



UNITED NATIONS ENVIRONMENT PROGRAMME

*River inputs to the
West and Central African
marine environment*

UNEP Regional Seas Reports and Studies No. 3

Prepared in co-operation with



Note

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PREFACE

The Regional Seas Programme was initiated by UNEP in 1974. Since then the Governing Council of UNEP has repeatedly endorsed a regional approach to the control of marine pollution and the management of marine and coastal resources and has requested the development of regional action plans.

The Regional Seas Programme at present includes ten regions and has over 120 coastal States participating in it. It is conceived as an action-oriented programme having concern not only for the consequences but also for the causes of environmental degradation and encompassing a comprehensive approach to combating environmental problems through the management of marine and coastal areas. Each regional action plan is formulated according to the needs of the region as perceived by the Governments concerned. It is designed to link assessment of the quality of the marine environment and the causes of its deterioration with activities for the management and development of the marine and coastal environment. The action plans promote the parallel development of regional legal agreements and of action-oriented programme activities.

By Decision 88 (V). C of 25 May 1977, the Governing Council of UNEP requested the Executive Director to initiate the development of an action plan for the West and Central African Region.

After a preparatory process, which included a number of experts meetings, fact finding missions and in-depth studies on resources and environmental problems of the region, the Conference of Plenipotentiaries on Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region (Abidjan 16-23 March 1981) adopted:

- the Action Plan for the Protection and Development of the Marine Environment and Coastal Areas of the West and Central African Region;
- the Convention for the Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region; and
- the Protocol Concerning Co-operation in Combating Pollution in Cases of Emergency.

The Governments of the region also established a trust fund to support the activities called for in the Action Plan. UNEP was designated as the secretariat of the Action Plan and the Convention.

This report was prepared as a contribution to the development of the Action Plan for the West and Central African Region. It provides an evaluation of the present status of monitoring river discharges, sediment discharges and contaminant discharges into the West and Central African Marine Environment, a description of the organizational set-up regarding water quality monitoring in countries of the region, existing problems and recommendations for action to improve the situation, together with a very preliminary estimate of total water, sediment and pollution inputs into the marine environment of the region.

The report is a synthesis of information and data obtained from Governmental sources, National Committees for the International Hydrological Programme and a fact-finding mission undertaken by two UNESCO consultants who visited ten countries in the West and Central African Region in November and December 1980. Furthermore, in order to review and complete the information and data collected and to formulate recommendations for follow-up activities, a Meeting of Experts on River Inputs to the West African Region was organized in Dakar, Senegal, 16-18 December 1980.

Mr. J.-M. Martin, Mr. M. Meybeck and Mr. A. Person served as consultants to UNESCO on this project.

REPORT ON RIVER INPUTS TO THE WEST AND CENTRAL AFRICAN
MARINE ENVIRONMENT

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I. INTRODUCTION AND OBJECTIVES

Within the framework of the Action Plan for the Protection and Development of the Marine Environment and Coastal Areas of the West and Central African Region (WAF) Unesco has been charged by UNEP (Project FP/0503-79-08) with an evaluation of the present status of regional monitoring of contaminants in river waters and sediments discharging into the West and Central African marine environment from the coastal countries.

The main objectives are:

- (i) to assess the present knowledge on the water and sediment discharged by major West African rivers to the West and Central African marine environment;
- (ii) to assess the nature and quantity of chemical compounds entering the West and Central African marine environment through rivers that are of concern to human health and/or to the environment
- (iii) to recommend harmonized methods of analysis of river dissolved and particulate pollutants in the region and to assist in developing the basis for water quality control measures in the coastal zone including beaches and productive areas
- (iv) to identify institutions, laboratories and individual scientists actively involved in river studies relevant to the project (hydrology, chemistry, sedimentology.....)

II. LINKS OF THE UNEP SPONSORED WAF WITH OTHER RELEVANT UNITED NATIONS PROGRAMMES

The international context of the WAF, in so far as this concerns river inputs to the seas and existing Unesco programmes and Unesco collaboration in joint programmes, is briefly outlined. It is noted that linkages existed between the various international scientific programmes fostered by Unesco, and that these are an important ingredient of any successful multi-disciplinary programme.

a. International Hydrological Programme (IHP)

The IHP is one of Unesco's international scientific programmes, with the objectives of contributing to a better knowledge of the hydrological system, and to the application of this knowledge to the rational use and management of the earth's water resources. Educational training is an important component of the IHP, covering the whole gamut of specializations in the water sciences, as well as promotion of education and training at technician, undergraduate and post-graduate levels. Assistance to Member States in the development of infrastructures in the sphere of water resources, with a view to developing their capacity to evaluate their water resources and to manage them scientifically is also an objective of Unesco's activities in the water sciences field.

The study of the influence of man's activities on the hydrological cycle has formed an important part of the IHP. Other IHP projects have

A second phase (1981-1983) of the IHP is in progress. One of the projects deals with the processes of water erosion and sedimentation in river basins, and the calculation of solid matter parameters, including the use of regional physical-geographical parameters, and the compilation of global sediment yield data. Another project concerns the methods for determining the balances of chemical substances in rivers and other water bodies, as well as coastal zones of the seas.

An important continuing IHP activity is the publication of "Discharge of Selected Rivers of the World", which is a compilation of monthly runoff data for more than 200 stream-gauging sites throughout the world.

National Committees for the IHP exist in practically each of the African Member States as well as in many countries. The Unesco Regional Office for Science and Technology for Africa is developing regional programmes in the field of scientific hydrology, in particular training activities, and a Regional Hydrologist has been appointed to promote this co-operation and participation in the IHP.

b. Man and the Biosphere (MAB) Programme

The MAB programme comprises 14 major themes or projects. Several of the MAB projects have relevance to the study of river inputs to the seas, but the principal features of MAB are its integrative focus and its stress on multi-disciplinary studies.

Active MAB National Committees exist in most of the African Member States, and these Committees coordinate national research and training programmes as well as organize regional activities.

c. IOC

The International Oceanographic Commission (IOC) and the Division of Marine Sciences of Unesco are the vehicles for regional activities, which encompass physical oceanography, marine and coastal biology and pollution, and marine geology and geophysics activities.

d. WORRI, GEMS-Water and RIOS

River input of substances (both dissolved and particulate) to the oceans has been recognized as one of the major interactions between industrialized society and the oceans. The assessment of the input of rivers to the oceans has been undertaken by Unesco at two different levels. At the global level, a catalogue of major rivers discharging to the oceans has been compiled, with the financial support of UNEP; this so called WORRI project provides a first list of 200 rivers ranked according to their mean annual discharge. Provisional data for the water quality of rivers discharging to the oceans have also been compiled, especially for the industrialized countries of Europe, North America and Japan. On the other hand, the Global Environmental Monitoring System water component (GEMS-Water) - a collaborative project linking UNEP and WHO, Unesco and WMO - will provide baseline data of water quality for major rivers near their mouths, as well as for rivers passing through large cities and for lakes and groundwater. Unesco is collaborating with UNEP and WHO in the training of specialists who will participate in the GEMS-Water project, as well as its wider role in the

of a Unesco/SCOR workshop held at Melreux, Belgium, in 1976 have been published by Unesco under the title "Biogeochemistry of Estuarine Sediments", 1978. The proceedings of a workshop held in Rome in April 1979 in the framework of RIOS are presently being edited by the Secretariat of the Intergovernmental Oceanographic Commission (IOC) for publication; they will give information on river composition, processes affecting this composition during estuarine mixing, the resulting flux to the oceans and the influence of man's activities on these characteristics.

On the regional scale, Unesco has conducted projects within the general framework of the UNEP Regional Seas Programme. Following on from the pilot Mediterranean projects, two projects - MED IX and MED X - allow an accurate assessment of the mass balance of water discharged to the Mediterranean and a first assessment of the dissolved pollutant discharge (MED X). MED IX stresses the importance of particulate matter as the carrier of most heavy metal and organic pollutants, and provides the first data on particulate matter composition in that region. After that was completed the preliminary project "River Inputs to the South-East Asian Seas".

The experience acquired during these projects has provided a sound basis for the planning and execution of a preliminary project "River Inputs to the West and Central African Seas". During this project, have been identified, together with the status of monitoring of water quality parameters included in the "Black list", "Grey list" and a miscellaneous list of determinants. A preliminary catalogue of major rivers discharging to the West and Central African seas and compilation of water quality data for major rivers have been prepared.

III. IMPLEMENTATION OF THE PROJECT

1. Introduction

In order to fulfil the objectives defined in paragraph 1, the following action has been taken by the Secretariat:

- (i) establishing contacts with institutions, laboratories and individual scientists actively involved in river studies;

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