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CONSULTATIVE MEETING ON MUNICIPAL WASTEWATER

REGION:

West Asia

Manama, Bahrain

10 - 12 November 2001



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Municipal Wastewater Management in West Asia
Manama, Bahrain, 10-12 November 2001

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Executive Summary

More than 40 experts from Governments, regional governmental and non-governmental organizations, representing three Regional Seas (the Red Sea and Gulf of Aden, the Kuwait Action Plan/ROPME Sea Area and the Mediterranean), endorsed a regional multi-stakeholder work programme to address the major impediments (e.g., political, legal, institutional, technological, social, economic, capacity-building, stakeholder involvement) and the priorities and recommendations for action on municipal wastewater management. As an integral part of this work programme, an annotated outline for developing pilot/demonstration projects was agreed upon and possible locations for implementing those projects were preliminarily identified in seven countries. The workshop also reviewed the draft GPA Recommendations for Decision-making on Municipal Wastewater and developed a Regional Annex reflecting common views of stakeholders on priorities, capacities and needs. This Regional Annex, together with the regional work programme, constitute a major input from the region to the First Intergovernmental Review Meeting on the Implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (Montreal, Canada, 26-30 November 2001).

Given that the Governments of West Asia (including all countries bordering the Red Sea and Gulf of Aden) have identified the discharges of untreated or partially treated municipal wastewater as one of the major threats to human health and the sustainable development of coastal populations throughout the region, the workshop:

- (1) Calls upon the respective Governments to commit themselves, at the highest possible level, (i) to work together on the implementation of the activities and recommendations included in the work programme on municipal wastewater; and (ii) to support the GPA and the GPA Regional Work Programme at the GPA Montreal Intergovernmental Review Meeting
- (2) Calls upon regional developments banks/funds and international multilateral financial mechanism to give the highest priority to supporting implementation of the adopted work programme on municipal wastewater
- (3) Encourages the countries of the region to begin a consultative process, with support from UNEP, PERSGA, ROPME and other relevant organizations and programmes, towards developing an Annex (to the respective Protocols on land-based sources and activities) specifically addressing municipal wastewater
- (4) Calls upon the active participation of the private sector in addressing the serious impacts of municipal wastewater discharges on the region's marine and coastal environment, and to demonstrate that municipal wastewater projects can be economically viable in the region through the development of partnerships between the public and private sectors

Background

1. Domestic wastewater discharges are one of the most significant threats to sustainable coastal developments worldwide. The priority for action on “sewage”, as identified by the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA), was reconfirmed by seven regional workshops of Government-designated experts organised (between 1996-1999) by the United Nations Environment Programme (UNEP) as GPA Secretariat, within the framework of the Regional Seas Programme and also by UNEP's Governing Council (decision 20/19 of 1999). Two of these workshops covered the Kuwait Action Plan/ROPME Sea Area and/or the Red Sea and Gulf of Aden: one in Bahrain (2-5 December 1996) and the other in Kuwait (8-9 June 1997).

2. The effects of individual municipal wastewater discharges are usually localised, but they are a major source of coastal and marine contamination in all regions and therefore a global issue. Pathogenic organisms in domestic wastewater-contaminated marine and estuarine waters cause massive transmissions of infectious diseases to bathers and consumers of raw and undercooked shellfish with a global economic impact recently estimated at US\$10 billion per year (GESAMP and ACOPS 2001)¹.

3. In response to the above, the UNEP/GPA Coordination Office, in cooperation with the World Health Organization (WHO), the United Nations Centre for Human Settlements (Habitat) and the Water Supply and Sanitation Collaborative Council (WSSCC) developed the GPA Strategic Action Plan on Municipal Wastewater (SAP) (UNEP/ROWA-GPA-SEWAGE.RW.1/INF.2). Important parts of the SAP are the draft Recommendations for Decision-making on Municipal Wastewater (UNEP/ROWA-GPA-SEWAGE.RW.1/6) and the organization of regional partnership meetings.

4. This workshop in West Asia (including all countries bordering the Red Sea and Gulf of Aden) was the seventh of a series of similar regional partnership meetings UNEP has organized during 2001. The previous meetings have covered: the Wider Caribbean (Kingston, Jamaica, 19-21 February), Eastern Africa (Dar-es-Salam, Tanzania, 11-15 June), Latin America (Mexico City, 10-12 September), Asia-Pacific (Toyama, Japan, 25-28 September) and South Pacific (Majuro, Marshal Islands, 10-15 October) (see UNEP/ROWA-GPA-SEWAGE.RW.1/INF.3, UNEP/ROWA-GPA-SEWAGE.RW.1/ INF.4; the reports of all these meetings are available in the GPA clearing-house website, www.gpa.unep.org). The results of these meetings and the experiences gained will significantly contribute to a special session dealing with the problems associated to municipal wastewater, during the First Intergovernmental Review Meeting on implementation of the GPA (Montreal, 26-30 November 2001).

Item 1. Opening of the workshop

5. Mr. Khaled Fakhro, Director General, Environment Affairs, delivered a welcome address on behalf of the HE Minister of Municipalities Affairs and Environmental Affairs, State of Bahrain. The meeting was opened by Mr. Mahmood Y. Abdulaheem, Regional Director & Representative of UNEP's Regional Office for West Asia (ROWA), at 1020 h on Saturday, 10 November 2001.

¹ Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection & Advisory Committee on Protection of the Sea. 2001. Protecting the oceans from land-based activities – Land-based sources and activities affecting the quality and uses of the marine, coastal and associated freshwater environment. Rep. Stud. GESAMP No. 71, 162 pp. Available in the GPA clearing-house website (www.gpa.unep.org).

6. The meeting was attended by Government-designated experts (representing the Ministries of Environment, Finances/Economy, Fisheries, Health, Municipalities, Tourism, Urban Development, Water Resources, and Work) from the following countries: Bahrain, Djibouti, Egypt, Republic of Iraq, Jordan, Oman, Palestine, Qatar, Saudi Arabia, Sudan, Syria and Yemen.
7. Experts from the following municipalities also attended: Aqaba (Jordan) and Hebron (Palestine).
8. The Secretariats of following Regional Seas were represented: the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA), the Regional Organization for the Protection of the Marine Environment (ROPME) and the Mediterranean Action Plan (MAP) of UNEP. A representative of the Marine Emergency Mutual Aid Center (MEMAC) also attended.
9. The following governmental, non-governmental and private sector organizations were represented: the International Center for Agricultural Research in the Dry Areas (ICARDA), the Desert and Arid Zones Sciences Programme of the Arabian Gulf University, the University of Bahrain, the King Fahad University for Petroleum and Minerals, the Kuwait Institute for Scientific Research (KISR), Friends of the Earth Middle East, and Binnie & Partners (Overseas) Ltd.
10. UNEP provided the Secretariat for the workshop. The full list of participants is attached as Annex 4 to the present report.

Item 2. Goal and objectives of the workshop

11. The particular objectives of the workshop, as introduced by the Secretariat, were:
 - (i) To consider and finalise a regional multi-stakeholder work programme addressing the major weaknesses, barriers and gaps (e.g., political, legal, institutional, technological, social, economic, capacity-building, stakeholder involvement) and the priorities and recommendations for action on municipal wastewater management in West Asia (including all countries bordering the Red Sea and Gulf of Aden);
 - (ii) To consider the development of possible pilot/demonstration projects on municipal wastewater management, involving key stakeholders in West Asia (including all countries bordering the Red Sea and Gulf of Aden);
 - (iii) To review the draft Recommendations for Decision-making on Municipal Wastewater and develop a Regional Annex to reflect common views of stakeholders on priorities, capacities and needs, as a direct input from the region to the GPA Review Meeting;
 - (iv) To exchange experience and expertise with regard to innovative, financial, technical and institutional arrangements related to the management of municipal wastewater, and to identify socio-economic opportunities and foster partnerships; and
 - (v) To prepare the regional input to the GPA Review Meeting.

Item 3. Organization of the workshop

(a) Election of officers

12. The workshop elected the following officers:

Chairperson: Mr. Bilal M.A. Al Bashir (Jordan)
Co-Chairpersons: Ms. Widad Abd El Mutaal Osman (Sudan)
Mr. Mohamed A. Abo ElRouss (Egypt)
Rapporteur: Mr. Asma J. Murad (Bahrain)

(b) Organization of the work

13. The workshop decided to address agenda items 1-4 and 6-13 in plenary and to address agenda item 5 in three Working Groups working on parallel sessions (assisted by members of the Secretariat as facilitators), as follows:

(i) Working Group on Financing Municipal Wastewater Management

Chairperson: Ms. Widad Abd El Mutaal Osman (Sudan)
Participants: Ms. Rana S. Hanna (Syria), Mr. Hisham M.I. Al-Nezili (Yemen), Mr. Hamed J. Al-Mahrooqi (Oman), Mr. Abdallah A. Bjaili (Saudi Arabia), Mr. Hassan N. Al-Nasser (Qatar), Mr. Jaber A. Al-Mohannadi (Qatar), Mr. Shaher A.A. Odeh (Jordan), Mr. Freddie Wilkinson (Binnie & Partners Overseas)
Facilitator: Mr. Habib N. El-Habr (UNEP)

(ii) Working Group on Building Capacities at the National and Regional Level

Chairperson: Mr. Mohamed A. Abo ElRouss (Egypt)
Rapporteur: Mr. Musbah Tahboub (Palestine)
Participants: Mr. Ismail El Kamish (Sudan), Mr. Aden H. Elmi (Djibouti)
Mr. Rehan Ahmed (Bahrain), Mr. Abdi A. Warsama (Djibouti)
Mr. Jehad Al Jabour (Palestine), Mr. Issam Taha (Syria), Dr. Muhammad F. Al-Rashed (KISR), Mr. Dirar H. Nasr (PERSGA), Mr. Ahmed T. Moustafa (ICARDA)
Facilitator: Mr. Fouad Abousamra (UNEP)

(iii) Working Group on Pilot/Demonstration Projects Involving Key Stakeholders

Chairperson: Mr. Bilal M.A. Al Bashir (Jordan)
Rapporteur: Ms. Mr. Asma J. Murad (Bahrain)
Participants: Mr. Mohamed A. Oushi (Sudan), Mr. Mohamed Luqman (Yemen), Mr. Maher K. El Gendi (Egypt), Ms. Lama Ahmed (Syria), Mr. Abdulrahman M. Buali (University of Bahrain), Mr. Ahmed Al-Zedjali (Oman), Mr. Taleb Harithi (Palestine), Mr. Khalifa O. Al-Hinaee (Oman), Mr. Ali Hadad (Republic of Iraq), Mr. Ahmed Robleh (Djibouti), Ms. Wasmia S. Al-Eissa (ROPME), Mr. Nedal Al Ouran (Friends of the Earth Middle East)
Facilitator: Mr. Omar Vidal (UNEP)

14. The workshop decided to set up an *ad hoc* drafting group, coordinated by Mr. Musbah Tahboub (Palestine), to review the Key Principles and Checklist of the GPA draft Recommendations for Decision-making in Municipal Wastewater (see agenda item 9). The drafting group also included the following experts: Ms. Rana S. Hanna (Syria), Mr. Taleb M.A. Al-Harithi (Palestine), Mr. Mohamed A.K. Oushi (Sudan) and Mr. Dirar H. Nasr (PERSGA).

Item 4. Adoption of the agenda

15. The workshop adopted the agenda after revising the provisional agenda prepared by the Secretariat (attached as Annex 3 to this report).

16. The full list of documents before the workshop is contained in Annex 5 to this report.

Item 5. The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA), its First Intergovernmental Review Meeting (Montreal, 26-30 November 2001), the GPA Strategic Action Plan on Municipal Wastewater, and the role and input of West Asia (including all countries bordering the Red Sea and Gulf of Aden)

17. The representatives of the Secretariats of the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA), the Regional Organization for the Protection of the Marine Environment (ROPME) and the Mediterranean Action Plan (MAP) briefed the workshop on development and implementation of relevant activities in their regions, with particular focus on municipal wastewater. Major points on their presentations were:

PERSGA

18. The Strategic Action Programme for the Red Sea and Gulf of Aden (SAP), which supports the primary goal of PERSGA, comprises seven components: (i) strengthening the capability of PERSGA for regional cooperation; (ii) reduction of navigation risk and marine pollution; (iii) management of marine living resources; (iv) habitat and biodiversity conservation; (v) establishment of a network of marine protected areas; (vi) integrated coastal management; and (vii) public awareness and participation. The major areas of concentration of the SAP are: (i) loss of coral reefs, seagrass, mangroves; (ii) fisheries; (iii) exploitation of endangered species; (iv) petroleum related pollution; and (v) industrial and municipal waste discharges.

19. With regard to the protection of the marine environment from land-based activities, PERSGA's activities focus on: (i) the Protocol for the Protection of the Marine Environment of the Red Sea and Gulf of Aden from Land-Based Sources of Pollution; (ii) treatment and management of wastewater; (iii) control of solid waste; (iv) control of sedimentation and dredging; (v) control of the degradation of marine protected areas; (vi) local and regional regulations for waste disposal; (vii) licensing and waste disposal regulations; (viii) environmental monitoring and data management; (ix) assessments of environmental impacts; (x) scientific and technical cooperation; (xi) scientific and technical assistance; (xii) transboundary pollution; and (xiii) settlement of disputes and compensation

ROPME

20. ROPME's activities, with regard to land-based activities, focuses on: (i) updating the national surveys; (ii) preparation of a river basin management programme including associated wetlands, khors and coastal lagoons; (iii) development of guidelines, standards and criteria for the management of land-base activities; and (iv) development of a manual for the implementation of the Protocol against pollution from land-based sources.

21. There have been delays in implementing the Protocol against pollution from land-based sources, mainly due to limited political will and lack of financial resources.

MAP

22. In this region, wastewater management is addressed by the Strategic Action Programme to Address Pollution from Land-based Activities. Important activities are the implementation of National Action Plans to be elaborated, approved and financed by the Mediterranean countries with the assistance of the MAP and its regional Activities Centers, regional and international donors. The management of municipal wastewater is supported by capacity-building and monitoring programmes. The capacity-building programme would provide: (i) guidelines for sewage treatment and disposal; (ii) environmental quality criteria and standards; (iii) national training courses; (iv) development of programmes for sharing and exchange of information; (v) promotion of research programmes to identify and validate sewage treatment technologies; (vi) pre-feasibility studies for 11 hot spots including waste water treatment facilities; and (vii) identification of national economic instruments to finance waste water treatment projects.

23. The Secretariat briefed the workshop on the aim and objectives of the GPA, on recent progress in its implementation and on the preparations for the GPA Review Meeting. Some of the main objectives of the Review Meeting include (i) the consideration of the overall approach of the GPA Strategic Action Plan on Municipal Wastewater and its Recommendations for Decision-making with a view to, among others, recommend that its approach be used as a model to address other priority source categories listed in the GPA; (ii) the consideration, revision and endorsement of the proposed 2002-2006 work programme of the UNEP/GPA Coordination Office and partner organisations, with indicative costs; (iii) how to improve the implementation of the GPA through improved coastal and ocean governance; (iv) necessary steps to build partnerships and finance the implementation of the GPA; and (v) endorsement of a Ministerial Declaration on the Protection of the Marine Environment from Land-based Activities. All documents for this Review Meeting have been already distributed to participants and are also available in all United Nations six languages, including Arabic, in the GPA clearing-house website (www.gpa.unep.org).

24. The Secretariat invited those countries that have not yet confirmed their participation in the GPA Review Meeting, to ensure that their Governments inform UNEP, as soon as possible, of the name (s) of their representatives.

25. The Secretariat also briefly introduced the GPA Strategic Action Plan on Municipal Wastewater (UNEP/ROWA-GPA-SEWAGE.RW.1/ INF.2) and its draft Recommendations for Decision-making (UNEP/ROWA-GPA-SEWAGE.RW.1/6), emphasising that their aim was to facilitate **concrete action** at the local and national level, through: (i) promoting the use of **alternative solutions**, including low-cost technologies, appropriate financial mechanisms and partnerships; and (ii) creation of an **enabling environment** for action.

26. The workshop discussed the possible concrete input from West Asia (including all countries bordering the Red Sea and Gulf of Aden) to the GPA Review (see agenda item 10 below).

Item 6. Management of municipal wastewater in West Asia – lessons learned and possible partnerships

27. The Secretariat informed the workshop that the following regional development banks and funding mechanisms were invited to attend the workshop and to brief Governments on their role and lessons learned in financing the management of municipal wastewater in the region: The Islamic Development Bank, the Arab Gulf Programme for United Nations Development Organizations, the Arab Fund for Economic and Social Development, the Kuwait Fund for Arab Economic Development, the Saudi Fund for Development and the Arab Monetary Fund. Regrettably, none of these organizations attended the workshop.

28. Ms. Asma Murad, from the delegation of Bahrain, gave a presentation on the production and utilization of treated sewage effluent (TSE). The main points of her presentation were: (i) in 1971, the Bahrain government commenced discussion with the United Nations Development Programme; (ii) a master plan study undertaken in 1974/1975, on behalf of the World Health Organization, recommended the implementation of design and construction programmes for trunk sewers in Manama, greater Manama, Muharraq and Isa Town; (iii) at the end of 1979 the Trunk Sewerage Network Completed including some minor wastewater network and house connection to the new system; (iv) in 1980s, the Bahrain government commissioned Tubli Water Pollution Control Centre including a tertiary treatment facilities to reuse 40,000m³/day of the treated effluent which was called (TSE-Ph.1); (v) in 1993 a preparation for the study of Tubli WPCC expansion started. This study highlighted the need for more treated sewage effluent to replace over abstraction of ground water used in Agriculture and to stop the pollution of our environment; (vi) in 1997, the government of Bahrain decided to proceed with full production and utilization of the expected effluent of 200,000 m³/d equivalent to a population of 875,000 which can substitute 70 m.m³/yr of ground; (vii) in 1998, ACE consultant were appointed to design and supervise the whole project of the (TSE-Ph II); and (viii) TSE-PH II project consist of Production which include Secondary Treatment expansion, Sludge Drying plant and Tertiary Plant, Transmission Lines of 40 km, distribution network of 150 km, drainage network of 120 km, new reservoirs 15, landscaping network of 100 km and 15 reservoirs.

29. Capt. A.M. Al-Janahi briefed the meeting on the role of ROPME's Marine Emergency Mutual Aid Center (MEMAC) in supporting the management of municipal wastewater in the region. He reported that the total sewage generation from shipping in the ROPME Sea Area is 376,821 tonnes per year. Other main conclusions/recommendations included: (i) the need for a regional approach but for national implementation; (ii) national reception facilities to serve on regional basis; (iii) need to involve the private sector in buil/own/operate; (iv) monitoring by States; (v) operation of the reception facility to be financed through a waste service discharge; (vi) the operator to have the exclusivity to operate a defined reception facility; and (vii) national reception facilities can be operated and financed without major Government investment.

30. The Secretariat also informed the workshop that it approached various intergovernmental and non-governmental organizations, as well as the private sector, inviting

them to share the experiences and lessons learned on the management of municipal wastewater, with a view to establish possible partnerships.

31. Mr. Freddie Wilkinson (Binnie Black & Veatch; a specialist consulting company in the water and wastewater sector) reported on his company's involvement in wastewater projects for over a century. In this region, they have been involved in the sewerage of Kuwait for more than a decade, with the Greater Cairo Wastewater Project for more than two decades and are currently involved in the development of sewerage in Amman. In a private sector initiative, they have acted as technical advisors to a proposed development group for a proposal to bring water from Iran to Kuwait by pipeline.

32. From a private sector perspective some of the items to be considered, if the BOT route is followed, are: (i) revenues must be sufficient to cover operations plus a reasonable rate of return on investment; (ii) there must be guarantees on revenue; (iii) laws and regulations: Who can own and operate a utility? Who can buy or sell a service? What are restrictions on ownership? (51 local/49 foreign, 51 Govt/ 49 Private), regulations must be in place to allow a private sector entity to perform a public sector operation; (iv) What restrictions are there regarding tariff and rate structures?; (v) Who will collect the revenues?; (vi) What will be the taxation position of the concession company?; (vii) owner participation in the concession company may allow advantage of low interest loans available only to Governments. (It may be possible for the owner to finance completely using lower cost options and sell the facility to the concession company); (viii) foreign companies may have their own national constraints (particularly the case with US companies); (ix) rapid growth areas are more favourable to private sector; (x) in a bid situation the private sector may be reluctant to bid due to the costs of preparation unless there is a reasonable chance of winning. It may be better to follow a "development management" principle with a directly appointed team (owner/ technical adviser/ legal adviser/ financial adviser) working together developing preliminary planning and conceptual design. At the end of this activity there is a fairly accurate determination of revenue/ expenditure streams. This allows go/ no go decisions to be made. If it is go then it is possible to identify financiers, operators etc. and establish a concession company; and (xi) it is important to note that when projects proceed in a BOT environment the burden of risk shifts from the owner to the contractor and so the level of control also has to shift.

33. Mr. Nedal M. Al Ouran, representative of Friends of the Earth Middle East, briefed the workshop on his experiences on sustainable tourism in the Gulf of Aqaba of Jordan, illustrating his experiences and lessons learned related to the management of municipal wastewater, with a focus on opportunities for concrete partnerships between non-governmental organizations and the public and private sectors. The major conclusions/recommendations of his presentation were: (i) it is critical to educate the general public on the importance of the marine environment, and how it is globally connected to, and affected by other systems; (ii) importance of promoting the involvement of all stakeholders in the development and implementation of Integrated Coastal Management programmes, particularly the involvement of local communities, including women and resources poor groups; and (iii) the local communities should be involved in all stages of projects and plans

Item 7. Priorities for action and recommendations to address the management of municipal wastewater in West Asia

34. The Secretariat introduced document UNEP/ROWA-GPA-SEWAGE.RW.1/3. This document was based on a critical analysis of an overview of the socio-economic aspects related to the management of municipal wastewater in West Asia (including all countries

bordering the Red Sea and Gulf of Aden) and also takes into consideration available published and unpublished information.

35. In terms of availability of freshwater resources to meet their needs, these countries can be roughly divided in two groups: (i) countries with scarce natural freshwater resources and which depend mainly on desalinated water and, to a lesser extent, on groundwater, treated municipal wastewater and drainage water (Bahrain, Djibouti, Jordan, Kuwait, Oman, Palestine, Qatar, Saudi Arabia and the United Arab Emirates); and (ii) countries with access to substantial natural freshwater resources in the form of rivers and groundwater (Egypt, Eritrea, Republic of Iraq, Iran, Lebanon, Somalia, Sudan, Syria, Turkey and Yemen).

36. Based on the extent of municipal wastewater treatment, the amount and quality of discharges into the coastal and marine environment, countries can also be roughly grouped in five categories (from more to less developed): Group 1 (Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates), Group 2 (Bahrain and Jordan), Group 3 (Egypt, Syria and Turkey), Group 4 (Iran, Republic of Iraq, Lebanon and Palestine) and Group 5 (Djibouti, Eritrea, Somalia, Sudan and Yemen).

37. The workshop agreed that all the above need to be taken into consideration when establishing and addressing the specific priorities in a particular country or group of countries.

38. After a plenary discussion on this issue, the workshop decided to split in the three Working Groups previously established: Financing Municipal Wastewater Management, Building Capacities at the National and Regional Level, and Pilot/Demonstration Projects Involving Key Stakeholders.

39. The first two Working Groups were tasked with (i) reviewing the major impediments, priorities and recommendations for action (as outlined in document UNEP/ROWA-GPA-SEWAGE.RW.1/3); and (ii) to outline the activities, work plan, timetable, expected outputs, stakeholders and estimative costs to address those impediments, priorities and recommendations.

40. The Working Group on pilot/demonstration projects was tasked with (i) identifying possible suitable locations for developing and implementing pilot projects; and (ii) reviewing and further developing the preliminary annotated outline as prepared by the Secretariat (UNEP/ROWA-GPA-SEWAGE.RW.1/4).

Item 8. Preparation of a multi-stakeholder work programme for addressing municipal wastewater in West Asia

41. At the end of one full day devoted to the work of the three Working Groups, the workshop met in plenary to consider the reports provided by the chairperson of each Working Group. The major impediments to the management of municipal wastewater in West Asia (including all countries bordering the Red Sea and Gulf of Aden) were identified as:

- ❖ There is concern in the region about the environmental issues related to the municipal wastewater, but there is limited awareness at all levels (e.g., Governments, private sector, civil society) of the benefits and costs of action vs. no action

- ❖ Limited environmental, educational, institutional and human capabilities at the national level
- ❖ Limited and/or lack of enforcement of existing rules and regulations
- ❖ Limited or lack of appropriate financial resources
- ❖ Limited coordination among relevant government institutions (e.g., Ministries of Environment, Health, Urban Development, Economy)
- ❖ Limited or lack of environmental standards, criteria, effluent and emission limitations, and provisions for efficient enforcement
- ❖ Lack of involvement of the private sector and lack of regulations for their participation
- ❖ Gaps in scientific and economic information, limited scientific research and accessibility to available information at the national and regional levels
- ❖ Limited laboratory facilities and quality control systems
- ❖ Insufficient emphasis on prevention and cleaner technologies
- ❖ Insufficient and inadequate public environmental awareness
- ❖ Insufficient participation of the civil society

42. The priorities for action and recommendations to address the above impediments, as endorsed by the workshop, fall in five major clusters dealing with legislation, management, capacity-building, assessment needs and public participation, as follows:

Legislation

- (1) By 2003, to revise and update existing rules and regulations for municipal wastewater treatment and disposal at the regional level and develop detailed guidelines on standards, criteria, effluent/emission limitations, timetables for achieving the limits and provisions for enforcement
- (2) By 2004, to revise and adopt national legislation on discharges of municipal wastewater to rivers, estuaries and the marine environment in order to ensure harmonization with legislation at the regional level (i.e., the respective Protocols)

Management

- (3) To update/prepare, in close coordination between the Governments of the region, national inventories of municipal wastewater assets and their condition, in order to identify priorities and investment programmes for insuring optimum use and improvement of existing systems
- (4) To take immediate steps to improve the implementation of existing measures dealing with municipal wastewater treatment at the national level. Relatively simple and inexpensive measures could yield significant gains in most countries, including: better design and installation of sanitary systems, better maintenance and operation of existing treatment plants, and improved siting of municipal wastewater outfalls
- (5) To promote the involvement of the private sector in the management of municipal wastewater by creating an environment where the risks are identified

- (6) To ensure that industries treat their effluent on-site and that they meet the minimum environmental quality criteria and standards before being discharged to the public sewerage system, river or the marine environment
- (7) To prevent further pollution of the marine environment by avoiding discharges of untreated or partially treated effluent to rivers, estuaries and coastal waters
- (8) By 2006, to develop national plans aimed at the environmentally-sound management of municipal wastewater, which shall include practices and measures such as those to:
 - Prevent or reduce contaminant production or harmful practices
 - Modify contaminants, practices or reduce contaminant discharge or extent of the practice
 - Prevent or reduce degradation of affected areas
 - Mitigate or reverse degradation that is unavoidable or has already occurred
- (9) To promote the reuse (e.g., effluent/sludge recycling, land-filling, composting) of treated municipal wastewater both in order to conserve water resources and to take advantage of valuable components of sewage, by using less centralized and less capital-intensive technologies such as improved septic tanks, composting toilets, small-scale biogas and treatment plants
- (10) To continue the development of the wastewater collection (sewerage) system to increase the proportion of the population served and to keep pace with urban growth
- (11) To immediately make compulsory environmental impact assessment for all coastal development projects
- (12) To develop and implement cost-effective wastewater treatment and reuse technologies for settlements and plants not connected to the public sewer systems

Capacity-building

- (13) To promote and strengthen the legislative, institutional, technical and resource mobilisation capacities of the countries to deal with municipal wastewater management, in the framework of national coordination and regional and international cooperation
- (14) By 2004, to develop and began implementation of various related national and regional programmes for sharing and exchanging technical information and advice on environmentally-sound municipal wastewater management
- (15) To develop and promote research programmes to identify and validate municipal wastewater treatment and reuse technologies
- (16) To provide support in the formulation of projects eligible to be financed by regional and multi-lateral financial institutions and donors

43. The two Working Groups also identified specific activities to achieve the above recommendations and estimated the costs necessary to implement them.

Working Group on pilot/demonstration projects

44. The Working Group on pilot/demonstration project reviewed the preliminary annotated outline for the development and implementation of these projects. The final outline, as endorsed by the Working Group and by the workshop in plenary, is included as part of the work programme on municipal wastewater (Annex 1).

45. The Working Group also preliminarily identified possible locations for the development and implementation of pilot/demonstration projects, which are not listed in order of priority, as follows (additional locations might be identified):

- ❖ Howar Island, **Bahrain**
- ❖ Douda, **Djibouti**
- ❖ Marsa Alm, **Egypt**
- ❖ Aqaba, **Jordan**
- ❖ Tawi Part of Sur Town, **Oman**
- ❖ Governorate of Khanyounis, **Palestine**
- ❖ Port Sudan (a part of the city), **Sudan**
- ❖ Jableh, **Syria**

46. The Working Group endorsed the suggestions from the expert from the Republic of Iraq with regard to criteria for choosing municipal wastewater strategies for villages with a population of less of 5,000 inhabitants, including: (i) the need to investigate the quantity and quality of raw sewage discharged to the coast; (ii) the availability and sources of freshwater; (iii) the topographic and land characteristics; and (iv) the available financial resources.

47. The Working Group agreed on the following timetable with regard to the pilot projects:

- (i) Presentation of the annotated outline as part of the regional work programme on municipal wastewater to the GPA Intergovernmental Review Meeting (Montreal, Canada, 26-30 November 2001);
- (ii) Finalization of the annotated outline (e.g., work plan, timetable and detailed budget for each selected location/site) - February 2002; and
- (iii) Incorporation of the costed outline into project proposal for funding and submission to selected, national, regional and international funding mechanisms

48. The Secretariat was requested to consolidate the results of the three Working Groups into the work programme. The work programme was endorsed by the workshop in plenary session and it is attached as Annex 1 to the present report.

49. The Secretariat was request, in consultation with PERSGA, ROPME and MAP, to further develop the cost estimates and to submit the draft costed work programme to the GPA Review Meeting (Montreal, Canada, 26-30 November 2001) as the main input from the region on the issue of municipal wastewater.

50. The Secretariat informed the workshop that it plans to approach relevant regional development banks and international multilateral funding mechanisms with a view to raise the necessary financial resources for implementing the work programme, and that it will to report back to governments on its efforts on this regard.

Item 9. Regional Annex (reflecting the common views of stakeholders on priorities, capacities and needs) to the draft GPA Recommendations for Decision-making on Municipal Wastewater

51. The chairperson of the *ad hoc* drafting group introduced to the workshop the draft Regional Annex (based on document UNEP/ROWA-GPA-SEWAGE.RW.1/6). The final Regional Annex, as endorsed by the workshop, is attached as Annex 2 to the present report. The chairperson of the drafting group thanked the members of the group for their valuable participation and inputs. The Secretariat was requested to forward the Regional Annex to the GPA Review Meeting, as an additional input from the region.

Item 10. Inputs from West Asia to the First GPA Intergovernmental Review Meeting

52. The workshop decided that the concrete inputs from West Asia (including all countries bordering the Red Sea and Gulf of Aden) to GPA Review Meeting should be:

- (i) The regional multi-stakeholder work programme to address municipal wastewater endorsed by the government-designated experts
- (ii) The Regional Annex to the draft Recommendations for Decision-making on Municipal Wastewater
- (iii) The report of the present regional workshop

53. The Chairperson submitted to the consideration of the participants the major recommendations reached by the workshop. These recommendations, as endorsed by the workshop, are:

Given that the Governments of West Asia (including all countries bordering the Red Sea and Gulf of Aden) have identified the discharges of untreated or partially treated municipal wastewater as one of the major threats to human health and the sustainable development of coastal populations throughout the region, the workshop:

- ❖ Calls upon their respective Governments to commit themselves, at the highest possible level, (i) to work together to implement the activities and recommendations included in the work programme on municipal wastewater; and (ii) to support the GPA and the GPA Regional Work Programme at the GPA Montreal Intergovernmental Review Meeting
- ❖ Calls upon regional development banks/funds and international multilateral financial mechanism to give the highest priority to supporting implementation of the adopted work programme on municipal wastewater
- ❖ Encourages the countries of the region to begin a consultative process, with support from UNEP, PERSGA, ROPME and other relevant organizations and programmes, towards developing an Annex (to the respective Protocols on land-based sources and activities) specifically addressing municipal wastewater
- ❖ Calls upon the active participation of the private sector in addressing the serious impacts of municipal wastewater discharges on the region's marine and coastal environment, and to demonstrate that municipal wastewater projects can be

economically viable in the region through the development of partnerships between the public and private sectors

Item 11. Other matters

54. The Secretariat informed the workshop that UNEP, through its GPA Coordination Office and ROWA, were supporting the Governments of Yemen and Egypt on the development of their National Programmes of Action on land-based activities. The aim of these programmes is to enable the resolution of national problems in the management of land-based activities, by strengthening national institutional capabilities to manage land-based activities and strongly advocating dialogue among key stakeholders.

55. The representative of PERSGA informed the workshop that his organization, together with UNEP, were considering the organization (in early 2002) of a technical/legal meeting of Government-designated experts to consider the draft 2000 Protocol to address land-based sources and activities in the Red Sea and Gulf of Aden, and that Members States will be informed in the near future on the relevant details.

Item 12. Report of the workshop

56. The Rapporteur introduced the draft report of the workshop. The final report was adopted by the workshop.

Item 13. Closure of the workshop

57. The Chairperson expressed his appreciation to the experts for their active participation and to UNEP for convening the workshop. The participants thanked the Chairperson for the diligent work in conducting the workshop. They also expressed their appreciation to UNEP for having organising and facilitating the workshop and to the Government of the State of Bahrain for hosting it.

58. Mr. Mahmood Y. Abdulraheem, Regional Director and Representative, UNEP/ROWA, thanked the Chairperson and the participants for their important work in fully achieving the objectives of the workshop. He highlighted the importance of the recommendations from the workshop and the regional work programme on municipal wastewater. He stressed the need for the active participation of the Governments from the region in the GPA Montreal Intergovernmental Review Meeting (26-30 November 2001) to support both the GPA and the efforts of the region in addressing the problems associated with human activities on land.

59. The workshop was declared closed by the Chairperson at 1540 h on Monday, 12 November 2001.

ANNEX 1

DRAFT WORK PROGRAMME TO ADDRESS MUNICIPAL WASTEWATER IN WEST ASIA (INCLUDING ALL COUNTRIES BORDERING THE RED SEA AND THE GULF OF ADEN)

**As endorsed by the Government-designated experts attending the
UNEP/PERSGA/ROPME Workshop on Municipal
Wastewater Management in West Asia
(Manama, Bahrain, 10-12 November 2001)**

Introduction

Regional wars, internal conflicts and political instability have hampered the efforts of many countries of West Asia (including countries bordering the Red Sea and Gulf of Aden) to address the most urgent environmental problems facing them. These conflicts, together with the pervasive effects of poverty in several countries, have also stressed their financial and natural resources. The whole region is facing a number of major environmental challenges, of which the scarcity and degradation of freshwater resources and the degradation of the marine and coastal environment are probably the most important ones. Pollution and degradation of the marine environment caused by human activities on land have been recognized as the most serious threat to the coastal and marine environment, human health and the well being of coastal populations through West Asia.

The countries of West Asia are bordered by the Red Sea, the Arabian (Persian) Gulf, the Arabian Sea and the East Mediterranean Sea. These countries are included in three regional action plans aiming at the protection and sustainable development of the coastal and marine environment: the Mediterranean Action Plan (Egypt, Lebanon, Palestine, Syria and Turkey), the Kuwait Action Plan/ROPME Sea Area (Bahrain, Islamic Republic of Iran, Republic of Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates) and the Red Sea and Gulf of Aden Action Plan (Djibouti, Egypt, Eritrea, Jordan, Saudi Arabia, Somalia, Sudan and Yemen).

These three regions have also developed Protocols to address land-based sources and activities affecting the marine environment, including provisions for discharges of municipal wastewater: 1996 Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources and Activities, 1999 Protocol for the Protection of the Marine Environment against Pollution from Land-based Sources in the ROPME Sea Area, and the draft 2000 Protocol for the Protection of the Marine Environment in the Red Sea and Gulf of Aden from Land-based Sources of Pollution and Activities.

The countries of West Asia (including all countries bordering the Red Sea and Gulf of Aden) have identified the discharges of untreated, or partially, treated municipal wastewater into the coastal and marine environment as one of the major threats to human health and the sustainable development of coastal populations through the region.

In response to the above, the Government-designated experts participating in the UNEP/PERSGA/ROPME Workshop on Municipal Wastewater Management in West Asia (Manama, Bahrain, 10-12 November 2001) developed the present work programme. The

work programme is based on the background documentation prepared for the workshop by the United Nations Environment Programme (UNEP).

The aim of this work programme is to (i) briefly summarize the major impediments with regard to the management of municipal wastewater in West Asia; (ii) to identify the national and regional priorities; and (iii) to offer a set of specific recommendations for action, together with a workplan, timetable and estimative costs.

II. Major impediments to the management of municipal wastewater in West Asia

Overall, the focus in West Asia has been on conducting studies and preparing strategies (action plans, programmes, etc) with limited progress achieved in implementing the actions/activities agreed upon. Many countries have formulated national environmental action plans, which include identification and prioritisation of key issues, and have set targets and timetables for implementation. However, in most cases, these national plans are mainly checklists of desirable actions based on rather limited information. These plans are generally short of reliable cost estimates, timetables, division of responsibilities for implementation and identification of funding sources. There is clearly an urgent need to move from planning to action.

The major impediments faced by countries of West Asia in their efforts to protect their coastal and marine environment and human health from the impact of discharges of untreated or partially treated municipal wastewater can be grouped as follows:

- ❖ There is concern in the region about the environmental issues related to the municipal wastewater, but there is limited awareness at all levels (e.g., Governments, private sector, civil society) of the benefits and costs of action *vs.* no action
- ❖ Limited environmental, educational, institutional and human capabilities at the national level
- ❖ Limited and/or lack of enforcement of existing rules and regulations
- ❖ Limited or lack of appropriate financial resources
- ❖ Limited coordination among relevant government institutions (e.g., Ministries of Environment, Health, Urban Development, Economy)
- ❖ Limited or lack of environmental standards, criteria, effluent and emission limitations, and provisions for efficient enforcement
- ❖ Lack of involvement of the private sector and lack of regulations for their participation
- ❖ Gaps in scientific and economic information, limited scientific research and accessibility to available information at the national and regional levels
- ❖ Limited laboratory facilities and quality control systems
- ❖ Insufficient emphasis on prevention and cleaner technologies
- ❖ Insufficient and inadequate public environmental awareness
- ❖ Insufficient participation of the civil society

III. Priorities for action and Recommendations

The priorities for action and recommendations to address the above impediments fall in five major clusters dealing with legislation, management, capacity-building, assessment needs and public participation. These are detailed above, together with preliminary cost

estimates for implementing the activities proposed between 2002-2005 (not including the development and implementation of the pilot/demonstration projects referred to above).

Legislation

1. By 2003, to revise and update existing rules and regulations for municipal wastewater treatment and disposal at the regional level and develop detailed guidelines on standards, criteria, effluent/emission limitations, timetables for achieving the limits and provisions for enforcement.
 - ❖ To be done by ROPME, PERSGA and MAP, with full support of UNEP and other relevant organizations and programmes in each region
 - ❖ An expert meeting is necessary in each region to finalize the amendments
 - ❖ A Ministerial meeting is necessary in each region to adopt the amendments

Costs estimated at US\$ 150,000 per region

2. By 2004, to revise and adopt national legislation on discharges of municipal wastewater to rivers, estuaries and the marine environment in order to ensure harmonization with legislation at the regional level (i.e., the respective Protocols)
 - ❖ To be done by the respective Governments

Costs to be covered as part of each Government's budget

Management

3. By 2004, to update or prepare national inventories of municipal wastewater assets and their condition, in order to identify priorities and investment programmes for insuring optimum use and improvement of existing systems
 - ❖ To be done by the relevant national authorities, with assistance from consultants
 - ❖ Financial resources shall come from either the Governments themselves or from regional development banks/funds and international multi-lateral financial mechanisms

Costs estimated at US\$ 500,000 per region, depending on the country and maintenance condition

4. By 2005, to take immediate steps to improve the implementation of existing measures dealing with municipal wastewater treatment at the national level. Relatively simple and inexpensive measures could yield significant gains in most countries, including: better design and installation of sanitary systems, better maintenance and operation of existing treatment plants, and improved siting of municipal wastewater outfalls
 - ❖ To be done by the relevant national authorities

The costs should be borne as part of the operation and maintenance of the relevant authorities or agencies dealing with municipal wastewater in each country

5. By 2003, to promote the involvement of the private sector in the management of municipal wastewater by creating an environment where the risks are identified

Costs need to be estimated

6. To ensure that industries treat their effluent on-site and that they meet the minimum environmental quality criteria and standards before being discharged to the public sewerage system, river or the marine environment

❖ Part of the legislation and enforcement of the law in each country

Costs to be borne by the relevant industries

7. To prevent further pollution of the marine environment by avoiding discharges of untreated or partially treated effluent to rivers, estuaries and coastal waters

8. By 2006, to develop national plans aimed at the environmentally-sound management of municipal wastewater, which shall include practices and measures such as those to:

- (i) Prevent or reduce contaminant production or harmful practices
- (ii) Modify contaminants, practices or reduce contaminant discharge or extent of the practice
- (iii) Prevent or reduce degradation of affected areas
- (iv) Mitigate or reverse degradation that is unavoidable or has already occurred

❖ To be done by the relevant authorities operating the water and sewage sectors

Costs to be borne by users through billing system and as part of the planning and operation, as well as of implementation of the regulations

9. To promote the reuse (e.g., effluent/sludge recycling, land-filling, composting) of treated municipal wastewater both in order to conserve water resources and to take advantage of valuable components of sewage, by using less centralized and less capital-intensive technologies such as improved septic tanks, composting toilets, small-scale biogas and treatment plants

❖ To be done by increasing public awareness and by highlighting the financial savings in reusing treated effluents

10. To continue the development of the wastewater collection (sewerage) system to increase the proportion of the population served and to keep pace with urban growth

❖ To be done by sewerage authorities in each country

Costs to be borne through investment and billing

11. To immediately make compulsory environmental impact assessment for all coastal development projects

- ❖ Part of the planning and the legislation of each country
12. To develop and implement cost-effective wastewater treatment and reuse technologies for settlements and plants not connected to the public sewer systems
- ❖ To be done by sewerage authorities in each country

Costs to be borne by each Government and to be recovered through billing

Capacity-building

13. To promote and strengthen the legislative, institutional, technical and resource mobilization capacities of the countries to deal with municipal wastewater management, in the framework of national coordination and regional and international cooperation
14. By 2004, to develop and began implementation of various related national and regional programmes for sharing and exchanging technical information and advice on environmentally-sound municipal wastewater management
15. To develop and promote research programmes to identify and validate municipal wastewater treatment and reuse technologies
16. To provide support in the formulation of projects eligible to be financed by regional and multi-lateral financial institutions and donors

Proposed activities and partners

Training & Workshops

- ❖ National training courses on socio-economic aspects of municipal wastewater management, during 2003-2005 (national and regional organizations)
- ❖ Development of higher technical education and research programmes oriented to the management of municipal wastewater, 2002-2003 (national, regional and international organisations, including the International Institute for Infrastructural, Hydraulic and Environmental Engineering-IHE, Delft, the Netherlands)
- ❖ Technical assistance, 2002-2003 (national, regional and international organisations, including the IHE)
- ❖ National training courses to strengthen the capacities for the improved management and operation of existing treatment facilities, 2003-2004
- ❖ Regional training workshop on the best use of the GPA Global Knowledge Base on municipal wastewater management, 2002 (UNEP, IHE)
- ❖ Development of regional environmental database on municipal wastewater management in UNEP's Regional Office for West Asia, 2002-2003 (UNEP, ROPME, PERSGA, Kuwait Institute for Scientific Research-KISR)
- ❖ Development of pilot ("twining") projects between countries within the region, ROWA and MAP countries, 2003-2005 (UNEP, ROPME, PERSGA, MAP)
- ❖ Development of technical guidelines on environmentally-sound municipal wastewater management, 2002-2003 (UNEP, PERSGA, ROPME, MAP)
- ❖ Development of training packages on municipal wastewater management, including reuse, 2002-2004 (PERSGA, ROPME, UNEP)

- ❖ Regional training workshop on project formulation for submission to regional development banks/funds and international multilateral financial institutions, 2002-2003 (ROPME, PERSGA, UNEP, MAP, GEF, EU)

Costs estimated at US\$ 600,000

Scientific Research

- ❖ Development of pilot research project on soil-aquifer treatment of municipal wastewater, 2002-2003 (KISR, national and regional organizations/institutions)
- ❖ Development of monitoring programmes on the impacts of municipal wastewater on the marine environment, 2002-2003 (MAP, national and regional organizations/institutions)
- ❖ Development of research programme on the use of treated municipal wastewater in agriculture, 2002-2003 (ICARDA, national and regional organizations/institutions)
- ❖ Development of research programme to validate technologies on the treatment of municipal wastewater, 2002-2003 (IHE, national and regional organizations/institutions)
- ❖ Development of research programme on the impact of municipal wastewater on public health, 2002-2003 (World Health Organization, national and regional organizations/institutions)
- ❖ Development of research programme on the impact of municipal wastewater reuse on the water resources, 2002-2003 (MAP, national and regional organizations/institutions)
- ❖ Development of cost benefit study on the utilization of treated municipal wastewater as an additional water source as compared to desalinated water, 2002-2003 (ROPME, national and regional organizations/institutions)

Costs estimated at US\$ 250,000

Public Awareness

- ❖ Development of guidelines for the formulation of pre-feasibility studies for projects on municipal wastewater, 2003 (UNEP, ROPME, PERSGA, MAP and other relevant organizations)
- ❖ Development and improvement of educational *curricula* for environmental management of municipal wastewater, 2002 (ALECSO, national and regional institutions)
- ❖ Conduct public awareness campaigns through mass media information systems, 2002-2005 (national and regional organizations/institutions)
- ❖ Production of public awareness materials, 2002-2005 (national and regional organizations and institutions)
- ❖ Development of community participation programme at national and local levels, 2002-2005 (national and regional organizations and institutions)
- ❖ Production on information, education and communication guidelines for decision makers, 2002-2005 (national and regional organizations and institutions)

Costs estimated: US\$ 200,000

ESTIMATED TOTAL COST: US\$ 3,000,000

IV. Development and Implementation of Pilot/Demonstration Projects

The annotated outline below was endorsed by the workshop for developing and implementing feasible pilot/demonstration projects in the region and to apply the specific guidance given in the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, its Strategic Action Plan on Municipal Wastewater and associated Draft Recommendations for Decision-making in the region.

Countries wishing to participate on the development and implementation of the initial set of pilot/demonstration projects were invited to express their interest and to identify the suitable locations/sites. The criteria for choosing such locations included: (i) a “manageable” size in terms of population (i.e., not too big); (ii) importance/uniqueness of the location in environmental and socio-economic terms; (iii) possibilities for the pilot project to succeed; (iv) possibilities for replicability; and (iv) potential for establishing or fostering partnerships among stakeholders, including the public and private sectors.

The following locations/sites, not listed in order of priority, were preliminarily identified by the workshop as potential suitable for developing and implementing these projects (additional locations might be identified)ⁱ:

- ❖ Howar Island, **Bahrain**
- ❖ Douda, **Djibouti**
- ❖ Marsa Alm, **Egypt**
- ❖ Aqaba, **Jordan**
- ❖ Tawi Part of Sur Town, **Oman**
- ❖ Governorate of Khanyounis, **Palestine**
- ❖ Port Sudan (a part of the city), **Sudan**
- ❖ Jableh, **Syria**

Annotated outline for developing and implementing of pilot/demonstration projects

Building and/or strengthening the technical, legal and institutional capacities and expertise, and promoting approaches adapted to the local context of each pilot/ demonstration project is critical. A good understanding of the local socio-economic, political, cultural and environmental conditions and constraints, as well as of the capacities, barriers, demands, trends and technical specifications, is needed for the design of these projectsⁱⁱ.

This annotated outline would have to be modified/adapted to suit the particular conditions of each country/municipality/site and to reflect the ongoing relevant activities.

1. Description of the location/site
 - 1.1 Physical environment (e.g., setting and resources)
 - 1.2 Socio-economic condition (e.g., development trends, population, economic activities, pressures and threats, opportunities such as new coastal developments)
 - 1.3 Threats posed to the environment and human health by discharges of untreated or partially treated municipal wastewater
 - 1.4 Major areas/sectors potentially affected (e.g., tourism, fisheries and seafood, desalinisation of seawater, recreational amenities)

Output: Rationale (justification) for selecting the location/site as a demonstration project, on the basis of its environmental and socio-economic significance for both the country and the region, possibility of success and potential for replicability

2. Status of existing management of municipal wastewater in the location/site

- 2.1 General planning, management approaches, regulatory framework, tools and incentives (e.g., economic instruments and instruments to foster voluntary action by industry)
 - 2.1.1 Measures to prevent or reduce contaminant production or a harmful practice
 - 2.1.2 Measures to modify contaminants, practices or reduce contaminant discharge or extent of the practice
 - 2.1.3 Measures to prevent or reduce degradation of affected areas
 - 2.1.4 Measures to mitigate or reverse degradation that is unavoidable or has already occurred
- 2.2 Available infrastructure and type of treatment (s)
- 2.3 Reuse of municipal wastewater (e.g., effluent/sludge recycling for irrigation, industrial process water, land filling, fertiliser)
- 2.4 Institutional arrangements and capacities
- 2.5 Role of stakeholders (e.g., municipalities, civil society, private sector, non-governmental organizations)

Output: Status of municipal wastewater management and barriers, needs and opportunities for establishing partnerships

3. Analyses for action, including the effectiveness and barriers of the strategies in place to manage municipal wastewater in the location/site

- 3.1 Assessment of water resources
 - 3.1.1 Sources of freshwater to meet water consumption needs (e.g., groundwater, rivers, desalinated seawater, treated domestic wastewater, drainage water) and their sustainability
 - 3.1.2 A multi-sectoral analysis of current uses
 - 3.1.3 An evaluation of water quality applied to the uses
 - 3.1.4 Projections as to future water supply and demand
- 3.2 Inventory of major sources of municipal wastewater, e.g., diffuse sources (e.g., latrines, septic tanks) and point sources (e.g., outfalls, animal husbandry, industries such as food processing, pharmaceuticals)
- 3.3 Assessment of the quality of wastewater discharges in selected treatment plants or sites (e.g., on-site sampling and analysis, pollution loads, faecal coliforms concentrations)
- 3.4 Major areas/sectors potentially affected (e.g., tourism, fisheries and seafood, desalinisation of seawater, recreational amenities)
- 3.5 Cost-benefit analysis with regard to, *inter alia*, tourism and recreation, human healthⁱⁱⁱ, groundwater and fishing losses^{iv}

Output: Assessment of water resources demonstrating the benefits of action vs. no action and providing specific recommendations for sustainable uses and management of wastewater effluent/sludge

4. Development of a sanitation strategy^v

On the basis of the analyses and consultations carried out as part of 1-3 above, the feasibility and advantages of applying the following step-wise integrated approach will be evaluated. The overall strategy of this approach is to prevent and reduce the pollution to the maximum extent possible, while remaining (more concentrated) waste will be treated through resource recover options and utilized.

Sequential steps to achieving sustainable management of municipal wastewater^{vi}:

- (i) Pollution prevention
- (ii) On-site treatment and reuse (close to source)
- (iii) Non-conventional treatment at (off-site) small-scale plants using low cost technology and ecological engineering for the conversion of wastewater into resources
- (iv) Use and/or stimulation of the natural self-purification capacity of receiving water bodies
- (v) Conventional off-site sanitation collection and centralized high-technology end-of-pipe treatment

The local conditions will determine which step in the proposed approach is most appropriate and contributes more effectively to addressing the management of municipal wastewater. Building the local technical capacities and expertise and promoting approaches adapted to the local context of each pilot/demonstration project is of critical importance.

It should also be underlined that the selection of any strategy, and its eventual success, would depend of a wide consultative process involving all sectors of society. This is of the utmost importance taking into consideration that environmentally sound municipal wastewater management will require the largest share of investment capital, even more than investment required to provide access to clean drinking water and irrigation^{vii}.

Output: Concerted sanitation strategy, which shall include: (i) the selection and/or adaptation of a particular step or steps (on the basis of the availability of freshwater resources, water consumption rates, population density, associated costs, local capacities and resources); (ii) the development of appropriate effluent limitations, standards and guidelines; (iii) the needs of the particular municipality or site to implement the chosen step (s) (e.g., financial and human resources, capacity-building^{viii}, transfer of technology); (iv) a detailed and costed work plan to operationalise the selected strategy, with the identification of partners, their concrete contributions and responsibilities; and (v) recommendations for concrete mechanisms and actions, including innovative financial arrangements^{ix}, in support of the implementation of a more cost-effective municipal wastewater management (e.g., an appropriate and stable national/municipal legal and regulatory framework, financial and fiscal stimuli to promote waste minimization and pollution prevention, recycling, reuse) and the involvement of the private sector^x.

5. Funding and implementation of the selected sanitation strategy

Resources, both financial and human, need to be mobilized to carry out the activities agreed as part of the work plan. Detailed budgets for developing and implementing each pilot

project need to be prepared in consultation among each municipality/site and the participating stakeholders. Potential sources of support include: local and national authorities, private industries (e.g., water, tourism, fisheries), national, regional and international development banks, multilateral funding mechanisms, United Nations organizations and programmes, and the donor community.

6. Work plan and timetable

- (i) Circulation of the draft annotated outline to all participants in the Workshop on Municipal Wastewater Management in West Asia - October 2001
- (ii) Review and finalization of the draft annotated outline, Workshop on Municipal Wastewater Management in West Asia - 10-12 November 2001
- (iii) Presentation of the annotated outline and the region's draft work programme to the GPA Intergovernmental Review Meeting (Montreal, Canada, 26-30 November 2001)
- (iv) Finalization of the annotated outline (e.g., work plan, timetable and detailed budget for each selected location/site) - February 2002
- (v) Incorporation of the costed outline into project proposal for funding and submission to selected, national, regional and international funding mechanisms

ⁱ Partners would need to be identified by the individual countries and shall include national and municipal authorities, private sector, university/scientific institute, non-governmental organizations (NGOs) and the civil society.

ⁱⁱ These are the prerequisite for designing sustainable projects and their associated investments plans. Key factors to consider include (see PricewaterhouseCoopers. 2001. Promoting sustainable financing: What can be learnt from past experience with public-private-partnerships? Unpublished): (i) the population's ability to pay (i.e., can the population afford the tariff?), its willingness and attitude towards payments (i.e., are they used to paying and willing to pay for water services and wastewater treatment?); (ii) proposing technical solutions adapted to the population's needs and demands; and (iii) planning a step-by-step involvement of the private sector to build a more efficient and sustainable partnership. These three factors are of particular importance to West Asia, especially the latter, since presently the public sector in all countries controls municipal wastewater management and the involvement of the private sector is almost non-existent.

ⁱⁱⁱ Pathogenic organisms in domestic wastewater-contaminated marine and estuarine waters cause massive transmission of infectious diseases (e.g., respiratory and enteric) to bathers and consumers of raw and undercooked shellfish with a global economic impact recently estimated at US \$10 billion per year (GESAMP & ACOPS. 2001. Protecting the oceans from land-based activities - Land-based sources and activities affecting the quality and uses of the marine, coastal and associated freshwater environment. GESAMP Reports and Studies, No. 71). The number of working days lost arising from illnesses associated with these activities can be very significant.

^{iv} Also, eutrophication and toxic algae blooms, stimulated by an excess of nutrients from sewage and agricultural chemicals and wastes, does widespread and serious damage to the life of coastal waters and fisheries. For instance, at least some of the "fish kills" events recorded in the ROPME Sea Area between 1986-2001 (the most recent one off Kuwait in August-September 2001 estimated to have kill more than 3,000 tons of fish) could be probably attributed (at least partially) to pollution caused by discharges of sewage and nutrients into the coast.

^v Based on: (i) the application of a holistic approach which considers the relationship between pollutant discharge, carrying capacity and present and future uses of the water resources; (ii) the application of a mix of

technological and managerial intervention options, each appropriate and optimal for different zones in the city; and (iii) the realization that water pollution abatement is a long time process (better measured in decades than in years), rather than a short time intervention.

^{vi} The appropriate conditions, advantages and disadvantages, etc of each step are described in detail in the documents (i) Strategy options for sewage management to protect the marine environment, commissioned by the UNEP/GPA Coordination Office to the International Institute for Infrastructural, Hydraulic and Environmental Engineering (IHE), Delft, the Netherlands; and (ii) the draft Guidance on Municipal Wastewater, developed jointly by the UNEP/GPA Coordination Office, WHO, UNCHS (Habitat) and the WSSCC (available at <http://www.gpa.unep.org>).

^{vii} The need for investments has recently been estimated at US\$ 4,500 billion, i.e., US\$ 180 billion per year on a global scale over the next 25 years (PricewaterhouseCoopers 2001).

^{viii} Including (i) strengthening or building the institutional and regulatory capacities of government agencies to regulate the water sector and enforce environmental standards; (ii) fostering the capabilities of Governments to design and negotiate “fair” contractual agreements with the private sector (although it has been said that the overall climate of trust is perhaps more important than the contractual arrangements); (iii) improving the public sector delivery of water services and sanitation; and (iv) promoting partnerships with the multilateral financing mechanisms, the private sector and civil society for developing best practice guidance for private involvement in water services and wastewater management that specifically includes criteria for provision to the poor and protection of the marine and coastal environment (see also Megateli, N.Z.Z. 2001. Innovative sustainable financing for marine and coastal environments subject to land-based stressors: A review of World Bank Group experience, unpublished report).

^{ix} For example, the World Bank Group financial arrangements to protect the marine environment from land-based activities considers various types of innovative financing that offer a good potential for municipal wastewater management in West Asia, in particular: (i) International Finance Corporation private sector loans and creation of venture capital (via the Terra Capital Fund and Small and Medium Enterprise Programme); (ii) cost internalisation of environmental investments and benefits, in particular through cost-recovery and joint billing for water and wastewater; (iii) environmental and social funds aimed at various kinds of grant, credit and co-financing arrangements via financial-institutional partnerships between banks, financial intermediaries and public and private sector partners; and (iii) Global Environment Facility (GEF) grants associated IBRD/IDA loans that promote strategic partnerships (see footnote 12, above).

^x The involvement of the private sector and civil society in addressing land-based activities is currently very limited in West Asia (including countries bordering the Red Sea and Gulf of Aden). It should be stressed that private sector involvement in providing water services (including wastewater treatment) does not automatically mean that consumers will have to pay more for their water (and services). However, as has been pointed out in a recent study supported by the World Wild Life Fund for Nature, UNICEF and the IHE-Delft, because of political, financial and other risks, the private sector is unlikely to provide a substantial proportion of the enormous investments needed to ensure adequate services for every one (Schwartz, K., M. Blokland, A. Nigam & B. Gujja. 2001. Privatisation of water services in developing countries: Implications for the poor and nature. Unpublished). Thus, the role of Government in financing water services infrastructure remains paramount for the foreseeable future in developing countries. Demonstration projects, such as these ones in West Asia, to stimulate the use of innovative technologies and financing arrangements and illustrate their cost-benefits can be a very useful vehicle to encourage both investments and environmentally responsible action by the private sector.