



**MEDITERRANEAN ACTION PLAN
PRIORITY ACTIONS PROGRAMME**

**PAP-7/W.2/1
13 June 1990
Original: English**



UNITED NATIONS ENVIRONMENT PROGRAMME

**Workshop on Environmental Guidelines for
Municipal Wastewater Reuse in the
Mediterranean Region**

Split, 11-13 June 1990

**R E P O R T
OF THE WORKSHOP ON ENVIRONMENTAL GUIDELINES FOR
MUNICIPAL WASTEWATER REUSE IN THE MEDITERRANEAN REGION**

**Priority Actions Programme
Regional Activity Centre
Split, June 1990**



UNITED NATIONS ENVIRONMENT PROGRAMME

Workshop on Environmental Guidelines for
Municipal Wastewater Reuse in the
Mediterranean Region

Split, 11-13 June 1990

REPORT
OF THE WORKSHOP ON ENVIRONMENTAL GUIDELINES FOR
MUNICIPAL WASTEWATER REUSE IN THE MEDITERRANEAN REGION

Priority Actions Programme
Regional Activity Centre
Split, June 1990

REPORT

Introduction

1. The Regional Activity Centre for the Priority Actions Programme (PAP/RAC) of UNEP's Mediterranean Action Plan (MAP) is carrying out the priority actions "Water Resources Development in Mediterranean Islands and Isolated Coastal Zones" and "Solid and Liquid Waste Management", in cooperation with FAO and WHO/EURO.
2. In the frame of both priority actions, PAP/RAC is rendering special attention to non-conventional water resources and, the problems of treated wastewater reuse, in particular. To enable the exchange of experience among the Mediterranean countries, and to promote knowledge in this important field, PAP/RAC commissioned the preparation of a number of national reports and demonstration studies.
3. These reports and studies were reviewed at the Workshop on Treatment and Use of Sewage Effluents for Irrigation (Split, 25-27 November 1987) which recommended, among others, that the knowledge and experience in the field be unified in a set of environmental guidelines for municipal wastewater reuse and evaluated at another workshop planned for June 1990.
4. In accordance with this recommendation, PAP consultants prepared the first draft of the guidelines and later, in cooperation with FAO, re-drafted them in harmony with FAO general guidelines to make sure that the PAP document reflected the specific Mediterranean conditions as much as possible.
5. The first draft of the guidelines was prepared by a team of experts, namely Ms. A. Bahri (Tunisia), Mr. P. Boutin (France), Mr. P. M. Lehucher, Mediterranean Water Institute from Marseille (MWI - France), Mr. M. Libhaber (Israel) and Mr. I. Papadopoulos (Cyprus). Following the conclusions of a PAP/RAC-FAO meeting (Split, 8-9 September 1989), the second draft was made by Mr. S. Tedeschi, Professor at the Civil Engineering Faculty of the University of Zagreb, co-ordinator of the priority action dealing with solid and liquid waste management who was assisted by Mr. M. B. Pescod, Professor at the University of Newcastle upon Tyne.

Participation

6. The Workshop on Environmental Guidelines for Municipal Wastewater Reuse in the Mediterranean Region was held in the offices of PAP/RAC in Split, from 11 to 13 June 1990 with the participation of 11 Mediterranean countries (Cyprus, Egypt, France, Israel, Libya, Malta, Morocco, Syria, Tunisia, Turkey and Yugoslavia) and the representatives of FAO, WHO/EURO and the Co-ordinating Unit for the Mediterranean Action Plan.
7. The list of participants is contained in Annex I of this report.

Agenda item 1: Opening of the workshop

8. Mr. A. Pavasovic, the Director of PAP/RAC, opened the workshop and gave floor to the representative of the City of Split.

9. Mr. S. Zrno, the President of the Local Communities Chamber in the City Assembly of Split, greeted the participants on behalf of the City of Split, pointing out that after the recently-held democratic elections the country had started to re-appreciate its roots and traditions while setting path for new areas of activity, the recovery of Kastela Bay being among the priority ones. He mentioned a long tradition of the city's regard for its environment (the 14th century Statute which stipulated the ways of maintaining the cleanliness of the streets and the harbour). Finally, he thanked the participants for their attendance and assured them that the City of Split would continue to provide support to the efforts of the PAP Centre.

10. Mr. I. Dharat, Programme Officer in the Co-ordinating Unit for the Mediterranean Action Plan, welcomed the participants on behalf of Mr. A. Manos, Co-ordinator of MAP and thanked the President of the Local Communities Chamber for his introductory statement. He stated that the world was facing enormous challenges to achieve sustainable development without degrading the environment. These challenges are related to population explosions and pressures on the limited coastal resources, ozone depletion, climatic changes and global warming. He pinpointed the various problems strongly felt in the developing countries of the Mediterranean region, particularly the supply of adequate clean water and environmentally appropriate sanitation services. Therefore, the Environmental Guidelines for Municipal Wastewater Reuse would be a good tool in this direction. Finally, he stressed the importance of strengthening cooperation between Mediterranean countries to tackle these problems and the need to achieve an optimal adjustment of economic activities to environmental concerns.

11. The representative of FAO pointed out that wastewater reuse is becoming an increasingly important activity in agriculture, particularly in the water deficient countries including the Mediterranean Region. The proper treatment and reuse of wastewater can help in many ways to minimize environmental degradation; but at the same time improper treatment and reuse can lead to environmental degradation. Hence, guidelines on the environmental aspects of wastewater reuse are very much needed and their preparation is appropriate and timely. FAO was happy to collaborate with PAP/RAC in the preparation of the guidelines document and is looking forward towards its publication.

12. The representative of WHO confirmed the interest of his Organization in the subject-matter of the Workshop, which was very important in view of the need for conserving water in the Mediterranean region. In this context, it was necessary to ensure that health hazards were reduced to a minimum in the re-use of wastewater in agriculture and aquaculture.

13. Ms. V. Lapcevic addressed the participants on behalf of the Federal Secretariat for Development and Environment, as well as on behalf of the Federal Institute for International Technical and Cultural Cooperation. She expressed the interest of the Yugoslav Government in the results of the workshop and wished the participants success in their work.

14. The Director of PAP/RAC greeted the participants on behalf of the Centre and expressed his satisfaction that WHO, FAO and the Co-ordinating Unit for the Mediterranean Action Plan were represented at the meeting.

Agenda item 2: Rules of procedure

15. The workshop noted that the rules of procedure contained in the document UNEP/IG.43/6, Annex XI, were applicable mutatis mutandis to its deliberations.

Agenda item 3: Election of Officers

16. The workshop elected the following Officers:

Chairman:	Mr. I. Papadopoulos (Cyprus)
Vice-Chairman:	Mr. K. Khawajki (Syria)
Vice-Chairman:	Mr. El Hachmi Tazarni (Morocco)
Rapporteur:	Mr. V. Gauci (Malta).

17. Mr. S. Tedeschi, coordinator of this priority action acted as Secretary of the workshop.

18. On behalf of the elected Officers, the Chairman expressed his thanks for the trust accorded to them by the meeting.

Agenda item 4: Adoption of the agenda

19. The agenda as adopted is contained in Annex II of this report.

Agenda item 5: Objectives of the workshop

20. The Director of PAP/RAC recapitulated the objectives of the meeting which were (a) to review, discuss and amend the Environmental Guidelines for Municipal Wastewater Reuse in the Mediterranean Region; and (b) to propose the follow-up activities.

Agenda item 6: Background information

21. The Director of PAP/RAC gave brief background information which is contained in the Introduction of this report. He regretted that Mr. M. Libhaber (Israel) and Mr. P. O. Lehucher (MWI, France), two of the authors of the draft Environmental Guidelines, were unable to attend due to already existing commitments elsewhere during the period of the workshop.

Agenda item 7: Presentation of draft Guidelines

22. Mr. S. Tedeschi, co-ordinator of the priority action on solid and liquid waste management, presented the general structure and content of the document entitled "Environmental Guidelines for Municipal Wastewater Reuse in the Mediterranean Region" - PAP-3/G.1(Draft), as well as the chapter dealing with case studies.

23. In the absence of Mr. M. Libhaber, Ms. A. Bahri presented the chapters entitled "General Considerations" and "Technological Considerations".

24. Mr. I. Papadopoulos presented the chapters entitled "Integrated Approach to Wastewater Reuse" and "Environmental Consideration Related to Specific Uses".

25. In the absence of Mr. P. M. Lehucher (MNI), Mr. D. Alexandrian (France) presented the chapter entitled "System Planning and Design".

26. Mr. A. Kandiah and Mr. M. B. Pescod briefly informed the meeting of the concept and content of the document "Community Wastewater Treatment and Use in Agriculture" currently under preparation by FAO. They stated that the PAP document was complementary to the FAO document. Although the former reflected the specific conditions of the Mediterranean region, it would also be useful within a broader geographical context.

27. Mr. M. B. Pescod informed the participants of the existence of several other documents prepared by institutions some of which were not represented at the workshop. At a suggestion of the meeting, the titles of these documents would be referred to in the Guidelines.

Agenda item 8: General discussion

28. In the general discussion, almost all participants took part. Statements, observations and suggestions relative to the final text of the Guidelines may be summarized as follows:

- Various wastewater treatment technologies, with special reference to low-technology options, should be described in a greater detail.
- A step-by-step integrated approach to system designs and implementation of these designs should be stressed.
- Special attention should be paid to prevailing geological conditions of the Mediterranean region, and particularly of its karstic areas.
- As a prerequisite to reuse, it would be necessary to consider that the municipal wastewater is a resource and as such must be protected. In this respect, the discharge of industrial waste into the municipal sewerage system must be controlled, if possible, by appropriate legislation, and necessarily complemented by a monitoring and enforcement system.
- Since sludge, as a by-product of treatment, may be used in agriculture too, the relevant bibliography should be quoted in the document.
- The references at the end of each chapter should be reviewed in order to reduce their number, if possible.
- The introduction should be supplemented by reference to the outstanding documents on the topics of municipal wastewater reuse.
- The document should mention that direct or indirect reuse is not a technological novelty but has been practiced by many Mediterranean countries since a very long time.
- Long-term effect of wastewater reuse should be stressed.

29. It was agreed that the summaries of additional case studies, as well as other relevant items of information, be included in the document provided they reached PAP/RAC by the end of July 1990.

30. Discussing the structure and profile of the document, the participants approved of its environmental orientation. However, they shared the view that while being self-contained the document should incorporate enough general knowledge and references for selected in-depth studies, particularly with regard to agricultural production and health aspects.

31. The participants felt that the document should clearly state that it was particularly addressed to national and local decision makers, as well as professional staff responsible for wastewater management who may lack access to sufficient technical expertise.

32. PAP/RAC was strongly advised that the structure, elaboration of topics and wording of Chapter 6 entitled "System Planning and Design" be given special attention in final editing.

33. Several participants felt that the important issue of sludge should at least be dealt with at the level of general considerations. However, after a lengthy discussion, it was decided against the inclusion of this issue in the document since it was part of the liquid waste treatment technology, a topic covered in a number of other textbooks.

34. It was also suggested that all tables in the final document be presented in the same format.

35. Speaking of the financial aspects of wastewater reuse, Mr. I. Dharat informed the participants of the negotiations taking place between MAP/UNEP, the World Bank and the European Investment Bank on their cooperation within the implementation of Mediterranean environmental programmes. He also informed the participants that the Ministers responsible for the environment of the Mediterranean and the members of the Commission of the European Communities responsible for the environment have met in Nicosia (Cyprus) from 26 to 28 April 1990, under the auspices of the European Commission. A Charter on Euro-Mediterranean Cooperation Concerning the Environment in the Mediterranean Basin was adopted by the meeting in which they reaffirmed the commitment to the objectives of the Barcelona Convention, to the Mediterranean Action Plan, and to the Genoa Declaration. The Charter specifies a number of priority actions and contains a specific calendar and relevant economic provisions. He pointed out that well-prepared projects of municipal wastewater treatment plants might compete for financial support from the EEC programme, as well as programmes of other funding organizations.

36. As some participants received the draft document shortly before the meeting, it was recommended that PAP/RAC should avoid similar situations in the future even if this incurred increased expenses.

Agenda item 9: Discussion and comments per chapters of the Guidelines

37. In the discussion that followed per chapters, the participants were proposing amendments, the majority of which were accepted.

38. The participants were invited to formulate their proposals in writing.

Agenda item 10: Working groups

39. The participants worked in two groups, one dealing with Chapters 1, 2 and 3, and the other with Chapters 4, 5 and 6.

Agenda item 11: Evaluation of amendments

40. Mr. Tedeschi and Mr. Pescod, reported on the results of the work in groups.

41. The working groups made a number of amendments. It was suggested that some tables which were not enough representative for the Mediterranean conditions were replaced by some more appropriate sources. Repetitions in the text were left out and the references reviewed.

42. The working groups paid special attention to the structure of the document and reorganized some parts of the text.

43. Following the recommendation of the workshop, the groups particularly dwelt upon Chapter 6, but did not intervene in the text, since the author of that chapter was absent. However, they suggested how it could be reorganized and brought into line with the already amended parts of the text.

44. The amendments, as adopted by the participants, were submitted to the Secretary of the meeting. It was understood that the final text would be edited accordingly.

45. Recognizing the importance of Chapter 6, the meeting recommended to PAP/RAC to take due time and pay close attention to its editing even if it might postpone the printing of the Guidelines.

46. Finally, expressing their opinion that the final document would be applicable and useful not only in the Mediterranean region but also in other regions, the participants recommended to PAP/RAC to proceed to its finalization, printing and distribution.

Agenda item 12: Recommendations

47. As the topic of municipal wastewater reuse is specially important for Arab countries of the Mediterranean region, it was strongly recommended that the Guidelines be translated and issued in Arabic.

48. It was also recommended to PAP/RAC to ensure the implementation of the Guidelines in MAP Coastal Area Management Programmes (CAMPs) and other Mediterranean projects which contained the wastewater reuse component.

49. As to the follow-up activities, the meeting gave the following recommendations to PAP/RAC:

- to keep an open file for information on wastewater reuse knowledge and practices, and to secure their dissemination to interested countries;
- to prepare and organize training courses on the subject with the Guidelines as a basis for the preparation of training materials, and to secure the participation of professionals and/or decision makers directly involved in the implementation of wastewater reuse projects;
- to provide, at request of the Mediterranean countries, appropriate consultancy in the field.

Agenda item 13: Closure of the meeting

50. The Chairman thanked PAP/RAC for its effort in preparing the draft Guidelines and for excellent work conditions provided. He thanked FAO, WHO/EURO, the MAP Co-ordinating Unit, and the distinguished representatives of the countries for their valuable contribution in improving the Guidelines. Finally, he thanked the Rapporteur and the Secretariat for their excellent job of preparing the meeting report.

51. The Director of PAP/RAC thanked the Chairman for his expert chairing the meeting and warmly thanked the participants for their active participation and valuable contribution to the improvement of the Guidelines. He reassured the meeting that PAP/RAC would proceed with the final editing of the document in accordance with its recommendations. Finally he expressed his gratitude to FAO, WHO/EURO and the MAP Co-ordinating Unit for their commitment to this activity from its outset.

52. The Chairman declared the meeting closed at 12:30 hours on June 13th, 1990.

ANNEX I
ANNEXE I

List of participants
Liste des participants

CYPRUS
CHYPRE

Mr. Ioannis PAPADOPOULOS
Agricultural Research Officer
Agricultural Research Institute
Ministry of Agriculture and
Natural Resources
Nicosia

Tl.: (357) 30.51.01
Tlx: 4660 MINAGRI
Fax: 44.51.56

EGYPT
EGYPTE

Dr. Mohamed Salah AZAB
Environmental Scientist
14 Mostafa Reda Str.
El-Manyal
Cairo

Tl.: 202.84.00.62
Tlx: 93794 WAZRA UN
Fax: 202 34.20.768

FRANCE
FRANCE

M. Daniel ALEXANDRIAN
Directeur de l'Agence MIDA
419 Avenue Jean-Paul Coste
Centre Commercial Bel Ormeau
13100 Aix en Provence

Tl.: 33. 42.26.81.11
Fax: 33. 42.26.65.36

ISRAEL
ISRAEL

Mr. Baruch VEBER
Industrial Wastewater Section
Ministry of Environment
P.O.Box 6158
91060 Jerusalem

Tl.: 2.70.15.77
Tlx: 25629 ENVIR IL
Fax: (2) 38.50.38

LIBYAN ARAB JAMAHIRIYA
JAMAHIRYA ARABE LIBYENNE

Mr. Ahmed ENKISSA
Technical Centre for Environmental
Protection
P.O.Box 83618
Tripoli

Tl.: 45.795
Tlx: 20138

Mr. Mahmoud FALLAH
Technical Centre for Environmental
Protection
P.O.Box 83618
Tripoli

Tl.: 45.795
Tlx: 20138

MALTA
MALTE

Mr. Vincent GAUCI
Professionnal Officer II
Ministry for Development of Infrastructure
Sant Antnin Sewage Treatment Plant
Marsaskala
Malta

Tl.: 77.21.48
Tlx: 1100 MOD MLT

MOROCCO
MAROC

M. Mohamed BELKASRI
Direction Générale de l'Urbanisme, de
l'Aménagement du Territoire et de
l'Environnement
Ministère de l'Intérieur
Rabat - Chellah

Tl.: 7.66.659
Tlx: 31731
Fax: 7.68.426

M. El Hachmi TAZARNI
Direction Générale de l'Urbanisme, de
l'Aménagement du Territoire et de
l'Environnement
Ministère de l'Intérieur
Rabat - Chellah

Tl: 7.66.658
Tlx: 31731
Fax: 7.68.426

SYRIA
SYRIE

M. Khaldoun KHAWAJKI
Architecte
Conesil de Premier Ministre
Shahbandar Street
Damascus

Tl.: 11.22.60.00
Tlx: 411903

TUNISIA
TUNISIE

Mme Akissa BAHRI
Responsable du Laboratoire d'Analyses
Chimiques Eaux-Sols-Boues
CRGR
Route de la Soukra
BP 10
2080 Ariana

Tl.: 1.71.79.51; 1.71.78.01

TURKEY
TURQUIE

Ms Ganime GUZEL
Environmental Engineer
Undersecretariat for Environment
Prime Ministry
Atatürk Bulvari 143
Bakanliklar
06640 Ankara

Tl.: 41.17.44.55/ext. 297
Tlx: 18944620
Fax: 41.17.79.71

YUGOSLAVIA
YUGOSLAVIE

Ms Vera LAPCEVIC
Senior Advisor
Federal Administration for International
Scientific, Cultural and
Technical Co-operation
Kosancicev venac 29
11000 Beograd

Tl.: 11.62.99.20

Mr. Mitja RISMAL
Department of Civil Engineering
Institute for Sanitary Engineering
University of Ljubljana
Hajdrihova 28
61000 Ljubljana

Tl.: 21.08.12.
Tlx: 31775 FAGGLJ YU
Fax: 38.61.26.85.72

WORLD HEALTH ORGANIZATION
ORGANISATION MONDIALE
DE LA SANTE

Dr. Louis J. SALIBA
Senior Scientist
WHO/EURO Project Office
Co-ordinating Unit for the
Mediterranean Action Plan
P.O.Box 18019
48, Vassileos Kostantinou Ave.
11610 Athens

Tl.: 724.45.36
Tlx: 222611 MEDU GR
Fax: 729.11.60

FOOD AND AGRICULTURAL
ORGANIZATION
ORGANISATION POUR
L'ALIMENTATION ET
L'AGRICULTURE

Mr. Arumugam KANDIAH
Land and Water Development Division
FAO
Via delle Terme di Caracalla
00100 Rome

Tl.: 6.57.97. 40.33
Tlx: 610181
Fax: 67.99.563

MEDITERRANEAN ACTION PLAN
PLAN D'ACTION POUR LA
LA MEDITERRANEE

Mr. Ibrahim DHARAT
Programme Officer
Co-ordinating Unit for the
Mediterranean Action Plan
P.O.Box 18019
48, Vassileos Kostantinou 48
11610 Athens

Tl.: 724.45.36
Tlx: 22611 MEDU GR
Fax: 729.11.60

REGIONAL ACTIVITY CENTRE
FOR THE PRIORITY ACTIONS
PROGRAMMES
CENTRE D'ACTIVITES REGIONALES
POUR LE PROGRAMME D'ACTIONS
PRIORITAIRES

Mr. Arsen Pavasovic
Director
PAP/RAC
Kraj sv. Ivana 11
P.O.Box 74
58000 Split

Tl.: (43.499) 59.11.71
Tlx: 26477 URBS
Fax: 38.58.36.16.77

Dr. Stanislav TEDESCHI
Co-ordinator of the priority action
"Solid and Liquid Waste Management
in the Mediterranean Region"
Institute of Civil Engineering
Rakusina 1
41000 Zagreb

Tl.: 41.53.39.06.
tlx: 22275
Fax: 41.53.38.89.

Dr. Jure MARGETA
Co-ordinator of the priority action
"Water Resources Management in Mediterranean
Islands and Isolated Coastal Areas"
Faculty of Civil Engineering
V. Maslese bb
58000 Split

Tl: 58.52.33.33

Prof. Mainwaring PESCOD
PAP/RAC Consultant
Head
Department of Civil Engineering
University of Newcastle upon Tyne
Cassie Building
Newcastle upon Tyne
NE1 7RU

Tl.: 91.22.26.00/ext.6410
Tlx: 53654 UNINEW G
Fax: 91.261.11.82

Ms Ljiljana PREBANDA
Administrative Assistant (Fund)
PAP/RAC

Ms Vera KATUNARIC
Technical Assistant to Projects
PAP/RAC

Ms Kasja TULIC
Technical Assistant to Projects
PAP/RAC

ANNEX II

Agenda

Monday, 11 June

09:00 - 09:30

Registration of participants.

09:30 - 11:00

Opening of the workshop.
Welcome addresses.
Rules of procedure.
Election of Officers.
Adoption of the agenda.
Objectives of the meeting.
Background information.

11:30 - 13:00

Presentation of draft Guidelines
by the editor and authors.

16:00 - 17:00

General discussion on draft
Guidelines.

17:30 - 19:00

Discussion and comments per
chapters of the Guidelines.

Tuesday, 12 June

09:00 - 10.30

Discussion and comments per
chapters of the Guidelines.

11:00 - 13:00

Discussion and comments per
chapters of the Guidelines (cont.).

16:00 - 17:00

Drafting of amendments (working
groups).

17:30 - 19:00

Drafting of amendments (working
groups) - continuing.

Wednesday, 13 June

10:00 - 11:00

Evaluation of amendments.

11:30 - 12:30

Adoption of the meeting report.

12:30

Closure of the meeting.