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F I E L D R E P O R T

# CENTRAL AMERICAN REGIONAL WORKSHOP ON WASTEWATER MANAGEMENT

San Salvador, El Salvador  
July 12-16, 1993

SECRETARY  
INTERNATIONAL REFERENCE CENTRE  
FOR COMMUNITY WATER SUPPLY AND  
SANITATION (IRC)

WASH Field Report No. 419  
August 1993



Sponsored by the U.S. Agency for International Development  
Operated by CDM and Associates

341.0-93CE-11155

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Prepared for the Office of Health,  
Bureau for Research and Development  
U.S. Agency for International Development  
under WASH Task No. 455

by  
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LO: 341.0 93 CE

August 1993

Water and Sanitation for Health Project  
Contract No. 5973-Z-00-8081-00, Project No. 936-5973  
is sponsored by the Office of Health, Bureau for Research and Development  
U.S. Agency for International Development  
Washington, DC 20523

## RELATED WASH REPORTS

*Andean Regional Workshop on Alternative Approaches to Wastewater Management.* March 1993. Prepared by J. Ellis Turner and Alan Hurwitz. Field Report No. 394

*Guidelines for Improving Wastewater and Solid Waste Management.* July 1993. Prepared by Richard Andrews, William B. Lord, Larry O'Toole, and Fernando Requena. Technical Report No. 88.

*Central American Wastewater Treatment Workshop Preparation Visit.* May 12, 1993. Prepared by Ann Hirschey. Task 455.

*A Brief Summary of International, Governmental, Non-Profit and Other Groups Involved in Wastewater Development in Central America.* March 1993. Prepared by Chris Bessenecker. WASH Working Paper.

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## ABOUT THE AUTHORS

Armando F. Balloffet, Ph.D., P.E., has more than 24 years' experience in systems analysis applications to environmental impact assessments, water resources studies, noise and air quality assessments, and large project management. He has directed numerous multi-year, multi-million dollar studies and has also completed many individual consultancies. His overseas experience includes projects in South America, Africa, and Asia. Among his projects are the bi-annual EPA report to Congress on the effectiveness of the Clean Water Act, the evaluation of toxic pollution in Laguna Lake in the Philippines, and continuing consultancies at the Rocky Flats Plant in Colorado. He founded Balloffet and Associates, Inc. in 1986 to provide planning and engineering services in the areas of transportation, water resources, and the environment. The company has 25 professionals and two offices in Colorado.

Dr. Balloffet's education includes a B.S.C.E. from the School of Engineering and Applied Sciences, Columbia University, a B.A. in science and mathematics from Columbia College, New York, a master's in environmental engineering from the University of Colorado, and a Ph.D. in water resources systems analysis from Colorado State University, Fort Collins. He is a registered professional engineer in four states.

Alan Hurwitz, Ed.D., is a consultant in strategic planning and organizational/institutional development. He specializes in helping diverse groups to identify and work toward common goals and in the facilitation of large systems change. Dr. Hurwitz works with large private corporations, local and national governments, and non-profit organizations. He has worked on international development and other projects in 28 countries, including almost every country in Latin America, and countries in Africa, Europe, the Caribbean, and the Near East.

Dr. Hurwitz has his bachelor's in political science from Yale University and an Ed.D. from the Center for International Education at the University of Massachusetts. He has many professional and personal ties to Latin America.



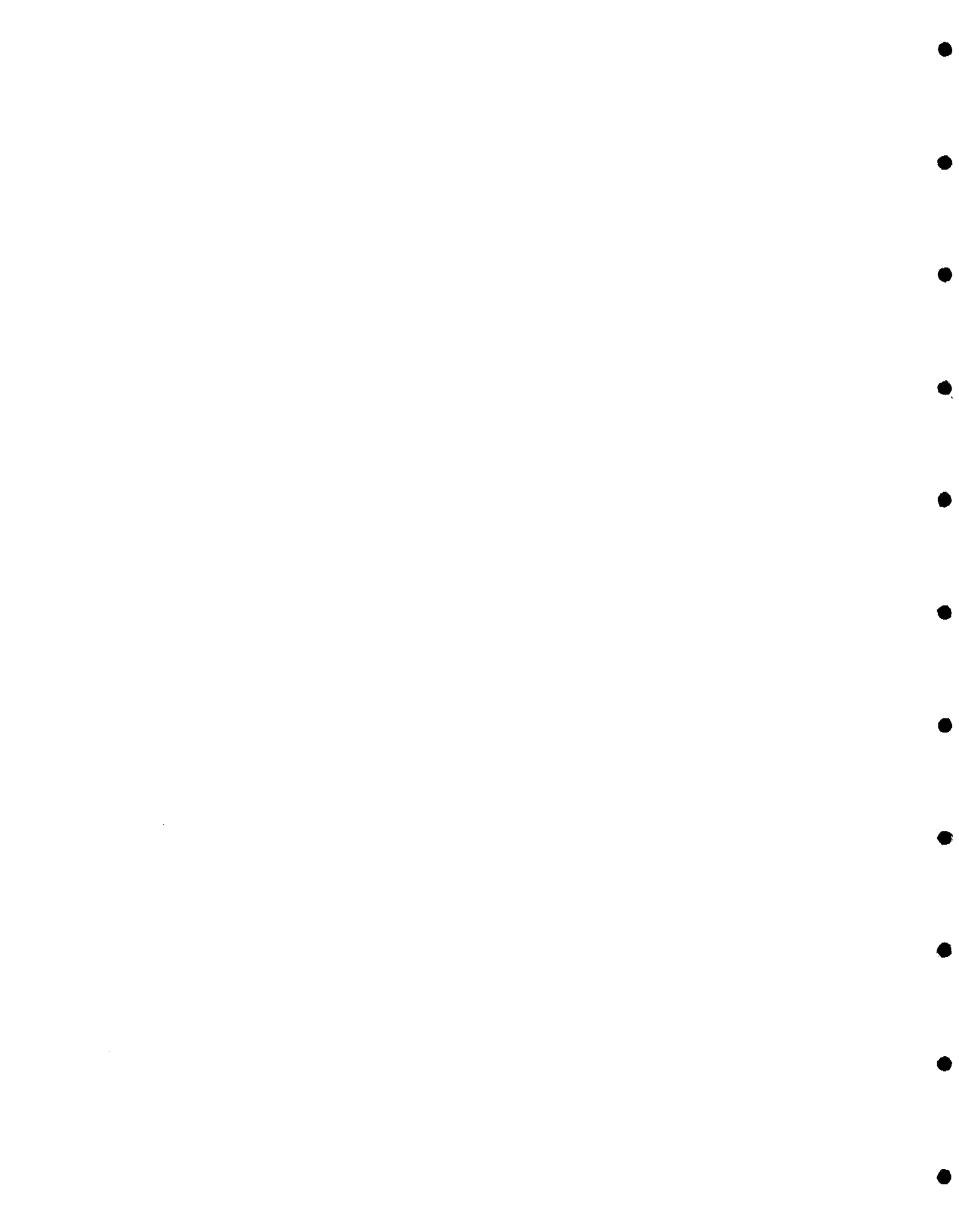
## ACKNOWLEDGMENTS

The authors wish to acknowledge the support of ANDA, SEMA, and the other Salvadoran agencies that contributed to the success of this workshop. We thank Ing. Rodolfo Saenz of PAHO who provided a well-received, balanced, and thought-provoking assessment of public health issues. We also wish to particularly thank the many WASH people who worked so hard to make this workshop a success, including Ellis Turner, Eddy Perez, Chris Bessenecker, and Fred Rosensweig.

The workshop simply would not have occurred without the tireless work of the Workshop facilitating team, which included Denis LaPointe, Ann Hirschey, Rita Cestti (World Bank), Emilia De Quintanilla, and Leslie Barker. Ann Hirschey deserves our particular thanks for a job well done as the Workshop Coordinator.

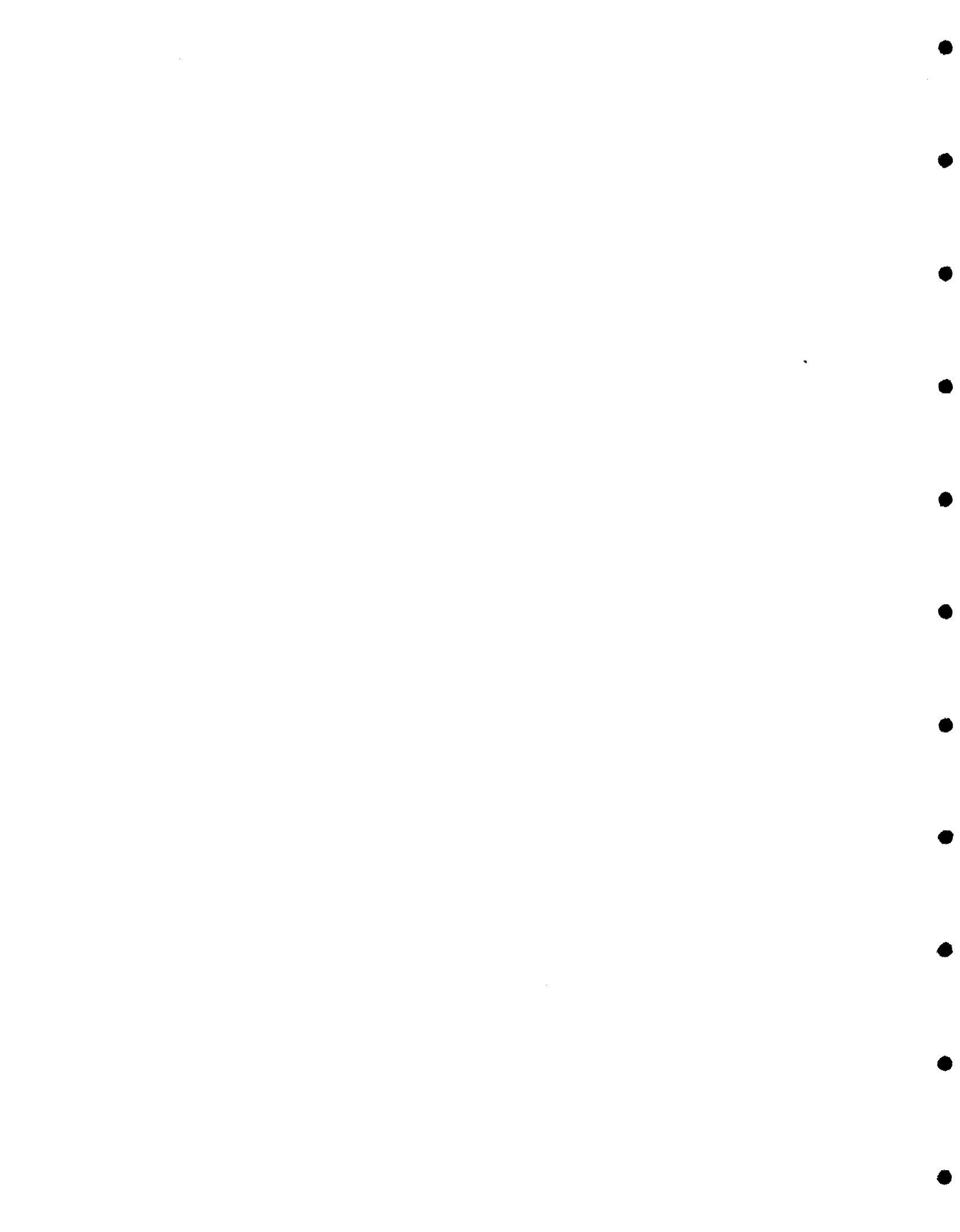
We wish to point out that the workshop succeeded in no small measure due to the preparation and enthusiasm of the participants from El Salvador, Nicaragua, Guatemala, Costa Rica, Panama, Honduras, and the Dominican Republic. Finally, we wish to thank all our Salvadoran hosts for their friendship and their frank approach and discussion of wastewater treatment problems in El Salvador, which was recognized by the participants of the other countries.





## ACRONYMS

A.I.D.	U.S. Agency for International Development (Washington, D. C.)
ANDA	Administración Nacional de Acueductos y Alcantarillados (El Salvador)
CAPRE	Comité Coordinador Regional de Instituciones de Agua Potable y Saneamiento de Centro América, Panamá y la República Dominicana
IDB	Inter-American Development Bank
GTZ	German International Aid Agency
LAC	Bureau for Latin America and the Caribbean
NGO	nongovernmental organization
PAHO	Pan American Health Organization
RWSN CA	Regional Water and Sanitation Network—Central America
SEMA	Secretaría Ejecutiva del Medio Ambiente (Salvadoran environmental agency)
TPM	team planning meeting
USAID	U.S. Agency for International Development (overseas missions)
WASH	Water and Sanitation for Health (project)



## EXECUTIVE SUMMARY

In recognition of the need for realistic, effective, and sustainable national and regional approaches to wastewater management, WASH has developed a comprehensive management framework whose components reflect the multiple contributors to the problems and solutions, and which suggest many possible points of intervention. Very briefly, the WASH method relies on the application of a variety of tools to the management task, including economic, institutional, and policy instruments in addition to the more traditional applications of technology. The purpose of this workshop was to expose key managers and decision-makers in the sector to these alternative approaches to wastewater management and their practical application, and to provide them with an opportunity to begin the planning of applications in their own countries. The workshop methodology was based on adult learning principles, emphasizing active participation in sessions to draw on the participants' individual experiences. In keeping with the interactive nature of the workshop, the facilitators employed a balance of lectures, field visits, panels, and small-group work.

Following the highly successful Andean Regional Workshop on Alternative Approaches to Wastewater Management (September 28–October 2, 1992 in Santiago, Chile), WASH was asked by the Bureau for Latin America and the Caribbean (LAC) of A.I.D. to carry out another workshop on the same topic in Central America. This workshop was planned by WASH and executed on July 12-16, 1993 in San Salvador, El Salvador. The World Bank and the Pan American Health Organization provided support and made presenters available. The workshop was structured so as to have participants from seven Central American and Caribbean countries, including Panama, Costa Rica, Honduras, Nicaragua, El Salvador, Guatemala, and the Dominican Republic.

The workshop team met formally twice in the months preceding the workshop and developed a design under the overall guidance of Dr. Alan Hurwitz, Team Leader. WASH personnel carefully solicited and screened candidates to be participants in the workshop and made an initial trip to El Salvador to arrange local support and other logistics.

The workshop proceeded on schedule and as planned, except for a few minor field modifications. Participants evaluated the workshop (see Appendix F) to allow planning and follow-up of future workshops. The overwhelming response was that the workshop met the goals and needs of the participants. Participants also provided individual input for the workshop facilitation team.

Many of the participants expressed a desire to transmit their learning to their own countries by way of national-level workshops modified to account for areas of specific need. WASH believes that these national events could be extremely valuable by providing effective wastewater management tools for controlling cholera and other waterborne diseases. A main point of the framework is to involve a wide range of decision-makers in the wastewater management process. National workshops could provide opportunities for involving a large group of these and other stakeholders. On another subject, many participants wanted more of a model or a manual of

practice than a framework to assist them with their planning efforts. A discussion of these models (including simulation and optimization models, expert systems, and other decision support systems) could be included in the framework discussion in future workshops.

The authors believe that the current design of the workshop is extremely rich and has been executed very successfully, with minor modifications, in two regions. No major design changes are suggested.

## **Chapter 1**

### **INTRODUCTION**

#### **1.1 Background**

In recognition of the need for realistic, effective, and sustainable national and regional approaches to wastewater management, WASH has developed a comprehensive management framework whose components reflect the multiple contributors to the problems and solutions, and which suggest many more possible points of intervention than have traditionally been considered. In addition to the appropriate use of technology, a large number of institutional tools are suggested by the framework, such as economic incentives, legal and regulatory instruments, public participation, environmental and health education programs, and institutional strengthening.

The purpose of the workshop was to expose key managers and decision-makers in the sector to these alternative approaches to wastewater management and their practical application, and to provide them with an opportunity to begin the planning of applications in their own countries and throughout the region.

Following the highly successful Andean Regional Workshop on Alternative Approaches to Wastewater Management (September 28–October 2, 1992, Santiago, Chile), WASH was asked by the Bureau for Latin America and the Caribbean (LAC) of A.I.D. to carry out another workshop on the same topic in Central America. This workshop was planned by WASH and executed on July 12-16, 1993 in San Salvador, El Salvador. Detailed information on the Chile workshop can be found in WASH Field Report No. 394 and in other workshop documents at WASH.

The workshop was structured to have participants from seven Central American and Caribbean countries, including Panama, Costa Rica, Honduras, Nicaragua, El Salvador, Guatemala, and the Dominican Republic.

#### **1.2 Scope of Work and Workshop Personnel**

A scope of work for WASH's involvement in the Central American Regional Workshop on Wastewater Management in San Salvador is contained in Appendix A. The purpose of the workshop was to repeat and enhance the presentation made in Chile by introducing a more comprehensive and systematic approach to the management of wastewater programs than has been the usual practice in the region. The workshop was based on the concepts developed by WASH of a comprehensive framework for wastewater management, and on adult training methods.

Very briefly, the WASH method relies on the application of a variety of tools to the management task, including economic, institutional, and policy instruments in addition to the more traditional applications of technology. Appendix B contains a summary of the WASH framework, (contained

in the workshop brochure) and a detailed treatise is presented in WASH Technical Report No. 88, which was translated to Spanish for the workshop.

The workshop team included the following:

**Armando F. Balloffet (WASH Consultant)—Framework Presenter**

**Leslie Barker (WASH Consultant)—Administrative Assistant**

**Chris Bessenecker (WASH Consultant)—Assistant Task Manager for the Workshop**

**Rita Cestti (World Bank)—Presenter on Economic Case Studies and Panelist**

**Ann Hirschey (WASH)—Workshop Coordinator and Panelist**

**Alan Hurwitz (WASH Consultant)—Workshop Designer and Team Leader**

**Denis LaPointe (WASH Consultant)—Presenter on Appropriate Technology**

**Eduardo Perez (WASH)—Overall Task Manager**

**Emilia De Quintanilla (WASH Consultant)—Technical Consultant**

**Rodolfo Saenz, PAHO)—Presenter on Health Issues**

Local support of the workshop was provided by Office Service of San Salvador. The workshop was held in the Hotel Camino Real, San Salvador.

## Chapter 2

### WORKSHOP PLANNING

#### 2.1 Planning

Planning for the workshop began with an in-depth review of the status of wastewater management activities in each of the seven countries involved in the workshop. Chris Bessenecker, WASH consultant, conducted the review from the WASH office interviewing government agencies, nongovernmental organizations (NGOs), and other groups involved in the sector. He wrote a report summarizing his findings, which is available from WASH (see *Related WASH Reports*). Because of the level of activity and interest found in El Salvador, it was decided to hold the workshop there. Once the site was decided upon, the technical team was selected and the workshop planning was begun.

The first of two team planning meetings (TPMs) was held on April 8 and 9, 1993 at WASH Operations Center in Arlington. That meeting was chaired by WASH consultant and professional facilitator, Jawara Lumumba. The team members worked to review the process and expected results. The planning included a review of the Chile workshop, presentations on the WASH framework, discussions about the background of the team members, and roles to be played. There was a discussion of the participating countries and the type of participants desired.

WASH and the technical team developed a brochure in English and Spanish that described the background of the workshop, goals and objectives, content, and desired participants (see *Appendix B*). Chris Bessenecker then distributed this to more than 40 organizations in the seven countries asking them to nominate candidates for the workshop by sending resumes to WASH. WASH received 60 potential candidates of which 38 were selected. This process resulted in candidates whose experience and influence in the area of wastewater management promised to make the workshop interesting and productive. The final list of participants is found in *Appendix C*. A large measure of the success of the workshop was due to the careful work of selection of the participants. Chris Bessenecker also made calls to participants of the Chile workshop to obtain feedback on the way that workshop made a difference (if any) to them. A memo describing the results of this follow-up effort is reproduced in *Appendix D*.

Team members who were responsible for workshop sessions worked under the general guidance of Dr. Alan Hurwitz and Eddy Perez to develop and refine the workshop design, with particular attention to the workshop process. A second TPM was held in Arlington on June 14 and 15, 1993 to finalize the design for the workshop and establish the final set of responsibilities. The final workshop design and the resulting agenda are presented in *Appendix E*.



## **2.2 In-country Preparations**

As Workshop Coordinator, Ann Hirschey organized and coordinated the in-country preparations. These included an initial Workshop Preparation Visit carried out by Ann from May 1-8, 1993 (see Related WASH Reports). The trip had three purposes:

1. Arrange for workshop logistics, including a hotel, a technical consultant to help with local arrangements, and a secretarial support organization.
2. Interview ministry officials involved in wastewater treatment to get a better understanding of the groups that are involved in treating wastewater or are dealing with the problems caused by the lack of wastewater treatment.
3. Visit potential field visit sites.

The workshop facilitation team arrived in San Salvador on July 7 and 8 and were met by the local support consultants and contractors. An office was established in the hotel, and a computer, printer, and other necessary equipment were rented. The quality and reliability of the equipment caused some difficulties, but eventually these were worked out. The team met with the San Salvador USAID mission, various panelists, and other officials. These individuals were made aware of the purpose of the workshop and their role in the opening and closing ceremonies and external panel discussion. Lists of the individuals who participated in these activities are found in Appendix C.

## Chapter 3

### WORKSHOP IMPLEMENTATION

#### 3.1 Workshop Goals and Objectives

The workshop was intended to be a participatory effort to develop new strategies to improve wastewater management and reduce the incidence of cholera and other water-related diseases. It was aimed at high-level public sector decision-makers from government sectors that represent health, environment, water and sanitation, urban development, finance, planning, natural resources, and agriculture.

The following goals and objectives of the Chile workshop were adopted as appropriate for the Central American workshop:

- Participants will appreciate the limitations of current wastewater management approaches in addressing current challenges in Central America and develop a stronger commitment to trying new approaches.
- Participants will gain awareness of new or under-utilized technical options and tools for evaluating new options.
- Participants will be able to use a “systems approach” to analyze actual and potential wastewater management situations, i.e., including institutional and economic as well as technical factors, and apply them to at least one “back home” situation.
- Participants will be more effective in promoting desired changes within their own wastewater management systems.
- All of us (participants and facilitators) will better understand the applicability of diverse wastewater management approaches to Central America.
- Participants will leave the session with a stronger sense of being a significant part of an extensive network of people who deal with wastewater management from many different perspectives and professional roles.

#### 3.2 Participants

Thirty-eight participants attended the workshop, as listed in Appendix C. Five participants each came from Nicaragua, Honduras, Panama, Costa Rica, Dominican Republic, and Guatemala. There were eight participants and numerous dignitaries and panelists from El Salvador. Below is a profile that reflects the management level and technical area expertise of the participants.

## **PROFILE OF PARTICIPANTS**

- 4 Agency Directors
- 24 Divisional or Departmental Directors
- 2 Regional Directors
- 1 Divisional Sub-Director
- 1 National Assembly Representatives
- 3 Environmental Sanitation Advisors
- 1 Urban Planning Advisor
- 2 Urban Master Plan Coordinators
- 1 Urban Water and Sanitation Project Engineer
- 1 Environmental Technical Assistant

## **PROFILE OF AGENCIES REPRESENTED**

- 6 Ministries of Public Health
- 6 National Water and Sanitation Agencies
- 4 Municipal Water and Sanitation Agencies
- 1 National Legislatures
- 1 National Natural Resources Agency
- 3 National Environmental Coordination Committees
- 4 Monitoring/Regulatory Committees
- 1 National Municipal Association
- 3 National Municipal Development Agencies
- 1 Hydroelectric Commission
- 1 Presidential Committee for the Rehabilitation of a Contaminated Lake
- 1 Housing and Urban Planning Agency
- 1 Capital Environmental Protection Agency
- 1 Central America Region Water and Sanitation Coordinating Committee

### **3.3 Workshop Methodology, Content, and Schedule**

The workshop methodology was based on adult learning principles, emphasizing active participation in sessions to draw on the participants' individual experiences. In keeping with the interactive nature of the workshop, the facilitators employed a balance of lectures, field visits, panels, and small-group work.

The workshop (see Appendix E for workshop design) followed a sequence that centered around a conceptual framework for developing new approaches to wastewater management. For a full description of this WASH-developed framework and its application, see WASH Technical Report No. 88.

#### *Monday*

The workshop was formally opened by the Minister of Agriculture and Ranching, Mr. Antonio Cabrales. Mr. Cabrales' keynote address was preceded by opening remarks from Mr. Henry Reynolds, the Deputy Director of the USAID mission in El Salvador; Mrs. Mirna Lievano de Marques, the Minister of Planning and Coordination of Economic and Social Development; Dr. Lisandro Vasquez Sosa, the Minister of Public Health and Social Assistance; Mr. Juan Ramón Menjívar, General Manager of the ANDA (National Administration of Aqueducts and Sewerage Systems); and Mr. Miguel Araujo, Executive Director of SEMA, the Executive Secretariat of the Environment. The inauguration was opened and moderated by Team Leader Dr. Alan Hurwitz.

The next session provided the participants with an overview of the workshop results, agenda, methodology, and norms, and began a discussion of the criteria for determining successful wastewater management efforts. Following this opening session, the participants were taken by bus to the ANDA recreational club overlooking the city, where a box lunch was served. Next, the group visited the community of Alpes Suizos, just outside San Salvador, and the Hilasal, S.A. textile factory. This field visit gave the participants a chance to view the technically successful wastewater treatment plant at Alpes Suizos, comparing it to an adjacent abandoned plant, and meet with town officials and representatives of the community. During the visit to Hilasal, participants viewed a treatment plant that was operating but was not adequately treating industrial contamination. Before the field visit, the participants were given guidelines for a competition among small groups on how to carry out a Phase II plan for Alpes Suizos, given projected growth and changes in the nature of the wastewater to be treated. They worked on their proposals Monday evening.

#### *Tuesday*

The participants presented their Phase II proposals on Tuesday morning and each one was discussed.

The rest of the day was spent presenting the wastewater management framework developed by WASH. During the framework presentation and the following half-day session, presenters conveyed three main points:

- The systems nature of the wastewater management problem
- How new tools such as wastewater reuse, economic and policy instruments, and appropriate technology could be applied to the problem
- How different actors, including the public, play a key role in solving the wastewater problem

The presenters defined the elements of the framework and used examples to highlight how they could be applied.

### *Wednesday*

Because of the design of the workshop, many of the sessions exposed the participants to the wide variety of actors and perspectives in the wastewater system. To further develop the range of players, an Actors' Panel discussion was held on Wednesday morning. This session consisted of a discussion among a group of Salvadoran representatives of public and private sector organizations involved in wastewater issues, and questions from participants.

Wednesday afternoon was devoted to the selection and application of appropriate technology, including a diagnostic group exercise by country group.

### *Thursday*

The first session on Thursday continued the exercises from Wednesday afternoon. Following this, a presentation was made on encouraging change in the wastewater management system. This included the use of the Force Field Analysis methodology, as applied to a case study presented by the Panamanian group (the cleanup of the Bay of Panama). In the afternoon, a PAHO representative from Washington, D.C. (Dr. Priscilla Rivas) made a short presentation on the current PAHO initiative in this field. The end of the day included a group dinner at a local restaurant.

### *Friday*

The last day of the workshop included individual and country action planning by the participants, a panel presentation by external and regional support groups, presentation of the country action plans (see Appendix G), and the workshop closure. The support group panel included representatives from the Agency for International Development (USAID), Pan American Health Organization (PAHO), the World Bank, the Inter-American Development Bank, Regional Water and Sanitation Network for Central America (RWSN), CAPRE, the Italian Agency for International Cooperation, WASH, and GTZ (see Appendix C for panel list).

Each of the participants received a workbook, a copy of the WASH Framework Guidelines (WASH Report No. 88), copies of all overheads, flip charts, and handouts; a group photo; and a certificate of completion for attending the workshop. In addition, they had ample opportunities to review the reference materials available in the back of the workshop room throughout the week, and to sign up to receive copies of these materials. A complete copy of the workshop workbook is in the WASH library.

## Chapter 4

### WORKSHOP ASSESSMENT

#### 4.1 Participant Evaluation of Workshop

An evaluation form (see Appendix F) was developed, based in part on the Chile workshop evaluation form, but modified to include additional inputs that were judged by the workshop team to be useful in the planning and follow-up of future workshops. The overwhelming response was that the workshop strongly met the goals and needs of the participants. Participants also provided individual input for the workshop facilitation team. The form included a scale rating and open questions.

##### 4.1.1 Numerical Ratings

How would you rate the various aspects of the workshop? (Scale of 1-5 with 1 being dissatisfied and 5 being satisfied)

RATING	DISSATISFIED			SATISFIED	
	1	2	3	4	5
<b>Administrative Aspects</b>					
Workshop in general	-0-	-0-	-0-	5	24
Hotel	-0-	-0-	1	5	22
Meals	-0-	-0-	4	7	17
Transportation	-0-	1	2	14	11
Notification of workshop	-0-	1	-0-	3	24
Materials handed out	-0-	-0-	1	8	19
<b>Content</b>					
Field trip	-0-	-0-	4	12	14
Conceptual framework	-0-	-0-	1	8	19
Economic incentives (Cestti presentation)	-0-	1	2	7	19
Panel of actors for WWM	-0-	-0-	2	9	20
Appropriate technologies	-0-	2	3	7	17
Health aspects (Saenz presentation)	-0-	-0-	1	6	22
Change promotion in WWM	-0-	-0-	1	10	17
Donor panel	1	-0-	4	8	12
Individual cases (Optional evening activity)	-0-	-0-	2	10	14
Elaboration of action plans	1	-0-	2	10	14
Interchange of ideas and experiences in general	-0-	-0-	1	5	22

### **4.1.2 Qualitative Comments**

The evaluation form contained a series of open questions regarding other aspects of the workshop. The compiled data are in Appendix F, but below is a synthesis of the most often expressed comments.

- Many participants expressed a need for more time for the action planning process and more time for group activities.
- Participants asked for the scope of the workshop to be expanded to cover solid wastes and toxic and hazardous waste management.
- The support group panel generally received the lowest grades; the participants expected the announcement or facilitation of actual funds for planning purposes that would come from PAHO, USAID, or others.
- Although we made it clear at the outset that there would be no project funding associated with the workshop, it seems that many people came with the hope of getting resources for their activities. Presentations on individual case studies had a “proposal” ring to them even at the beginning of the sessions.
- There was and continues to be great interest in following up on their work. Most participants stated that they would like to hold seminars or workshops on the subject at the national level, ideally with a similar kind of facilitation from WASH.
- A few said the pace of the workshop was too intense. The structure was made more intense than planned by two optional evening sessions requested by the participants because they wanted more time to share individual cases. Some participants expressed the desire for some free time during the week and more time during the planning sessions.

## **4.2 Technical Team Assessment of Workshop**

### **4.2.1 Workshop Goals**

The explicit goals for the workshop remained the same as those for the Chile workshop, though the experience in Chile and the very comprehensive preliminary work for this workshop enabled us to ground those results more concretely in the experience of the participants. Emphasis was placed on leaving with some very specific applications to real cases, and on creating opportunities for sharing among participants, as well as between participants and facilitators. This emphasis turned out to be very appropriate and useful for the group. The opening session seemed to make clear that participants and facilitators had come to the right place.

#### *Comparison with Chile Workshop*

This event invites comparison with its predecessor in Chile last year. We saw some improvements, mainly from using the feedback from the Chile workshop. The high level of

attention paid (primarily by Chris Bessenecker at WASH) to the recruitment of appropriate participants added to the success of this workshop. The group seemed to be just at the target level—technically focussed but aware of the need to become more strategic in their approach. The extensive and effective recruitment resulted in a large pool of appropriate and interested candidates. This allowed a selection process that encouraged participants to take the event very seriously. As a result, all participants showed up. With thirty-eight participants, the group was large but manageable.

The Salvadoran participation was larger than the rest, but small enough to be a group like the other groups. This gave the event a more genuinely regional feel than in Chile, which was more dominated by the local participants. Despite the best efforts to the contrary, there was still some problem from conflicting pressures on local participants, but much less than in the Chile event. A less central location, if a suitable one is available, and making the session residential for all participants would greatly reduce or eliminate this problem.

Another important difference between this event and the Chile workshop was the presence of a full-time person to coordinate all administrative activities. Because of the usual unpredictable factors, this became a larger task than originally envisioned. The coordinator was to help with facilitation activities, but it took a huge effort just to complete those strictly administrative tasks, even with a lot of support from the national counterpart in these areas.

It is very clear that the presence of a very competent and responsible person in that position made it possible for the team leader and facilitation team to focus on the content needs of the group and the process of the sessions themselves. That was very different from Chile where the team leader was heavily burdened with financial and administrative details.

#### *Inauguration*

A special aspect of this event was the strong interest among high-level people. Identifying a person at the ministerial level to open an event like this can be difficult. For the inauguration of this event, we had three ministers, the head of the environmental authority, and the general manager of the water authority. There was some talk of the President or Vice-President making an appearance, which caused a flurry of instant attention to a range of protocol issues. Several people told us that if they had had more advanced notice, one of them might have come. That high level of interest in Salvador was evident throughout. The decision to substitute a series of short welcomes for a longer keynote address worked very well—for both time and content.

#### *Field Trip*

The field trip worked well. Some problems with organization and communication occurred as the team tried to deal with quickly changing circumstances. The community aspect of the Alpes Suizos visit became for most participants the most valuable part of the day. It must have been quite a sight for the community: forty-plus wastewater experts from nine countries in someone's yard in a little town listening and questioning enthusiastically about people's problems, within sight of a "very successful" wastewater treatment facility. Odors, insects, and lack of communication with the government and private owners of the plant were discussed. ANDA was



given most of the blame for people's concerns. We're not sure if they knew that there were ANDA people in the group, but the ANDA representatives handled it all quite well. In fact, it seemed that through some efforts of ANDA and a local legislative person in the participant group, some problems might actually have been solved. The group was also very interested in the technical approach used at Alpes Suizos.

The visit to Hilasal seemed to have value for the group, largely as an example of the difficulties of a system without strong government controls. Some felt the company's approach to be inadequate, though the technology was interesting.

The group competition activity seemed to work very well and produced quality presentations for that point in the process. Even the (pre-visit) criteria-setting activity showed that people were beginning to think along broader (rather than purely technical) lines. The competition resulted in every participant receiving a small gift (prize).

When available, site visits should be geared toward larger projects. In this workshop, some participants indicated a wish to visit the San Salvador wastewater treatment project sites, even if no works have been initiated yet. Together with a technical presentation of the proposed project, this might generate comments on the idea of using the sites in that way and provide a possibility of interaction with a community *before* a project is implemented.

#### *Actors' Panel*

The Actors' Panel session was an attempt to present an example of actual interaction among various stakeholders in the wastewater management sector. The advance preparation and input from local counterparts who knew many of the actors helped make this event a success. The private sector was well-represented by the construction and industrial organizations, as were several governmental departments and NGOs (see Appendix C for list of panel members). Participants seemed very interested and involved in the interaction and clear about the application of these Salvadoran issues to their own situations. The panel served to demonstrate a bigger picture within which many apparently interpersonal conflicts take place. This exercise should help participants take into account a larger group of interested parties and broader points of view as they identify the players in their wastewater management strategies.

#### *Framework Presentation*

The wastewater management framework sessions were perhaps the most difficult to grasp for the participants, given that their background and inclination were more attuned to engineering details rather than to macro-level planning. During the sessions, some of the participants expressed a concern that the framework was not useful as a model since it did not appear to have a starting and ending point. Future seminars should stress the value of the framework as a conceptual planning environment that indicates the possible points of intervention rather than a mathematical model. Perhaps because of this, a few of the participants did not appear to internalize the possibilities offered by the framework and left the workshop without having modified their thinking about their approach to their individual case studies.

A majority of the participants were able to grasp the concept, however, and used it in their action planning. That a Spanish-language version of the framework guidelines document was available as a reference was very helpful to the participants as well as to the facilitators. It would be helpful in the future to present some specific examples of the use of the framework, such as the French case study presented by Rita Cestti.

### *Appropriate Technology*

Most participants had a technical (sanitary engineering) background and participated strongly in the sessions on the selection of appropriate technology. In future such sessions, more "success" cases could be presented since the case studies were generally of plants that were not operational.

### *Case Study*

The use of a case study as a training tool fits the initial strategy of using a high-impact regional event to lead to individual planning workshops on a national level. Groups from each of the seven countries represented closed the workshop expressing a strong desire for follow-up and recognition of the importance of involving many groups in their countries in the planning process. Most of the countries expressed clear interest in such a follow-up activity. Many of those involved seem unsure about what steps to take to make such an event happen, either through WASH or on their own.

Most participants brought large, specific, and detailed projects to the session. One person mentioned that this very conscientious response to our request had to do with the competitive nature of the workshop selection process. It perhaps has to do also with the high level of motivation of group members, and their involvement in activities of a very strategic nature. Many people came expecting to present their projects to the group. It seemed clear to most that 30-plus presentations and analyses would take up most of the workshop's time. Because of the strong interest, the participants and facilitators accepted a proposal to have two optional evening sessions in which six groups shared their particular cases. Up to twenty-five people participated in each of the evening sessions.

The proposed cleanups of the Bay of Panama and Lake Amatitlan (Guatemala) were two important cases discussed during the optional evening sessions. There were many others, many of some notoriety (e.g., Lake of Nicaragua and Lake Managua). From the final presentations, it seemed clear that the participants' approaches to these cases had broadened.

Another factor that emphasized the regional flavor of the week was the last-minute withdrawal of the Colombian presenter (Río Bogotá case study). The group decided to substitute one of their cases, the Bay of Panama case, which the facilitating team selected according to its appropriateness for the methodology (force field analysis and framework application). The activity was successful and produced many creative and practical ideas. Several people mentioned the value of using a case from the region as opposed to one from another part of the world. The potentially serious problem of the Colombian withdrawal became a blessing from the point of view of the participants and the facilitators. We were concerned about some possible resentment around using one case and not another, but apparently none materialized. The regional case study

proved to be an important aspect of the workshop success. One question that emerged within the facilitating team was how to build regional case studies supplied by the participants into future designs when it is usually unsure to what extent participants will respond.

#### *Panel of Support Organizations*

The panel of support organizations (formerly “donor panel”) served a part of its strategic purpose, though it did not seem to add a lot of new information. We had good panelist participation, though it was mostly arranged by our local counterpart during the week of the event. She was especially helpful in this activity. Communication gaps between WASH, RWSN, ANDA, and the support organizations existed. None of the support organization representatives were invited until the week before the workshop. (A list of participants is included in Appendix C.)

Most interest was expressed in the input of the IDB representative, perhaps not surprisingly given the group’s interest in financing for their projects. PAHO’s Salvadoran representative participated quite separately from PAHO’s other participation. The presentations did give the participants a sense, for better or worse, of the state of mind of some donors. The concept of the panel was expanded from donors to support organizations to include RWSN, CAPRE, and WASH, whose presentations added a useful perspective. From among the non-participant panelists, only the GTZ representative stayed after lunch for the country presentations. Two people from the USAID mission were present for the panel as non-participants, and one stayed for the presentations. The acting director, John Lovaas, participated in the closing ceremony with representatives from RWSN, ANDA, SEMA, the World Bank, and WASH.

#### *Regional Exchanges*

Significant emphasis was given to the “sharing aspect” of the workshop goals. The uniformly high level of participant preparation made this easier to accomplish. We did not keep track in any systematic way, but we believe that the participants spent a lot of time in small-group activities (formally and informally, in various combinations—countries or disciplines). The individual cases also contributed to this sharing aspect. Participants were mixed for the first two days, but we then put them into country groups on Wednesday for the Actors’ Panel and the first part of the Appropriate Technology presentation, the country-by-country diagnostic. We mixed them again on Thursday and put them back into country groups on Friday for the action planning and individual country presentations. This flow seemed to work quite well, both in terms of appropriateness for activities and creating a balance between being with different people and keeping in close touch with national colleagues as thinking developed on common issues.

#### **4.2.2 Documentation**

The participants appreciated the availability and importance of the documentation delivered during this workshop. However, they expressed a need for more at different levels, especially because technical information is often not available in their respective countries. They apparently have plenty of information about drinking water, but documents and expert reports on wastewater

treatment and management are generally missing. A bibliography of available documents treating the subjects discussed during the workshop would be a valuable addition to the seminar.

The participants appreciated graphic and visual documents. Most of those documents, when available, should be used for the purpose of the presentations. A better graphical presentation of the framework might help people grasp the concepts more readily.

Presenters, host organizations such as SEMA, and the press made several videos available during the workshop. Some hotels servicing the workshop used an internal TV channel for scheduled evening presentations of appropriate audio/visual documents of interest to the participants.



## Chapter 5

### RECOMMENDATIONS

#### 5.1 Follow-up National Workshops

Many of the participants expressed a desire to transmit their learnings to their own countries by way of national-level workshops similar to this workshop but modified to account for areas of specific need. WASH should contact all participants in six months and document follow-up activities resulting from this workshop. WASH believes that these national events could be valuable by providing effective wastewater management tools for controlling cholera and other waterborne diseases. A main point of the framework is to involve a wide range of decision-makers in the wastewater management process. National workshops could provide opportunities for involving large numbers of these and other stakeholders.

As a follow-up to this workshop, Honduras proposes to create a national-level inter-institutional commission to begin the process of coordinating management activities in the environment sector, particularly for water quality. They could also request a workshop to assist and train other decision-makers in that country to be more effective members of that commission by broadening their outlook on wastewater management planning.

#### 5.2 Design Changes and Other Recommendations

The authors believe that the current design of the workshop is extremely rich and has been tried successfully, with minor modifications, in two regions. No major design changes are suggested.

Minor changes, such as those listed below, may be useful:

- The participants generally felt that the workshop was intense and that they did not have enough time for their individual or country planning. We cannot judge whether more planning time would have improved the outputs because we did not hear presentations of all the individual case studies; we heard only summary reports for the country-level plans. Many participants were not expecting to work as hard as they did. Some said informally that they were expecting more presentations “conference style.” Attendees should be informed before the workshop that they are coming to work and participate, and not just to listen. However, a half-day break sometime in the workshop may help by giving participants more time to work on their plans and perhaps visit the host city. A guided tour could be organized. An evening work session could replace this free afternoon, if necessary.
- The concept of optional evening sessions was well received. This allows time for individual case study presentations or other participant business (such as a meeting to lay the groundwork for a regional coordinating organization or workshop). These sessions

could be moderated by a workshop facilitator to control the amount of time used by each presenter.

- More needs to be done to clarify the framework concept. Better graphics and specific case studies (such as the case of French wastewater planning, as presented by Rita Cestti) would be very helpful. A further discussion is needed of the inter-relationships among stakeholders both within and outside of the wastewater management sector.
- Many participants wanted more of a model or a manual of practice than a framework to assist them with their planning efforts. The development of wastewater management planning models should be considered, and a discussion of these models (including simulation and optimization models, expert systems, and other decision support systems<sup>1</sup>) should be included in the framework discussion. A full treatment of this subject would not be possible during the limited time of the workshop, but an outline of available tools and those under development could be presented. The facilitating team feels that the framework remains as the fundamental tool with which managers should become familiar. The use of these advanced decision-support tools without a firm grounding in the big picture of effective wastewater management can lead to bad decisions disguised by sophisticated analyses.
- Documentation improvements should include a bibliography of available documents treating the subjects discussed during the workshop and more use of videos, especially for off-hours.
- The use of larger wastewater management projects for the site visit, whenever available, should be considered. Although interesting, many participants felt that the small projects used for the site visit did not demonstrate something new. (The facilitating team felt that these small projects demonstrated several important principles of the framework.)
- More “success” stories for the use of appropriate technology and framework-type approaches need to be presented, even if they are from outside the region.
- Some of the participants informally visited the ANDA offices. Since nearly all participants work for public service agencies, it may be useful to formally organize an optional visit to the local wastewater management agency.
- Whenever possible, the case study used for the Force Field Analysis sessions should come from within the region. If optional evening sessions are used, the facilitators would

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<sup>1</sup> “Simulation models” refer to those computer programs that attempt to recreate a natural process, such as river flows or dispersion of contamination, using mathematical relationships. “Optimization models” are computer programs that assist decision-makers in selecting the best solution from among many options, given a well-defined statement of objectives, a description of the relationship among the options, and the natural and other constraints which govern these relationships. “Expert systems” are computer programs that capture the knowledge of domain experts in a series of rules, usually expressed as “If-Then” relationships. The user presents a problem situation to the expert system and the system responds by using its set of rules to infer a solution.

have a chance to “preview” the case studies brought by participants to see if there is one which has enough breadth to be used in the formal session.



**APPENDIX A**

**SCOPE OF WORK**

## SCOPE OF WORK

### CENTRAL AMERICA WORKSHOP ON WASTEWATER MANAGEMENT

April 8, 1993

#### BACKGROUND

The current cholera epidemic in Latin America has demonstrated the need for and created significant interest in the area of wastewater management. Collection and disposal of wastewater in urban areas is relatively high whereas in peri-urban areas it is very low. However, *treatment* of disposed wastewater is almost non-existent regionwide. Recent efforts have had limited success because of an overall weakness in the sanitation sector. Additionally, the traditional approach to dealing with deficiencies in the sanitation sector has been to apply technical solutions when, in fact, institutional, economic, social, legal, and other factors contribute heavily to the overall problem.

WASH has recognized the need for a comprehensive approach to wastewater management, and over the past year has initiated a number of activities designed to promote awareness and adoption of such an approach throughout the Latin American Region. For the purposes of its work in the sector, it employs the following definitions:

**Wastewater** is defined as liquid waste that moves off-site and becomes a public problem. It may include feces (in liquid form), gray water, and industrial wastewater. The problem is exacerbated by rainwater entering the sewer system. Discharge from sewers is untreated or poorly treated.

**Management** is defined as a comprehensive approach encompassing the range of private and public options (including legal, economic, social, and technical) to avoid deleterious effects on human health and the environment.

A first step in WASH's wastewater management activities was to explore interest in and need for a workshop on wastewater management on the part of USAID missions in LAC. Thirteen out of fourteen responses to a regional cable from R&D/Health were positive.

Last September, WASH organized a first regional workshop on WWM in Chile. The workshop was attended by high-level sector representatives from Bolivia, Peru, Ecuador, and Colombia, as well as from Chile. The five-day workshop was highly successful because of the quality of the design, the timeliness of the subject, and the innovative approach being promoted.

#### THE CENTRAL AMERICA WORKSHOP

The interest generated by the Chile workshop has led to the development of a similar workshop for Central America, which will be a collaborative effort between WASH and PAHO. This workshop will incorporate the successes and lessons learned from its Chile predecessor. The countries currently being considered for participation are Honduras, Guatemala, El Salvador, Nicaragua, Panama, Costa Rica, and the Dominican Republic. Ultimately, a country's expressed interest in wastewater management problems will determine its inclusion in the workshop. Approximately five participants are expected from each country.

The overall purpose of the workshop will be to promote awareness of the different technical and management approaches for addressing wastewater problems. The goals, objectives, and design will be modelled on the Chile workshop, with modifications as needed for the different setting and participants.

The workshop will be 4½ to 5 days long and will be held in San Salvador. The exact length will be determined in consultation with the USAID mission in San Salvador. The participants will be high-level managers and will represent agencies and institutions responsible for wastewater management in the respective countries. Appropriate personnel from USAID, PAHO, IDB, UNDP/World Bank, and other institutions and donors will also attend. The workshop will be conducted in Spanish.

## **PERSONNEL AND TASKS**

A team of the following personnel will conduct the workshop:

- one environmental engineer with a background in urban environmental policy
- one engineer conversant with the latest wastewater treatment technologies appropriate to Central American conditions
- two facilitators (one lead and one adjunct)

This team will be supported by a number of expert consultants who will be presenters. Workshop logistics will be handled by a WASH assistant task manager in conjunction with locally hired persons. All workshop personnel must be fluent in Spanish.

Tasks anticipated for workshop personnel are as follows:

### Environmental Engineer

- Participate in a two-phase team planning meeting with the facilitator and relevant WASH and outside personnel.
- Together with the other team members and relevant WASH staff, redesign the Chile Workshop to fit the requirements of a 4½- to 5-day workshop in the Central American setting.
- Using the materials from the Chile Workshop, present the WASH framework for wastewater management at the Workshop.
- With the other team members, develop a central case study on the Bogota River experience that will serve as the basis for exercises enabling participants to appreciate the need for a comprehensive, multisectoral approach to WWM.
- Hold lead responsibility for writing a report describing the workshop proceedings and summarizing the lessons learned, next steps, and suggestions for future workshops on WWM.

- On the basis of the decisions made during the team planning meetings regarding the final workshop decision, the consultant may also be asked to make additional presentations during the workshop.

#### Engineer

- Participate in a two-phase team planning meeting with the facilitator and relevant WASH and outside personnel.
- Using materials from the Chile Workshop, prepare and present an overview of the current wastewater treatment technologies appropriate to a Central American setting as part of the workshop agenda.
- Together with the other team members, assist in the preparation of a case study on the Bogota River experience. This case study will serve as a basis for practical exercises on the application of the WASH framework for wastewater management.
- Contribute to the final report.

#### Lead Facilitator

- Participate in a two-phase team planning meeting with the workshop team and relevant WASH and outside personnel.
- Together with other team members and relevant WASH staff, redesign the Chile Workshop to fit the requirements of a 4½- to 5-day workshop on WWM in the Central American setting.
- Assist other team members in developing the case study on the Bogota River experience.
- Serve as lead facilitator of the workshop.
- Serve as team leader for the workshop team.
- Help write a workshop report describing the workshop proceedings and summarizing the lessons learned, next steps, and suggestions for future workshops on WWM.

#### Co-Facilitator

- Participate in a team planning meeting with the workshop team and relevant WASH and outside personnel.
- Co-facilitate the workshop with the lead facilitator.
- Assist as required with the final report.

#### Logistics Coordinator (ATM)

- Several months prior to workshop, travel to El Salvador to identify a suitable workshop site.

- Identify and contract local staff, if necessary.
- Coordinate the travel and per diem arrangements of the participants.
- During the workshop, act as on-site logistics coordinator, including participant travel, per diem, local site visit arrangements, audio-visuals (as needed), and general support to the participants and facilitators as required.

Expert Consultants

- At the request of the workshop facilitators, prepare and deliver presentations according to topics and approaches agreed upon with the facilitators and WASH.

**SCHEDULE**

April 8 and 9	TPM #1 (2 days)
End May	TPM #2 (2-3 days)
End April, early May	ATM travel to El Salvador to set up logistics (site and staff) (3-4 days)
July 6	Team travel to El Salvador
July 12	Workshop begins
July 16	Workshop ends
July 18	Team returns to United States
End July	Debriefing

The level of effort for workshop personnel is estimated as follows:

Activity	Person and Level of Effort	Date
TPM #1	Balloffet 2 LaPointe 2 Hurwitz 2 Co-facilitator 2 Hirschey 1 Perez 2 Turner 1 Liebler 4	April 8 and 9
Preparation visit to El Salvador (includes 2 days travel)	Hirschey 10	TBD
Design Preparation/ Preparation of Technical Presentations	Hurwitz 5 LaPointe 1 Balloffet 4 Co-facilitator 2	Ongoing between TPM #1 and the workshop
Case Study	Hurwitz 2 LaPointe 5 Balloffet 2	Ongoing between TPM #1 and the workshop
TPM #2	Balloffet 3 LaPointe 3 Hurwitz 3 Co-facilitator 3 Hirschey 1 Perez 2 Turner 2	End of May
Pre-workshop (5 days), Workshop (6 days), and Travel (2 days)	Balloffet 13 LaPointe 13 Hurwitz 13 Co-facilitator 13 Hirschey 13	Arrive in El Salvador 7/6/93, Workshop is July 12-16, 1993
Report Preparation	Hurwitz 1 Balloffet 2	Complete by 7/25/93
Task Administration	Fry 6 Perez 4 Turner 2 Bessenecker 20 Hirschey 5	Ongoing

Activity	Person and Level of Effort	Date
TOTAL LEVEL OF EFFORT	Sarah Fry 6 Balloffet 26 LaPointe 24 Hurwitz 26 Facilitator 20 Hirschey 20 Perez 8 Turner 4 Bessenecker 20 Lumumba 4	

**APPENDIX B**

**WASH WORKSHOP BROCHURE WITH FRAMEWORK  
FOR WASTEWATER MANAGEMENT**



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**RESPONDING TO THE ENVIRONMENTAL SANITATION CRISIS IN  
CENTRAL AMERICA:**

**A Comprehensive Approach to Wastewater Management in  
the Region**

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**A Workshop Designed for Decision-makers,  
Senior Managers and Policy Makers**

**Sponsored by:**

**the U.S. Agency for International Development  
in collaboration with the Pan American Health Organization, the World Bank, and the  
Regional Water and Sanitation Network-CA**

**Organized by:**

**the Water and Sanitation for Health Project (WASH)  
with funding from the Latin America and Caribbean Bureau of USAID**

- What:** A participatory workshop to develop new strategies to improve wastewater management and reduce the incidence of cholera and other water-related diseases.
- Where:** San Salvador, El Salvador
- When:** July 12-16, 1993
- For Whom:** High-level public sector decision-makers from government sectors that represent health, environment, water and sanitation, urban development, finance, planning, natural resources, and agriculture.

# NATIONAL AND REGIONAL STRATEGIES FOR WASTEWATER MANAGEMENT

A Regional Workshop for Central America and the Dominican Republic  
San Salvador—July 12—16, 1993

## Background

**Wastewater** can be defined as the liquid wastes from homes, commercial premises, and industries. **Wastewater management** can be defined as a comprehensive approach encompassing a range of private and public options (including legal, economic, social, and technical) and including a strategy incorporating wastewater collection, safe treatment, reuse, or disposal.

In Latin America, population growth, urbanization, and industrialization are responsible for a huge increase in the quantity of wastewater generated. Improperly managed sewage and excreta also seriously threaten public health, agriculture, the environment, and the economy.

It is estimated that in Latin America's urban centers less than 50 percent of the households have sewage connections and approximately 90 percent of the sewage collected is emptied untreated into surface streams. Rapid industrialization has led to increases in the volume and toxicity of industrial wastewater, conditions that have contaminated surface waters and underground aquifers. In addition, untreated wastewater is often used for crop irrigation.

Diseases related to contaminated drinking water and crops and inadequate disposal of sewage and excreta contribute significantly to the spread of debilitating and deadly diseases such as cholera. In Latin America, disease epidemics result in an immense losses in productivity and income.

The management and disposal of the current and ever-increasing amounts of wastewater present an enormous challenge to national and municipal governments. While pollution cannot be eliminated, much **can be done** to reduce pollution and to mitigate its worst consequences. In the past, wastewater management has been addressed almost exclusively through municipal public works investment in sewerage systems and centralized wastewater treatment plants. However, in Latin America these end-of-pipe strategies have often failed or have not even been attempted because of costs.

In response to this failure, it is becoming increasingly recognized that the range of wastewater management options considered should be far broader. Technological interventions alone will not ensure effective wastewater management. Rather, a well-designed wastewater management strategy—a comprehensive combination of technologies, institutional capabilities, public policy instruments, and economic incentives—is required.

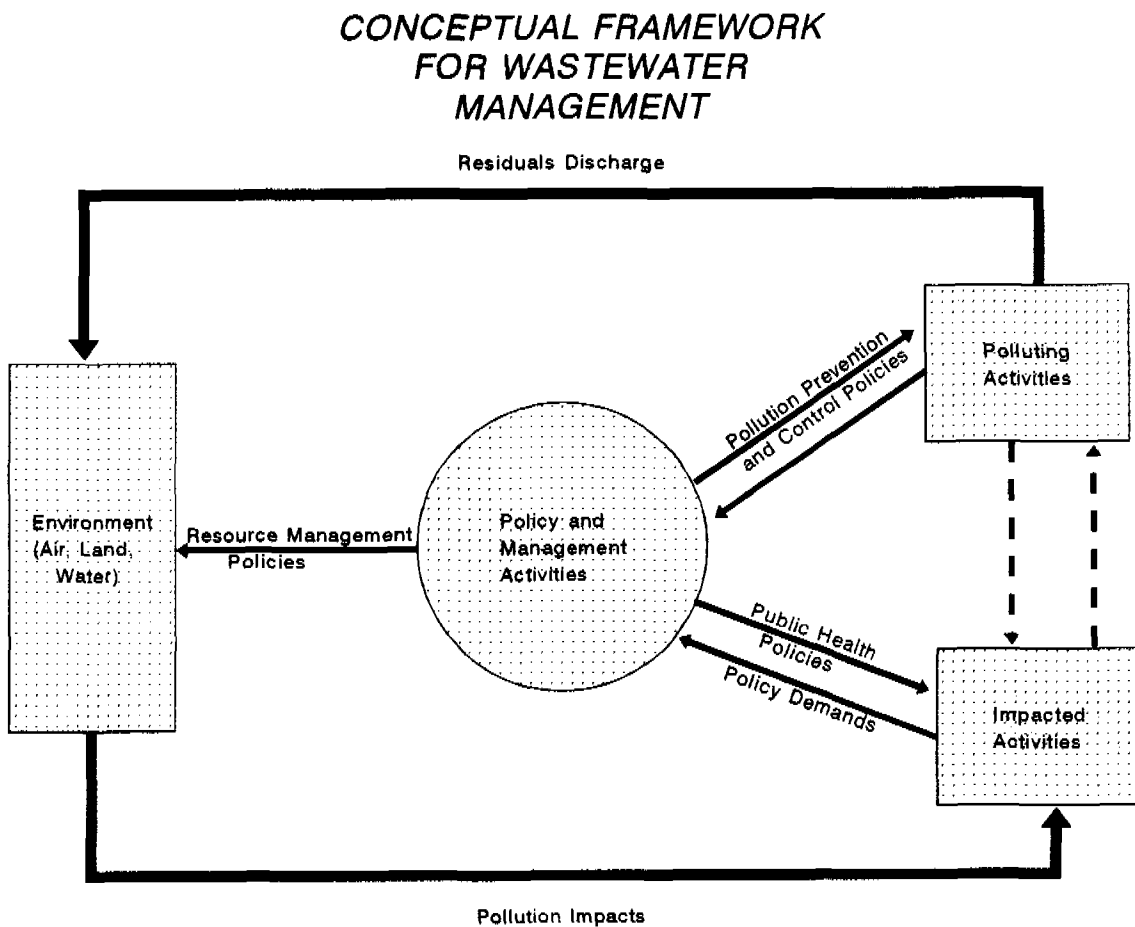
As part of the U.S. Agency for International Development's (USAID) effort to control the cholera epidemic in Latin America, the Latin American and Caribbean (LAC) Bureau funded, through the Water and Sanitation for Health (WASH) Project, the Andean Regional Workshop on Alternative Approaches to Wastewater Management, September 28—October 22, 1992. The workshop was held in Santiago, Chile and attended by participants from five Andean countries. The workshop was received positively and

prompted USAID to agree to a recommendation to organize a similar workshop in another region, such as Central America.

### Purpose of the Central America Regional Workshop

In recognition of the need for realistic, effective, and sustainable national and regional approaches to wastewater management, WASH has developed a comprehensive management framework whose components reflect the multiple contributors to the problems and solutions: economics, environmental considerations, institutional strength, legal and regulatory issues policy, and public participation (see chart below). This non-conventional view requires the sector to adopt new strategies.

The purpose of the workshop is to expose key managers and decision-makers in the wastewater management sector to the framework's conceptual basis and practical application, and to provide them with an opportunity to plan its application in their own countries in accordance with specific problems they face.



It is our expectation that participants will leave the workshop with concrete ideas for new approaches to actual situations they face. These are likely to be non-technical solutions that are perhaps less obvious or missing from more traditional approaches

### **Workshop Sponsors and Collaborators**

The LAC Bureau is sponsoring the workshop and WASH is organizing it and providing technical input. WASH will collaborate with the World Bank and with the Pan American Health Organization (PAHO) as part of its Regional Plan for Investment in Environment and Health. In addition, WASH will work with the Regional Water and Sanitation Network for Central America to ensure that all external support agencies active in the water and wastewater sector in Central America are consulted and involved in the development of the workshop.

### **Content of the Workshop**

Experts will give presentations on aspects of the wastewater management framework and components including assessment of public health risks and public health standards; policy instruments including economic and regulatory instruments; and technologies and technical approaches such as waste reduction, wastewater reuse, recycling, alternative treatment, and safe disposal.

Presentations will also focus on the roles of the various actors in wastewater management including national and municipal governments, private sector industries, nongovernmental organizations, and communities and families.

Using a variety of methods—such as case studies, field trips, and small-group work—the workshop participants will explore in detail the problem of wastewater management. The workshop will provide ample opportunity for discussing country- and region-specific wastewater management problems and offer practical suggestions for dealing with these.

### **Workshop Participants**

The workshop will be open to approximately five participants from each of the following countries: Costa Rica, the Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua, and Panama. Participants will include persons in the public sector with program-level decision-making responsibilities in the wastewater management area at the national, regional, or municipal levels. Participants could include representatives from a variety of organizations that have key responsibilities on issues related to wastewater management, such as national wastewater utilities and ministries of health, finance, environmental protection, water resources, and agriculture.

For example, we would expect appropriate country participants to be made up of five representatives from among the following:

- Director or subdirector of sanitation for national or municipal water and sanitation agency
- Director or subdirector of national environmental committee
- Legislator who holds a seat on the national environmental commission
- Director or subdirector of national unit that monitors industrial and domestic waste
- Director or subdirector for urban development of the national planning agency
- Director or subdirector for the urban sanitation of the ministry of health

- Director or subdirector for urban development in the ministry of economy and finance
- Director or subdirector for agriculture and natural resources

In addition, representatives of external support agencies such as UNICEF, IDB, PAHO, and the World Bank will be involved in one or more of the workshop sessions.

For more information, please contact Eddy Perez or Ann Hirschey at WASH; 703-243-8200 (tel.) or 703-351-0026 (fax).

## APPENDIX C

1. FINAL LIST OF PARTICIPANTS
2. LIST OF REPRESENTATIVES IN ACTORS' PANEL
3. LIST OF REPRESENTATIVES FROM SUPPORT ORGANIZATION PANEL

**PARTICIPANT LIST**  
**LISTA DE PARTICIPANTES**  
**TALLER REGIONAL**  
**PARA CENTROAMERICA Y LA REPUBLICA DOMINICANA**

**"Estrategias Nacionales y Regionales para el Manejo de Aguas Residuales"**

**San Salvador 12-16 de julio de 1993**

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**LISTADO DE PANELISTAS  
TALLER REGIONAL PARA CENTROAMERICA Y  
LA REPÚBLICA DOMINICANA ESTRATEGIAS NACIONALES Y REGIONALES  
PARA EL MANEJO DE AGUAS RESIDUALES**

14 DE JULIO DE 1993

1.  
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Representa: **ASOCIACION SALVADOREÑA DE INDUSTRIALES -ASI-**  
Grupo a que pertenece: **SECTOR PRIVADO**  
Punto de vista: **SECTOR EMPRESARIAL .**  
Cargo: **Gerente General de Industrias Eureka S. A.**
  
2.  
Nombre: **ING. MENOS CAMPOS**  
Representa: **Cámara Salvadoreña de la Industria de la Construcción CASALCO**  
Grupo a que pertenece: **SECTOR PRIVADO**  
Punto de vista: **Constructores y requerimiento para que se traten aguas residuales.**  
Cargo:
  
3.  
Nombre: **ARQ. LEON SOL**  
Cargo: **Dirac.Ofic. Planific. Area Metropolitana San Salva.**  
Grupo a que pertenece: **GOBIERNO SECTOR DESARROLLO (OPAMSS)**  
Punto de vista: **Requerimientos/infraestructura (aguas reciduales y aguas lluvias) desarrollo urbano y construcción en el AMSS.**
  
4.  
Nombre: **ING. MARIO CESAR FLORES**  
Cargo: **FUNDASAL**  
Grupo a que pertenece: **SECTOR ONG's**  
Punto de vista: **Punto de vista ONG's S/uso de tecnología apropiada**
  
5.  
Nombre: **ING. JOSE ZOYLO CASTRO**  
Cargo: **Jefe Depto de Evacuaciones ANDA**  
Grupo a que pertenece: **SECTOR GOBIERNO**  
Punto de vista: **Requerimientos para los proyectistas y constructores de urbanizaciones**
  
6.  
Nombre: **ING. LUIS ALBANES MOLINA**  
Cargo: **PRESIDENTE DE LA JUNTA DIRECTIVA DEL PROYECTO CHALCHUAPA ATIQUIZAYA**  
Grupo a que pertenece: **SECTOR COMUNIDAD**  
Punto de vista: **Efectos Sociales y sobre la salud por la mala dispocición de excretas (enfermedades de origen hídrico y sus principales causas)**

7.  
Nombre: LIC. JOSE RENE MEDINA  
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Grupo a que pertenece: SECTOR MUNICIPAL  
Punto de vista: Asesoría a Municipalidades (problemas por riego, industria, turismo y economía)

8.  
Nombre: DR. JULIO GAMERO  
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Grupo a que pertenece: SECTOR GOBIERNO  
Punto de vista: Requerimientos legales p/proteger la ecología y el ambiente.

9.  
Nombre: ING. CARLOS ROBERTO OCHOA  
Cargo: Secretaria Ejecutiva del Medio Ambiente - SEMA  
Grupo a que pertenece: Sector Gobierno  
Punto de Vista para el Panel: Aspectos ambientales con relación aguas residuales.

## **Panel de Organizaciones de Apoyo**

1. **Angel Valenzia**  
**Organización Panamericana para la Salud**  
**El Salvador**
2. **Ramón Menjívar**  
**Representante de**  
**RRAS-CA El Salvador**
3. **Ricardo Rojas**  
**RRAS-CA Central**
4. **Mynor Márquez**  
**CAPRE**
5. **Rita Cestti**  
**Banco Mundial**
6. **Fadrique Otero**  
**Sub-representante**  
**Banco Internacional de Desarrollo**
7. **Giuseppe Repetto**  
**Cooperación Italiana**
8. **Ann Hirschey**  
**WASH**
9. **GTZ**

**APPENDIX D**

**FOLLOW-UP ON THE CHILE WORKSHOP**

**Impacts of the  
Andean Regional Workshop on Alternative Approaches to  
Wastewater Management**

**Santiago, Chile**

**September 28 - October 2, 1992**

**as of**

**July 7, 1993**

**Chile**

Mr. Reinaldo Patricio Fuentealba from the department of planning in the Ministry of Public Works was a Chilean participant who attended the workshop last year. Mr. Fuentealba reports that the workshop helped to push forward a multi-agency project that, up to then, lacked momentum and enthusiasm. The primary goal of the project is the assessment and eventual privatization of the wastewater concession in a small but important area of tourism in the country. The project is being coordinated by the Corporación de Fomento (CORFO) and involves active participation from the Ministry of Housing, the Ministry of Public Health, and the Ministry of Public Works. The community is called Valdivia and is located in southern Chile. Thus far, two firms are interested in applying for pre-qualification for management of the concession, which is now owned by the state.

Nancy Cepeda Rodriguez from the Agency for Sanitary Service Supervision was also one of the Chilean participants in the workshop. Mrs. Cepeda has informed WASH that the workshop provided her with valuable information on wastewater management, which has enhanced her ability to do her job. She mentioned, however, that her responsibility in the area of new project finance limits her experience in the application of what was learned at the workshop.

**Colombia**

Mr. Luiz Buzón is an assistant to Ruben Dario Avendaño of the National Department of Planning. Mr. Avendaño attended last year's workshop. Mr. Buzón has informed WASH that the workshop provided valuable information that has been incorporated into a new environmental policy affecting the three largest cities in Colombia—Cartagena, Bogotá, and Medellín. In general, the workshop provided the Colombians with a broader framework in which to approach wastewater management. Specifically, many of the workshop materials and presentations relating to economic tools and incentives used in wastewater management were adopted and drafted into the new policy. Prior to the workshop only the technical and environmental aspects of management had been considered.

## **Ecuador**

Mr. Holger Hernan Vimos Reinoso works for the Ecuadorean Institute for Sanitary Works (IEOS) and was an Ecuadorean participant at the workshop. Mr. Vimos reports that very little has transpired as a result of the workshop. Within Mr. Vimos' division in IEOS, there has been a greater understanding of what wastewater management means, but because of his limited role in the agency, he has little power to affect change in the overall structure of the sector.

## **Peru**

Mr. Sixto Felipe Meza Rojas, who works for the National Water Supply and Sanitation Service for Peru, has informed WASH that he and the three other Peruvians that attended the workshop were greatly influenced by the workshop as was their country. Mr. Meza and his colleagues drew two important conclusions from the workshop, which have had a direct effect on the sector in Peru.

First, they concluded that there would need to be an overall management structure for the Peruvian water and sanitation sector, which is in the process of decentralization. The national agencies currently responsible for the sector are being eliminated and concessions are being transferred to the municipalities. From the presentations and the interchange that took place with the other countries (Chile and Colombia's situations were very influential), they concluded that a significant void would exist in the new arrangement if a national agency was not created to provide technical support and supervise and enforce sector standards. In addition, the workshop exposed the Peruvians to the idea of privatization of water and wastewater concessions as an attractive element to the management solution.

Second, they concluded that a legal framework needed to exist which embraced the ideas mentioned above. As a result, the Ley General de Creación de una Superintendencia (General Law for the Creation of Supervision) and the Ley General de Saneamiento (General Sanitation Law) were drafted. On December 19, 1993, the outline of the Ley General de Creación de una Superintendencia was approved by Congress thus calling for a centralized national agency for wastewater management in the country. Details for both laws still have to be worked out, but Mr. Meza has informed WASH that sector administration, treatment technologies, and privatization of concessions are all topics that will be covered by these laws.

**APPENDIX E**

**WORKSHOP DESIGN**

**WORKSHOP GOALS**

**AGENDA (IN SPANISH AND ENGLISH)**

**REGIONAL CENTRAL AMERICAN WORKSHOP ON WASTEWATER MANAGEMENT**

**Moderator: Dr. Alan Hurwitz: Facilitator's Team, WASH**

**SUNDAY, JULY 11**

**7:30 - 9:30 pm WELCOME RECEPTION (Salón Los Arcos)**

**MONDAY, JULY 12**

**8:00 am *Inscription, with Continental Breakfast* (La Arboleda)**

**8:30 am Workshop Inauguration (La Arboleda)**

- **Introductory remarks, Dr. Alan Hurwitz, Moderator of the workshop**
- **Welcome by Ministers and USAID**
  - **MR. HENRY REYNOLDS**  
Acting Deputy Director of the United States Agency for International Development -- USAID
  - **LIC. MIRNA LIEVANO DE MARQUES**  
Minister of Planning and Coordination of Economic and Social Development
  - **DR. LISANDRO VASQUEZ SOSA**  
Minister of Public Health and Social Assistance -- MSPAS
  - **LIC. JUAN RAMON MENJIVAR**  
General Manager of the National Administration of Acueducts and Sewage Systems -- ANDA
  - **LIC. MIGUEL ARAUJO**  
Executive Director of the Executive Secretariat of the Environment -- SEMA

**Inaugural Remarks -- Minister of Livestock and Agriculture -- MAG  
MR. ANTONIO CABRALES**

***Coffee Break* (Los Arcos)**



- 9:50 am Introduction to Workshop
- Desired Results
  - Introductions and Expectations: Team and Participants
  - Agenda
  - Workshop Norms
  - Logistics/Administration
- 11:15 am Criteria for Assessing Wastewater Management (WWM) efforts
- Criteria Overview
  - Small Group Exercise
  - Plenary Discussion
- 12:00 pm Site Visit Preparation
- Explanation of Group Exercise: "Phase II Planning"
  - Background of the Site Visit
- 12:45 pm Bus Departs for Site Visit  
(Box lunch provided en route)
- Sites Visited: Alpes Suizos - Community Development  
Hilasal, S.A. - Textile Industry

**TUESDAY, JULY 13**

- 8:00 am **Coffee (Los Arcos)**
- 8:30 am Group Presentations/Competition (based on site visit)
- Presentations
  - Review
  - Awards
  - General Individual Comments on the Visits
  - Diary
- Coffee Break**
- 10:15 am Framework: Session 1 -- Setting the Stage
- Conceptual Overview
  - Group Activity
  - Systems Approach
- 12:30 pm **LUNCH**
- 2:00 pm Framework: Session 2 -- Description and Applications
- Policy and Management Strategies
  - Group Activity

**Coffee Break**

- Presentation of Case Studies  
Rita Cessti, World Bank
- Individual Applications
- Diary

**WEDNESDAY, JULY 14**

8:00 am **Coffee** (Los Arcos)

8:30 am Actors and stakeholders in the WWM system

- Introduction: Identification of Stakeholders
- Presentations by Sector Representatives
- Panel Discussion

**Coffee Break**

- Group Discussion
- Situation Analysis
- Diary

Photograph del Grupo

12:30 pm **Lunch**

2:00 pm Selecting Appropriate Technologies

- Presentation -- Regional Diagnosis
- Small Group Activity -- Local Issues
- Plenary Session -- Local and Regional Issues

**Coffee Break**

- "Aproprate Technologies which Guarantee the Public Health -- PAHO, Ing. Rodolfo Saenz
- Introduction to Appropriate Technologies

**THURSDAY, JULY 15**

8:00 am **Coffee** (Los Arcos)

8:30 am Selecting Appropriate Technologies

- Presentation
- Small Group Activity -- Selecting Appropriate Technology
- Plenary Session: Aproprate Technologies
- Diary

**Coffee Break**

10:30 am Encouraging change in the WWS -- The Bogota River Case Study

- Explanation of an Analysis Model
- Presentation of the Bogota case study - Problem Description: Ing. Carlos Vargas

- Work in Large Group
- Work in Small Groups
- Reports and Discussion

12:30 **LUNCH**

- 2:00 The Bogota River Case Study (continued)
- Actual Activities and Results - Report  
Ing. Carlos Vargas
  - Discussion

**Coffee Break**

- 3:30 pm The PAHO Regional Plan for Investment in the Environment and Health (PIEH)
- Presentation
  - Discussion

**Evening: Dinner and Entertainment in a Typical Restaurant**

**FRIDAY, JULY 16**

8:00 am **Coffee (Los Arcos)**

- 8:30 AM Action Planning
- Strategy Design
  - Individual Planning
  - Feedback/Consultation
  - Country Support and Plans

**Coffee Break**

11:00 Donor Panel

12:00 **Lunch** Participants in the panel and other distinguished guests are invited to join us for lunch and the afternoon activities.

- 1:30 Country Presentations
- Country groups present action plan(s)

**Coffee Break**

- 3:00 Closing Activities
- Evaluation
  - Presentation of certificates

4:00 **ADIOS Buen Viaje**

**T A L L E R    R E G I O N A L**  
**PARA CENTROAMERICA Y LA REPUBLICA DOMINICANA**  
**ESTRATEGIAS NACIONALES Y REGIONALES PARA EL MANEJO DE AGUAS**  
**RESIDUALES**

San Salvador  
12 - 16 de julio de 1993

**METAS**

1. Los participantes reconocen las limitaciones de los actuales enfoques del manejo de aguas residuales para hacer frente a los retos actuales en América Central y en la República Dominicana (por ejemplo, la epidemia de la cólera) y promover un compromiso más fuerte al ensayo de nuevos enfoques.
2. Los participantes toman conciencia de opciones y herramientas técnicas nuevas o subutilizadas para ampliar la gama de opciones.
3. Los participantes pueden utilizar un "Enfoque de Sistemas" para analizar situaciones actuales y futuras para el manejo de aguas residuales, por ejemplo, los factores institucionales y económicos así como técnicos, y aplicarlos al menos en una situación cuando regresen a sus países.
4. Los participantes promueven con mayor eficacia los cambios deseados dentro de sus propios sistemas de manejo de aguas residuales.
5. Todos nosotros (participantes y facilitadores) comprendemos mejor la aplicación de diversos enfoques para el manejo de aguas residuales en el contexto latinoamericano.
6. Los participantes salen de la sesión con un sentido más fuerte de constituir una amplia red de personas (sistema de personas) dedicados al manejo de las aguas residuales, desde muchas perspectivas y diferentes roles profesionales.

**A G E N D A**  
**T A L L E R   R E G I O N A L**  
**PARA CENTROAMERICA Y LA REPUBLICA DOMINICANA**  
**ESTRATEGIAS NACIONALES Y REGIONALES PARA EL MANEJO DE AGUAS RESIDUALES**

**DOMINGO, 11 DE JULIO**

**7:30 - 9:30 pm    RECEPCION DE BIENVENIDA (Salón Los Arcos)**

**LUNES, 12 DE JULIO**

**8:00 am        Inscripción con Café y Pasteles (Salón La Arboleda)**

**8:30 am        Inauguración del Taller (Salón La Arboleda)**

- **Palabras de Introducción, Dr. Alan Hurwitz, Moderador del Taller**
- **BIENVENIDA POR PARTE DE ALTOS FUNCIONARIOS DEL GOBIERNO DE EL SALVADOR Y DE LA USAID**
  - **SR. HENRY REYNOLDS**  
Sub Director de la Agencia de Desarrollo Internacional de los Estados Unidos -- USAID
  - **LIC. MIRNA LIEVANO DE MARQUES**  
Ministra de Planificación y Coordinación de Desarrollo Económico y Social -- MIPLAN
  - **DR. LISANDRO VASQUEZ SOSA**  
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  - **LIC. JUAN RAMON MENJIVAR**  
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  - **LIC. MIGUEL ARAUJO**  
Director Ejecutivo de la Secretaría Ejecutiva del Medio Ambiente -SEMA-
- **APERTURA OFICIAL POR EL ING. ANTONIO CABRALES, PRESIDENTE DE CONAMA Y MINISTRO DE AGRICULTURA Y GANADERIA**

**Refrigerio (Salón Los Arcos)**

- 9:45 am Introducción al Taller
- Resultados Deseados
  - Introducciones y Expectativas: Equipo y Participantes
  - Agenda
  - Normas del Taller
  - Logística/Administración
- 11:15 am Criterios para Evaluar el Manejo de las Aguas Residuales (MAR)
- Perfil de Criterios
  - Actividad en Grupos Pequeños
  - Plenaria
- 12:00 pm Preparación para la Visita de Campo
- Explicación de Actividad de Grupo -- "Planificación de la Segunda Fase"
  - Antecedentes para la-Visita de Campo
- 12:45 pm Salida del Bus para la Visita de Campo  
(Almuerzo en el camino)
- Locales a Visitar:
    - \*Alpes Suizos - Desarrollo Comunal
    - \*Hilasal - Industria de Tejidos

**MARTES, 13 DE JULIO**

- 8:00 am **Café y Pasteles (Salón Los Arcos)**
- 8:30 am Presentaciones de los Grupos/Competencia (basado en las visitas de campo)
- Presentaciones de los Grupos
  - Repaso
  - Premios
  - Comentario General Sobre la Visita
  - Diario
- Refrigerio**
- 10:15 am Marco Conceptual: Sesión 1 -- Introducción a un Nuevo Enfoque
- Perfil Conceptual
  - Actividad en Grupos
  - Enfoque de Sistemas
- 12:30 pm **ALMUERZO**
- 2:00 pm Marco Conceptual: Sesión 2 -- Descripción y Aplicaciones
- Estrategias Políticas y Gerenciales
  - Actividad en Grupos

**Refrigerio**

- Presentación de Experiencias -- Rita Cestti, Banco Mundial
- Aplicaciones Individuales
- Diario

**MIERCOLES, 14 DE JULIO**

8:00 am **Café y Pasteles (Salón Los Arcos)**

8:30 am Actores en el Sistema de Manejo de Aguas Residuales

- Introducción: Identificación de los Actores
- Presentaciones por Representantes Sectoriales
- Discusión del Panel

**Refrigerio**

- Discusión a Nivel de Grupo
- Análisis de una Situación Específica
- Diario

**Foto del Grupo**

12:30 pm **ALMUERZO**

2:00 pm Tecnologías Apropriadas

- Presentación del Diagnóstico Regional
- Actividad a Nivel de Grupo: Problemática Local
- Plenaria: Problemática Local y Regional

**Refrigerio**

- "Tecnologías Apropriadas Para Segurar la Salud Pública" -- Ing. Rodolfo Saenz de OPS
- Introducción a Tecnologías Apropriadas

**JUEVES, 15 DE JULIO**

8:00 am **Café y Pasteles (Salón Los Arcos)**

8:30 am Escogiendo Tecnologías Apropriadas

- Presentación
- Actividad a Nivel de Grupo: Escogiendo la Tecnología
- Plenaria: Tecnologías Apropriadas
- Diario

**Refrigerio**

10:30 am Fomentando Cambios en el MAR -- Estudio de Caso del Río Bogotá

- Explicación de un método de análisis
- Presentación del Estudio de Caso Bogotá: Descripción del Problema -- Ing. Carlos Vargas de CAR Colombia

- Trabajo a Nivel General
- Trabajo a Nivel de Grupo
- Informes y Discusiones

12:30 **ALMUERZO**

2:00 El Estudio de Caso del Río Bogotá (continuación)

- Actividades y Resultados Actuales: Informe -- Ing. Carlos Vargas de CAR Colombia
- Discusión

**Refrigerio**

3:30 pm El Plan Regional de la OPS para Inversión en el Medio Ambiente y Salud (PIAS)

- Presentación
- Discusión

**Tarde: Cena y Entretenimiento en un Restaurante Típico**

**VIERNES, 16 DE JULIO**

8:00 am **Café y Pasteles (Salón Los Arcos)**

8:30 AM Planes de Acción

- Diseño de Estrategias
- Planificación Individual
- Aportes/Consultas
- Apoyo a Los Países y Planes

**Refrigerio**

11:00 Panel de Donantes

12:00 **ALMUERZO** Los donantes y otros distinguidos invitados nos acompañarán para el almuerzo y el programa de la tarde.

1:30 Presentaciones por parte de los Países Participantes

- Cada País Presenta su Plan de Acción

**Refrigerio**

3:00 Clausura

- Evaluación
- Entrega de Diplomas

4:00 **¡ADIOS Y BUEN VIAJE!**



**APPENDIX F**

**WORKSHOP EVALUATION**

**REGIONAL WORKSHOP ON WASTEWATER MANAGEMENT**

**EVALUATION OF THE WORKSHOP**

Name: (optional) \_\_\_\_\_

July 16, 1993

1. How satisfied were you with the following aspects of the workshop?

	1 Not Satisfied	2	3	4	5 Satisfied
<b>ADMINISTRATIVE ASPECTS</b>					
General assessment of the workshop	_____	_____	_____	_____	_____
Hotel	_____	_____	_____	_____	_____
Food	_____	_____	_____	_____	_____
Transportation	_____	_____	_____	_____	_____
Announcement of the workshop	_____	_____	_____	_____	_____
Materials distributed	_____	_____	_____	_____	_____
<b>CONTENTS</b>					
Field visits	_____	_____	_____	_____	_____
Conceptual framework	_____	_____	_____	_____	_____
Economic incentives (Presentation by Ms. Cestti)	_____	_____	_____	_____	_____
Panel of agents involved in wastewater management	_____	_____	_____	_____	_____
Appropriate technologies	_____	_____	_____	_____	_____
Health aspects (Presentation by Mr. Saenz)	_____	_____	_____	_____	_____
Promotion of changes in wastewater management	_____	_____	_____	_____	_____
Panel of donors	_____	_____	_____	_____	_____
Individual cases (optional evening activity)	_____	_____	_____	_____	_____
Preparation of action plans	_____	_____	_____	_____	_____
Exchange of ideas and experiences (in general)	_____	_____	_____	_____	_____

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\* Providing your name will help us to follow up on any comments.

2. How do you intend to use the knowledge you acquired in this workshop?

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3. How could this workshop be improved?

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4. What topics would you suggest be included in future workshops, in addition to those covered here?

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5. What kind of follow-up do you plan on doing for the workshop? That is, what immediate action do you plan to take?

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6. What kind of support would you like in the future to promote "systemic" strategies for wastewater management?

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7. In your opinion, how would you evaluate the following aspects of the workshop?

INTENSITY	very weak	_____	appropriate	_____	very intense	_____
PACE	very slow	_____	appropriate	_____	very fast	_____
COVERAGE	too broad	_____	appropriate	_____	very limited	_____

8. Other observations:

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9. What kind of feedback (positive and/or suggestions) can you give for the members of the team?

ALAN

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ANN

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ARMANDO

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DENIS

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EMILIA

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RITA

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RODOLFO

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THANK YOU VERY MUCH!

Answers to Questions on Workshop Evaluation Form

**Question 2. How do you intend to use the knowledge you acquired in this workshop?**

- Herrera: In my work at the Department of Installation and Control of Works, Environmental Sanitation Division. Each new housing development must present how it plans to treat the wastewater that will be produced.
- No name (black ink): (Note at bottom of page: Yes, my name may be used to follow up on my comments.) From my position, I plan to make my small contribution so that the necessary regulations will be established, and also to help in the strengthening of the coordinating agency.
- García: Through direct application in my institution. By adapting existing plans. By raising the awareness of the sectors involved.
- No name (pencil): By transferring knowledge to colleagues. By implementing it in our wastewater projects and monitoring (both thermoelectric and geothermoelectric).
- Chang: To benefit the institution and to my personal benefit.
- No name (blue ink): I will bear it in mind in all future activities related to wastewater management at the institution where I work. The aspects connected with coordination, application of economic incentives, and community participation are the areas that applied most to me.
- Delgado: In management activities, to promote change in wastewater management. I will try to share this knowledge.
- Reyes: In planning actions to be taken.
- Urruela Pivaral: As the person in charge of planning at my company, the knowledge acquired in the workshop constitutes a valuable tool for the application of new approaches to wastewater management.
- Urrutia Molina: By applying it to the case of Matitlán Lake and in my personal life.
- Argueta: By making myself a catalyst for this knowledge and, at the same time, undertaking efforts within my scope to implement it through a campaign to convince persons with authority to promote them.
- Quintero: I plan to use it in the various programs, plans, and projects related to waste management in general.
- Salas: I plan to apply the case study and subsequent problems through an approach based on sector coordination with a view to changing sanitation activities in my country.
- Rodríguez: For the implementation of the master plan for cleaning up Panama Bay.

Copete: By using planning and implementation strategies I had not previously considered. By assuming the commitment to commit and modify all factors in order to obtain the desired goal.

Villavicencio: Disseminate it through the \_\_\_\_\_ and set up a national network. Involve agents.

Miranda: By converting the group from the Dominican Republic that attended the workshop into a catalyzing agent to change mentalities and strategies.

Maltés: By focusing efforts on proper wastewater management through mechanisms for coordination and dissemination.

Betancourt: The efforts of all the sectors involved in wastewater management need to be brought together in an integrated and coordinated action so as to attain positive results.

Velásquez Lazo: By applying it in practice and sharing it with all sectors related to sanitation issues.

No name (blue fountain pen) I will apply the systems approach to modify the action plan for the rehabilitation and sanitation of Lake Managua.

Leclair: In preparing the action plan for the project we are working on. In particular, I feel that the evaluation of the support framework is useful in the evaluation of any problem.

Peña: Through sanitary surveillance, wastewater disposal systems, and provide the necessary guidance that is our duty as an institution.

Torres Romero: First, share it with the personnel under my responsibility and help them to frame strategies for drawing up action plans in the annual program for our work.

Guerrero: By applying it in my work when I return to my country.

Alverado: By promoting coordination among the agents involved in wastewater treatment issues. By contributing to institutional strengthening. By participating in the creation or modification of regulatory guidelines for wastewater treatment.

Robles: By adopting a specific approach in actions aimed at solving the problem of wastewater (disposal) in the community of Batán Chimón in Costa Rica. This case was not presented in the workshop, since there were three institutions from Costa Rica that participated and it was not possible to present all three cases.

Méndez: In the preparation and implementation of the action plan in my country.

Rosario: By enforcing legislation to control pollution caused by household and industrial waste, whose solution lies in the establishment of water treatment plants with a common objective and requirements, applying the knowledge and the new strategies acquired in the workshop held on July 12-16, 1993.

**Question 3. How could this workshop be improved?**

Herrera: The field visits should involve more participation. Encourage participation, since the "students" were very reluctant to participate.

No name (black ink): (none)

García: By including another field visit so as to make the office work less intense.

No name (pencil): By being more strict about attendance. By keeping track of time schedules and attendance.

Chang: It seems to me that each session should have about 5 minutes of group dynamics so as to break the ice, using this period to give the participants the chance to get to know each other by name and not by country, as was the case mostly here.

No name (blue ink):  
 1. The daily agenda for the workshop should have been sent with the invitation to the workshop. This is important in order to identify who should attend.  
 2. Please consider the alternative of some other \_\_\_\_\_ or the use of \_\_\_\_\_ to make more resources available to participants.

Delgado: I think the participants should be made aware that they are managers who should seek change. In this connection, it would be advisable to begin with the topic of promoting change.

Reyes: (none)

Urruela Pivaral: (none)

Urrutia Molina: It is very well organized.

Argueta: I felt it was already well organized and carried out.

Quintero: By focusing on managerial aspects of wastewater management.

Salas: The time allotted for group work was very short. Make some kind of arrangements (disciplinary action, fines) to encourage early arrival of participants.

Rodríguez: An initial session presenting the methodology to be used.

Copete: By supplementing it with more specific techniques in the areas of implementation. By holding national workshops that focus on the preparation of a country plan in the area.

Villavicencio: By including a touristic visit halfway through, with full group participation.

Miranda: Improve?

Maltés: Individual cases from each country should be presented and discussed during the day, since by the evening most participants were physically exhausted.

Betancourt: By presenting more practical experiences from other countries in Latin America and incorporating more experiences in the appropriate use of technology.

Velásquez Lazo: Greater participation of sector specialists from WHO/PAHO and international agencies (CEPIS, CAPRE, AIDIS, etc.).

No name (blue fountain pen) By limiting talks that are not related to the workshop. Speakers should be a bit more specific with regard to the experience related to the workshop.

Leclair: By scheduling more time for group work so that the work can be performed more conscientiously. In the case studies and field visits, it would be good to have more information on them so that the results could be truly suitable.

Peña: By supplementing it with a workshop that addresses problems of a strictly technical nature and thus strengthen water supply and sanitation programs in our country.

Torres Romero: (none)

Guerrero: (none)

Alverado: By improving the information on the agencies involved in the sector of international cooperation.

Robles: By making it longer.

Méndez:
 

- a. If the main objective of the workshop is to prepare the action plan, considerably more time should have been assigned to this activity.
- b. Return flights should be confirmed on the first day of the workshop.
- c. The presentation given by Mr. Sáenz was excellent. He should have been given more time to elaborate on such an important issue.
- d. The topic of appropriate technologies should be reoriented: I don't feel that anything new was presented.

Rosario: By having more technical staff specialized in the various areas related to the solution of problems connected with the control of pollution from urban and industrial sources.



- Question 4. What topics would you suggest be included in future workshops, in addition to those covered here?**
- Herrera:** Identify critical points in engineering design and review them.
- No name (black ink):** Calculation of treatment plant design
- García:** Pollution caused by industrial waste and health impact (experiences). Experience with appropriate technology for this kind of waste. (This topic is related to the presentation by Rodolfo Saenz.)
- No name (pencil):** Air pollution. Soil pollution. E.I.A.
- Chang:** Solid waste treatment.
- No name (blue ink):** I felt that the technical aspects were not sufficiently considered.
- Delgado:** Information should be included on the negotiating process so as to minimize or neutralize limitations. Another important aspect is the process of policy formulation.
- Reyes:** Pollution caused by gases and by noise.
- Urruela Pivaral:** (none)
- Urrutia Molina:** The privatization of water supply and sewerage services. The granting of concessions for water supply and sewerage services. How to negotiate changes in attitude. How to negotiate \_\_\_\_\_ How to improve project management.
- Argueta:** I feel it would be helpful to organize one on the design of wastewater treatment plants.
- Quintero:** Solid waste management. Underwater outfalls. Development of the social participation component.
- Salas:** Group management techniques. To facilitate the coordination of efforts in the countries.
- Rodríguez:** Optimalization of existing systems, installations, and processes.
- Copete:** Theory of sanitation project evaluation, especially practical in the area of solid and liquid waste.
- Villavicencio:** Something on the analysis of forces, mainly negative forces, such as a negotiating process to change from negative to positive. Incorporate the topic of community participation and health education.
- Miranda:** Underscore the topic.
- Maltés:** (none)
- Betancourt:** The aspects of institutional strengthening with regard to the generation of more revenue in water companies to be used for effective environmental sanitation.

Velásquez Lazo: More attention to environmental impact, especially the analysis, evaluation, and application of studies to improve and guarantee environmental protection.

No name (blue fountain pen) Present one official case study per country.

Leclair: Effective mechanisms for involving the community and private initiatives.

Peña: Technical aspects.

Torres Romero: a. Solid waste treatment  
b. Hazardous waste treatment

Guerrero: Something on administration.

Alverado: Greater detail on environmental legislation, especially with regard to environmental monitoring standards.

Robles: (none)

Méndez: More emphasis should be placed on information systems and monitoring networks.

Rosario: There should be scientific laboratory support and coverage so as to ensure greater monitoring of samples of effluents before and after treatment, i.e., a topic should be included on scientific study of effluents using laboratories with specialized staff.

- Question 5.**            **What kind of follow-up do you plan on doing for the workshop? That is, what immediate action do you plan to take?**
- Herrera:**                **Apply new concepts in my work.**
- No name (black ink):**    **Improve existing regulations on wastewater (try to).**
- García:**                **By exchanging information with participants in similar situations so as to provide feedback. Maintain contact with international technical agencies (WASH, PAHO/WHO).**
- No name (pencil):**        **Continue discussions with local colleagues.**
- Chang:**                 **Follow up on our project, assigning more importance to the sanitation area at the institution.**
- No name (blue ink):**     **In particular, include \_\_\_\_\_ and \_\_\_\_\_ in policy-setting aspects, which are the institution's duty.**
- Delgado:**               **First, I will try to repeat the event in Panama and apply the method to improve my management techniques.**
- Reyes:**                 **Adapt positions, strategies, and recommendations to local conditions and them implement them.**
- Urruela Pivaral:**        **Adopt a systems approach to analyze current and future situations for wastewater management.**
- Urrutia Molina:**        **Report to the authority in charge of the lake on my experience and the possibility of holding a workshop with WASH on problems related to the lake.**
- Argueta:**               **Share the new knowledge and criteria with colleagues who work with me in the sector, recommending that they be implemented so as to improve existing criteria.**
- Quintero:**              **I plan to continue with all the actions that have to do with change, especially the negative aspects of the Panama Bay sanitation project.**
- Salas:**                 **Implementation of the solutions identified in the case studies.**
- Rodríguez:**             **Offer to organize a follow-up workshop on the topic on November 22-23 in Panama.**
- Copete:**                **Modify or prioritize the assessment of wastewater management locally. Apply wastewater management programs within our institution's framework of action, by providing the appropriate support for them so that resources can be obtained.**
- Villavicencio:**         **Exchange information with participants from other countries so as to evaluate advances made.**
- Miranda:**               **1. Group the participants to act — after establishing a consensus — jointly as catalyzing agents.  
2. Prepare an action plan to apply the knowledge acquired in establishing a strategy for wastewater management.**

**Maltés:** Share ideas on ways to formulate a systemic methodology for wastewater management, provide justification for creating a wastewater management committee with legal bases, and streamline the process to achieve coordination among the different groups involved.

**Betancourt:** Integration of all the sectors involved in environmental issues. Prepare an action plan to address environmental problems with realistic objectives.

**Velásquez Lazo:** Maintain contact with the participants and panelists involved. The action plan executed by our country will be used in creating a program with funding from the governments of Japan and Germany, and in creating an interinstitutional support commission.

**No name (blue fountain pen)** Inventory of sources of environmental pollution. This effort will begin in August 1993, with funding from DANIDA.

**Leclair:** Continue with work to prepare the action plan for \_\_\_\_\_ the Masaya Lagoon.

**Peña:** Establishment of a national technical committee.

**Torres Romero:** Assess objectives and goals obtained.

**Guerrero:** Apply knowledge acquired in our work. Try to maintain contact with the persons in charge of the workshop for consultation purposes.

**Alverado:** Promote training of officials and staff in the area of sanitation and sewerage management and treatment systems in cities in my country and their regulations.

**Robles:** In connection with the case indicated in question 2:  
Involve the community. Define the technology to be used. Identify the problem by using health indicators (dissemination).

**Méndez:** The best follow-up would be to implement the action plan prepared.

**Rosario:** Apply all the knowledge acquired in the approval of projects for \_\_\_\_\_ monitoring of pollution from different sources (urban and industrial) in the National Commission for Ecological Sanitation of the Dominican Republic.

- Question 6. What kind of support would you like in the future to promote "systemic" strategies for wastewater management?**
- Herrera: Attend events related to this topic.
- No name (black ink): Technical training and financial support for the country to enable it to carry out wastewater projects.
- García: Receive information on applied methodologies. Training through seminars. Financial support (from agencies).
- No name (pencil): Training. Equipment.
- Chang: Information and documentation that we can use in sanitary education directed toward the community. Seminars for other persons in the country.
- No name (blue ink): (none)
- Delgado: Technical support is required so that the international level can have an impact on high-level decision-making with regard to policies.
- Reyes: Raise the awareness of agents involved in wastewater management with regard to this strategy and then identify needs.
- Urruela Pivaral: Literature, refresher seminars, participatory workshops on horizontal cooperation and coordination. Maintain contacts with other countries in the area so as to learn about with their achievements and the strategies used.
- Urrutia Molina: Invitations to seminars on the topic. Documents and books on the topic.
- Argueta: Documentation on the topic, for study and implementation.
- Quintero: Technical assistance. Financial assistance. Seminars and workshops. Meetings to exchange ideas.
- Salas: Hold a local workshop in Costa Rica — similar to this one — to facilitate administration and implementation of wastewater management programs in Costa Rica.
- Rodríguez: Logistical and organizational support from WASH for a follow-up workshop in Panama.
- Copete: Bibliographic documentation on results and experiences applied to specific cases with appropriate final results achieved.
- Villavicencio: The international agencies located in our countries should inform country authorities of events and the responsibility we have acquired as country representatives.
- Miranda: It would be very helpful to have an agency such as WASH available for consultation and technical — and, above all, moral — support so as to make it easier to post achievements at the national level.

Maltés: (none)

Betancourt: DIMA urgently needs institutional support to implement the action plan to be proposed, i.e., improve the structure, train staff, and seek financial resources for its success.

Velásquez Lazo: Dissemination of newsletters as part of strategies and policies that arise from cases which — in the opinion of AID/WASH — could contribute to wastewater management.

No name (blue fountain pen) Funding. Organization of a national workshop.

Leclair: Organization of local seminars similar to this one. Technical cooperation focused on specific problems.

Peña: Bibliography. Manpower training.

Torres Romero: (none)

Guerrero: Receive information periodically from WASH.

Alverado: The best support would be to have a bibliography and printed materials on the topic of environmental monitoring and specific guidelines for wastewater management. Results of experience with integrated systems.

Robles: For Costa Rica in particular, continue reporting to the principal institutions involved on the activities of the WASH Project (seminars, workshops, etc.). These institutions are: the Ministry of Health, AyA, and IFAM (as regulatory agency for the cities).

Méndez: (none)

Rosario: Receive considerable technical and scientific advice for solutions and methods for the different kinds of effluents to be treated, as well as legal support.

<b>Question 8.</b>	<b>Other observations.</b>
Herrera:	(none)
No name (black ink):	The workshop was excellent and provided many new ideas in the area of support as well as in other areas.
García:	(none)
No name (pencil):	Congratulations to ANA.
Chang:	(none)
No name (blue ink):	(none)
Delgado:	I think different participants came to the workshop with different expectations concerning the workshop's objectives. Many participants think that there are other non-explicit motives for this event, and therefore do not accept the expressed objectives.
Reyes:	(none)
Urruela Pivaral:	(none)
Urrutia Molina:	Congratulations and thank you for _____.
Argueta:	(none)
Quintero:	I am really quite satisfied with the course as concerns the establishment of management strategies. I am also very pleased that the Panamanian project was selected to be analyzed in the workshop.
Salas:	As concerns the speakers, their topics and methodologies were appropriate. It so happened that the Colombian speaker was not able to come and this facilitated the study of one of the cases. This approach should be used in all the workshops, i.e., the study of a case from the countries participating in the workshop.
Rodríguez:	(none)
Copete:	(none)
Villavicencio:	Congratulations to everyone responsible for the workshop having achieved its goals.
Miranda:	Independently of the responsibility of the administrative and technical staff that led the workshop, we want to make special mention of the human side, which was outstanding: Anny was marvelous, Alan was effective in ensuring that objectives were reached, and Denis showed keen insight as well as a very personal side.
Maltés:	(none)
Betancourt:	Other expectations: that the seminar would clearly define the stages of the action plan.

## ACTION PLAN FOR EACH COUNTRY

from the plenary session held on Friday, July 16

### EL SALVADOR

- Problem:** Pollution of the Lempa River
- Goal:** Improve the water quality of the Lempa River to a level compatible with fishing and the generation of hydroelectric power
- Specific objectives:**
1. Provide ongoing control of urban, agro-industrial, and industrial contaminants
  2. Integrated watershed management

#### Short-term Goals

- Set up a regulatory commission for the river basin
- Draw up a plan for integrated management and improvement of the Lempa River watershed
- Promote community involvement
- Revise and update existing regulations and standards
- Strengthen regulatory agencies
- Seek funding for feasibility studies

#### Additional Measures

- Promote environmental education and awareness as a means of creating and fostering change
- Ensure that political support has the underpinning of an informed public
- Adopt appropriate, sustainable technologies

#### When and How

- SEMA should take measures to ensure that the regulatory commission for the watershed is set up by the end of the year and has the active participation of the various sectors involved, with a view to drawing up an action plan as soon as possible.



### How Effectiveness will be Measured

- Periodic evaluation of the action plan based on contributions made and steps taken
- Monitoring of water quality (pollution)
- Measurement of accumulated sediment in hydroelectric reservoirs
- Epidemiological surveillance of water-borne diseases

## NICARAGUA

### Rehabilitation and Rational Use of Masaya Lagoon

#### Additional Objectives

1. Adopt a new methodology for preparing the plan
2. Establish mechanisms for coordination among the agents involved
3. Draw up a feasibility study on the economic rate of return
4. Launch a health education campaign
5. Define and establish a rate system for discharges of pollutants

#### Additional Measures

1. Encourage involvement of the media:
  - a. Focusing on civil society with a view to promoting the project and formats for participation
2. Organize multisector debates and roundtables:
  - a. To create awareness and promote initiatives by politicians
3. Organize a national and regional network to support, strengthen, and coordinate wastewater management
4. Create an environment fund to ensure the sustainability of wastewater management

#### When and How

1. Apply the new methodology immediately
2. Provide for coordination within five months
3. Conduct an economic feasibility study by April 1994, using internal funding
4. Specialized education activities are to be implemented beginning in August 1993
5. Define and establish a rate system within two months:
  - a. Making allowance for inputs

#### Project Monitoring

1. Implementation of the actions will be evaluated through continuous follow-up under a program carried out jointly with the institutions involved

2. Systematized monitoring of water quality in the lagoon
3. Health indicators (morbidity and mortality)

## COSTA RICA

### Problem:

#### General Objective

- To reduce, prevent, and control pollution levels in rivers located in the Ede. de Tárcoles River basin so as to:
  - Maintain ecosystem integrity by protecting bodies of water from the negative impact of uncontrolled development
  - Protect public health against vectors of disease and pathogens
  - Guarantee long-term sustainable use of water at the national level

#### Additional Measures

- Define mechanisms to provide economic and other incentives for wastewater-generating activities with a view to improving their management
- Involve affected communities in comprehensive solutions to problems related to wastewater management
- Promote multisector coordination for the study, expansion, and establishment of:
  - Legal guidelines
  - Regulations for sanitation works
  - Regulations for water use (uses vis-à-vis water quality)
  - Mechanisms for the rational use of water
  - Environmental education
  - A framework to disseminate all the activities under this action plan
  - Awareness-raising activities

#### In the Short Term

- The Minister of Health will call on the various agents involved in wastewater management to take part in a workshop that will focus on coordination.
- These agents will create the necessary mechanisms.

#### In the Medium Term

- Publish, implement, and disseminate the mechanisms drawn up
- Design announcements in various formats for the mass media

### Direct Indicators

- Findings of the water monitoring system

### Indirect Indicators

- Health levels of the population
- Tourism levels in the area of influence of the body of water

## DOMINICAN REPUBLIC

1. Draw up a national plan for environmental and pollution control
2. Revise existing legislation
3. Improve coordination among sector institutions
4. Monitor and control discharges into the environment (air and water)
5. Draw up educational programs and policies aimed at raising the awareness of the population

**Problem:** Severe pollution caused by household and industrial wastewater in the Ozama River in the last five kilometers before it empties into our beautiful Caribbean Sea

This section of the river is used solely as a tourist port and for sports activities and small floating discotheques.

When the waves break on the coral reefs located along the coast, they produce oxygenation similar to that found in giant blowholes.

**Goals and Objectives:**

**Prior to the workshop:**

Restore this section of the river to its original condition

**Now (after WASH and consultations with PAHO):**

We have decided that it would be best to divide the problem into two parts:

- a. Treat household effluents so that \_\_\_\_\_ ? with the flow of the river, the requirements for its uses
- b. Encourage industries to treat their effluents within a period to be decided upon

**How we will address the problem:**

- a. Pursue discussions with the group from the Dominican Republic that attended the workshop with a view to obtaining the basic consensus needed in order to successfully promote it
- b. Once a basic consensus is achieved within the group, promote selective contacts with national advisors and/or technical staff having technical and political responsibility for decision-making

- c. Contact and raise the awareness of environmental leaders so as to keep them from creating obstacles by demanding pristine water quality
- d. Contact with AIDIS in the Dominican Republic and professional institutes to secure their understanding and support
- e. Contact with industrial associations

When and how we will carry out these actions:

- a. Upon our arrival in the Dominican Republic, promote a meeting of the group that attended so as to reach a consensus.

## HONDURAS

### Interinstitutional Commission on Waste Management and Control

#### 1. Objectives:

To set up an interinstitutional commission to coordinate, promote, and unify standards, specifications, strategies, and policies focusing on waste management and control

#### 2. Measures

- 2.1 Identify agents
- 2.2 Organize regional and local subcommissions
- 2.3 Identify technical, economic, and technological resources
- 2.4 Implement educational, information, and training programs through the subcommittees
- 2.5 Promote scientific research and studies for support.

#### 3. When and How

##### 3.1 In the short term

- 3.1.1 Promote the establishment of the commission
- 3.1.2 Revise and analyze current legislation (Law on the Environment, Health Code)
- 3.1.3 Draw up a timetable for implementation

##### 3.2 In the medium and long terms

- 3.2.1 Secure funding for implementing the plan
- 3.2.2 Decide on definitive regulations and set up a legal framework for control and follow-up mechanisms

#### 4. Program Effectiveness

- 4.1 Periodic revisions according to the schedule (evaluations)
- 4.2 Take remedial measures

PANAMA

**Objective:** To ensure effective implementation of the social participation component under the Panama Bay Sanitation Plan

**Measures:**

- Reinforce the criteria of the group
- Meet with the Vice-Minister of the MIPPE
- Invite the Minister of Health to a meeting with the Minister of the MIPPE
- Meet with the IDB and other international lending agencies
- Update the action plan

**When and how:**

- Seek funding from civic groups and CAPAC
- Hold a meeting in mid-September
- Launch activities immediately

**Effectiveness:** — To be measured during execution of the action plan



**WATER AND SANITATION  
FOR HEALTH PROJECT**

Operated by CDM and Associates

Sponsored by the U.S. Agency  
for International Development

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14 September 1993

TAS 455

Dear Colleague:

On behalf of the WASH Project, I am pleased to provide you with a copy of **WASH Field Report 419, Central American Regional Workshop on Wastewater Management**, by Armando F. Balloffet and Alan Hurwitz. This report summarizes the planning and execution of the workshop and gives recommendations on the design and possible follow-on activities.

The purpose of the workshop was to expose key government managers and decision makers to a broad range of interventions which could be used to combat the problem. These included innovative low-cost wastewater treatment technologies, institutional strengthening, public policy instruments, legal instruments (regulation), and economic tools (incentives and fees). Participants were high-level public representative from the environmental, legal, financial, health and sanitation sectors of Guatemala, Honduras, Nicaragua, Costa Rica, Panama, Dominican Republic, and El Salvador.

If you have any questions or comments about the findings or recommendations contained in this report, we will be happy to discuss them. Please contact Eduardo Perez at the WASH Operations Center. Please let us know if you would like additional copies.

Sincerely,

J. Ellis Turner  
WASH Project Director