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PROPOSAL FOR THE PREPARATION OF THE GUIDE BOOK
FOR WATER RESOURCES MANAGEMENT IN SMALL MEDITERRANEAN ISLANDS
AND COASTAL AREAS

UNITED NATIONS ENVIRONMENT PROGRAMME

PAP/RAC Expert Meeting on the
Preparation of the Guidebook for
Water Resources Management in
Small Mediterranean Islands
and Coastal Areas

(Split, March 9-10, 1987)

PROPOSAL FOR THE PREPARATION
OF THE GUIDEBOOK FOR WATER RESOURCES MANAGEMENT
II. SMALL MEDITERRANEAN ISLANDS AND COASTAL AREAS

Prepared by:
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Priority Actions Programme
Regional Activity Centre
Split, March 1987

1. INTRODUCTION

The Mediterranean Action Plan is a programme of Mediterranean countries in the implementation of the Convention for the protection of the Mediterranean Sea against pollution and its related protocols. The Convention has been in force since 1978, and its Contracting Parties are all Mediterranean countries (except Albania) and the European Community.

The "Integrated Planning" component of the Mediterranean Action Plan (IAP) has been expected to deal with the problems of development and its impact on the environment. It has been agreed that this particular component should consist of and operate on two planes:

- Long-term development of the Mediterranean and the problems of development in relation to the Environment (Blue Plan);
- Current and acute problems of development in the Mediterranean, the use of its resources, and the impact of both on the state of environment (Priority Actions Programme).

The investigation of current problems and conflicts between the development and the environment, as well as the assessment of the possible use of available resources in conformity with the environmental protection principles is the primary task of the Priority Actions Programme (IAP).

So far, six priority fields of IAP have been identified and among them the rational management of water resources.

In the course of IAP development, the priority action relative to water resources management was steered to the water supply problems of smaller Mediterranean islands, so that the 1984-1985 IAP programme on water resources issues envisaged launching and implementation of the action entitled "Water Resources Development of Islands and Isolated Coastal Areas".

The main objectives of this action are to identify and analyse problems relevant to water resources management of the Mediterranean islands and isolated coastal areas and to assist the States of the region facing the problems to resolve them.

The action's workplan includes: (a) identification of the problems faced by the States; (b) analyses of information on relevant problems of water resources development; (c) cooperation with the States in developing water resources; (d) exchange of experiences on existing problems and suggestions of appropriate solutions; (e) organization of the seminars and courses where the problems related to the project will be dealt with; and (f) working out the manual for water resources management.

The problems related to small Mediterranean islands were dealt with during 1984-1985, whereas the programme for 1986-1987 includes the problems of the big Mediterranean islands and isolated coastal areas.

At the meeting of experts held in Split on 28-29 January 1985 it was decided to start the work on the Manual.

The programme for 1986-1987 includes the working out of the Manual according to the results achieved through the activities carried out in the field of this action. The first step leading to its preparation was the meeting of experts held in Split on 3-5 November 1986 which formulated relevant thematic framework and recommendations.

Those recommendations were presented in the meeting on Water and Sanitation in big Mediterranean Islands and Isolated Coastal Areas of Fluctuating Population Caused by Tourism (Malta, 9-12 December 1986). The participants discussed them and made suggestions for the further development of the project.

According to those suggestions, a group of experts prepared a list of available literature pertinent to the contents of the Manual. In the meeting organized in Split on 9-10 March 1987, the list was discussed and the thematic framework for the Preparation of the Manual reviewed and amended. The follow-up of the action was also proposed.

2. THEMATIC FRAMEWORK OF THE MANUAL

General remarks

The provision of safe and reliable water supply should be considered as a priority.

The manual should be a simple, practical and comprehensive guide to assessment of local demand, supply and development of various sources in providing safe and wholesome water. It should be useful to decision makers (planners and administrators), to local and regional authorities concerned with development and management of water resources in Mediterranean small islands and coastal areas, as well as to non-specialists dealing with water resources management.

The manual should prove useful, not only for small islands, but also for communities distant from the existing water supply systems, on the mainland, in large islands and coastal areas having physical and social conditions characteristic of the Mediterranean Region.

At the same time, the manual should also be useful to specialists, field workers and engineers by presenting a collection of water resources management issues in a practical way.

The manual should present various techniques developed in the region introducing new ideas and serving for technology transfer. It should promote the concern about water quality protection and interrelation between waste disposal and water supply. The manual should stress, among other subjects, typical problems of the Mediterranean Region.

The recommendations included in the manual should be as practicable as possible, but without compromising basic professional principles, especially those of sanitation.

Overall framework

General title of the manual will be "Guidelines for Water Resources Management in Small Mediterranean Islands and Coastal Areas".

In view of the various purposes and uses this manual is to serve, it was felt that it should be subdivided into the following three self-contained separate parts:

- I Guidelines for water Resources Management in Small Mediterranean Islands and Coastal Areas: Executive summary.
- II Guide-book for Water Resources Management in Small Mediterranean Islands and Coastal Areas.
- III Guidelines for Water Resources Management in Small Mediterranean Islands and Coastal Areas: Technical Papers on Selected Topics.

The first part of the manual is meant for decision makers and it will cover in broad terms subjects which fall in the domain of their responsibility. This part is expected to be clear and concise, using adequate terminology.

The second part which is considered as first priority is meant for field workers, local and regional water authorities, and administrators dealing with water resources management aspects. At the same time, it is expected to be useful to specialists.

The third part is meant for specialists and will treat typical problems of the Mediterranean Region with reference to the selected topics. Each technical report is expected to cover one problem in depth, but in a concise manner.

Some of the proposed topics are:

- water resources assessment and evaluation;
- desalination;
- rain-harvesting;
- wastewater reuse;
- submarine pipelines;
- water tankers;
- utilization of submarine springs;
- lined ponds and reservoirs;
- sea-water intrusion control;
- conjunctive use of surface and groundwater;
- aquifer modelling;
- management for water resources protection;
- small water treatment plants; and
- small sewage treatment plants.

In the course of the expert meeting held in March 1987, the preparation of the Guide-book (item II) was discussed as a priority for the following reasons:

- There is a great need for the guide-book (Item II), as results from various missions carried out by PAP/RAC, and as indicated by the discussion on the manual at the Malta meeting (December 1986).
- The issues of this part of the manual will have a considerable impact on the cost and the impact-to-effect ratio.
- The existence of the guide-book will enable the preparation of a more defined executive summary (Item I).
- The guide-book will provide for a better choice of technical papers on selected topics (Item III).

Therefore, it has been suggested that the guide-book (Item II) be prepared first, as a priority, followed by the executive summary (Item I), and, finally, by the technical papers series.

The three parts of the manual should be considered as complementing each other, but intended for different levels of users, while their preparation represents one single activity. Nevertheless, each part can stand on its own.

3. THE GUIDE-BOOK

Contents

PREFACE

1. INTRODUCTION

2. WATER RESOURCES OF SMALL ISLANDS AND COASTAL AREAS

2.1 Hydrology cycle (rainfall, runoff, evaporation, losses)

2.2 Surface water (rivers, springs, lakes, etc.)

2.3 Groundwater (volcanic aquifers, karstic aquifers, alluvial aquifers, submarine springs, surface springs)

2.4 Non-conventional water sources (rain harvesting, desalination, used water)

2.5 Quantity and quality (water balance, man-influence)

2.6 End-up of used water (pollution effects and pathways, protection and recovery)

References

3. WATER RESOURCES PLANNING AND MANAGEMENT

3.1 Assessment of present and future demands (population, tourist trends, agriculture, industry, planning horizon, resources limitations)

3.2 Inventory of water resources

3.3 Definition of shortage or surplus

3.4 Definition of options of available water supply sources and planning of their development (quantity and quality in time and space)

3.5 Optimization of water utilization (water saving, conjunction use, etc.)

3.6 Conservation and protection of existing sources and environmental impact (general)

References

4. DEVELOPMENT OF WATER RESOURCES

- 4.1 Feasibility study contents
- 4.2 Preparation of terms of reference and contract documents
- 4.3 Follow-up of the feasibility study
- 4.4 Evaluation, financing and implementation of the project

References

5. GROUNDWATER RESOURCES

- 5.1 wells/boreholes (drilling methods, construction, completion, development, testing, sanitary protection and control, pumping plant)
- 5.2 springs (development, construction, storage, sanitary protection and control)
- 5.3 Infiltration galleries (construction, protection)
- 5.4 Fresh water lense skimming and other considerations
- 5.5 Submarine springs
- 5.6 Subsurface weirs
- 5.7 Monitoring and aquifer management
- 5.8 sea-water intrusion in aquifers

References

6. SURFACE WATER RESOURCES

- 6.1 Diversion and storage of surface runoff (types, general)
- 6.2 Use of water from lakes and reservoirs
- 6.3 Artificial catchment and rain-harvesting (methods of construction, storage, treatment and protection, losses)
- 6.4 Linea ponds and dams (types, characteristics, construction)
- 6.5 Protection and management of surface water resources

References

7. OTHER SOURCES

- 7.1 Submarine pipelines (pipes, construction, installation, protection)
- 7.2 Water tankers (quality considerations, port facilities, storage)
- 7.3 Reuse of waste water (treatment, storage, use in relation to treatment, health aspects, soil and agricultural considerations, irrigation)
- 7.4 Desalination (potential use, techniques and costs, operation and maintenance)

References

8. WATER SUPPLY SYSTEMS: DESIGN AND CONSTRUCTION

- 8.1 General information on the various systems
- 8.2 Required information (design flow, distance from the sources, etc.)
- 8.3 Transmission (hydraulic considerations, materials, etc.)
- 8.4 Pumping stations (classification, construction, etc.)
- 8.5 Service reservoirs (volume, construction, accessoires)
- 8.6 Distribution network (pipes, accessoires, system layout and design)

References

9. WATER TREATMENT AND DESINFECTION

- 9.1 General approach (water quality, diseases, transmission, standards)
- 9.2 Ground water treatment (softening, demineralization, nitrate removal, fluorination, etc.)
- 9.3 Surface water treatment (coagulation, sedimentation, rapid filtration, slow-rate filtration, contact filtration, water conditioning)
- 9.4 Desinfection (gas chlorination, hypochlorination, chlorine dioxide, etc.)

References

10. WATER SUPPLY SYSTEMS: OPERATION AND MAINTENANCE

- 10.1 Operation of the systems (organizational aspects, operation routine, control, etc.)
- 10.2 Monitoring (quantity, sampling, quality, assessment priorities)
- 10.3 Maintenance of the systems (control, protection, workshops, spare parts, etc.)
- 10.4 Emergency supply schemes

References

11. WATER SUPPLY ECONOMICS

- 11.1 Elements of water supply economics
- 11.2 Records of water supply costs
- 11.3 Water charges - rates
- 11.4 Evaluation of cost per cubic metre

References

12. WATER RESOURCES CONSERVATION

- 12.1 Protection of water sources against depletion and pollution
- 12.2 Measures for water economy and conservation
- 12.3 Water losses reduction
- 12.4 Efficiency in water uses
- 12.5 Reuse of waste water
- 12.6 Public awareness and education

References

13. ENVIRONMENTAL IMPACT OF WATER MANAGEMENT POLICIES

- 13.1 General characteristics of the fragile environment of small islands and coastal areas
- 13.2 Impact of water supply systems on environment
- 13.3 Possible consequences of the water supply systems impact
- 13.4 Simplified methodology for environmental impact assessment

References

APPENDIX

- Climatological, meteorological, hydrological and hydrogeological data of the Mediterranean Region.

Extent

The guide-book should have an extent of about 250 pages, of which 60 pages should be devoted to illustrations and 30 pages to the appendix

Editing

The guide-book will be simultaneously printed in English and French. However, it was recommended that the book be also published in other languages of the region. In publishing it in other languages, PAP/RAC should consider possibilities of adding an annex containing issues which should be of specific use for the country.

The drafting of the guide-book will be entrusted to a number of experts from various Mediterranean countries. A project manager-editor will be entrusted with overall responsibility of organizing the work and editing materials.

Printing will be undertaken by PAP/RAC.

Time-plan and cost estimate

The time-plan and cost estimate have been based on the level of difficulty of each chapter and the number of pages and illustrations.

It is envisaged that 2 years will be necessary for the whole procedure (drafting, 2 meetings of rapporteurs to prepare the final version, editing and printing) and that it will be completed in the biennium 1988-1989.

Cost estimate:

- Drafting	25,000 \$
- Editing	5,000 \$
- 2 meetings	15,000 \$
- Printing	5,000 \$
- Administrative support	5,000 \$
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	55,000 \$

The estimated amount has been included in the PAP budget proposal for 1988-1989 (50% each year), within the priority action Water Resources Management.