistemas Costeros Unesco-SCOR-AIOB en su quinta reunión, celebrada del 15 al 20 de diciembre de 1988 en São Luis de Maranhão, Brasil. Además del análisis detallado de las actividades en curso en las diferentes regiones, se hace hincapié en los nuevos programas iniciados en el bienio 1987-1988. Entre estas actividades cabe mencionar: la iniciación del proyecto regional sobre Investigación y Formación en Sistemas Marinos Costeros en Africa (COMARAF) en cooperación con el Programa de las Naciones Unidas para el Desarrollo (PNUD), el establecimiento del Comité de Coordinación y el inicio de las actividades del proyecto sobre Sistemas Costeros Templados de América del Sur; y el examen de temas que posiblemente se presten a la cooperación entre COMAR y el Programa Internacional sobre la Geosfera y la Biosfera (IGBP) del CIUC.

РЕЗЮМЕ

В данном докладе представлены мероприятия в рамках Межрегионального проекта ЮНЕСКО по прибрежным экосистемам (КОМАР), на период 1987-1988 гг., а также рекомендации в отношении последующего развития Проекта, сформулированные Объединенной консультативной группой ЮНЕСКО/СКОР/МАБО по береговым системам в ходе ее пятой сессии, состоявшейся 15-20 декабря 1988 г. в Сан-Луисе, Мараньян, Бразилия. Кроме детального анализа текущих мероприятий, осуществляемых в различных регионах, упор делается на новые программы, осуществляемые в течение двухлетия 1987-1988 гг. Они касаются, в частности, Африки в связи с началом осуществления "Регионального проекта по прибрежным системам Африки" (КОМАРАФ) в сотрудничестве с Программой развития Организации Объединенных Наций (ПРООН), создания Координационного комитета и начала осуществления мероприятий в рамках субрегионального проекта по прибрежным системам умеренного климата Латинской Америки, а также рассмотрения вопросов, которые могут стать предметом возможного сотрудничества с Международной программой по геосфере-биосфере (МПГБ).

ملخص

يعرض هذا التقرير أنشطة مشروع اليونسكو المشترك بين المناطق بشأن النظم الساحلية (كومار) للفترة ١٩٨٧-١٩٨٨ ، والتوصيات الرامية الى تطوير المشروع في المستقبل حسبما قدمتها اللجنة الاستشارية المشتركة بين اليونسكو واللجنة العلمية لبحوث المحيطات (سكور) والرابطة الدولية للأقيانوغرافيا البيولوجية (يابو) ، والمختصة بالنظم الساحلية خلال دورتها الخامسة التي عقدت من ١٥ الى ٢٠ ديسمبر/كانون الأول ١٩٨٨ في ساو لويس ، ماراناو ، (البرازيل)، وفضلا عن اجراء تحليل مفصل للأنشطة الجارية في مختلف المناطق ، فان التركيز ينصب على البرامج الجديدة التي نفذت في غضون فترة عامي ١٩٨٧-١٩٨٨ . وتتعلق هذه الأنشطة على الأخص بأفريقيا ، ومنها بدء "المشروع الاقليمي بشأن النظم الساحلية لأفريقيا" (كوماراف) بالتعاون مع برنامج الأمم المتحدة للتنمية (بامت) ، وانشاء لجنة التنسيق والبدء في أنشطة المشروع الفرعي بشأن النظم الساحلية المعتدلة لأمريكا اللاتينية ، وبحث الموضوعات التي من المحتمل أن يشملها التعاون بين كومار والبرنامج الدولي للغلاف الأرضي والمحيط الحيوي التابع للمجلس الدولي للاتحادات العلمية (ايكسو) .

概　　要

本报告介绍教科文组织１９８７－１９８８年期间沿海生态系统国际项目(COMAR)的活动以及教科文组织／海洋研究科学委员会／国际生物海洋学协会沿海系统联合咨询委员会在其１９８８年１２月１５日至２０日于圣路易斯(马拉尼翁，巴西)举行的有关沿海系统的第五次会议上就今后开展这一项目所提出的建议。除详细分析了各地区正在开展的各项活动外，报告着重提及１９８７－１９８８年双年度期间所实施的各项新计划。上述活动尤其涉及：在非洲，与联合国开发计划署(PNUD)合作开办了“非洲地区沿海系统项目”(COMARAF)，建立了协调委员会，发起了拉丁美洲温带系统分项目的活动，以及研究了有可能成为教科文组织沿海生态系统国际项目与国际科学联合会理事会国际地圈及生物圈计划(PIGB)合作内容的各种题目。

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Acknowledgement

Unesco is grateful to Brazil and in particular to the authorities of the Federal University of Maranhao for having hosted and organized the programme of the Vth meeting of the Unesco/SCOR/IABO Consultative Panel on coastal systems in São Luis.

Unesco is also grateful to the many authorities, scientists, administrators and colleagues in many countries who have all responded with great enthusiasm to the fundamental COMAR objectives of studying the coastal areas, what they are made of and what our present society foresees for their future.

A general summary of activities

I INTRODUCTION

The activities of COMAR were pursued following the last meeting of the Consultative Panel in Dakar, Senegal, (December 1986) with some success, but also difficulties inherent to the continuing budgetary restrictions in Unesco and the difficulty to raise extra-budgetary funding, in particular for the region of Latin America and the Caribbean.

The project has continued to develop its regional components as well as its cooperation with the international scientific community, in particular SCOR, IABO and ICSU/IGBP.

The main new events during the period 1987-1988 are:

- the beginning of implementation of the regional project on the "coastal systems of Africa" (COMARAF);
- the establishment of the coordinating committee of the COSALC-sub-project on the temperate coastal systems of Latin America and initiation of its activities;
- the SCOR working group (WG 85) on experimental ecosystems held its first meeting;
- preliminary contacts were established with the ICSU/IGBP programmes.

Many other on-going activities are described in the course of this document.

When reference is made to past activities (before 1987), these are given in Table I.

Lists of documents and publications are given respectively in Annex 1 and 2.

List of participants is given in Annex 3.

I.1 Budget

The Unesco regular programme budget for COMAR and related activities of the Division of Marine Sciences for the biennium 1988-1989 is about US$ 450,000. As far as the extra-budgetary funds allocated or requested are concerned, the situation as at the end of 1988 is the following:

	(Approximate figures)	
- Allocated (by UNDP and IDRC)[1]		
Asia and the Pacific	US$ 3,450,000	(1983-1989)
Pacific only	US$ 300,000	(1988-1989)
Africa	US$ 1,000,000[2]	(1987-1989)
- Allocated (by Japan and N.S.F)		
Asia and Latin America and the Caribbean	US$ 120,000	(1984-1989)
Total	US$ 5,020,000	
- Requested to UNDP Africa (COMARAF-II)	US$ 2,300,000	(1990-1993)
Asia and the Pacific (COMARASP)	US$ 3,425,000[3]	(1990-1993)
Latin America and the Caribbean (COSALC)	US$ 3,000,000[3]	(1987-1991)
	US$ 8,725,000	

[1] IDRC: About US $250,000 for the "Regional Mangrove Information Network (REMIN)" executed in coordination with the UNDP/Unesco Regional Project on Asian Mangrove Ecosystems.

[2] A project proposal with a budget of US $3,300,000 was submitted to UNDP, while US $1,000,000 have been allocated. The additional US $2,300,000 will be requested from UNDP for a second phase of COMARAF.

[3] The COSALC project proposal (US$ 4,000,000) has been submitted to UNDP in August 1985. It is a matter of fact that the five year budget cycle of the UNDP Regional Desk for Latin America and the Caribbean is four to five times smaller than the budget, for example, for Asia and the Pacific, or for Africa. UNDP has indicated that their budget available did not allow to fund COSALC at the level requested of US$ 4,000,000 and advised Unesco to submit projects with reduced budget.

It was then prepared and submitted to UNDP two small projects on two of the sub-projects of COSALC, (1) a first phase of CARICOMP (two years - US$ 250,000) and (2) a preliminary project on the temperate coastal systems of Latin America (two years - US$ 200,000). So far UNDP has not retained these projects. In the meantime Unesco submitted the full CARICOMP project to the European Economic Commission.

In August 1988 at the initiative of the Director General, Unesco organized an internal Task Force to receive and select from its various sectors, among which the Science sector, six projects for submission to the Director General. The Director General would negotiate the funding of the projects he will have retained with funding agencies, UNDP among others. On October 11, 1988, the Division of Marine Sciences submitted to the Task Force the two following COMAR projects: (a) a revised version of COSALC (US$ 3,000,000 - four years and (b) a new project on the coastal systems of Asia and the Pacific (COMARASP) (US$ 3,425,000 - four years).

I.2 Evaluation of COMAR
(document 5.9 and recommendation 6.1 refer)

An evaluation of the COMAR projects has been made by Dr. T. Parsons in conjunction with the last meeting of the Panel and is available in Unesco.

II. COOPERATION WITH THE SCIENTIFIC NON GOVERNMENTAL ORGANIZATIONS

II.1 Cooperation with SCOR
(documents 6.1, 6.3 and recommendation 6.2 refer)

The actual co-operation with SCOR is mainly related to W.G. 85 on experimental ecosystems. Another SCOR/Unesco working group relevant to COMAR has been established, the W.G. 89: "Sea level and erosion of the world's coastlines".

a) Experimental ecosystems (W.G. 85)

On the basis of a proposal reviewed by IABO the terms of reference of the group are as follows:

- To examine previous studies involving experimental ecosystems; critically evaluate the results and the application of such techniques to estuarine, coastal and open sea problems.

- To make recommendations for complete systems (mesocosms, field, laboratory, and simulation modelling) approaches to current problems in biological oceanography.

- To specify design criteria pertinent to studies in the range of estuarine, coastal, and open sea conditions.

An extract from the summary report of the W.G. Vice-Chairman reads:

> "The W.G. met in Hamburg in June 1988 to review the state of knowledge regarding "Controlled Ecosystem Experiments". The WG found that these systems have found wide application in the study of three areas of marine ecology. These are:
>
> 1. General biological oceanography; particularly the need to understand processes and measure fluxes.
>
> 2. Aspects of exploitation and management of resources.
>
> 3. Fates and effects of pollutants.

The W.G. proposed to prepare a manual of controlled ecosystem experiments. The WG emphasized that such experiments should be performed in addition to more conventional laboratory and field experiments and not to the exclusion of these approaches to research in near shore processes.

A Unesco/IABO W.G. "High Diversity Ecosystems" met in Woods Hole in July 1988 (see item II.2.a); it suggested that the controlled experimental ecosystem technique may be applicable to the study of high diversity ecosystems under stress, in particular due to changes in nutrient flux, including such processes as eutrophication, deforestation and changes in freshwater flow.

Since many high diversity ecosystems occur in tropical latitudes in which the COMAR program has its greatest interest, it may be of interest to COMAR participants to consider the use of controlled experimental ecosystems for the study of some practical problems in near shore management".

b) Sea level and erosion of the world's coastlines (SCOR W.G. 89)

The Argentinian Committee for SCOR (chairman : Ing. N. Lanfredi, also chairman of the Argentinian COMAR Committee) submitted to SCOR a proposal for a W.G. on "Coastal Ocean Processes". The general meeting of SCOR (1986) considered that the terms of reference presented for this new proposal were too broad. It later accepted a revised proposal focussing on the "sea level and erosion of the world's coastlines" with the following terms of reference:

- to evaluate the state of our knowledge of sea level rise and the potential impact on the coastline.

- to examine the status of the existing models and formulate a programme of investigation for their verification or rejection.

- to evaluate the role of short and long-term sea level rises in beach erosion.

- to recommend the best strategy for a monitoring programme in areas with lack of data.

- to produce a report for SCOR which addresses these questions.

The group was further urged to co-operate with the SCOPE project on estuaries and coastal embayments, which held its first meeting in Bangkok in November 1988.

II.2 Co-operation with IABO
(documents 6.2, 6.4, 6.5, 6.6 and recommendations 6.3.1, 6.3.2 refer)

a) Highly diverse marine ecosystems

The IABO/Unesco working group on highly diverse marine ecosystems held two meetings both in the U.S.A., in August 1986 at Syracuse University and in July 1988 at Woods Hole Oceanographic Institute.

At its second meeting the W.G. mainly concentrated on its fifth term of reference:

- to discuss the interest in, and feasibility of an international programme of cooperative field studies.

The W.G. considered that diversity provides a valuable evaluation of the existence and quantification of environmental changes such as the general environmental impact of man's development operations, including the over-exploitation of living resources and the pollution effects of intensive exploitation of non-living resources. The W.G. felt that an international programme: High Diversity Marine Ecosystem Experiments and Observations (HIDIMEEXO) could be designed within which ecosystems of different parts of the world could be compared.

The objective of HIDIMEEXO would be to provide, through studies of the causes and implications of diversity, an understanding of tropical and temperate ecosystems that would be relevant to their more efficient management. The latter consideration is clearly of wide interest and the Working Group would wish to take into account other ongoing or planned work in this field.

The programme would need two basic components. The first would aim at detecting and quantifying global changes in diversity by establishing a series of observatories in selected sites throughout the world, whose output could be, in part, to provide a service to pollution and resource managers. The second component would be a series of experiments designed to provide understanding of the processes that control diversity change and to allow for forecasts of their implications. The programme would set detailed guidelines on sampling, processing and analyses: it would prescribe appropriate laboratory and field experiments; it would recommend procedures of presentation and ensure that results were comparable from different areas; it could usefully include an international training or educational component, and the possibility that a manual on diversity study techniques might arise from this, could be considered.

The Panel acknowledged the efforts of the working group and recognized that diversity was one among other parameters to characterize the ecosystems and their changes including those due to external factors. The Panel also believed that the understanding of complex systems would benefit from studies focussing on selected key species populations.

b) Traditional knowledge and management of coastal systems

The manuscript of the Proceedings of the Regional Seminar on Traditional Knowledge and Management of Coastal Systems of West Africa held in Benin (Nov. 1985) is in its final stage of preparation. The delay in its preparation was due to late receipt of several authors' contributions and to the poor reproduction of some original graphics and figures. Certain texts also need rewriting.

The Chairman of the IABO/Unesco Working Group on Traditional Knowledge and Management of Coastal Systems, Dr. Kenneth Ruddle and Dr. Robert Johannes, will complete a volume on the Traditional Knowledge and Management for the Pacific Basin, as a contribution to the programme of the Working Group.

A third regional seminar focussing on Latin, Central and North America was due to be organized in 1986/1987 in Canada.

Unfortunately, due to financial restrictions, the seminar could not be organized.

The last meeting of the Working Group recommended the organization of two other regional seminars, one in Europe and a last one focussing on the Indian Ocean, in addition to the preparation of two publications: one being a popular book on traditional systems and a management handbook as well as the production of audio-visual material.

A proposal was reviewed and endorsed by the panel to organize in 1989/1990 a Seminar on Traditional Knowledge and Management of Coastal Systems, devoted both to Europe and to the Americas (South, Central and North), tentatively in Venice.

The preparation of the popular book would be postponed to 1990/1991.

II.3 Co-operation with ICSU's International Geosphere Biosphere Programme (IGBP)
(document 5.2 and recommendation 6.4)

The period covered by the present report corresponds to the preparatory phase of the IGBP programme.

During that period, either directly with the IGBP Secretariat or on the occasion of the regular Unesco (Science sector)/ICSU Secretariat joint meetings, the possibility of co-operation between IGBP and Unesco, in particular with COMAR, was discussed.

As far as COMAR is concerned, the basis for a proposed co-operation was essentially the following:

- Among the main areas of interest to the Global Change Programme are the interfaces between different "spheres". Hence, COMAR's fundamental interest lies at the sea/land/air interface where special features of the Bio-, Geo- and Atmospheres converge.

- It can be estimated that in many cases the environmental parameters which are considered by the COMAR programme in its various interregional, regional and sub-regional components would be similar or close to parameters considered in programmes which IGBP would be interested to develop in the coastal areas. It seems reasonable to think that with a revision but without changing the fundamental objectives of some of the COMAR programmes, these programmes could serve both the interests of the local scientific communities and also respond to the IGBP objectives.

- A number of on-going COMAR regional and sub-regional programmes could be units of the planned IGBP observatory network, should these units serve well defined programmes. The matter could also be considered together with the proposed "High Diversity Marine Ecosystems and Observations" (see item II.2.1).

IGBP decided on its first plan of action at its first meeting of the Scientific Advisory Council held in October 21-28, 1988 in Stockholm.

However, IGBP did not decide on a coastal zone programme at that meeting. The matter will in principle be considered later and the COMAR Secretariat has indicated its readiness to maintain the dialogue with IGBP on the matter. In the meantime, the Panel considered that COMAR should pay attention to the research done on the global changes, and in particular on those phenomena and factors concerning directly and influencing the coastal systems.

III. COMAR REGIONAL ACTIVITIES

III.1 Asia and the Pacific
(documents 5.2, 7.1.1 to 7.1.6 and recommendation 6.5.1)

a) Research and its application to mangrove ecosystems management

The second project (RAS/86/120) funded by UNDP (US$ 1,300,000) for the period 1987/1989 is partly focussed on the field research and advanced training programme being carried out at the Mangrove Forest Research Center (MFRC), including 22,000 ha of mangroves, at Ranong, Thailand.

The Government of Thailand contributed the equivalent of about half a million US dollars for the project. The Center, especially enlarged for the project, has accommodation for ten scientists; it has three small laboratories (air conditioned instrument lab, wet and general labs) and a small office/library. A canteen serves meals, and boats and catwalks allow penetration in the mangroves.

The year 1987 was devoted to building the infrastructure and the beginning of the research programme, as planned in 1986.

In 1988, two intensive research study periods took place in March and July/August while a permanent team of about ten scientists carried out the routine sampling and work.

The "First Intensive Research Study Period" (3 to 30 March) was attended by 19 junior and 23 senior scientists from eleven countries.

Research and advanced training was carried out on the following topics:

1. Forestry and soils

Structural characteristics; phenology; growth; potential net primary productivity; litter fall and decomposition; soil characteristics; microbiology; etc.

2. Fisheries and Fauna

Fish and prawn surveys; mangrove intertidal macrofauna distribution; tree fauna distribution; soil meiofauna sample collection; mangrove zooplankton sample collection; fish and prawn larval survey; mangrove crab reproductive cycles; mangrove insect-leaf decomposition relationships; edible crab; Scylla serrata; etc.

3. Oceanography and hydrology

Physical environment of the Ranong Province; sediment distribution and dispersion by remote sensing; physical processes of the estuary; water quality analysis; water circulation and slat transport in mangrove swamps; numerical modelling; nutrient cycling in estuaries; tide and current measurements; etc.

Field studies were carried out by the participants who were divided into three groups and were rotated to participate in all three disciplines (i.e. forestry, fisheries and oceanography). Participants were trained to collect water samples which were later analysed in the laboratory for basic water quality parameters i.e. nutrients (nitrite, nitrate, phosphate and silicate), chlorophyll and suspended sediments; they were also shown how to use in situ meters for measurements of salinity, temperature, pH and dissolved oxygen.

Demonstrations of the use of a mud probe (a small CTD linked with an optical fibre nephelometer) for in situ measurement of suspended sediments, conductivity, temperature and depth along Klong Ngao estuary were made, as well as of the use of a current vane to measure currents in shallow estuaries like Klong Ngao, and to measure tides by simple tide staffs.

Conclusion and recommendations from this first intensive study period are summarized as follows:

a) The enthusiasm, interest and hard working attitude shown by the junior participants made the training efforts of the senior scientists worthwhile.

b) By living and working closely together, informal interaction between the participants and scientists (representing many countries and disciplines) provided many additional benefits beyond those of the formal training programme.

c) While noting that the facilities were very basic and inadequate for some aspects of the research (in particular, equipment being limited), the specialists were impressed by what had been achieved so far, in such a short time since the project first started.

d) The specialists pointed out the importance of resident staff at Ranong continuing the special research topics initiated by visiting scientists.

e) Each specialist saw the need within his research field for data collection to continue beyond 1988. In all cases, but particularly in oceanography, the importance of studying inter-annual variability was stressed as this is one of the poorest known aspects of tropical coastal ecosystems.

f) They supported the decision to concentrate research activities on the dry and wet seasons in Ranong (i.e. the seasons in which the First and Second Intensive Study Periods have been scheduled) because of the major influence of the monsoons on physico-chemical processes in the Ranong mangrove ecosystem.

A "Second Intensive Study Period" was organized in July/August 1988 with the participation of about 45 scientists from the region.

The Second Study Period, in contrast to the first one, was held in the wettest period of the year when freshwater effects on the mangroves are greatest. The wet weather anticipated during this Second Study Period also required that very careful planning went into the field study programme to make it a) effective within the constraints of the weather, and b) safe for the participants going out into the mangroves.

The Second Study Period followed a similar format to the first one, but with more emphasis on field research since this was the only opportunity for detailed study of the dynamic processes in the mangroves in the wet season.

The participants worked throughout within their own discipline (Forestry/Soils, Fisheries/Fauna or Oceanography/Hydrology) in one of the study groups. They were, in this way, able to contribute their own expertise to the group, and by working together as a small team of about 10 students, they developed their skills - to the great benefit of the research activities. The decision to separate the participants in three distinct groups was also taken for the overriding reason of safety, particularly when using boats.

As it turned out, the participants worked extremely hard, undeterred by the unfavourable weather. Each of the study groups were each able to complete these programmes of fieldwork.

These programmes included:

- Tidal data collection and analysis;

- Current measurements: the current data will be used, in particular, to estimate material transport as well as for calibration of the numerical model of the hydrodynamics of the system;

- Meteorological data analysis: regional climate data were obtained from the meteorological station of the Ranong Province. In addition, our temperature and solar radiation data were collected by the project equipment.

- LANDSAT data analysis: Surface water samples were collected along a cross-shelf transect from Haad Sai Hhao to Kho Mhor every two weeks whenever the LANDSAT satellite overpassed the area. This will be used as the ground truth for the interpretation (calibration) of LANDSAT images in order to reveal the distribution and dispersion of sediments in the study area. Calibration of LANDSAT data from field (ground truth) data was also demonstrated to the participants.

- Water quality analysis: Participants were trained to collect water samples which were later analysed in the MFRC project laboratory for basis parameters, i.e. chlorophyll and suspended sediments, nutrients (nitrite, nitrate, phosphate and silicate); in situ measurements of water salinity, temperature, pH and dissolved oxygen were also made. A mud probe, an

instrument consisting of a set of detectors which measure depth, salinity, temperature and turbidity, was also used in the study period. Data obtained from the mud probe were stored in a built-in data logger from which it was retrieved for later analysis using a desk-top computer.

- Numerical modelling: A model of the hydrodynamics of the Klong Ngao estuary was demonstrated to the participants. The model predicts sea-level and currents at hourly intervals at each of 13 locations in Klong Ngao; it will also be useful for upwelling studies of nutrients from the mangroves.

- Offshore studies: A reconnaissance survey was organized on 28th July 1988 to investigate some of the offshore water properties beyond the mangrove study area. A total of 17 sampling stations were established in the offshore area to study the effect of freshwater discharge from Klong Ngao and the Kra Buri River into the coastal water. This study is expected to provide some understanding of the circulation pattern of this area as well.

Several of the many reports of research grants made to the participating countries and of the work achieved at Ranong are gradually coming in and will be put together in a single technical report before the end of 1989.

A plan of action for research and application of research results to the rational use of the mangroves of the small island ecosystems was discussed at Apia, Western Samoa, in February 1988. The plan is intended to be applied to the study and management of island ecosystems of other world oceans in addition to the core programme that is focussed on the Pacific Ocean.

The project RAS/86/120 will be extended until the end of 1989, with an additional financial support from UNDP of US$ 228,000.

At the meeting of the project's "Regional Task Force" held in May 1988, the decision was taken by the participating country representatives to convert this Task Force into a permanent "Regional Mangrove Coordinating Committee" (RMCC) which will continue to function after the termination of the project.

A five-day multiple meeting event is being planned to take place in December 1989 at Okinawa, Japan under the aegis of JICA (Japan International Cooperation Agency), Ministry of Education of Japan (National Commission for Unesco) and UNDP/Unesco-RAS/86/120 Regional Mangrove project.

The Programme would comprise:

- A national seminar on the mangroves of Japan;

- The first meeting of the Regional Mangrove Coordinating Committee (RMCC);

- A workshop on the management, afforestation and reforestation of mangroves under difficult conditions;

- An excursion to the coastal zone of Okinawa and visit to Okinawa Memorial National Government Park.

It is also intended that this event will mark the launching of an International Society for Mangrove Ecosystems, which is actually under consideration in Japan.

Coral reefs

Unesco-COMAR regional octocoral research workshop with advanced training in Phuket, Thailand, 30 November-13 December 1987. Eleven participants from six countries.

Octocorals play an important part in the general coral reef ecological framework and have been shown to contribute directly to the stabilization and growth of the reef. Along with being an attractive living resource, octocorals have gained world-wide importance due to the bioactive compounds they contain, already utilized in anti-cancer, anti-viral and anti-fungal drugs.

Three specialists in the field of octocoral taxonomy conducted the meeting, namely Dr. P. Alderslade from Australia, Dr. Y. Benayahu from Israel and Dr. K. Muzik from Japan. The workshop schedule combined field surveying and specimen collection techniques with laboratory teaching and identification. The participants were exposed to octocoral taxonomy through both the preparation and description of samples in the laboratory and the study of living specimens in the field.

The 1228 octocoral samples collected during the workshop, covering 13 families and 36 genera, will make up the nucleus for an octocoral reference collection at the Phuket Marine Biological Center.

The meeting called for the creation of a regional network of information exchange on octocorals and for research to be undertaken in octocoral taxonomy and biology in each country of the region so as to promote the establishment of national octocoral reference collections.

The Panel expressed its appreciation for the results achieved.

Sixth International Coral Reef Symposium, Townsville, Australia, 8-12 August 1988.

Four participants from three countries were supported by Unesco/ROSTSEA to attend the symposium.

Marine Science Data-base Development and Data Processing

Unesco/COMAR workshop on marine science microcomputer data base development center for oceanological research and development P30 LIPI, Jakarta, Indonesia, 17-18 November 1986.

Fifteen participants from five countries and two participants from IDRC.

This workshop was held to investigate the requirements for data-base development relating to the marine environment in the recent arrival of the age of the microcomputer.

In the field of environmental analysis it has been realized that the advantages of consistent data-sets gathered over a wide time-frame for the analysis of trends and changes in both the ecology and the physical nature of the environment are numerous and persuading and such data-bases have now become essential management tools.

The meeting considered that users of individual data-bases would benefit by adopting a common approach to information management through the use of a standard form of data dictionary. The meeting then defined a suitable structure to be used as a standard data dictionary for the marine sciences in the region.

The meeting concluded that a simple network for data interchange should be established by compiling a register of data holdings that would include various attributes of the data sets such as the structure of the data etc., rather than the data itself.

Unesco/IHP/COMAR/MAB regional training course on microcomputer based applications of statistical packages for environmental scientists, Quezon City, the Philippines, 15 June - 4 July 1987.

Nineteen participants from eight countries, with the support of IDRC.

This activity was supported by the three Unesco programmes, IHP, COMAR and MAB, as a collaborative effort together with IDRC. The course was held as a follow-up to the first activity which was held in Singapore in April-May 1985.

The course covered the following areas:

(1) Principles of sampling and experimental design;

(2) Linear and non-linear regression models in environmental studies;

(3) Introduction to multivariate statistical methods;

(4) Presentation by participants of environmental study problems.

The response to the course was very high. The panel agreed that further courses of this nature should be held in the different regions so that a wider range of environmental problems could be attacked in a systematic manner.

Co-operation with MAB (Japan): Man's impact on the coastal environment (MICE)

Unesco/MAB/COMAR Regional Seminar on Man's Impact on the Coastal Environment, MICE III, Brackish Water Ecosystems with the emphasis on Conservation and Management, Ranong Province, Thailand, December 9-12, 1986.

This meeting was the third in a series funded by a Japanese "funds-in-trust" contribution together with inputs from both the Unesco Divisions of Marine Sciences and Ecological Sciences.

The topics discussed were: estuarine ecosystems, reclamation of peat/acid sulphate soils, aquaculture in brackish-water areas, mangrove forest ecosystems, conservation and management of resources in coastal zone.

Man's Impact on the Coastal Environment, University of Ryukus, Okinawa, Japan, 24 September - 3 October 1987.

Fifty-nine participants from nine countries.

The 4th session of the joint Unesco/COMAR/MAB Japanese Committee activity "Man's impact on the coastal environment" (MICE) was operated as a field training course. Participants from throughout Southeast Asia and the Pacific formed two groups consisting of (1) the mangrove activity, which was implemented at the University of Ryukus field station on Diomote island and (2) the coral reef work, which was done at Sesoko Marine Station of the University of the Ryukus.

At both venues, participants were exposed to experimental field techniques. A number of projects were initiated and some environmental data sets gathered.

The field activity was followed by a 3-day International Symposium on Coral Reefs and Mangroves which was conducted by the University of the Ryukus.

Man's Impact on the Coastal Environment (MICE), Fifth Symposium for Asia and the Pacific, Nanjing, Peoples Republic of China, 3-9 August 1988.

The symposium was jointly sponsored by Unesco through the MAB and COMAR programmes, the Chinese National Natural Science Foundation and the Unesco/MAB National Committees of China and Japan. It was held and organized by the Centre of Marine Sciences of Nanjing University and attended by 64 participants from Asia and the Pacific.

Noting with interest its past activities, the Panel encourages MICE to pursue with its programme.

III.2 In Latin America and the Caribbean
(documents 5.1, 8.1 and recommendation 6.5.2 refer)

Three of the six sub-projects of COSALC, the COMAR component for Latin America and the Caribbean, are on-going.

As indicated under document I.1.2 Budget, the COSALC project document has been revised (see document 8.1). The number of sub-projects has been reduced from seven to six and the budget from US $4,000,000 to 3,000,000. In the revised version, the coral reefs are part of CARICOMP (COSALC III) and seagrass is merged with mangroves in sub-project COSALC IV.

The designation of the sub-projects on temperate coastal systems of Latin America has been maintained as COSALC III in the new version of the project (instead of COSALC VI) in order not to confuse the numerous participants in this sub-project who are now used to the acronym: COSALC VII.

COSALC I - Pilot project on coastal and beach stability in the Eastern Caribbean Islands
(documents 8.4.1, 8.4.2 and 8.4.3 refer)

Three coastal monitoring programmes and field manuals have been prepared for Dominica, St. Kitts and Nevis.

The programmes are essentially designed to monitor the beach profiles in various sites around the islands and to measure the waves' period and directions.

Documents 8.4.1 and 8.4.2 give a description of the programme and of the field manual prepared for Dominica. Similar materials have been prepared for St. Kitts and for Nevis.

In addition, the Unesco consultant (Dr. G. Cambers) made an evaluation of the progress of the Dominica coastal monitoring programme, in October 1988, after the first year's operation. The conclusion of her report reads as follows:

> "The first year of the Dominica coastal monitoring programme has proceeded well, the data have been collected on schedule, and an initial evaluation indicates that the data are accurate".

The first year of the coastal monitoring programme may be considered a success, largely due to the competence of the counterpart, Mr. A. James, and the commitment of the Forestry and Wildlife Division to beach conservation. The coastal monitoring programme is scheduled to continue for at least the next twelve months, possibly with a reduced frequency of measurement. Already the Physical Planning Unit is taking an interest in the programme and it is hoped that it will incorporate the findings of the first technical report into its coastal planning policy and application reviews.

Audio-visual material was provided to the six participating countries in 1987.

The United Nations Economic Commission for Latin America and the Caribbean (ECLAC) has called on the COMAR co-ordinator to comment on two reports: "Coastal conservation proposals for the Eastern Caribbean" and "Regional survey of coastal conservation", which surveyed each of the following islands: Anguilla, Antigua, the British Virgin islands, Dominica, Grenada, Montserrat, the Netherlands Antilles, St. Kitts & Nevis, St. Lucia, St. Vincent, Trinidad & Tobago. Comments were provided to ECLAC and it has been agreed, in principle, that COMAR and ECLAC cooperate to work out a joint programme on the above subjects to be submitted for extra-budgetary funding (see document 8.4.3).

COSALC III - Caribbean Coastal Marine Productivity (CARICOMP)
(documents 8.1, 8.2, 8.2.1, 8.2.2, 8.2.3, 8.2.4 refer)

A meeting of the CARICOMP Steering Committee was held at the Marine Research Station "Universidad Autonoma de Mexico" in Puerto Morelos, Mexico, 23-26 February 1988.

Participants

J. Ogden (U.S.A.)	Co-chairman
E. Jordan (Mexico)	Co-chairman
B. Kjerfve (U.S.A.)	
P. Penchaszadeh (Venezuela)	
J. Woodley (Jamaica)	(replacing I. Goodbody)
B. Wiebe (U.S.A.)	
Z. Zieman (U.S.A.)	
M. Steyaert (Unesco) (ex-officio)	

Absent: E. Ramcharan (Trinidad & Tobago).

Various subjects were discussed as follows:

Budgetary status

No international funds have so far been allocated for the implementation of CARICOMP, besides the Unesco Regular Programme and an N.S.F. contribution.

A decision was taken to enlarge the scope of the fund-raising effort by assigning the task to the Steering Committee members to make contact with a number of possible funding agencies.

It was considered that funding through bilateral agreements would not work unless a minimum of regional funding is made available.

Implementation of CARICOMP

A revision of the CARICOMP Programme was discussed and will be finalized by J. Ogden and J. Zieman for circulation to the S.C. members for negotiations with the funding agencies.

The total estimated budget has been reduced from US $6,000,000 to US $3,846,100. A preliminary funding of about US $200,000 would allow the regional network of research institutions to start functioning and it was decided that the programme should proceed in any event with the available resources in the countries and internationally.

It was therefore decided:

(1) To organize a Regional Training Workshop on the basis of the Manual of Research Methods in 1989 with financial support from Unesco and to seek a financial contribution from N.S.F.

A possible location for the workshop would be Puerto Morelos (Mexico) or Discovery Bay (Jamaica). To start with, the workshop will focus on basic time series measurements, biomass and productivity.

If, in the meantime, additional funds are made available, the programme priorities are to:

a. Guarantee full regional coverage of the programme

b. Increase the scope of measurements.

(2) To provide to the participating countries 40 thermistors if they can be obtained from NOAA through the Caribbean Marine Research Center in the Bahamas (Dr. R. Wickland).

The translation of the CARICOMP programme into Spanish was done by P. Penschazadeh.

Manual of research methods

The draft research manual prepared by a working group headed by Dr. P. Bacon (Jamaica) was reviewed. It was considered complete and well done, although too detailed and academic. J. Woodley, in coordination with P. Bacon, will edit the new text to be delivered to Unesco for publication.

Bibliography

J. Zieman has produced a list of research titles concerning the Caribbean region which is considered complete for the sections on mangroves and seagrass but not as yet for coral reefs.

E. Jordan will review this last section and will establish a list of publishing houses corresponding to a selection of key papers so that Unesco may request authorization to reproduce these papers for distribution to the participating laboratories.

If this proves to be feasible for the coral reefs, it will also be done for the two other ecosystems and other relevant research fields (water dynamics, etc.).

Proposal for co-operation with the NASA Research Programmes

NASA is actually calling for research proposals for its forthcoming "Earth Orbiting Satellite" Programme to start in 1990 on the basis of four space platforms to be equipped with a selection of sensors. One of the research proposals considered to be of interest by the Steering Committee members, is to study:

(1) the phenomena consisting of heat waves coming from Africa, circulating over the Atlantic in the direction of the Caribbean, passing over and collecting moisture from the Amazon and Orenoco basins, and further contributing to the formation of the hurricane systems in the Caribbean region.

(2) the resulting warming patterns in the Caribbean sea, oxygen, chlorophyll and ammonia contents, sea surface height and subsequent influence on the biological systems.

It has been proposed that the CARICOMP sites be used as a network for ground/sea truth measurements for that project.

Programme administration

Since CARICOMP is likely to be funded by various Agencies and Foundations with their own characteristics and requirements, the S.C. considers that there is a need to establish certain rules to be followed for the implementation of the project.

The S.C. therefore considers the following:

(1) CARICOMP is a programme initiated and sponsored by Unesco (COMAR).

This Committee actually consists of 8 members headed by two co-chairmen; its role is to oversee all aspects of the programme.

A Task Force (or Advisory Panel) consisting of one representative from each participating laboratory will meet with the Steering Committee at least once a year to review progress, formulate the next year's plans and initiate new sub-projects.

In addition, the Steering Committee will meet each year to review the programme and take any initiatives that are necessary. Ad hoc consultations will be to consider problems or new proposals.

(2) All decisions by the Steering Committee will be by unanimous vote.

(3) Sub-projects from an outside source will be of three types:

a) those that affect all sites

b) those that affect individual or selected sites within the programme and

c) Advanced research - Potential principal investigators must get the approval of the Steering Committee before accepting funds, but not (necessarily) before submission, provided this Programme Administration section is appended to any submitted proposal and that it is clearly understood that the Steering Committee has the ultimate authority over sub-projects. Sub-projects will have access to all of the CARICOMP data and it is recognized that data from sub-projects will be shared with all CARICOMP members. Publications resulting from sub-projects will be by the investigators acknowledging the CARICOMP programme. If CARICOMP data are used, they must be referenced as resulting from the CARICOMP programme. Summaries of work done at the CARICOMP sites must be completed and sent to the Data Manager at the end of each field period.

These rules are intended especially for cases when extra-budgetary funds are made available, but are administered independently from Unesco (COMAR), and when independent research projects will wish to use CARICOMP data and be associated with its network of laboratories.

If funds can be raised from one or several extra-budgetary sources, negotiations should be engaged to decide whether the funds will be administered by or independently from Unesco.

Documents 8.2.3 and 8.2.4 represent a tentative to obtain funding for CARICOMP from UNDP and EEC.

COSALC VII - Temperate coastal systems of Latin America
(documents 8.3. to 8.3.9 refer)

The sub-project's first meeting was a seminar/workshop on physical and biological processes of the temperate coastal and estuarine environment of Latin America, 3-7 November 1986, Montevideo, Uruguay (see document 8.3.1).

The meeting recognized the great potential interest of the exchange of experiences and competence among scientists and institutions of the participating countries, on a number of specific subjects of common interest concerning the coastal rocky and sandy bottom communities, the estuarine environment and the coastal dynamics and stability.

The meeting noticed an important heterogeneity in the development of the scientific infrastructures and opportunities and recommended that advanced training be organized in relation to the research programmes.

Noticing also that very few contacts on cooperative activities actually existed among the scientists in the area, the meeting recommended the establishment of a scientific technical committee composed of specialists, representatives of the regions and of the various themes, to be in charge of coordinating the activities of the project.

The meeting further made several research proposals which are detailed in the 'Informes de la Unesco sobre ciencias del mar N° 47, 1988'.

The consultant missions of Profs. J.C. Castilla (Biology, Marine Ecology) and L.R. Martins (Geology) were organized to the five countries participating in the pilot project (Argentina, Brazil, Chile, Peru and Uruguay) to review, on the basis of the recommendations of the first meeting, the interest, needs and potential of the various institutions and of the Scientific Community to participate in the activities of the project (see document 8.3.4).

A second meeting of the sub-project was held in Conception, Chile, on November 19, 1987.

As a result of Prof. L.R. Martins' (Brazil) consultant mission, a consensus among the geologists was reached to develop and co-operate in a research project on the "Dynamics and stability of sandy coasts, and their relation with the continental shelf" including two main components:

- dynamics of sandy coasts;

- stability of coasts and influence of sea level variations.

Prof. J.C. Castilla (Chile) visited fifteen government services, universities, laboratories or research institutes (interviewing more than 100 scientists in total) and obtained indirectly or through telephone contacts, information on fifteen additional research institutions.

In each country visited, Prof. Castilla identified the existing interests and potentials of the institutions, listing the senior and junior scientists, their research programmes, training needs and interest to cooperate with foreign institutions and colleagues.

Study grants and grants for co-operative research were reported to have been provided to five persons since the first meeting of the sub-project.

The meeting ended with the establishment of the Scientific Coordinating Committee.

First meeting of the Scientific Coordination Group, 20-21 November 1987, Concepcion, Chile.

Members

Argentina :	N.W. Lanfredi, member
Brazil :	L.R. Martins, chairman
Chile :	J. Stuardo, member
Peru :	M. Vegas, co-chairman
Uruguay :	J. Abdala, member
Unesco consultant :	J.C. Castilla, ex-officio
Unesco consultant :	V. Scarabino, ex-officio
Unesco :	M. Steyaert, ex-officio.

Prof. L. R. Martins and Prof. M. Vegas were elected respectively chairman and co-chairman for the year 1988. The meeting first considered the function of the Committee.

It was decided that the chairmanship of the Committee will be a rotating function among the members, on a yearly basis. After one year the co-chairman will become the chairman for the following year and a new co-chairman will be elected, etc.

The meeting was briefly informed on the way the existing National COMAR/COSALC Committees (Argentina and Brazil) function and of the on-going COSALC activities in the three other countries.

The reports of the two Unesco consultants (J.C. Castilla and L.R. Martins) were received and acknowledged. It was decided that Prof. J.C. Castilla will complete his report regarding Brazil and Chile and that he will revise and consolidate the two consultant reports in consultation with Prof. L.R. Martins, to be approved by the Committee at its second meeting in ROSTLAC, Montevideo, in 1988.

The Committee proceeded with selecting a number of specific activities proposed to Unesco for funding in 1987/1988.

These activities are the establishment of :

- Working group on estuaries, coastal lagoons and bays. In charge: Dr. E. Jaramillo, Univ. Austral, Valdivia, Chile, in cooperation with Dr. G. Perillo, Instituto Oceanografico Argentino, Bahia Blanca, Argentina.

- Working group on dynamics of sandy coasts. In charge: Dr. N.W. Lanfredi, CONICET, Buenos Aires, Argentina, in cooperation with Prof. L.R. Martins, Porto Alegre, Brazil.

- Training course on dynamics of sandy coasts.

- Training course on ecological theory and coastal marine ecology.

- Support of the participation of scientists from countries being part of the COMAR/COSALC VII, presenting a paper at the Chapman Conference on sediment transport processes in estuaries, June 13-17, 1988, Bahia Blanca, Argentina.

- Support to the VIII Jornadas de Ciencias del Mar in Talcahuano, Chile for participation of foreign scientists from COMAR/COSALC VII.

- Postgraduate study of Mr. Carlos Lasta (Argentina) at the Catholic University of Chile, BIOTECMAR, in Talcahuano.

- Mission of Prof. J.C. Castilla to Brazil.

- Administrative support for the functioning of the Scientific Coordinating Committee.

Second meeting of the Scientific Coordinating Committee in ROSTLAC, Montevideo, 15-16 April 1988.

Since the first meeting of the Steering Committee (November 1987), the following activities have been accomplished so far in 1988:

- Lic. Carlos Lasta (INIDEP, Argentina) received postgraduate training in estuarine ecology at the Catholic University of Chile (Campus in Talcahuano).

- The Proceedings of the Seminar on physical and biological processes in the temperate coastal and estuarine environment of Latin America (November 1986) were finalized and presented at the Steering Committee meeting as N° 47 in the 'Unesco reports in marine sciences' series.

- Contracts were prepared with scientists from the subregion for the organization of two working groups, in particular with:

- Dr. Eduardo Jaramillo (University Austral of Chile) and Dr. Gerardo Perillo (Institute of Oceanography of Argentine) in charge of the working group on Estuaries, coastal lagoons and bays. A first meeting of the working group was organized in ROSTLAC in May 1988 (see document 8.3.6).

- Dr. Nestor Lanfredi (CONICET, Argentina) (co-responsible with Dr. L.R. Martins, CECO, Brazil), in charge of the working group on coastal dynamics.

It was decided that the heads of the working group would be invited to participate in the next meetings of the Steering Committee.

The representative of Argentina (Dr. Lanfredi) offered to organize the Training course on coastal dynamics (which was decided at the first meeting of the Steering Committee) in Argentina.

The Steering Committee recognized the interest that material, prepared for the course organized by the sub-project, be reproduced (course syllabus manual or diskettes) for further utilization by the universities of the sub-region.

The sub-project's report was sent to the countries for comments which, as far as the biology section is concerned, were incorporated in a consolidated document (except for some additional information needed for Chile). This section was approved.

The geology section was completed by Dr. L. R. Martins and N. Lanfredi's meeting in ROSTLAC in May 1988.

This section will essentially propose co-operative research in the areas of :

(i) sandy coasts, physical parameters and sediments transport, and

(ii) variation of sea level (at 100 years' scale) and its influence on coastal dynamics.

A number of specific actions regarding the modalities of implementing the sub-project, as well as the awarding of study grants, were decided.

The next meeting of the Steering Committee will be held in ROSTLAC early in 1989.

COSALC II - Coastal lagoons of Latin America

The sub-regional workshop on environmental processes in coastal lagoons which was scheduled to be held in Mexico in 1986 could not be organized and the activities of this sub-project have been temporarily suspended due to lack of financial resources.

COSALC IV - Mangroves and seagrass of Latin America and the Caribbean and COSALC V - Estuaries, deltas and their relations with the continental shelf have so far not yet been implemented because of lack of financial resources. However, the objectives of COSALC V are partially taken into account within the framework of COSALC VII - Temperate coastal systems of Latin America.

III.3 In Africa
(documents 9.1, 9.1.1 to 9.1.6 refer)

The fourth meeting of the Consultative Panel, held in Dakar, December 1986, took place around the same time as the end of the preparatory phase of the COMAR programme for Africa (1976-1986). During this period, marine scientists of Africa met at various occasions, cooperated with Unesco in defining the objectives and priorities for a regional cooperative project on the coastal marine environment and problems, and prepared themselves for the implementation of such a project.

The project "Regional project on coastal marine systems of Africa" (COMARAF) has now been funded by UNDP at the level of US$ 1,000,000 for a period of three years.

As indicated under item I.1.2 Budget above, it is hoped that the project will be extended over the first three years and that additional funding will be provided in order to be able to implement all the objectives retained for the project at the COMARAF meeting held in Dakar in December 1986 (see document 9.1.2).

In the meantime, the project activities have been concentrated under two main themes:

(1) the productivity of marine coastal zones
(2) the hydrodynamics and the geology of coastal areas and the continental shelf.

In addition, the project will:

- reinforce the national research teams and COMARAF Committees

- promote the exchange of scientists and results by supporting the implementation of selected joint research programmes among various participating countries

- support a network of rapid communications and the production of publications and manuals.

The project has been operational since 1 July 1988 and will end, in principle, on 30 June 1990. Prof. Salif Diop (Senegal) is the project's Chief Technical Adviser (CTA).

A Regional Task Force (RTF) has been established and is composed of one representative per participating country. Its first meeting was held from 29 February to 3 March 1988. The CTA and the RTF constitute the executive body of the project.

Various field training workshops were organized during the last few years on:

- marine geology of West Africa, March 1987 in Conakry, Guinea;
- coastal ecosystems productivity, December 1987, Douala, Cameroun;
- study and management of coral reefs, October 1988, Mauritius.

Two additional workshops are planned in 1989 on (1) mangrove and estuarine/deltaic processes and hydrodynamics in Tanzania and (2) coastal geological processes in Nigeria.

The project has initiated the production of a "COMARAF Newsletter", a brochure, a report series and a technical series.

It should be noted that Nigeria is publishing its "National COMARAF Newsletter".

Cooperation between COMARAF and the COMAR Asian Regional Project on mangrove ecosystems (Unesco/UNDP-RAS/86/120) is planned to allow the participation of several African scientists, within an international team of scientists, in an intensive research period to be organized at the Ranong Mangrove Research Centre (Thailand) in 1989.

III.4 In the Mediterranean, the Red Sea and the Gulf
(documents 10.1, 10.2 and recommendation 6.5.4 refer)

An "Expert meeting on coastal lagoons of North Africa" was organized in Cairo (14-17 November 1987) with participants from Algeria, Egypt, Morocco and Tunisia.

The meeting discussed the objectives and mode of implementation of a regional programme on : "the study of the ecosystems in the coastal lagoons of North Africa".

The main objectives are :

- development of integrated conceptual models of the ecosystems,
- adoption of a general policy for the rational management and exploitation of the economical resources of the lagoons,
- exchange of experience among the countries involved, as well as the training of national cadres.

The following activities were proposed:

- the implementation of concurrent studies (in all countries) on the fishes of the coastal lagoons. The studies would comprise classification, feeding, reproduction and population dynamics of fish. The accumulated information will be used to develop sub-models on the fishes of the coastal lagoons of the region;

- the organization of a training course on plankton at the Department of Oceanography, Alexandria, with the collaboration of the National Institute of Oceanography and Fisheries, in Egypt;

- the venue of a training course in Algeria, on marine chemistry, water budget, and the exchange of water and sediments;

- the training of some specialists on benthos and two specialists from Morocco and Egypt to visit Tunisia and Algeria for two months;

- two specialists in aquaculture (economic oysters) from Morocco and Tunisia to visit Egypt and Algeria for two weeks in order to make field observations;

- one junior specialist from Egypt and another from Algeria to be sent for training in Tunisia and/or Morocco for one month;

- the organization of a training course on modelling in Tunisia;

- the exchange of specialists between the participating institutions within the framework of the regional programme.

The meeting recommended that :

- Unesco fosters this regional research programme on coastal lagoons of North Africa and finds a source to provide the required funds through COMAR;

- the concerned governmental authorities in the participating Arab countries support the implementation of this programme;

- Unesco and COMAR support the participation of specialists from the North African countries in the training courses on marine environment approved in Unesco's 1988 PAD;

- a sub-committee for North African countries be formed within the COMAR project.

III.5 In Europe
(documents 11.1, 11.1.1.)

In execution of laws passed in 1973 and 1984, the Italian Government has decided on three main projects for the safeguard of Venice and of its lagoon from the floods and pollution of various sources.

a) An engineering project for the regulation of the water circulation at the three main entrances of the lagoon, especially for the protection of the city from being flooded by the highest tides. This project is under the responsibility of the Ministry of Labour which contracted a consortium of Italian companies (Consorzio Venesia Nuova) for its implementation;

b) A project for the monitoring and mitigation of pollution under the responsibility of the Ministry of Environment in cooperation with the Region of Veneto;

c) A research project on the Lagoon of Venice under the responsibility of the Ministry for Science and Technology.

Already, after the exceptionally high tide of 1966, Unesco (Culture Sector) launched an International Campaign for the restoration of the monuments and art collections.

In 1980, Unesco (Science Sector) was invited to co-operate with the Italian government in preparing a first version of a research project which was published in 1983 but was not funded. Various foreign experts were called in to participate in the work.

After the new law of 1984, Unesco was invited again to participate in an expert group of the Minister of Science and Technology to prepare a new project for the study of the Lagoon of Venice (mentioned in c) above). This project is conceived on the basic hypothesis that the lagoon is an open system with fluxes and variations of fluxes of matter and energy flowing in and out under the influence of natural factors and of man.

Various themes were defined, such as the characterization and qualification of water fluxes and energy; fluxes of elements, particles and compounds in solution; exchanges and processes at the water sediment interface; level of productivity; pollutants and eutrophication; subsidence and variation of the lagoon morphology; erosion along the littoral and inside the lagoon.

The Consultative Panel noted with appreciation the participation of COMAR in the preparation of the International Research project on the Lagoon of Venice and recognized that the implementation of this project will constitute a case study of potential interest for other similar coastal areas in the world.

IV. INTERREGIONAL ACTIVITIES
(documents 12.1 and 12.2 and recommendation 6.6)

The various activities of COMAR undertaken in co-operation with the international scientific community and in the regions, are creating interesting opportunities for interregional cooperation. For example, on regional projects:

a) acquired after a certain stage of development and experience to be in a position to offer a valuable service to another regional project. It is presently the case with the co-operation established between the Regional Mangrove Project for Asia and the Pacific (RAS/86/120) and COMARAF.

b) the activities developed by a group of scientists in one region have attracted the interest of another group of scientists in another region. This is what happened between the CARICOMP and scientists working in the Pacific, which resulted in the holding of a seminar in Fiji (March 1986), discussing comparison of community structures, ecological processes and productivity between Atlantic and Pacific tropical marine coastal ecosystems.

c) Paleo-oceanography of Latin America and African Atlantic coasts. It is proposed to undertake a comparative geological analysis of these regions, during the Holocene, considering the present active processes and disciplines, such as geomorphogenisis, sedimentation, micropaleontology and others. It will provide important subsidies to a better interpretation of the evolution of the sedimentary basins in both sides of the Atlantic Ocean, and should bring considerable contribution to knowledge of the paleogeographic evolution during the last geological time.

Seen from a practical angle, this kind of scientific information is of capital interest for the study, exploration and exploitation of non-living resources which are genetically related to the geological environment described above, in the form of hydrocarbon deposits, evaporites, sulphur, phosporites, placer accumulations and other mineral concentrations.

V. COMAR INTERREGIONAL SCIENTIFIC CONFERENCE

An evaluation of the project was done two years ago and concluded that COMAR, with a minimum infrastructure in Unesco, was in general on the right track and should continue to promote research on the scientific understanding of coastal ecosystems on a long term basis.

A basic guiding principle was recognized to be that the project should continue to seek efficiency in responding to needs and interests of countries and regions and of their Scientific Communities in co-operation with the international Scientific Community concerning the major scientific problems and management challenges for the coastal zone.

The Panel believes that the on-going activities and experiences accumulated over the past years in each regional COMAR component on subjects and problems often of similar nature, justify the organization of a COMAR Interregional Scientific Conference to enable an exchange of experience over the regions and to promote the establishment of working relations among specialists from the various regions.

The Panel noted that COMAR is known and appreciated at the governmental level while it is managed and carried out through the countries' scientific community. The Panel also noted that a key to COMAR success is the distinction kept between these two levels, which are complementary and mutually reinforcing.

While the Consultative Panel carries on performing a scientific advisory function, the need was recognized that the heads or chairmen of the various COMAR regional and sub-regional projects attend the meetings of the Consultative Panel and meet at that occasion.

VI. NEXT MEETING OF THE CONSULTATIVE PANEL

The principle has been retained that the next meeting of the Consultative Panel be held at Unesco Headquarters in September 1990, in conjunction with the COMAR Interregional Scientific Conference.

VII. RECOMMENDATIONS

VII.1 Evaluation of COMAR

The Consultative Panel

Took note with appreciation of the evaluation of the COMAR project made by Prof. T.Parsons and endorsed its conclusions.

Recognized :

- that COMAR has been successful and has achieved useful results regarding coastal observations extended over long periods of time and in different parts of the world.

- that the policy of parallel projects in numerous different environmental conditions has proved to be very fruitful.

- that COMAR results show that generalizations regarding the management of ecosystems of the coastal zones could be inefficient or even dangerous. Therefore, specific site survey and research should be carried out before doing any major manipulation in a special coastal zone.

Recommends that the activities of the COMAR project be actively pursued in the various regions, with a special effort to promote the interregional cooperation among its various regional components.

VII.2 Co-operation with SCOR

VII.2.1 Experimental ecosystems

The Consultative Panel,

Took note of the report and welcomed the cooperation with SCOR.

Noted the results of the first meeting of the working group on experimental ecosystems held in Hamburg in June 1988, and in particular the proposal to prepare a manual on controlled ecosystem experiments. The Panel considers that such a manual could be very useful for coastal studies and in particular for those carried out by the various projects of COMAR.

Noted the date and place of the next meeting of the working group to be held at Qingdao, in June 1989.

Recommends

- that the COMAR project be associated with the future activities of the above Working Group and,

- that cooperation with SCOR continue in the definition of scientific subjects and the organization of related working groups and programmes of interest to further promote the scientific understanding of coastal systems and processes.

VII.3 Co-operation with IABO

VII.3.1. Highly diverse marine ecosystems

The Consultative Panel,

Regretted that the Chairman of the Working Group on Highly Diverse Marine Ecosystems was unable to attend the meeting and in his absence debated on the subject from the point of view of the study of marine ecosystems in their overall complexity,

Considered

- the numerous aspects and wide spectrum of factors governing the communities of these ecosystems, in both time and space,

- that a comprehensive study of natural ecosystems requires that the analysis of diversity be complemented by taking into account other parameters governing their functioning,

- the practical difficulty due to incomplete knowledge of the determination and classification of many botanical, zoological and lower taxa,

Recommends

- that, when considering approaches to the characterization of marine communities, other parameters than those based on the relative abundance of species be considered,

- that studies of key species populations be undertaken, supported by experimental work, as a means to enhance our understanding of highly diverse ecosystems.

VII.3.2. Traditional knowledge and management of coastal systems

The Consultative Panel,

Noting that there is a standing conflict between the traditional societies living in and using the coastal systems and the modern industralized society developing in the same area,

Recognizes the value of the objectives of the Working Group on traditional knowledge and management of coastal systems,

Endorses and supports the proposal to hold the next seminar in Venice in 1989/90, devoted to the traditional knowledge and management of coastal systems in Europe and in the Americas.

Recommends that the Working Group consider the need to undertake specific inquiries on traditional practices in the various coastal areas of the world.

VII.4 Cooperation with ICSU's International Geosphere-Biosphere Programme (IGBP)

The Consultative Panel

Noted that IGBP, in its "Action Plan" (paper no 4):

- "recognized that global change in climate, land-use practices, as well as dramatic changes in the quality or quantity of riverine discharge associated with climate and land-use changes in watershed, would have profound effects on coastal and estuarine regions."

- "considered that research is needed in the areas of:

  a) long-term trends and regional patterns in the eutrophication of coastal waters,

  b) effects of anticipated climate change on watershed hydrological cycles that can influence riverine delivery of suspended sediment and dissolved nutrient materials to estuarine and coastal habitats,

  c) effects of global sea-level rise on estuarine and coastal wetland habitats and its implications.

- "referred to COMAR as one of the activities of other bodies related to IGBP"

- "stated nevertheless that in areas related to coastal and estuarine biological systems, coordinated programmes are neither in place nor likely to be planned as part of other international programmes in the near future".

Further noted

- "that at the first meeting of the Scientific Advisory Council of IGBP (Oct.88), the Council affirmed the selection of the general research areas, mentioned in paper N° 4 regarding the four coordinated panels and four working groups, as appropriate first steps in the interactive process of programme definition, and recommended that further refinement continue, including the establishment of realistic goals in all areas",

- "that the Council endorsed further elaboration of the Global Change Programme and specific project plans for core elements (which will be further defined by its scientific commission together with specific pilot activities) to be developed during the next 18 months, to be discussed at a second meeting of the Scientific Advisory Council in mid 1990".

- that IGBP interest lies in programmes addressing key interactions and significant changes on a time scale of decades to centuries that most affect the biosphere, that are most susceptible to human perturbation, and that will most likely lead to predictable capability.

- that at the meeting no further attention was given to coastal regions although these regions are now modified on a global scale.

Recognizes

- that IGBP is not sufficiently informed of the COMAR programme,

- that COMAR's fundamental interest lies in the particular and key interactions occurring at the boundary between sea, land and the atmosphere, which are expressed in the form of the various systems and ecosystems encountered in this zone,

- that the various regional and sub-regional COMAR programmes also deal with environmental issues and parameters similar or close to those of potential interest to IGBP in the coastal area,

- that the COMAR interregional programme network could participate in the planned IGBP observatory network provided that it serve well defined programmes, and programmes of interest for the coastal zone.

Recommends

- that Unesco express its willingness, in principle, that COMAR participate in the IGBP,

- that IGBP, upon developing its programme, take into account COMAR and its programmes.

VII.5 COMAR regional activities

VII.5.1. In Asia and the Pacific

The Consultative Panel,

Considered

- the expertise acquired during the implementation of the UNDP/Unesco Asia and Pacific Regional Mangrove Ecosystem Project,

- that the implementation of the project during the six years of activities will require follow-up field work for many years to come to supply research results to management,

- that the actual situations vary from place to place.

Recommends that the participating countries urgently formulate projects at national level to be submitted for the consideration of UNDP, the World Bank, the Asia Development Bank, or any other funding agency for the implementation of the national programmes, to follow-up the regional UNDP assisted research projects.

Further considered

- that one of the basic purposes of COMAR is to acquire knowledge on the structure and dynamics of the coastal ecosystems,

- that this knowledge is geared towards a wise management of coastal ecosystems for long-term sustained use without degradation of the environment.

Recommends

- that Unesco and UNDP give urgent consideration to implementing a new Regional Project entitled: "Research and training network for the management of coastal marine zone and resources in Asia and the Pacific". This new regional project should take advantage of the experience gained and the national and regional infrastructures established by the Regional Mangrove Ecosystem Project (RAS/86/120) which ends in 1989.

- that special attention be given to small island systems, both the atolls and high rise volcanic islands of the Pacific and Indian Ocean.

- Also considered the interest of microcomputer-based applications of statistical packages for environmental scientists, which was part of the programme of the Unesco/COMAR/MAB regional training course held in Quezon City, The Philippines, in 1987.

Recommends

- that the subject be further developed and extended to other regions,

- that data storage methodologies also be retained as a subject for similar courses.

Recommends that a regional network of information exchange on Octocorals be organized, and that research be undertaken in Octocoral taxonomy and biology in each country of the region, so as to promote the establishment of National Octocoral Reference Collections.

VII.5.2 In Latin America and the Caribbean

The Consultative Panel,

Noting with concern that the regional project "Research and Training on Coastal Systems of Latin America and the Caribbean and its relation with the continental shelf" (COSALC) is lacking the necessary funds to be properly implemented,

Reaffirms that this project is designed to promote the development of a comprehensive and rational framework for research related to the management of coastal systems,

Recommends that Unesco urgently apply to UNDP and/or to other funding agencies to finance the project.

Noting with appreciation that three of the six sub-projects of COSALC were initiated through the Unesco Regular Programme and in cooperation with the National Science Foundation (USA),

Welcoming in particular the interest of the scientists engaged in the activities of COSALC III - Caribbean Coastal Marine Productivity (CARICOMP), under the supervision of a Steering Committee,

Noting that this sub-project could only be initiated thus far, due to the limited resources of the Unesco Regular Programme,

Recognizing its multi-disciplinary and multinational nature and its importance to the Caribbean,

Recommends that CARICOMP be supported by Unesco and by extra-budgetary sources in order to enable an expansion of its activities as soon as possible.

Noting further with interest the development of COSALC VII - Temperate Coastal Systems of Latin America, and in particular the great amount of key information on scientific research institutions and senior and junior scientists collected in the subregion,

Recommends

- that the above information be completed and updated as required and published by Unesco-ROSTLAC,
- that the Steering Committee of COSALC VII prepare a Directory of Scientists of the subregion and that the Directory be published by Unesco-ROSTLAC.

Further recommends that the meetings of the Steering Committees of COSALC III (CARICOMP) and COSALC VII be, as far as possible, organized consecutively, one after the other, in April 1989 and that the Chairman of the COSALC VII Steering Committee attend the meeting of the CARICOMP Steering Committee in order to enhance the coordinating links between the two sub-projects.

VII.5.3 In Africa

The Consultative Panel,

Noting with appreciation

- that the full implementation stage of the COMARAF project was attained in a short time,

- that the recommendations of the first COMARAF Regional Task Force meeting and all the activities planned in the project, i.e. training, research, publications (newsletters, technical reports, manuals) or promotion of joint research programmes and exchange of scientists, are being carried out and are forming the basis for a regional network of cooperative undertakings,
- that an interregional cooperation between COMARAF and the UNDP/Unesco (COMAR) Regional Mangrove Project for Asia and the Pacific was initiated,

Recommends

- that the cooperation between West, Central and East Africa be reinforced in all aspects of the project, and in the undertaking of joint research programmes, field activities, exchange of scientists and organization of seminars and workshops,

- that the establishment of the network of rapid communication among participating countries and institutions be accelerated,

- that the interregional cooperation between COMARAF and the other COMAR regional projects be intensified,

- that consideration be given at the next meeting of the Regional Task Force to the preparation of the extension of COMARAF into a second phase after June 1990.

VII.5.4 In the Mediterranean, the Red Sea and the Gulf

The Consultative Panel,

Taking into consideration the agreement reached by the participants of the Expert Meeting on Coastal Lagoons of North Africa convened in Cairo, 14-17 November 1987, and of the follow-up meeting between Tunisian and Egyptian participants in Athens, 17-20 October 1988,

Recommends

- that a conceptual model for each of the selected lagoons be developed and that the investigation of the hydrochemical processes and the mass balance of suspended solids, salt and nutrients, be initiated as early as possible,

- that urgent steps be taken for the drafting of a Regional Project Document on Coastal Systems of the Region to be submitted to Unesco-COMAR for extrabudgetary funding,

- that Unesco convenes a Regional Seminar-Round Table by early 1990 to review present knowledge on North African coastal systems and agree on the approach and methodologies appropriate for their study,

- that Unesco works on reinforcing cooperation among all interested countries of the region in the implementation of the project.

VII.6 **Interregional activities**

The Consultative Panel,

Noting with satisfaction that COMARAF is sponsoring the participation of several African scientists in the mangrove research programme at the field station in Ranong (Thailand) which is an activity of the UNDP/Unesco (COMAR) Regional Mangrove Project,

Recommends that cooperation between COMARAF and the COMAR component for Asia and the Pacific be further reinforced.

Noting further the potential interest for cooperation between COMARAF and COSALC VII on paleo-oceanography during the quaternary, as well as between COMARAF and other sub-projects of COSALC,

Recommends

- that a comparative research programme on paleo-oceanography along both the coastlines of Africa and South America be developed between COMARAF and COSALC VII, and that, as a starting point, a planning meeting be organized with the participation of specialists on the question, working on both coastlines,

- that, in addition, consideration be given to the organization of joint training programmes and the exchange of information and publications between the two projects.

Further considering the need for a constant interaction among scientists and among countries for a healthy development of science and for better application and use of research results and techniques for sustainable development,

Recommends that COMAR

- sponsor the exchange of scientists between regions and between climatic zones,

- organize an Interregional Scientific Conference on the Coastal and Continental Zone, maximum every two years and minimum every four years,

- invite the head of its regional projects to participate in the meeting of the present Consultative Panel,

- pay special attention to enhance cooperation in its programmes between scientists and institutions of less advanced countries with those of advanced ones.

ACRONYMS

IABO:	International Association for Biological Oceanography
ICSU:	International Council of Scientific Unions
SCOR:	Scientific Committee on Oceanic Research

Table I.

Summary of COMAR's principal international and regional activities

COMAR

INTERNATIONAL ACTIVITIES	MAIN REGIONAL ACTIVITIES				
	Asia & the Pacific (COMARASP)	Europa	Latin America & the Caribbean (COSALC)	Africa (COMARAF)	Mediterranean, Red Sea and the Gulf (COMARAS)
Cooperation with NGO scientific Organizations (ICSU, IGBP, SCOR, IABO) through working groups conferences and editorial boards					
Sea-grasses	Mangroves related systems (RAS projects)	Lagoon of Venice	Coastal and beach stability (COSALC I)	Coastal marine productivity	Coastal lagoons of Nothern Africa
Coral reefs	Coral reefs			water dynamics and geology of the coastal zone and continental Coastal marine productivity	
Costal systems interactions: land/sea interface	Pacific coastal marine productivity (PACICOMP)		Caribbean Coastal Marine Productivity (COSALC III) (CARICOMP)		
Experimental ecosystems					
Highly diverse marine ecosystems			Temperate coastal estuarine environments (COSALC VII)		
Traditional knowledge and management of coastal systems marine ecosystems					
Traditonal knowledge and management of coastal systems					

Inter-regional activities

Inter-oceanic comparison of coastal marine productivity

Paleo-oceanography of Latin American and African coasts

ANNEX 1.

List of documents

COASTAL V/1	Agenda
COASTAL V/2	List of documents
COASTAL V/3	List of publications
COASTAL V/4	List of participants
COASTAL V/5	General
V/5.1	COMAR: A general report: activities 1987-1988 (M. Steyaert)
V/5.2	Research on coastal marine systems - Review and Recommendations for Unesco Programme 1987-1989. Unesco Technical Papers, N- 52. 1987.
V/5.3	Project evaluation of COMAR (T. Parsons)
COASTAL V/6	Cooperation with Non-Governmental Scientific Organizations
V/6.1	Cooperation with SCOR: A status report (H. Postma)
V/6.2	Cooperation with IABO: A status report (P.Lasserre)
V/6.3	Experimental ecosystems, SCOR/IABO W.G. 85. First meeting, 6-10 June 1988, Hamburg - A report (T. Parsons)
V/6.4	High diversity Marine Ecosystems. First meeting, IABO W.G. 1-14 August 1986, Syracuse U.S.A. (P.Lasserre)
V/6.5	High Diversity Marine Ecosystems. Second meeting, IABO W.G., 26-29 July 1988, Woods Hole, Mass. U.S.A. (P. Lasserre)
V/6.6	Traditional knowledge and management of coastal systems. IABO Working Group. A status report. (P. Lasserre)

Regional Activities

COASTAL V/7 Asia and the Pacific

V/7.1.1 Project RAS/86/120 - Research and its Application to Mangrove Ecosystems Management. Project Document. (M. Vannucci)

V/7.1.2 Mangrove ecosystems of the Pacific. A new sub-project of the regional project RAS/86/120. (M. Vannucci).

V/7.1.3 Field multidisciplinary research programme in Ranong (Thailand). First intensive research period, March 1988. A report. (M. Vannucci, D. Macinstosh)

V/7.1.4 Field multidisciplinary research programme in Ranong (Thailand). Second intensive research period, July-August 1988. A report. (M. Vannucci, D. Macintosh)

V/7.1.5 Research and training network for management of coastal marine zone and resources in Asia and the Pacific. A new COMAR project. (M. Vannucci, M. Steyaert)

V/7.1.5 bis Research and training network for management of coastal marine zone and resources in Asia and the Pacific. A new COMAR project (version bis)

V/7.1.6 Research carried out at the Mangrove Forest Research Centre, Ranong, Thailand, 14 April-19 May 1988 (B. Clough, M. Vannucci)

V/7.1.7 Hydrographic sampling in Klong Ngao, Ranong, Thailand, 20 March 1988 and recommendations for future sampling (Bjorn Kjerfve)

V/7.2 Non-mangrove COMAR activities in Asia and the Pacific (D. Troost, R. Harger).

COASTAL V/8 Latin America and the Caribbean

V/8.1 COMAR component for Latin America & the Caribbean (COSALC) - Project proposal (second version)

V/8.2 Caribbean Coastal Marine Productivity (CARICOMP) A status report (E. Jordan)

V/8.2.1 CARICOMP - The framework document

V/8.2.2 CARICOMP - The core programme

V/8.2.3 CARICOMP _ Establishment of a Caribbean Marine Network. First two years of implementation of CARICOMP

V/8.2.4 CARICOMP - Full core programme submission for funding to the European Economic Commission (EEC)

V/8.3 Temperate coastal systems of Latin America (COSALC VII). A status report (L.R. Martins)

V/8.3.1 Sistemas costeras templados de America Latina. Unesco report on Marine Sciences Nr 47.

V/8.3.2 COSALC VII - Coordinating committee. First Meeting 20-21 November 1987, Concepcion, Chile. A report. (L.R. Martins)

V/8.3.3 COSALC VII - Coordinating committe. Second meeting, 18-19 April 1988, Montevideo, Uruguay Report (L.R. Martins)

V/8.3.4 COSALC VII - Research manpower and institutions dealing with coastal zone in South America - An enquiry (1987) by Prof. J.C. Castilla (Unesco consultant)

V/8.3.5 COSALC VII - Cooperative network for the study and management of temperated coastal systems of Latin America - A COSALC VII project proposal 1988.

V/8.3.6 COSALC VII - Working group on estuaries, coastal lagoons and bays. Status report of activities by E. Jaramillo and G. Perillo.

V/8.3.7 COSALC VII - Working group on dynamics and stability of sandy beach and their relations with the continental shelf. A report on activities (1988)

V/8.3.8 COSALC VII - Working group on estuaries, coastal lagoons and bays - workshop on oceanographic processes and pollution. October 1988. Chile. Objectives

V/8.3.9 COSALC VII. Newsletter Nr 3, July 1988.

V/8.4.1 Setting up of a coastal monitoring programme in Dominica - A report by Dr. Gillian Cambers, 1987.

V/8.4.2 Dominica coastal monitoring programme - A field manual by Dr. Gillian Cambers, 1987.

V/8.4.3 ECLAC report. " Coastal conservation proposals for the Eastern Caribbean" by G. Cambers

COASTAL V/9 Africa

V/9.1 Regional Project on coastal marine systems of Africa (COMARAF) - Project document (1987)

V/9.1.1 COMARAF - Status of implementation (September 1988) (September 1987) by S. Diop.

V/9.1.2 Coastal marine ecosystems in Africa. Unesco reports in marine science Nr 48. 1988.

V/9.1.3 COMARAF Newsletter - July 1988

V/9.1.4 COMARAF in Nigeria, Newsletter, Jan-April 1988.

V/9.1.5 COMARAF - Rapport technique Nr 1 - La productivite des ecosystemes cotiers en Afrique. Sommaire des exposes et resultats de l'Atelier-terrain, Douala, Cameroun, 13-19 decembre 1987.

V/9.1.6 COMARAF- Serie documentaire Nr 1 - Productivite primaire dans les mangroves.

COASTAL V/10 Mediterranean, Red Sea and the Gulf

V/10.1 Research on coastal lagoons in Northern Africa - A status report (Y. Halim)

V/10.1.1 Research on coastal lagoons of Northern Africa, an expert meeting - Report (1987)

V/10.1.2 Northern Africa Regional training course on coastal zone monitoring and management. December 1986. Report (Y. Halim)

COASTAL V/11 Europe

V/11.1 Study of the lagoon ecosystem of Venice: A Unesco Proposal prepared by B. Battaglia, P. Lasserre and Ph. O'Kane.

V/11.1.1 "Sistema lagunare Veneziano" - A research project prepared by the Expert Committee of the Italian Ministry for Science and Technology (July 1988)

COASTAL V/12 Interregional activities

V/12.1 Paleo-oceanography of the Latin American and African Atlantic coasts: review and proposed research (L.R. Martins)

V/12.2 Comparison between Atlantic and Pacific tropical marine coastal ecosystems: community structure, ecological processes and productivity. Unesco-COMAR workshop, Fiji, 24-29 March 1986. Unesco reports in marine science Nr 46.

ANNEX 2.

List of Publications

- Coral taxonomy. Results and recommendations of a regional Unesco (COMAR)/UNEP Workshop with advanced training. Phuket Marine Biological Centre - Thailand, 10-26 February 1984. Unesco report in Marine Science Nr 33. 1985. 41 pp. (E)

- Human-induced damage to coral reefs. Results of a regional Unesco (COMAR) workshop with advanced training. Diponegoro University, Jepara and National Institute of Oceanology. Jakarta, Indonesia, May 1985. Unesco reports in Marine Science Nr 40. 1986. 180 pp. (E).

- Caribbean coastal marine productivity. Results of a planning workshop at Discovery Bay Marine Laboratory, University of the West Indies, Jamaica, November 1985. Unesco reports in Marine Science Nr 41. 1986. 59 pp. (E).

- The application of digital remote sensing techniques in coral reef, oceanographic and estuarine studies. Report on a regional Unesco/ COMAR/GBRMPA workshop, Townsville, Australia, August 1985. Unesco reports in marine science Nr 42. 1986. 151 pp. (E)

- Quaternary coastal geology of West Africa and South America. Papers prepared for the INQUA-ASEQUA Symposium in Dakar, April 1986. Unesco reports in marine science Nr 43. 1987. 145 pp. (E).

- Comparison between Atlantic and Pacific tropical marine coastal ecosystems: Community structure, ecological processes, and productivity. Results and scientific papers of a Unesco/COMAR workshop . University of the South Pacific, Suva, Fiji, 24-29 March 1986. Unesco reports in Marine Science Nr 46. 1987. 262 pp. (E).

- Coastal marine ecosystems of Africa. Objectives and strategy of the COMARAF Regional Project. Unesco reports in Marine Science Nr 48. 1987. 62 pp. (E).

  Sistemas costeros templados de America Latina. Proyecto COMAR/COSALC VII. Resultados del Seminario sobre Procesos Fisicos y Biologicos del Medio Ambiente Costero y Estuarino Templado de America Latina. Montevideo, Uruguay, noviembre de 1986. Unesco reports on marine science Nr 47. 1988.

- Coastal off-shore ecosystems relationships. Final report of SCOR/IABO/Unesco Working Group 65; Texel, Netherlands, September 1983. Unesco technical papers in Marine Science Nr 48. 1986. 38 pp. (E).

- Research on coastal marine systems. Review and recommendations for Unesco Programme 1987-1989, report of the fourth meeting of the Unesco/SCOR/IABO Consultative Panel on Coastal Systems, Dakar, 15-17 December 1986. Unesco technical papers in Marine Science Nr 52. 1987. 61 pp. (E). A COMAR document.

- Seagrass research method. Unesco monographs on oceanographic methodology Nr 9. Unesco. In preparation.

AFRICA

- COMARAF - Projet regional pour la formation et la recherche sur les systemes cotiers d'Afrique. Regional Project for Training and Research on Afican coastal systems (RAF/87/038).

- COMARAF Newsletter Nr00. July 1988.

- COMARAF Newsletter Nr 1. October 1988.

- COMARAF in Nigeria. Newsletter. Vol. Nr 1. Jan-April 1988.

- Productivite primaire dans les mangroves. Approches quantitatives et qualitatives par F. Achard et F. Blasco. Serie documentaire Nr 1. 1988.

- La productivite des ecosystemes cotiers en Afrique: sommaire des exposes et resultat de l'Atelier terrain, Douala, Cameroun, 13-19 decembre 1987. Serie technique Nr 1. 1988.

Remark

One publication related to preparatory activities for COMARAF is listed under the general COMAR publication above. It is "coastal marine ecosystems of Africa", Nr 48 in the Unesco reports Series in marine science.

To obtain the COMARAF publications, please write to Dr. Salif Diop Universite of Dakar Fann, Dakar, Senegal.

Latin America and the Caribbean

COSALC - Research and Training on coastal systems of Latin America and the Caribbean, and their relations with the Continental Shelf.

Remark

Two publications listed under general COMAR publications relate to COSALC. It is (i) Caribbean Coastal Marine Productivity, and (ii) Comparison between Atlantic and Pacific tropical marine coastal ecosystems. Community structure, ecological processes, and productivity, respectively Nr 41 and 46 in the Unesco reports in Marine Sciences.

To obtain the following publications, please write to Unesco/Rostlac P.O.B. 859, Montevideo, Uruguay.

- COSALC VII. Informe de la 1 reunion del comite cientifico de coordinacion, Concepcion, Chile, noviembre 1987. 1988.

- COSALC VII. Informe de la 2 reunion del comite cientifico de coordinacion, Montevideo, Uruguay, abril 1988. 1988.

- COSALC VII. Boleten Informativo Nr 3. Julio 1988.

- Comparative Ecology of Freshwater and Marine Ecosystems. Invited reviews of an International Meeting sponsored by ASLO, COMAR, IABO, HSE and US-NSF, 30 September - 4 October 1986, Nairobi. Editor: Scott W. Nixon. Limnology and Oceanography, Vol. Nr 33, Nr 4, part 2. 1988.

- ISLAS Oceanicas chilenas: Conocimiento cientifico y necesidades de investigaciones, sponsored by the Catholic University of Chile, Timber Foundation and COMAR. Editor: Juan Carlos Castilla. 1988.

In Asia and the Pacific. Since the inception of Unesco's COMAR activities in the region, the two projects:

(i) Training and Research Pilot Programme on the Mangrove Ecosystems of Asia and Oceania (RAS/79/002)

and

(ii) Research and its Application to the Management of the Mangroves of Asia and the Pacific (RAS/86/120)

have produced a total of about 30 titles, including directories, course material and outlines, manuals, meeting and workshop reports etc. The following is a list of the more current titles, of which a limited number of copies are still available (in English). They may be obtained by writing to: Unesco/UNDP Regional Mangrove Project (RAS/86/120), c/o UNDP, Box 3059, 110003 New Delhi, India.

a. **Workshop reports:**

-- *Workshop on Mangrove Ecosystems Dynamics*; held in Motupore, Papua New Guinea, 27-31 May 1985. Report. May 1986; 210 pp.

-- *Workshop on the Conversion of Mangrove Areas to Aquaculture*; held in Iloilo City, Visayas, Philippines, 24-26 April 1986. Report. March 1987; 175 pp.

-- *Workshop on the Conversion of Mangrove Areas to Paddy Cultivation*; report of meeting held in Los Banos, Philippines, 1-3 April 1985. Report. July 1985. 131 pp.

-- *Workshop on Human Induced Stresses on Mangrove Ecosystems*; held in Bogor, Indonesia, 2-7 October 1984. Report. July 1986; 133 pp.

-- *Workshop for Mangrove Zone Managers*; Phuket, Thailand, 9-10 September 1986. Report. June 1987; 60 pp.

b. **Mangrove Ecosystems Occasional Papers:**

-- *Traditional Uses of the Mangrove Ecosystem in Malaysia*; Chan, H.T. and Salleh, Mohd. N. **Mangrove Ecosystems Occasional Papers**, No. 1; January 1988.

-- *Timber Volume Inventory*; Islam, Mohd. J. and Faruq, A. Khan. **Mangrove Ecosystems Occasional Papers**, No. 2; May 1988.

-- Socio-economic Status of Human Communities of Selected Mangrove Areas on the West Coast of Sri Lanka; Amarasinghe, M.D. Mangrove Ecosystems Occasional Papers No. 3, 1987. 19 pp.

c. **Manuals:**

-- *Mangrove Microbiology. Role of Micro-organisms in Nutrient Cycling of Mangrove Soils and Waters.* Edited by Agate, A.D., Subramanian, C.V., and M. Vannucci. A manual. June 1988.

-- *Mangrove Palynology*; Thanikaimoni, G. Manual published jointly, in 1987, by the UNDP/Unesco Regional Project RAS/86/120 and the French Institute, Pondicherry. ISSN 0073/8336. 104 pp. May be purchased (price: 250 Indian rupees or equivalent in convertible currency, plus postage) from Institut Français, B.P. 33, 605001 - Pondicherry (India).

d. **Training course reports:**

-- *Second Introductory Training Course on Mangrove Ecosystems*; held in Goa, India, 1-25 November 1984. Jan., 1986; 276 pp.

-- *Training Course on the Ecophysiology of Mangrove Species*; held in Townsville, Australia, 1-14 May 1985. Report. February 1986; 123 pp.

e. **Proceedings:**

-- *Symposium on New Perspectives in Research and Management of Mangrove Ecosystems*; held in Colombo, Sri Lanka; 11-14 November 1966. Proceedings. August 1988. 266 pp.

f. **Technical Report:**

-- *Mangroves of Asia and the Pacific: Status and Management.* Technical Report on the UNDP/Unesco Research and Training Pilot Programme on Mangrove Ecosystems in Asia and the Pacific (RAS/79/002). March 1987. 538 pp.

List of participants

J.C. CASTILLA
Pontifica Universidad Catolica de Chile
Castilla 114 D
Santiago de chile
CHILE

S. DIOP
Universite de Dakar
Faculte des Lettres et Sciences Humaines
Dakar Fann
SENEGAL

Y. HALIM
Faculty of Science
University of Alexandria
Alexandria
EGYPT

E. JORDAN
Universidad Nacional Autonoma Mexico
Estacion "Puertos Morelos"
Apto 1152
Cancun, Q. Roo 77500
MEXICO

P. LASSERRE
Station Biologique de Roscoff
Place Georges Tessier
29211 Roscoff
FRANCE

L. R. MARTINS
Centro de Estudios de Geologia
Costeira e Oceanicade
Instituto de Geociencias
Campus de Vale
Av. Bento Goncalves 9500
9000 Porto Alegre
BRAZIL

H. POSTMA
Netherlands Institute for
Sea Research
Postens 59
Texel
NETHERLANDS

M. STEYAERT
Programme Specialist
Division of Marine Sciences
Unesco
7, place de Fontenoy
75700 Paris Cedex
France

M. VANNUCCI
UNDP/Unesco Project on Mangrove
Ecosystems of Asia and the Pacific
15 Jor Bagh
110003 New Delhi
INDIA

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