



WATER AND SANITATION
PROJECT

8 2 7

E C 8 9

Camp Dresser & McKee Associates

Sponsored by the U.S. Agency
for International Development

1611 N. Kent Street, Room 1001
Arlington, VA 22209-2111 USA

Telephone: (703) 243-8200
Fax (703) 525-9137
Telex WUI 64552
Cable Address WASHAID

INTEGRATED RURAL HEALTH DELIVERY SYSTEM ECUADOR FINAL EVALUATION

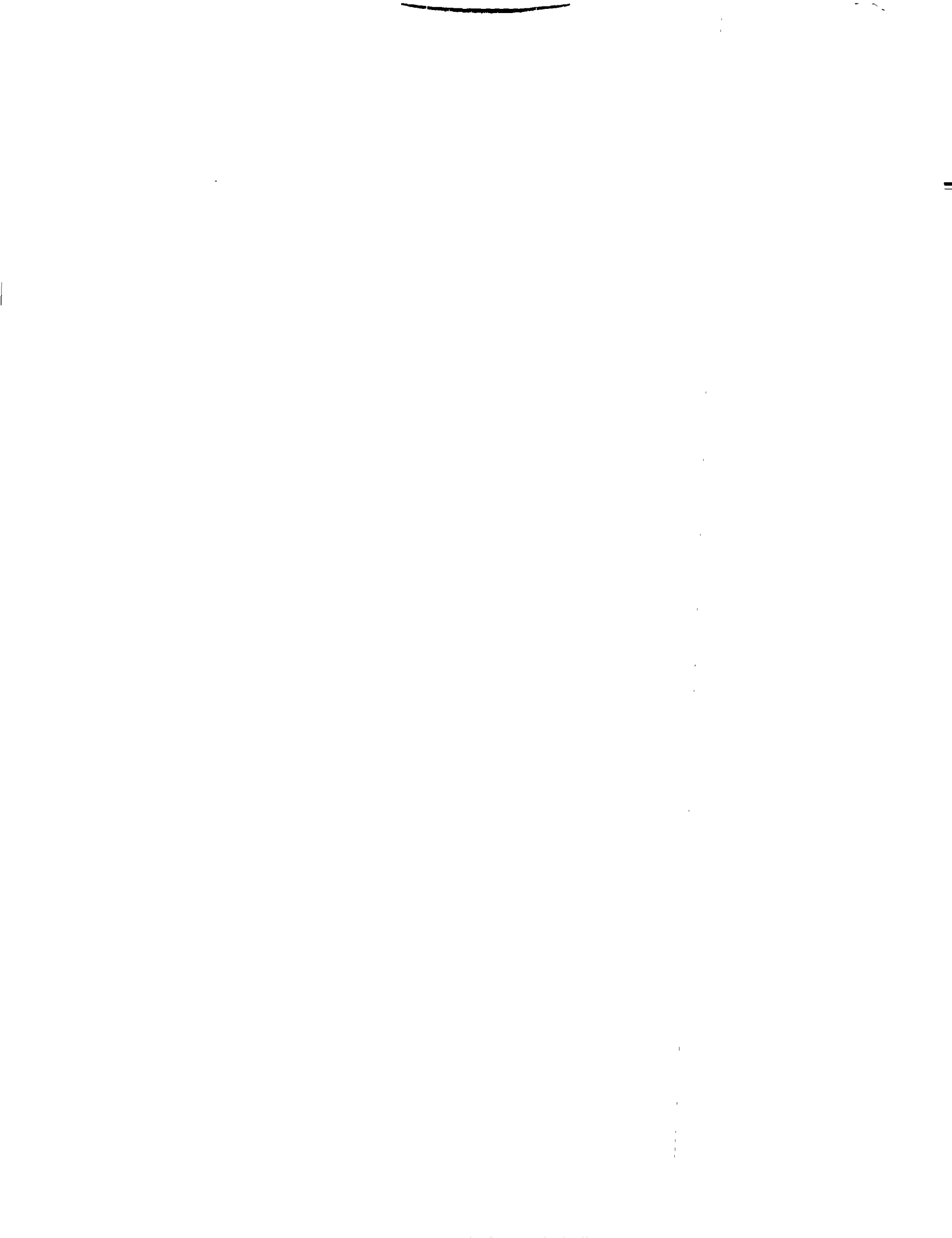
WASH FIELD REPORT NO. 264

JUNE 1989

LIBRARY
INTERNATIONAL REFERENCE CENTRE
FOR COMMUNITY WATER SUPPLY
SANITATION

Prepared for
the USAID Mission to Ecuador
and the Ecuadorian Sanitary Works Institute
WASH Task No. 030

The WASH Project is managed by Camp Dresser & McKee International Inc. Principal cooperating institutions and subcontractors are: Associates in Rural Development, Inc.; International Science and Technology Institute, Inc.; Research Triangle Institute; Training Resources Group; University of North Carolina at Chapel Hill; University Research Corporation.



WASH FIELD REPORT NO. 264

INTEGRATED RURAL HEALTH DELIVERY SYSTEM ECUADOR
FINAL EVALUATION

Prepared for the USAID Mission to Ecuador
and the Ecuadorian Sanitary Works Institute
under WASH Task No. 030

by

Daniel B. Edwards
Nancie L. González
Oscar R. Larrea

June 1989

LIBRARY, INTERNATIONAL REFERENCE
CENTRE FOR WATER AND SANITATION SUPPLY
AND SEWERAGE
10, rue de la Libération, 1201 GENEVE
Tel: (022) 81 11 11

IN: 6004
LC: 827 EC 89

CONTENTS

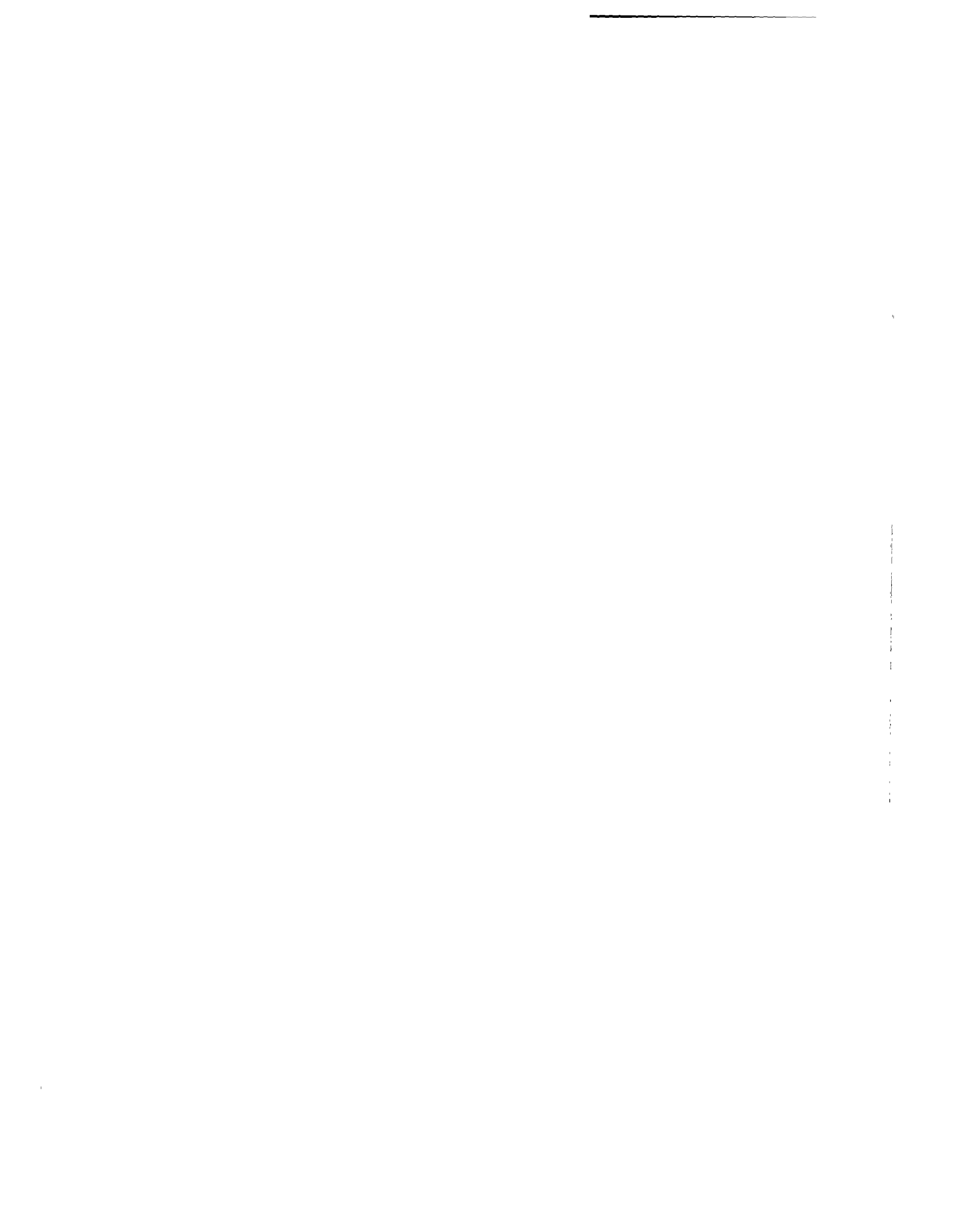
CHAPTER	Page
ACKNOWLEDGMENTS	v
ACRONYMS	vii
EXECUTIVE SUMMARY	ix
1. INTRODUCTION	1
1.1 Project Background	1
1.2 Objectives of the Final Evaluation	3
1.3 Team Composition and Evaluation Methodology	3
2. DECENTRALIZATION OF AUTHORITY TO PROVINCIAL OFFICES	5
2.1 Responsibilities and Organizational Structure of IEOS	5
2.2 Decentralization in the Project	10
2.2.1 USAID's Suggestions	10
2.2.2 Degree of Acceptance of Decentralization	10
2.3 Decentralization Issues for the Future Project	11
2.3.1 Use of the Operational Module	11
2.3.2 Delegation of Technical Decision Making	12
2.3.3 Delegation of Financial Decision Making	12
2.3.4 Selection Criteria for Communities	13
2.3.5 Summary of Decentralization Issues in Future Project	13
3. TRAINING AND HUMAN RESOURCE DEVELOPMENT AT THE PROVINCIAL AND COMMUNITY LEVELS	15
3.1 Project Training Goals	15
3.2 Training Accomplishments to Date	15
3.3 IEOS Training System	16
3.4 Impact of Training	16
4. COMMUNITY MANAGEMENT, ADMINISTRATION, AND FINANCING OF OPERATION AND MAINTENANCE	21
4.1 General Findings	21
4.1.1 Status of Operation and Maintenance	21
4.1.2 Status of Tariffs	21
4.1.3 Sanitation and Water Use	23
4.2 Community Capability for Sustaining O&M	23
4.3 Suggestions for Improving O&M in New Project	24

CONTENTS

CHAPTER	Page
5. CONSTRUCTION AND COST-SAVING TECHNOLOGY	25
5.1 The Operational Module as a Method of Construction	25
5.2 Cost of Construction	27
5.3 Sector Investments	27
5.4 Sector Coverage	28
5.5 Use of Appropriate Technology	29
5.6 Construction Issues for Next Project	30
6. LONG-TERM TECHNICAL ASSISTANCE IN THE PROJECT	31
6.1 Task of Technical Assistance	31
6.2 Impact of Technical Assistance on Policies and Programs	31
6.3 Technical Assistance Issues for Next Project	32
7. COMMUNITY ORGANIZATION AND INVOLVEMENT	33
7.1 Introduction	33
7.2 Factors Tending to Unite Communities	33
7.3 Factors Tending to Divide Communities	34
7.4 Implications for Next Project	35
8. COMMUNITY IMPACTS: HYGIENE AND HEALTH EDUCATION AND SOCIAL MARKETING	37
8.1 Social Marketing Approach to Hygiene and Health Education	37
8.2 Project Impact on Health	39
8.3 Linkages of Child Survival Activities to the Project	40
8.4 Effect of the Project on Women and Their Role in It	41
8.5 Prospects for Project Sustainability	42
8.6 Summary of Issues to Be Addressed in the Next Project	42
9. CONCLUSIONS AND RECOMMENDATIONS	45
9.1 Decentralization	45
9.1.1 Conclusions	45
9.1.2 Recommendations for Decentralization	46
9.2 Training and Human Resource Development	48
9.2.1 Conclusions	48
9.2.2 Recommendations	48

CONTENTS

CHAPTER	Page
9.3 Community Management of Operation and Maintenance	50
9.3.1 Conclusions	50
9.3.2 Recommendations	51
9.4 Construction and Cost-Saving Technology	52
9.4.1 Conclusions	52
9.4.2 Recommendations	53
9.5 Technical Assistance	54
9.5.1 Conclusions	54
9.5.2 Recommendations	54
9.6 Community Impacts: Organization, Hygiene, Health Education, Role of Women, and Social Marketing	56
9.6.1 Conclusions	56
9.6.2 Recommendations for Improved Community Impact	57
APPENDICES	
A. Scope of Work	59
B. References	63
C. Persons Interviewed	69
D. Communities Visited	75
E. Enhancements for the Social Marketing Program Approach to Health Education	79
TABLES	
1. Provincial Staffing of IEOS	9
2. Summary of Training	15
3. Comparison of Tariffs	22
4. Sector Investments	27
5. Sector Coverage	28
FIGURES	
1. IEOS Central Organization	6
2. Typical IEOS Provincial Organization	7



ACKNOWLEDGMENTS

The WASH team wishes to acknowledge the assistance, contributions and able guidance provided by a number of individuals currently working in the rural water and sanitation sector in Ecuador. Without their considerable help our work would have been more difficult and perhaps nearly impossible to carry out. These individuals include:

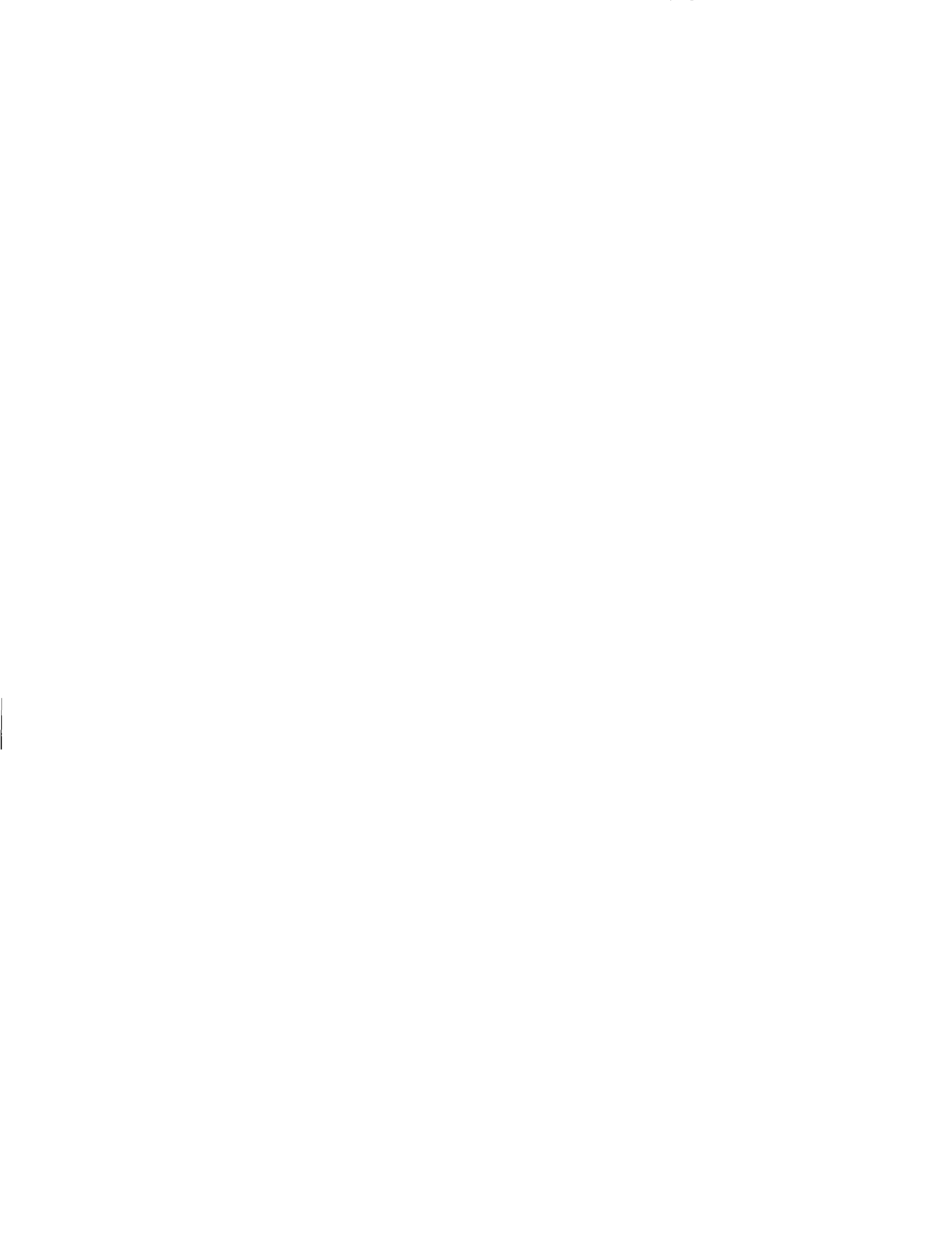
Ing. Adalid Arratia, USAID Project Advisor
Lcdo. Eduardo Coral, Coordinator General IEOS
Lcdo. Homero Morales, Chief of Promotion and Education IEOS
Ing. Jorge Castillo, AID Project Engineer

ACRONYMS

CONADE	<i>Consejo Nacional de Desarrollo</i> (The National Planning Council)
CRS	Catholic Relief Services
CWB	Community Water Board (<i>Junta Administradora</i>)
FONASA	<i>Fondo Nacional de Saniamiento Ambiental</i> (National Fund for Environmental Sanitation)
GOE	Government of Ecuador
IEOS	<i>Instituto Ecuatoriano de Obras Sanitarias</i> (Ecuadorian Sanitary Works Institute)
INERHI	<i>Instituto Ecuatoriano de Obras Sanitarias</i> (Ecuadorian Water Resource Institute)
KAP	Knowledge, Attitude and Practices: a health survey, usually to establish a baseline
MSP/MPH	<i>Ministerio de Salud Publica</i> (Ministry of Public Health)
PREMI	<i>Plan de Reducción de Enfermedad y Muerte Infantil</i> (Ecuadorian National Child Survival Campaign)
RWSS	Rural Water Supply and Sanitation System
USAID or USAID/E	U.S. Agency for International Development Mission/Ecuador
WASH	Water and Sanitation for Health Project

DEFINITIONS

<i>Junta Administradora</i>	Community Water Board (literally, administrative board)
<i>Minga</i>	Community work party
<i>Promotore</i>	Community-level organizer and construction paraprofessional for rural drinking water systems (literally, promoter).
Operational Module	An expedited promotion and construction team system consisting of one engineer, one administrative assistant, and three <i>promotores</i> .



EXECUTIVE SUMMARY

At the request of USAID/Ecuador, the Water and Sanitation for Health (WASH) Project sent a three-person team to Ecuador for three weeks in March 1989 to conduct a final evaluation of the Integrated Rural Health Delivery System Project. The focus of the evaluation was primarily on the past two years of the project, from the signing of Project Amendment 9 in July 1987.

The following is a summary of the team's findings, conclusions, and recommendations.

Findings:

1. USAID has used a team construction method called an "operational module" to demonstrate the effectiveness of decentralizing rural water supply and sanitation systems (RWSS).
2. Decentralization is not a current policy for projects not funded by USAID, but the government is interested in reestablishing it with a USAID-assisted project.
3. During the past year, the Ecuadorian Institute of Sanitary Works (IEOS) has trained approximately 1,200 project-related personnel.
4. This training has been effective in manual skills, less so in promotional skills and hygiene and health.
5. One of the strongest achievements of the project has been to establish community ownership and management of RWSS.
6. The WASH team estimates that community water systems and community water boards are being operated and maintained in the proportion of 60 percent good, 20 percent fair, and 20 percent poor.
7. Community-determined and enforced tariffs are too low to cover recurrent costs in most systems.
8. Communities have demonstrated the ability to maintain their own systems.
9. Promotion of health and hygiene education for community members and board officials has been weak.
10. The modular system has proven to be an efficient means of organizing construction. USAID has demonstrated that a team of one engineer, three *promotores*, and one administrator can construct six to seven systems a year.

11. The average cost of each RWSS is \$22,000.
12. A number of appropriate technology experiments have been tried without positive results.
13. Sector coverage for RWSS is currently estimated to be between 32 and 37 percent.
14. Long-term technical assistance has influenced policy towards decentralization and community participation and ownership.
15. Sustainability of constructed systems could be enhanced with better promotion and more in-depth knowledge of community culture.
16. The social marketing approach to health education is to be attempted in the final year of the project. It will require community-level interventions in addition to publicity. The current plan takes this into account to its great credit.
17. Health messages on radio and television tailored for survey communities will not prove effective for communities outside the target area that have a different water use/cultural-community profile.
18. The prospective social marketing approach does not target the usual caretakers of children such as older children, grandparents, and other extended family members.
19. The team was unable to determine whether the current project has had a significant impact on health.
20. The linkage of the water and sanitation project to other efforts to improve child survival (ORT, family spacing, immunizations) is important. Any follow-on project should support child survival activities.
21. The project has had a favorable impact on women, saving them time in carrying water, and improving personal and family hygiene.

Conclusions:

1. The concept of local participation, ownership, and self-management has been totally institutionalized.
2. The operational module should be part of any new project.
3. The delegation of authority to provincial-level decision makers is integral to decentralization.
4. FONASA funding has been erratic and projects depending on these funds have sometimes been left uncompleted.

5. Although it has made a good beginning, the training department will need strengthening in curriculum development and higher-level skill training for *promotores* and engineers.
6. The relatively high level of community maintenance of constructed systems (50-60 percent) is a good indicator of project success.
7. The follow-up by IEOS staff of community operation and maintenance has been weak.
8. User education in sanitation needs improvement, particularly in latrine promotion, construction, and water usage.
9. Construction targets of 18 systems per year for each operational module are unrealistic.
10. Logistical problems and lack of transportation have hampered the achievement of construction and promotion goals.
11. Latrines with concrete pour-flush devices are not being used because they are hard to keep clean and are aesthetically unappealing.
12. Appropriate technology has yielded few results but should be continued with more organization and supervision.
13. Future technical assistance should separate the USAID monitoring function from training and institution building.
14. There is evidence that 900 communities registered by IEOS are willing to undertake the responsibility of administration and maintenance of their RWSS.
15. Sociocultural factors must be considered in the optimum use of water and sanitation. Too many communities do not understand the health benefits of latrine use.
16. The team was unable to find evidence that health had been improved as a direct result of water and sanitation facilities.
17. Women play a prominent role as community leaders but are underrepresented as IEOS *promotores* and on community water boards.
18. Little attention has been given to health education in the project. The current corps of *promotores* is not large enough to provide health education as well as operation and maintenance supervision. Furthermore, health messages from male *promotores* are highly unlikely to win the acceptance of community women.
19. The plan for a social marketing approach to health education has been well designed for communities with water systems. It is not targeted to reach a larger Ecuadorian audience.

Recommendations:

1. A decentralized rural water and sanitation delivery system through IEOS is the key to effecting 70 percent sectoral coverage by 1995.
2. Enhanced operation and maintenance through systems development and stronger health and hygiene education should be an integral part of the follow-on project.
3. The operational module concept and the delegation of financial, technical, and community selection authority should also be major elements.
4. Counterpart funds from FONASA should be essential for the financing of RWSS. USAID should provide enough construction funding to allow assured demonstration and training.
5. Attention to lessons learned should be structured into a project learning system for project participants.
6. Increased technical assistance should be provided in the follow-on project by a mixture of local and external staff, depending upon locally available skills.
7. Training and human resource development should target 90 percent of current operators and water board members and all new system communities.
8. All existing and future systems should be targeted to raise operation and maintenance to an 80 percent level of efficiency.
9. The construction and use of latrines should be targeted in the follow-on project, and options for latrine improvement packages should be developed by IEOS.
10. Construction targets for each operational module should be set at a minimum of nine systems per year.
11. Research in appropriate technology should be continued for alternatives to chlorine or for lowering chlorine costs, for low-cost construction, and for other areas of emerging need.
12. IEOS should increase the number of *promotores*, at least 50 percent of whom eventually should be women. The number of its women engineers should also be proportionate to the percentage of female engineering graduates in the country.
13. A social anthropologist should be hired as a permanent member of the IEOS promotion and education staff to assist in tailoring promotional and health messages to the realities of Ecuadorian community diversity.

Chapter 1

INTRODUCTION

1.1 Project Background

The Integrated Rural Health Delivery System Project (AID/LAC/P-518-0015, June 1981) is now completing its last year. Since its beginning in 1982, the project has been amended nine times. It has changed, evolved, been evaluated at midterm (by a WASH team in 1985), and now reaches its final evaluation with this report. It represents a USAID investment of nearly \$14 million covering the original project loan and grant (development assistance funds). Economic support categories (ESF) and PL-480 funds (local currency funds generated from the sale of U.S. food surpluses) for construction and vehicles have added another \$1.5 million.

Much of the recent project activity has been with the Ministry of Health's Institute of Sanitary Works (IEOS), the primary service provider of rural water supply systems in Ecuador. But important contributions have also been made by Project CARE, Catholic Relief Services (CRS), and the Peace Corps. Grants have also been made directly to communities organized by other entities such as *Fe y Alegría*.

The primary purpose of the project has been "to develop a model low-cost health delivery system in three Integrated Rural Development areas which can be replicated nationwide" (P.P. 518-0015).

Subgoal areas and project outputs have included institution building for the National Health Council, decentralization and training for the Ministry of Health, and institutional strengthening and equipment for IEOS.

The principal project inputs during the first five years were technical assistance, training, and appropriate technology development, along with funds for water system construction. The last three years have emphasized the accelerated construction of rural water supply and sanitation systems (RWSS), increased practical skills training and education for all levels (from community to IEOS promotional staff), and the development of a health communications strategy (to be tested from April 1989).

The primary, readily measurable outputs of the project from 1982 to the date of this evaluation (March 1989) have been the construction of 200 RWSS and the formation of concomitant community water boards. (Observations and data relating to additional accomplishments in training, health, appropriate technology, and policy development will be detailed later in this report.)

The project was set up to coincide with a rural health development strategy that USAID was conducting in three impact areas: Salcedo (Cotopaxi province), Jipijapa (Monaví province), and Químiag-Penipe (Cotopaxi province). During the first five years, four other health-related entities in addition to IEOS collaborated with the project: the Ministry of Health, which was experimenting

with a decentralization strategy, the National Health Advisory (*El Consejo Nacional de Salud*), the Secretary of Social Welfare (*Secretaria de Bienestar Social*), and the National Development Council (*Consejo Nacional de Desarrollo*).

The original objective was to provide institutional development in the health sector and ultimately to improve the health of the Ecuadorian people. A subgoal was to set up a decentralized mechanism for construction of RWSS to be operated and maintained through self-financing community water boards. That same objective continues to influence project decisions. But two more--hygiene and health education related to use of the water, and the benefits of reduced child mortality and morbidity (the over-arching "child survival goal")--have been added during the past two years as goals that will bridge into a follow-on project scheduled to begin in late 1989.

In June 1987, USAID judged the institutional development goals of the MPH to have been well met. The decentralized health care delivery system was duplicated in all parts of the country after the pilot-zone experiment. The scope of the project was narrowed to provide only water and sanitation, and the number of agencies receiving project funds was reduced to one, IEOS. This decision was influenced, in large part, by the creation of the National Fund for Environmental Sanitation (FONASA). Under the FONASA law, congressionally identified communities are targeted to receive water and sanitation systems. FONASA is funded by a percentage of the profits from the national sale of petroleum products.

Project Amendment 9 (July 1987) argued that a large amount of counterpart funds for construction would allow USAID to further assist IEOS in its construction, training, appropriate technology, and decentralization efforts through technical assistance and training. Since major funds had not been available in past years, the time was right to give IEOS another chance to meet the original goals of the project.

At that time, the impact strategy for the project was dropped in favor of a general coverage strategy. Project areas were added to include communities that had expressed a desire for water but were not covered by the national priority list for rural water system construction under FONASA.

Therefore, USAID's strategy was to support the national goal of reaching 70 percent of rural villages and towns with populations of 500 to 3,000 by the year 1995. Thus, PL-480 and ESF funds for construction in 1988-89 were intended for 18 systems in each of the provinces of El Oro, Pinchincha, Chimborazo, and Azuay-Cañar, and 16 systems in each of the provinces of Bolivar-Tungurahua and Imbabura-Carchi (Implementation Letter No. 074, March 28, 1988, ESF No. 518-0058).

During the last three years the project has focused on the accelerated construction of RWSS with latrines, using a concept known as "operational modules." (The concept and an evaluation of its performance are detailed in sections 2.2 and 5.1.) This construction was made possible by the availability

of increased funds from USAID and FONASA, and the proven success of the concept*.

Because of the past two years' accomplishments, USAID/Ecuador has decided to undertake a follow-on project that would add elements relating to child survival (increased hygiene education and proper use of water). The goal of this project would be to provide IEOS with the institutional capacity to respond to the continued need for rural water supply and sanitation and the ability to attract funds from potential donors.

1.2 Objectives of the Final Evaluation

This evaluation is limited to six areas of perceived success listed for the WASH team by USAID/E in the terms of reference (see Appendix A). The period of performance for review is the past two years, covered by Project Amendment 9 (1987-1989). USAID/E requested recommendations for future activities and project development ideas that could be included in project design documents.

The WASH team was asked to consider the following points in evaluating achievements and proposing future project activities:

- Decentralization of authority to provincial offices for planning and constructing RWSS, using the modular system developed with USAID assistance
- Community management, administration, and financing of the operation of RWSS
- Development, acceptance, and use of cost-saving new technologies
- Training and human resource development at the provincial and community levels
- Influence of long-term technical assistance on policies and programs
- Probability of continued success of the current health education program

1.3 Team Composition and Evaluation Methodology

The WASH team, which spent three weeks in Ecuador in March 1989, included Daniel B. Edwards, team leader, who was responsible for overall coordination and final product management, and whose areas of inquiry covered institutional analysis,

* Construction had slowed down by the end of 1988 for lack of FONASA funds. The only funds at present are unused FONASA allocations from 1988 and the ESF contribution.

management, training, and project design; Nancie L. González, an applied medical anthropologist, who focused on health impacts, community organization and sustainability, family impacts and the role of women, and health education; and Oscar R. Larrea, an engineer, who looked into the sustainability of constructed systems, the use of appropriate technology, the effectiveness of the operational module, tariff and cost issues in community management, and the effects of decentralization.

The evaluation plan included a review of project documents, literature on Ecuadorian community profiles and anthropology, and management documents in USAID/E and IEOS (see Appendix B for a complete bibliography).

Interviews were conducted with USAID/E and IEOS project staff, as well as with representatives of the Peace Corps, Ministry of Health, CARE, CRS, *Fe y Alegría*, and a social marketing firm. IEOS staff included top management, heads of some departments (promotion and training, coordination, personnel, planning), provincial chiefs, engineers, and *promotores* in seven provinces. In all, some 70 persons in positions of leadership related to the project were interviewed (see Appendix C).

Field visits were conducted in seven provinces (see Appendix D for a list of communities visited and the itinerary). Field sites were selected to cover a cross section of community experience with rural water systems, and included sites where systems have operated for more than two years, sites under construction, and sites about to be inaugurated. For geographic and cultural diversity, the selection included highland, coastal, and midland sites with a cross section of mestizo, cholo-mestizo, black, and indigenous populations. Only one highland black community near Ibarra was included.

Members of the team visited homes, interviewed members of community *juntas*, *promotores*, engineers, and provincial chiefs, inspected water systems, *junta* records, and IEOS office files on communities, and tested samples for residual chlorine.

They recorded their observations in the field and periodically reviewed their findings together. They had three meetings with the USAID project officer and more frequent contact with the project advisor. Prior to production of the final draft report, there were final debriefings with both USAID and IEOS key staff to report results and recommendations.

Chapter 2

DECENTRALIZATION OF AUTHORITY TO PROVINCIAL OFFICES

2.1 Responsibilities and Organizational Structure of IEOS

IEOS was created in 1965 as a department in the Ministry of Public Health and made responsible for constructing drinking water systems in small cities. In 1972, the National Water Law transferred the ownership of all surface and groundwater to the government, gave control of water source allocation to the Ecuadorian Water Resource Institute (INERHI), and authority for national planning and standards to IEOS, which also received a mandate for rural water supply. It was not until 1978, however, that IEOS assumed major responsibility for constructing rural water and sanitation facilities (Project Paper, 518-0015, 1981, and World Bank Report No. 7341-EC).

IEOS is responsible for planning in both rural and urban water sectors, setting norms and standards, designing and securing funding for projects, and managing construction throughout the country. In five urban areas where municipal governments have responsibility for sectoral and system management (Quito, Guayaquil, Manabi, Jipijapa, and Pajan), IEOS only ensures that norms are met. It does not have responsibility for setting tariffs in either urban or rural drinking water systems, which only legally constituted administrative bodies, such as community water boards and municipalities that own the systems, are empowered to do.

IEOS is charged with providing technical assistance and training, when requested, to all community water boards and municipalities other than the five urban systems cited above. Although it has the authority to assist all small and medium urban areas in the sector, in practice it is unable to do much with very limited funds for lending or constructing (World Bank Report No. 7341-EC).

IEOS reports to a board of directors that is chaired by the Undersecretary for Environmental Health and Sanitary Works (Fig. 1) and includes representatives of INERHI, the Ministry of Finance, the National Planning Council (CONADE), and the Ecuadorian Association of Municipalities. The board is responsible for policy and for major decisions affecting the approved budget and work plan.

The executive director and deputy director manage the operation. There are six directorates--executive, planning, rural sanitation, urban sanitation, environment, and health facilities--and a number of administrative offices. All directorates and all provincial chiefs report to the deputy director.

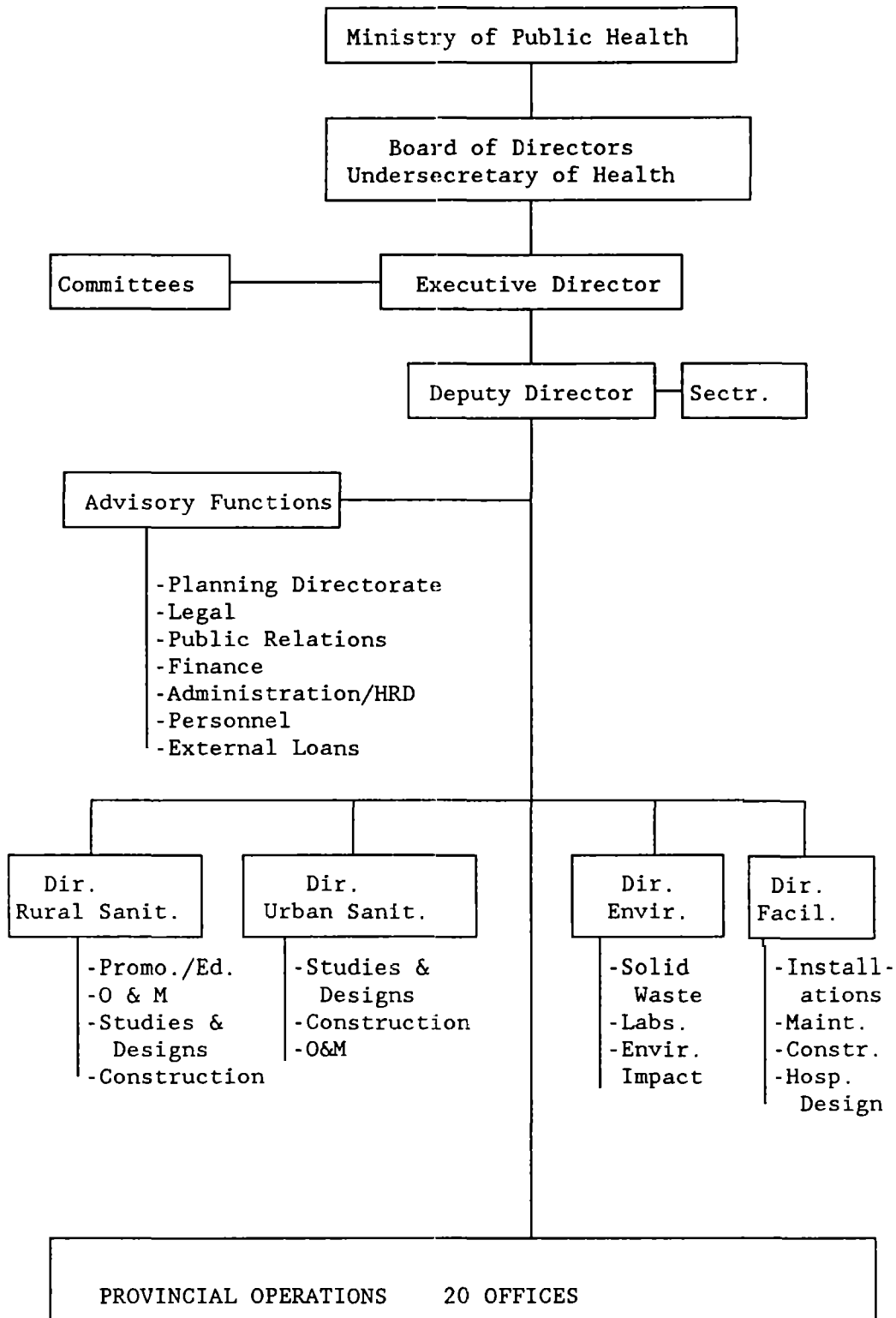


Figure 1: IEOS Central Organization

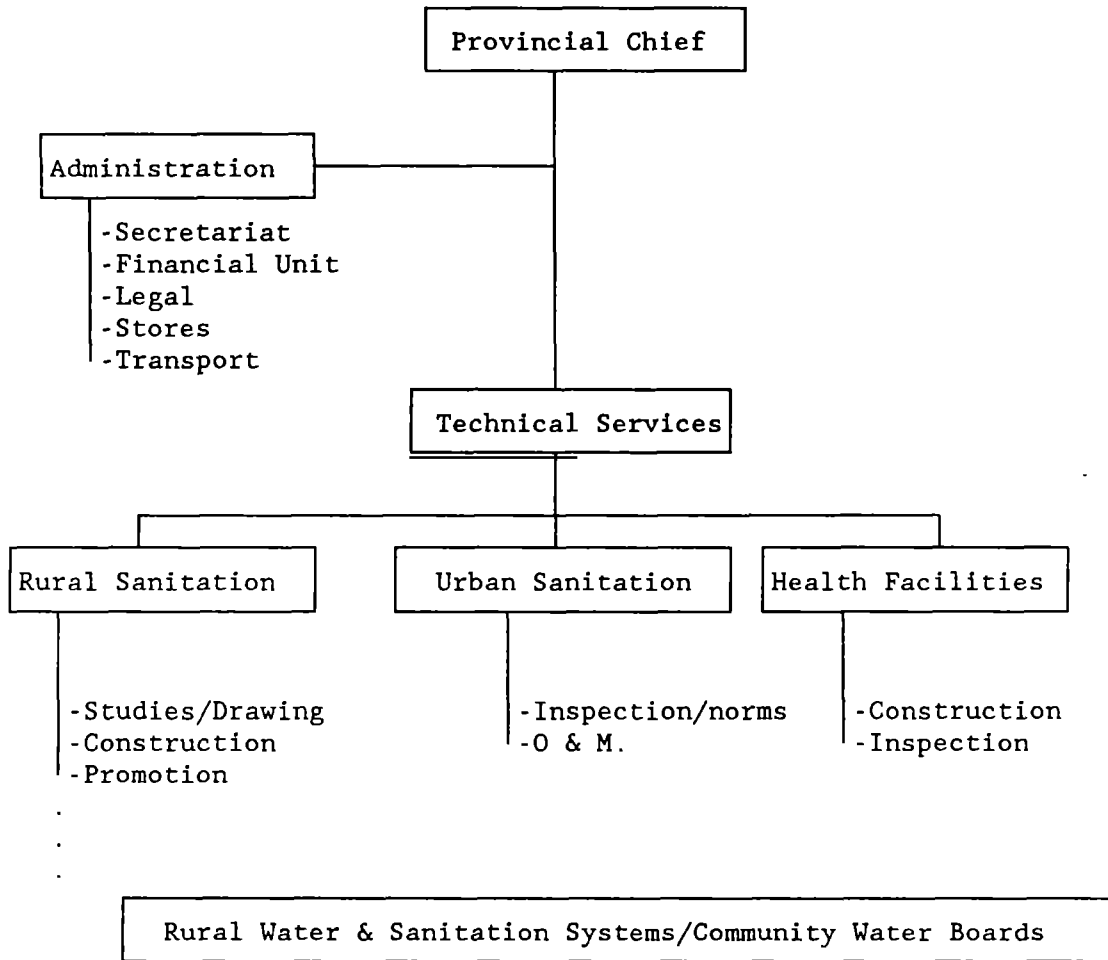


Figure 2: Typical IEOS Provincial Organization*

* Note: Variations in regional structure occur with population size and the number of urban systems in the provinces. Some provinces do not have a health facilities construction/inspection unit; some do not have urban responsibilities. Most groundwater and well-drilling capability is centered in Quito and Guayaquil.

The directorate most closely involved with the project is the rural sanitation directorate (RSD), which supervises the promotion and education division responsible for most of the *promotore* and operator training for community water boards. This division is now entering into management of the social marketing effort (discussed in Chapter 8). The RSD also supervises the studies and designs division, and is responsible for developing the basic design parameters for systems and for establishing sets of on-the-shelf designs (*planos tipos*).

When the project began, IEOS had a direct-hire staff of 203 in the headquarters office and 117 in its 20 provincial offices. Today it has 813 in the central office and 450 in the provincial offices. In addition, there are some 600 contract employees who, according to the director of personnel, have become "permanent contract staff." The total of 1,263 direct-hire staff represents almost a 400 percent increase during the past eight years. If the 600 contract employees are added, the total of more than 1,800 would represent close to a 600 percent increase.

Notwithstanding this increase, the provincial offices of IEOS are short of skilled technicians. There are 31 direct-hire engineers and 34 direct-hire *promotores* (Table 1). Of the engineers, approximately half are dedicated to urban inspections or hospital construction and are probably not available to support RWSS. Distribution of technical staff by provinces indicates that four provinces--Carchi, Galapagos, Imbabura, and Manabi--have no direct-hire *promotores*, and seven provinces--Bolivar, Carchi, Chinchipi, El Oro, Galapagos, Morona de Santiago, and Pastaza--have no direct-hire engineers.

Table 1.

Provincial Staffing of IEOS

<u>Province</u>	<u>Total Staff</u>	<u>Engineers</u>	<u>Promotores</u>
Azuay	26	3	4
Bolivar	10	0	2
Carchi	29 *	0	0
Cañar	15	1	2
Chinchipi	7	0	1
Chimborazo	18	1	3
Cotopaxi	21	1	3
El Oro	24	0	4
Esmeraldas	19	1	1
Galapagos	1	0	0
Guayas	118 **	9	1
Imbabura	11	2	0
Loja	15	1	1
Los Rios	26	3	1
Manabí	33	2	0
Morona de Santiago	5	0	1
Napo	8	1	1
Pastaza	7	0	1
Pichincha	30	2	5
Tungurahua	20	1	2
Totals	443	28	33

* Carchi has eight plumbers.

** Guayas has the Guayaquil offices. The well-drilling operation has 7 master well drillers and 19 drilling assistants. It is curious that an operation with 118 people (including 13 drivers) would have only one direct-hire *promotore*. Since operation of the Guayaquil municipal water and sewerage facility is the responsibility of the municipal company, not IEOS, the role of nine engineers in the municipal office is unclear.

2.2 Decentralization in the Project

2.2.1 USAID's Suggestions

Over the life of the project, and especially during the past two years, USAID has attempted to steer policy and practice toward decentralization, particularly for the rural water and sanitation components of IEOS. It has tried to persuade IEOS's decision makers that better results could be achieved by emulating the USAID project in

- Delegating financial control (currently up to 8 million sucres for USAID-funded projects) and purchasing power to provincial chiefs
- Delegating authority for approving scheme designs to provincial chiefs
- Organizing the work in the decentralized system by contracting one engineer, one administrator/accountant, and three *promotores*, assigning them work targets (18 systems per year), and giving them transportation, backup support, and control over construction (this is called an "operational module")
- Delegating selection of communities for RWSS to provincial offices and requiring that technical and socioeconomic norms be the deciding factors in selection
- Encouraging community participation in construction and self-financing of operation and maintenance through community water boards, assuming that most of the capital is donated and the community provides labor)

2.2.2 Degree of Acceptance of Decentralization

From interviews and a review of documents, the evaluation team made the following observations about the extent to which USAID's suggestions have been followed:

- The idea of community involvement, ownership, and financing of RWSS operation and maintenance has been fully accepted by IEOS and most communities.
- The delegation of financial and technical decision making and the use of the operational module in construction were fully accepted for an 18-month period (1986-1988) by the previous government, but are not in evidence outside of USAID financing at present.
- Grant funds for construction have been essential for demonstration purposes, and decentralization probably would

not have occurred to the extent that it did without them. During the period when IEOS embraced the operational module concept, it used FONASA funds both to contract staff for operational modules and to construct systems with its own core staff. During that period its production of RWSS increased by 400 percent.

- The module performance target of 18 systems per year per team has never been reached, except by a team led by the female Peace Corps engineer who initiated the concept of modular work in the mid 1980s. All those interviewed suggested that nine or ten systems per year would be more realistic.
- The prospects for reinstating the operational module concept and for concomitant delegation of authority by the new government are good in a new project.
- The selection of communities according to technical and socioeconomic criteria has never been followed by IEOS in FONASA-funded projects. In USAID-funded projects, selection has been governed by a community's proximity to the office and the ease of access to materials, community demand and willingness to work, and technical feasibility (acceptable water source and availability of local materials for construction). No priority seems to have been given to communities with special needs.
- IEOS has expressed strong interest in working with USAID to resume decentralization if it can get assistance in training staff to assume delegated responsibilities and can get the necessary equipment for a decentralized operation

2.3 Decentralization Issues for the Future Project

2.3.1 Use of the Operational Module

The experience gained from use of the module encourages optimism about the future use of this part of the decentralization concept. But this optimism must be tempered by political and practical realism.

After USAID demonstrated that a decentralized construction system using contracted staff was efficient, the top decision makers in IEOS at that time were convinced and demonstrated that belief by using the module in construction financed by FONASA. A year and a half later, in July 1988, a new government took power, all regional chiefs were fired, and all delegation of authority was rescinded.

The record shows that in 1986 IEOS constructed 25 systems. In 1987, after changing to a decentralized system, it increased output to 250 systems. Not all of this dramatic increase can be attributed to the efficacy of delegation.

FONASA funding had been set up by law only in 1985, and IEOS had not been asked previously to construct systems rapidly or on a large scale, nor been given the funding to do so. Secondly, the year and a half period of rapid output coincided with the period leading up to the elections.

This does not imply that the operational module is not superior as a construction system, but it does raise the question of how a system that requires strong delegation can be institutionalized in the context of political changes. The challenge for the next project will be to institutionalize delegation so that the IEOS provincial operation will be able to attract continued funding from all sources.

2.3.2 Delegation of Technical Decision Making

Although technical decision making for USAID-funded projects has ostensibly been delegated to each provincial chief and through him to the chief of the module, the USAID project monitoring system carefully tracks all technical decisions and requires all final plans to be approved by the USAID project engineer in Quito. This essentially is the same as the IEOS practice of having the Quito Rural Sanitation Directorate make technical decisions thorough channels as before. The only difference is that the USAID engineer reviews the design within a very short time and the normal IEOS process takes up to four months. Future success will hinge on the skills of provincial officers in making technical decisions and on the ultimate delegation of authority.

2.3.3 Delegation of Financial Decision Making

The delegation of financial decision making demonstrated and advocated by USAID (spending authority for up to 8 million sucres and the use of USAID bid quotation criteria) clearly speeded up the procurement of supplies and building materials for construction. Interview data indicated that the central purchasing system was cumbersome, often took four to six months to deliver supplies, and was unresponsive to provincial needs.

At present, an IEOS contract employee in the USAID project office in Quito monitors the expenditures of the provincial offices. He also provides one-on-one training for module administrators and regional accountants. Unfortunately, IEOS does not use the same accounting system that USAID does for the project. According to interview data, project expenditures prior to institution of the USAID accounting system in the spring of 1988 could not be identified by line item, and it was nearly impossible to separate them from other IEOS items with which they had been aggregated.

An important goal for the future will be to institutionalize a management information and accounting system that can track rural water supply expenditures by project, by component, and by line item.

2.3.4 Selection Criteria for Communities

The issue of selection criteria and the authority for selecting communities is important for decentralization. Provincial offices should be free to set priorities and develop annual work plans within an overall administrative budget. Community selection should be based on considerations other than proximity to the office, ease of access, or a community request. USAID-funded projects would have no difficulty adhering to criteria based on a scale of priorities. But for FONASA-funded projects, the prevailing practice is for Congress to use political criteria to make up the list of eligible communities.

2.3.5 Summary of Decentralization Issues in Future Project

Questions for the future are:

- Under what conditions will the government be willing to re-delegate authority for technical and financial decision making?
- To what extent will it be willing to use private contractors?
- If in-house staff is used, can provincial management set up a performance-based monitoring system to ensure results? Can the skills for managerial accountability be built into the next project?
- Will IEOS be able to assign enough engineers and *promotores* to target regions? If not, will contract employees fill the gap?
- Will IEOS be willing to undertake a training program for regional managers, engineers, and *promotores* to ensure that decentralization is firmly in place over the next four years and not easily reversed by the next political change?
- Will IEOS and USAID be willing to adopt community selection criteria that take into account such priorities as health and need?
- Will USAID allocate construction funds for demonstration purposes so that systems can be developed for decentralization?
- Will IEOS provide sufficient counterpart funds from FONASA or other sources to support decentralization and ensure that coverage targets are met within the next five years?

Chapter 3

TRAINING AND HUMAN RESOURCE DEVELOPMENT AT THE PROVINCIAL AND COMMUNITY LEVELS

3.1 Project Training Goals

Project Amendment 9 stated these training goals that the team evaluated:

Training. The amended project will provide in-country training to reinforce the decentralized RWSS delivery methodology. The beneficiaries of this training will include approximately 1,400 village-level water system operators in system operation and maintenance, 120 IEOS provincial-level sanitary *promotores* in community participation, health education, and water board creation, and 40 IEOS provincial-level field engineers in project management and appropriate technology. In addition, IEOS central and provincial managers will receive training in data processing and analysis for project implementation and logistics management. (Project Paper Supplement No. 3, Amendment No. 9, 7/21/87.)

3.2 Training Accomplishments to Date

Table 2 summarizes the accomplishments of the training program from its inception in June 1988 to March 1989. It is assumed that during the remainder of 1989 training of the planned numbers of operators, engineers, and *promotores* will continue. It appears that quantitative targets are being met.

Table 2.
Summary of Training

<u>Trainees</u>	<u>Subject Area</u>	<u>Duration (days)</u>	<u>Target (Nos.)</u>	<u>Actual (Nos.)</u>
Operators of RWSS	Basic O&M	5	1,400	452
Community Water Board Members	Duties/ Administration	2	(w/in 1400 above)	682
<i>Promotores</i>	Promotion/ Construction	25	120	40
Provincial Engs. Chiefs Oper. Mod.	Construction/ Design	5	40	26
Provincial Chiefs/ Executive Staff	Motivation & Planning of Social Mkt.	2	--	29

3.3 IEOS Training System

The department of education and promotion is responsible for regional training, and, from all accounts, has been anxious to obtain the resources to carry out an effective program. The last two years of the USAID project have provided the department with an opportunity to develop the framework and design of a basic curriculum. Course formats (including a schedule, syllabus, handouts, reading materials, and a rough training outline) have been prepared for operators, community water boards, and *promotores*, but instructors' manuals have not been developed yet. The department has begun to assemble materials from various sources and has designed some of its own.

For specific subjects such as health or communications, the department has been accustomed to bringing in guest lecturers from collaborating agencies like the MPH community development department, CARE, or the Peace Corps.

The training organization consists of a department head, support staff, and seven training coordinators, each responsible for a geographic area. Responsibility varies with the number of RWSS. Some provinces have only 20 to 30, others more than 100. In each province, the training coordinator has a training intern (*docente*) who serves as a local coordinator.

The staff showed confidence and a good grasp of training methods, but would welcome the opportunity for advanced training in areas such as promotion, community organization, engineering technology, and management. Case studies and integrated adult learning techniques using simulation and advanced communication methods would equip the department with the skills for an effective training program at the provincial level.

3.4 Impact of Training

The best measure of training effectiveness is performance on the job. But the limited sample available did not permit the evaluation team to assess this with complete certainty. However, the team did observe *promotores* and operators at work, inspected completed systems, and asked all those who had received training what else would help them do their jobs. The team's findings follow.

Water System Operators

- Village-level operators who had received training were able to demonstrate how to conduct tests for residual chlorine and to describe routine maintenance tasks.
- Some system operators, with community assistance, cleaned the slow sand filters too often, disturbing the top layer of organic filtration material and making filters less efficient.
- Operators, while able to describe some water-borne diseases, did not demonstrate knowledge of basic hygiene. One had turned the constructed latrine into a storage shed and admitted with embarrassment that he and his family still used the bush.

- Operators knew how to read meters but did not always read them for various reasons, e.g., some community water boards charged a flat rate.
- Operators could clearly describe their duties and work routine. Community members said they had seen operators tending the system, reading meters, and inspecting water lines.
- Operators said they would appreciate periodical refresher training.

Water Board Members

- The few hours in the curriculum devoted to health training have not been effective. Administrators themselves do not always use their own latrines. Some knowledge of water-borne diseases was evident, but more frequently among women than men.
- About half the tariff payment books were in order. One bookkeeper was described by the community as illiterate but good with mental calculations.
- Presidents of water boards understood the need to meet periodically with other board members and said they usually did so once a month, more often in systems under construction.
- Most water board members knew their duties, but the team noticed that in communities where two years had elapsed since project completion, they became less sure of their authority and role.
- No water board had cut off water for people who were in arrears or who had used the water improperly.

Promotores

- Almost all *promotores* said they had attended the training by USAID in Rio Bamba in July 1988 and by IEOS and CARE in September 1988. One *promotore* was new and was being trained by another with experience.
- Nearly all *promotores* said their training had overemphasized construction and had paid less attention to community promotion, organization, and health, as if they were being trained as engineering assistants. They also said they were under enormous pressure to complete construction and move on to the next job.

- *Promotores* in areas where indigenous medicine is practiced said they found the subject interesting, wished they knew more about it, and wanted more training in it.
- *Promotores* could clearly describe their responsibilities. Those on contract teams often stayed in the communities during construction, commuting back to the provincial capital on weekends. Two who were permanent IEOS employees said they visited communities once every two weeks during construction, and the project engineer supervised the work.
- All *promotores* said they had done a community survey before beginning community promotion. But most had merely spoken with influential community members, not made house visits.
- Most said it took two to three months to get a community ready to start construction after contracts had been signed.
- Most also said they held only one or two meetings to get the community to agree to a project, elect board members, and sign the agreement for community participation.
- In two instances, *promotores* said they felt their supervising engineers needed training in supervision, public/community relations and communication, and health awareness.
- The training for *promotores*, operators, and administrators includes a section on water-borne diseases. A knowledge, attitude and practices survey was conducted in August 1988. Training for *promotores* is now being oriented toward the findings of the KAP survey.

Project Engineers

- Project engineers' experience and knowledge of sanitary engineering varied widely, from seven years to recent graduation from school.
- Several did not understand how process control with a slow sand filter worked. They instructed community operators to clean filters too often, thus nullifying the effect of the filtration medium's bio-organic top layer.
- All engineers believed that systems had always to be chlorinated regardless of the purity of the water source. This could be the result of either a misunderstanding of water biology or a policy that needs to be investigated.
- All engineers used off-the-shelf designs and it was not certain they could design a system themselves.

- Most engineers were poorly informed about the importance of operation and maintenance procedures and how to set them up.
- Most engineers had not received training in health and sanitation and admitted they could use it.
- Most systems inspected showed good construction supervision and sound design.

Training is the key to strengthening the provincial capacity for constructing self-sustaining rural water systems, and in the next project should emphasize the following: personal hygiene, community health, and indigenous medicine; managerial skills; and operation and maintenance for engineers and *promotores*.

Chapter 4

COMMUNITY MANAGEMENT, ADMINISTRATION, AND FINANCING OF OPERATION AND MAINTENANCE

4.1 General Findings

One of the strongest achievements of the project has been the organization of a community water board (CWB) to manage each system. The CWB is formed prior to construction as part of the promotion process and is registered as an incorporated entity (*personaria juridica*). It usually meets once a month to review its finances, and to approve new connections and purchases for O&M. The CWBs in most of the systems visited by the team maintained a daily account book, a record of meetings, a record of supervisory visits by the *promotore*, a register of users, meter reader control cards, connection requests, receipts for water use bills, disinfection control cards, and a community participation register

4.1.1 Status of Operation and Maintenance

To get a picture of how efficiently systems are operated and maintained, the team drew on field inspections of 17 communities, IEOS records through 1988, and a current estimate by IEOS's department of promotion and education. Unfortunately, IEOS records contain a register of systems constructed, with demographic, financial, and technical information, but have nothing on O&M.

The WASH team estimated that the maintenance of 60 percent of the systems was good, 20 percent was fair, and 20 percent was poor. IEOS estimates for the three categories, based on a different rating system, are 50 percent, 24 percent, and 25 percent, respectively.

Considering little O&M promotion is done and many systems receive visits from *promotores* only once a year or less, the level of O&M is indeed very good and compares favorably with other community-owned systems in Central and South America.

4.1.2 Status of Tariffs

By law the tariff is determined by the CWB, usually with assistance from IEOS through the *promotore*. Tariffs must cover the costs of operation, maintenance, and administration, and provide a surplus of 10-20 percent for the replacement of parts, breakages, etc. They must meet the salary of an operator and occasionally of a part-time clerk, and the purchase of hypochlorite. User rates are determined by dividing average monthly operating costs by the number of subscribers and adding 20 percent. The rates may be adjusted as needed but the bylaws of the CWB require a formal review at least once a year. The team found that very few CWBs adjust rates annually as they should. The rates for the base amount (15 m³) of water vary with the type of system.

Table 3 shows the range of current tariffs. Many consumers pay about 150 sucres per month, the price of a soft drink. A 4-lb chicken costs about 1,200 sucres in a supermarket in Quito and about 800 sucres in the country. The minimum monthly wage for a full-time operator is 22,000 sucres (about \$44). Very few systems charge enough to pay this. The team believes tariffs in all systems should be reviewed and adjusted to cover the real cost of the service. Most users interviewed felt that the rates were reasonable and could be increased if necessary.

Table 3

Comparison of Tariffs

PROVINCE AND LOCATION	BASIC p/15m ³ (sucres)	EXCESS p/m ³ (sucres)	PROJECT SPONSOR PLUS COMMUNITY LABOR
<u>Pichincha</u>			
Loreto Pedregal	150	25	USAID PL-480
San Francisco	250	30	USAID ESF
San Miguel	150	20	USAID ESF
Unanchi Pucara	150	20	USAID/Municipality
<u>Imbabura</u>			
Cotama-Azama	120 (10m ³)	10	IEOS/Province
Tangali	150	15	World Vision
<u>Manabi</u>			
San Juan de Mata	400 (10m ³)	20	IEOS

Another problem is the escalating cost of hypochlorite, by as much as 400 percent in the past two years. Ecuador imports all of its chlorine from Peru. A chlorine manufacturing plant has been a "project-in-progress" for many years, with IEOS as one of the investors. Such a plant would represent a tremendous development opportunity for donors interested in a single business investment that would meet a real need.

4.1.3 Sanitation and Water Use

The team found that some communities, particularly where the systems are relatively new, are not making full use of the basic allocation of 15m³. Meter readings indicated a consumption of 1m³ to 5m³ per month for a family of five in some instances. The water system is intended not only to provide safe drinking water but to encourage the use of water for bathing, washing, and cleaning. When questioned, these families said they did not know how much water the basic allocation represented and were afraid of having to pay for excess use. Better community information and promotion by IEOS staff are clearly needed.

The latrines in most of the communities visited were of the pour-flush type with a ceramic bowl, a roofed housing made of cement blocks, and a wooden door. In about 60 percent of the communities, the latrines were still at different stages of construction. Many did not have roofs or doors. Others used only the allocation of bricks from IEOS, which requires the community to contribute half the bricks in most cases, and consequently had very low roofs. On the other hand, in the 40 percent of communities with finished construction, the team noted that the basic latrines had been improved, some with the addition of a shower, some with electric source heaters, and others with tank heaters and a clothes washing basin. Some were well finished and painted and were an attractive addition to family living.

4.2 Community Capability for Sustaining O&M

In all constructed systems, whether sponsored by IEOS or USAID, the beneficiary communities are responsible for operation and maintenance. This is written into an agreement with the CWB prior to construction. The CWB engages a paid system operator/caretaker who works part or full time depending upon the complexity of the system. All operators are trained at a five-day course by the IEOS promotion and education department. They are given a description of the water and sanitation system and an elementary knowledge of water-related diseases, and are taught O&M procedures, water disinfection methods, the reading of residual chlorine, house connections and basic plumbing, meter reading and maintenance, and user education and public relations.

Operators are supposed to be supervised by the CWB and the IEOS *promotore* periodically. The WASH team found IEOS supervision had grown less frequent over the past three years, with one visit a year or less in many systems. IEOS staff said they were not given transportation or travel expenses to make community visits. The team estimated that *promotores* were spending less than 10 percent of their time in promotional and health education activities, and most of their time working with engineers on new system construction as engineering assistants and plumbers.

As a consequence, many communities are not receiving the guidance they need in system management and in health and hygiene education. Many community board members were uncertain about how to make tariff adjustments, how to deal with people who abuse the system by using water for agricultural purposes, how and when to cut off a subscriber, how to deal with the scarcity of chlorine, and how to keep their books up to date.

Promotion seems to be strong at the beginning, since communities with new systems showed a good understanding of their responsibilities and the importance of water for the family's health and well-being. But, over time, the lack of continued support is nullifying some of the original benefits.

IEOS indicated that it is considering a proposal to add a new element to its operation and maintenance system: a *promotore* whose only responsibility will be to conduct community follow-up in health and hygiene education and assist local boards with administration. The team believes approval of this proposal is critical to the success of any future USAID effort.

Many of the CWBs in operation for a year or more are doing very well. One indicator of this is the rate of saving and surplus generated by the tariff. The team found four such systems in Chimborazo province, an area in the Sierra with a somewhat longer exposure to USAID projects.

<u>Community</u>	<u>Savings</u> (000 sucres)	<u>Years Operating</u>
San Andre	374	5
Huacona San Jose	90	1.5
Huacona La Merced	12	1
Palacio Real	80	1.5

4.3 Suggestions for Improving O&M in New Project

- The operational module should be modified to require the engineers to spend more time on project supervision, leaving the *promotores* to give more attention to community education in water use, hygiene, and group strengthening. *Promotores* should be helping to organize *mingas*, training operators and CWB members, and overseeing the plumber who sets up house connections. The *promotore* should not be the primary construction supervisor.
- The proposal to add a permanent cadre of O&M/health *promotores* should be regarded as critical to the success of long-term O&M.
- USAID should assist IEOS to make an inventory of all CWBs and water systems (current tariffs, costs of O&M, status of books) classified as good, fair, and poor, in order to set up a work plan for operation and maintenance.
- The next project should focus more on latrines and provide training in proper use and maintenance.

Chapter 5

CONSTRUCTION AND COST-SAVING TECHNOLOGY

5.1 The Operational Module as a Method of Construction

Chapter 2 discussed the operational module in relation to decentralization. Here it is discussed as a method of construction.

All evidence indicates that the modular construction system is quick, efficient, and qualitatively superior. Roles are clear, responsibilities are defined, and the means to get the job done--purchasing and technical authority, and the vehicles to transport personnel and materials--are built into the system. (Although adequate transportation is supposed to be included, the team found only two instances in the entire country where vehicles were provided.) The module consists of one engineer, three *promotores*, and one administrative assistant assigned to one province, all reporting to the provincial chief. Modules started by the USAID project have used mostly contract staff; IEOS has used both contract and direct-hire staff.

The members of the module have the following responsibilities:

Engineer

- Prepares field and office studies and designs
- Prepares lists of project materials
- Prepares a work plan listing all commodities, specialized labor, and labor in order of need
- Maintains construction progress charts and logs
- Supervises construction and the work of the *promotore* and the contract construction foremen (*maestros de obras*)
- Prepares payment vouchers for skilled contract labor
- Supervises the administrative assistant and assists him in preparing monthly expenditure reports
- Answers to the regional chief for all construction quality and schedule targets
- Supervises three projects at a time
- Maintains corrections in plans with "as-built" drawings (*planos de construcción actual*)

In addition, the engineer is responsible for following good engineering practice by seeking low-cost, appropriate designs, and modifying off-the-shelf plans (*planos tipos*) as needed. All design approval is delegated to the IEOS regional chief engineer.

Promotore

- Conducts initial community investigation and details socioeconomic status of the community using the IEOS promotional system
- Arranges individual and group meetings to explain community responsibilities in the water and sanitation system
- Organizes and trains the community water board
- Provides community education in the use of the water system, and explains elements of system function, metering, costs, and maintenance
- Coordinates the project labor and community work crews (*mingas*)
- Keeps the engineer informed of work progress in his absence (tool accountability, materials, community participation, etc.)
- Works on one community project at a time

Administrative Assistant

- Orders all materials and uses the bid quotation system for the three systems in progress
- Keeps all project books and accounts
- Prepares monthly progress and financial reports
- Reports to the project engineer

The initial plan for the operational module contemplated a work schedule of 18 systems per year, which has never been achieved. Administrative, promotional, technical, transportation, and weather problems have reduced this to six. The WASH team believes that if appropriate transportation is provided, about nine systems per year is a realistic target.

5.2 Cost of Construction

Communities provide about 20 percent of the cost of each system in labor, local materials, or cash.

IEOS's planning department estimates the per capita cost of systems for 1989 as follows:

	<u>Water</u> (000 sucres)	<u>Latrines</u> (000 sucres)
Coastal Areas	28	3
Mountains	22	5
East	30	6

The cost of systems constructed during the year has been about 10 million sucres (\$20,000).

5.3 Sector Investments

Table 4 shows investments from all sources budgeted by IEOS from 1982 to 1986 and projected for 1989.

Table 4

Comparison of Tariffs

Year	For Conducting Studies (000 sucres)	Construction (000 sucres)	O&M (000 sucres)
1982	8,644.19	146,216.25	2,511.96
1983	14,792.11	244,306.13	3,122.04
1984	9,100.96	456,269.42	4,435.08
1985	2,472.97	181,493.96	1,865.89
1986	1,495.33	499,129.12	2,043.64
1987	[data not available--not given]		
1988	[data not available--not given]		
1989	305,000.00	3,304,100.00	100,000.00

The exceedingly high figures projected for 1989 are explained by the aggregated investments of all donor-lenders and the budgeted amounts from FONASA. The figures may be misleading because, according to the three top managers of IEOS, the agency has received only 18 percent of budgeted FONASA funds to date this calendar year.

Contributions for RWSS (1989 and out years) from other donors include:

German Government	\$ 5,000,000 (RWSS in Loja and Zamora) 10,000,000 (RWSS in El Oro, Esmeraldas, Carchi, Napo)
UNICEF	2,500,000 (PROANDES program)
Italian Government	5,000,000 (through Social Services Ministry)

Health-related assistance is provided by Protestant groups, *Fe Y Alegría*, CARE, the Peace Corps, and other social action groups. The Peace Corps has a program with IEOS to support the USAID-funded project with engineers and community *promotores*.

5.4 Sector Coverage

Table 5 shows past and projected coverage for rural water supply and latrines. The team believes the projected coverage of 85 percent for rural water by 1992 to be unrealistic. Given past performance, coverage should be from 45 to 48 percent by 1992 and 70 percent by 1995.

Table 5
Sector Coverage

	Pre-FONASA Funded		IEOS, Donor, and FONASA Funded	
	Water	Latrines	Water	Latrines
1974	14	3	-	-
1977	16	3.3	-	-
1978	17	3.7	-	-
1980	20	4.2	-	-
1982			23	4.7
1984			28	7.0
1986			32.5	10.2
1988			37	12
<u>Projected Coverage</u>				
1989			47.4	15
1990			60	19
1991			75	24
1992			85	25

5.5 Use of Appropriate Technology

Over the life of the project, a number of attempts have been made to apply low-cost technology. These have had varied results.

<u>Technology</u>	<u>Result</u>
Locally manufactured handpumps	Pumps produced by several manufacturers in the early years of the project were discontinued because of manufacturing problems and low demand. Current status unknown.
Locally manufactured ceramic water filters for home use	Manufacture was never successful. IEOS tests found that filters were bacteriologically unsatisfactory for domestic use.
Robo-devices	These devices were never accepted by the communities as a means of controlling water use. Meters are generally used.
Pour-flush latrine	This is the only appropriate technology product in wide use. Locally manufactured units are installed in every IEOS project. Field inspections indicate the concrete bowl unit is not easy to clean and is rejected by many users for this reason. The alternative ceramic bowl unit available on the market is more popular and hygienically acceptable.
Chlorine generator using NaCl	Currently being tested. Results unavailable.
Compact water treatment units	Not initiated yet.
Ferrocement tanks	Final evaluations of experimental systems have not been conducted. Preliminary results are promising.
Groundwater exploration	Data not collected or tracked (or at least not available for team inspection).

5.6 Construction Issues for Next Project

The following issues should be considered in the next project:

- The operational module output should be reduced to nine systems per year as a realistic target.
- Operational modules must be provided with adequate transportation, and materials and budgets must be in place before construction begins. The team found instances where construction had been abandoned for lack of FONASA funds. A question for the next project to answer is whether USAID funds can be used to complete unfinished systems.
- The concrete latrine bowl should be replaced by the ceramic bowl for hygienic and aesthetic reasons.
- Several alternatives for upgrading latrine facilities (different combinations of showers, water heaters, and laundry facilities) should be prepared so that people have a range to choose from.
- Appropriate technology research should continue in areas such as alternative disinfection methods, construction of latrines in difficult soil conditions, cost saving construction, and cost saving operation and maintenance.
- USAID should ensure that planned sector investments by FONASA are made as a condition for annual project allocations.

Chapter 6

LONG-TERM TECHNICAL ASSISTANCE IN THE PROJECT

6.1 Task of Technical Assistance

The original project financed the services of a long-term engineer through a PASA. Those services were completed in mid-1987. The amended project provided the services of an engineer who serves primarily as project manager, coordinating funding sources (DA, ESF, PL-480), monitoring field work, and reporting to mission management on project progress. In addition, the engineer provides technical assistance and on-the-job training to IEOS staff in water quality control, logistics management, and appropriate technology development.

Another project sanitary engineer acts as advisor to IEOS staff on project implementation and liaison with field operations (design, construction management, logistics support).

Arrangements for IEOS contract staff have provided a project accountant and secretary.

6.2 Impact of Technical Assistance on Policies and Programs

Most of the technical assistance has been effective and well regarded by IEOS leadership. Because of the change in this leadership during the past six months, it is not certain how effective current technical assistance is in policy areas.

The PASA engineer influenced the community participation and ownership approach and demonstrated the efficiency of the operational module. These are significant contributions to the Ecuadorian rural water supply sector. He also supervised the use of handpumps, the experiments with the AID-Georgia Tech handpump, and other appropriate technology experiments (home ceramic filters and low-cost construction).

Observations of current technical assistance indicate that project monitoring and control are very effective, particularly in the areas of accounting, quality control, and coordination. Appropriate technology seems to be receiving less attention.

The team observed a role conflict in USAID's present technical assistance approach. The technical assistance advisors are attempting to provide project management and control as representatives of USAID, while also trying to transfer skills as consultants. These two roles are incompatible. Two examples illustrate this.

The team observed two IEOS project engineers and *promotores* with community people in the USAID project office at IEOS asking for a reallocation of excess project materials with which to build a community center. The USAID engineer subjected the IEOS staff to a lengthy interrogation on quality control aspects

of the work while community members watched and waited. In the exchange, the engineers were questioned as if they worked for USAID, not IEOS. Technology transfer and on-the-job training must be conducted in a client-centered, mentor-learner relationship, not a boss-subordinate relationship.

The second example concerns all RWSS designs, which must be reviewed and approved by the assistant USAID project engineer. Presumably this is a quality control measure, the reasons for which are that many engineers working on USAID projects are new and inexperienced, and that recent inspections have revealed several design and construction problems. If this procedure included field work and help in learning, it could serve as a means of transferring skills from more- to less-experienced engineers. But the exercise does not accomplish this. It merely supplants IEOS technical review. (All USAID projects have delegated authority for technical decision making to the provinces. They are not reviewed in Quito by the Division of Rural Sanitation.) The USAID technical assistance advisors cannot supplant IEOS management and supervision of project tasks, and at the same time try to act as teachers to junior engineers. It is not possible to espouse the client's interests as a consultant while functioning in a position of financial and technical control.

6.3 Technical Assistance Issues for Next Project

The team believes that the next project will require greatly expanded technical assistance and a different approach, particularly if provincial institution building is the primary goal. It will need persons experienced in skill transfer who will be readily accessible to provincial staff and will participate in structured training events such as seminars and workshops.

Project monitoring should not be a function of the technical assistance team, whose primary job should be institutional development and assisting IEOS to attain decentralization.

Chapter 7

COMMUNITY ORGANIZATION AND INVOLVEMENT

7.1 Introduction

Community organizations tend to vary with respect to region of the country, ethnicity, size, type of settlement (nucleated or dispersed), type of land tenure, predominant economic activities of men and women, and religion. Pedersen and Escobar (1989) have described the effects of these variables on community organizations in the six provinces they studied—Chimborazo, Azuay, Imbabura, Cotopaxi, Pichincha, and Guayas. The team's observations agree with their findings.

Some variables tend to unite communities, others to divide them. These are briefly discussed below in relation to their importance for the project.

7.2 Factors Tending to Unite Communities

When a community is small and homogeneous with respect to ethnicity, religion, and property ownership, long-standing custom has provided ways for the people to work as a unit even when minor factions exist. The family, both nuclear and extended, is the only effective subdivision in such communities.

The smaller communities are directed by a *cabildo*, which though elected tends to be dominated by one or two families. The same family names will turn up over and over again, and members of the CWB tend to be elected from the same group. Community meetings, attended by men, women, and children, are a way for the entire group to make decisions by consensus, although people are swayed by family alliances and by powerful orators. In such communities, the team often found a reluctance to read water meters or to charge according to usage. Instead, everyone was charged the same in recognition of the fact that some families were larger than others, but, by the same token, poorer. This may be seen as evidence of community cohesion, even though it may seem unfair to westerners.

More acculturated communities, both Indian and Mestizo, are likely to be more democratic but less likely to have frequent community meetings. Once elections have been held, things are left to the representatives. Pedersen and Escobar (1988, p. 45) suggest that this is more likely to occur in communities with wide differences in socioeconomic status.

Often communities are further organized into groups that work for a common purpose. Sometimes these groups are bound by cultural and kinship ties, but in other cases they are the result of an awakening interest in the benefits to be derived from involvement in national and provincial politics. Thus, there are several regional and national organizations of indigenous communities, including FISI (*Federacion de Indigenas de Imbabura*), CONAIE (*Confederacion de Nacionalidades Indigenas del Ecuador*), UNORCAC (*Union de Organizaciones Campesinas de Cotacachi*), FENOC (*Federacion Nacional de Organizaciones*

Campesinas), and MICH (*Movimiento Indigena del Chimborazo*). Many of these are concerned with developmental issues, including water and sanitation, and especially, health.

On the coast there are organizations not only for campesinos but for Indians who have migrated from the highlands and settled there permanently. Others unite producers, such as ACAL (*Asociacion de Cooperativas Arroceras del Litoral*), or workers in an industry, such as *Union Bananera*.

7.3 Factors Tending to Divide Communities

The team found several cases where two or more communities sharing the same water system had disagreements about managing it. When there is no common ground to bring about a resolution of such differences, maintenance and payments may suffer. IEOS, while seeking the greatest efficiency in construction, must be prepared to deal with communities requesting systems of their own in order to obtain control and what they believe will be better service.

Some communities have been seriously divided in recent years by the proselytization of various Protestant groups. One health educator said it is almost impossible to try innovations in such communities.

Anthropologists who have worked in Ecuador have noted long-standing differences and a permanent underlying conflict between Indians and Mestizos (Pedersen and Escobar 1989, p.40). When both live in the same community, there may be special problems for the water board. Yet IEOS personnel seem unaware of this fact.

The team found the black community of Piquiucho (Carchi) to be different in many respects. The women travel extensively to buy and sell goods, leaving the men to attend to agriculture and the grandmothers to take care of the children. The community seemed to have more abandoned wives and single mothers. It is difficult to generalize from this single observation, but the social structure fitted the description of other black communities in Latin America, including Ecuador. The frequent absence of the women would make a sustained educational effort more difficult.

In most communities it is the men who leave temporarily, seeking work in the cities and on the coast during harvest season. They may be gone for five or six months during the year, returning once or twice a month for short visits. This necessarily places a greater burden and responsibility on the women, who remain behind with the children and the older members of the community. It may be true that the more affluent or older men are in charge since they leave less often. In any event, this temporary migration tends to divide the community along gender lines, and may affect the way in which *promotores* and others construct their interventions.

Implications for Next Project

- Advance knowledge of how a community is organized and whether it is likely to be disrupted by internal or regional conflicts could enhance the sustainability of RWSS and influence the selection of communities.
- Communities that charge flat rates for water service may be operating very well, and may merely need help in arriving at a figure that will meet their costs. They may also need guidance in understanding that profits from water charges could finance other community improvements. They will probably be able to work out their own ways of preventing members from abusing the system. Flat rates are simpler in terms of providing change and in bookkeeping, and may be an important advantage in communities where literacy is still low.
- Communities with a heavy out-migration of men may suffer periodic declines in water system maintenance if all the members of the *junta* are male. The addition of women, perhaps wives serving as co-members with their husbands, might be a way to remedy this without infringing on community custom.
- The operational module could profit by enlisting the support of any regional organizations to which a community might belong. To the extent that such organizations are involved in local and national politics they could be of great assistance, but they should be approached in terms of the developmental benefits of the project, downplaying the political angle.
- Where communities are split between Indians and Mestizos, both groups should be represented on the *junta* and an arrangement worked into their rules for the president to be alternately elected. Because Mestizos tend to dominate local politics this may be difficult, but if the Indians are not well represented, working with them on proper usage of both water and latrines for health will be a problem. It might even be appropriate in some instances to have two water boards, one representing each group.

Chapter 8

COMMUNITY IMPACTS: HYGIENE AND HEALTH EDUCATION AND SOCIAL MARKETING

8.1 Social Marketing Approach to Hygiene and Health Education

The following comments are based on a careful analysis of the document entitled "Social Marketing Strategies for Hygiene Education in Water and Sanitation for Rural Ecuador" (Torres and Burns, 1988), as well as on interviews with its principal author, Dr. Marco Polo Torres, and two of his collaborators, Lic. Eduardo Coral and Lic. Homero Morales. The team also interviewed *promotores* and health educators familiar with the general method, although not with this document, and briefly reviewed the modules used in the November 14-December 9, 1988 course for *promotores*.

The approach is innovative, attractive to those upper-level professionals interviewed, and commendable in its goals. The success of a marketing strategy to sell ideas, as well as products, has been proven in many parts of the world among many different populations. The consultant leading the effort seems exceedingly well qualified to develop the communications strategies described. Furthermore, he recognizes, in principle, that the use of mass media alone is not likely to change health behavior, and that sociocultural and economic differences among the various population groups will have to be taken into account in constructing adequate interpersonal educational interventions at the community level (Torres and Burns, 1988, p. 13). Additionally, the project stage intends to vary messages to meet local needs and understanding.

It is difficult to assess the results of the approach to date. The team based its opinion on the findings of the original KAP survey, plus the materials used in the first workshop for *promotores*. The former sampled communities where IEOS had constructed water systems to determine water usage and hygiene practice; the latter used the findings of the survey, plus previous work in social marketing done in Ecuador and elsewhere. The instructors in the orientation course on social marketing for regional chiefs and top IEOS staff were experts in journalism, marketing, and social psychology.

The following comments are intended to improve the coverage and impact of the approach.

- From a socioanthropological perspective, the survey instrument is deficient in not taking into account the ethnic background of the respondents, their religious preferences, the level of poverty or affluence, the literacy of the mothers, and the type of community structure and organization. All of these have been shown to be of importance, in Ecuador and elsewhere, in determining health KAP.

- The survey results aggregate all communities and assume that behavior is the only important factor, without considering the causes underlying that behavior. The designing of appropriate health messages will require studies to determine how best to modify identified behavior.
- Another problem with the aggregation of data is that the information does not provide an interpretation of who is doing what. For example, do 90 percent of coastal people use chamber pots and dispose of excreta near the house, while 10 percent of Sierra people do not? The survey results would average this together.
- Because the sample included only those communities in which IEOS has been active, 100 percent of the respondents said that they had home water connections and used some sort of hygienic excreta disposal. The sample was not really characteristic of the population at large, even within the geographic area described, much less in the country as a whole. Therefore, as a tool for mass campaigns, either in the media or at the community level, the survey was probably off target.
- The plan to incorporate community members and professionals as part of the community health education team (CHET) is good. However, it may be impractical to expect persons busy in their own fields to devote very much additional time and effort to water and sanitation per se. To the extent that they already do so, as in the "hygiene corners" in schools, the project will benefit. School teachers already teach and try to monitor most of the behaviors mentioned. The team was unable to ascertain their effectiveness, however.
- Priests and nuns are relatively few in the rural areas, and, according to interviews, are already overworked. Many communities are totally Evangelical, others are divided in their religious preferences and a message by one religious group is rejected by another. Because the training materials and the study mention no religious groups but Catholics, it is not clear to what extent religious preference or the use of Evangelical ministers in health campaigns has been considered. Verifiable data on religious preference were not available to the team, but a spokesman for the Jesuit organization, *Fe y Alegría*, suggested that 25 percent of the Ecuadorian population today may be Evangelical, with the greatest concentrations in the marginal barrios of the cities and among the indigenous populations of Chimborazo and Imbabura.
- Focusing upon mothers as primary targets may be too narrow an approach, since many of the caretakers of babies and small children are grandmothers, unmarried aunts, and younger female relatives, often children themselves. To the extent that

community level programs ignore this fact, they will miss many of the most important sources of household contamination. It should not be assumed that the mothers will carry the information home to these caretakers; rather, they should be included in the instructional classes and their role recognized.

- The training plan makes no mention of traditional medical KAP, which have been shown to differ from those of populations which have accepted the biomedical, or western European, understanding of disease causation (see Acero and Pianalto, 1985, Aponte Schieber, 1988, Chancoso y Jimbo, 1987, Ortega, 1985, Pedersen, et al, 1979 and 1989). Both pre-Columbian and 16th century Spanish KAP contributed to the formation of the world views which are found among both the indigenous and the Mestizo populations in Ecuador today. The survey instrument, as well as the sample selected (see above), seems slanted toward more acculturated populations.

Since a secondary goal is to reach the larger Ecuadorian population, workshops for *promotores*, health educators, and community leaders should take traditional KAP into account. Acero and Pianalto (1985) is an excellent example of an approach combining traditional and modern biomedical concepts.

- The mass media campaign would be more effective if it were decentralized and carefully tailored to reach different population segments. The project director indicated that this will be done. It would be difficult for the same messages to reach both the target population (rural IEOS-served communities with water systems) and a secondary mass audience. A countrywide campaign may prove too expensive and may never reach rural and marginal urban populations which either have no television sets or radios that can pick up only local stations.

In some rural communities the radio is turned on only between 3 a.m. and 6 a.m. At least one local station in Chimborazo broadcasts only during those hours. It will be important to broadcast radio messages during these listening times.

8.2 Project Impact on Health

It has been demonstrated worldwide that an increase in the amount of water available in the home is directly related to decreases in morbidity and mortality (Elmendorf and Buckles, 1988), presumably because of a decrease in the spread of contagious and infectious diseases. When the quality of water is also improved, there is a decrease in water-borne diseases such as typhoid and others caused by salmonella. When sanitary facilities such as latrines are added, there is a decrease in parasitic infections.

Diarrhea is a symptom of many different diseases defined by biomedicine, and of even more defined by Ecuadorian traditional medicine (causes such as a cold wind, the evil eye, and spells are among these). Traditional ways of treating this symptom in Ecuador include the use of soups and *aguas caseras*, or herbal teas (Aponte Scheiber, 1988). Recent biomedical treatment has stressed the use of rehydration salts, commonly known as *TRO* or *sueros* (ORT or serums) among the ordinary people. There is little doubt that both these measures have reduced mortality from diarrhea in Ecuador.

However, in part because of these simple remedies, it is difficult to determine whether diarrhea has been significantly reduced by improved water and sanitation facilities or whether less diarrhea is now reported. Because many Ecuadorian women believe that medical doctors and nurses are unable to treat certain kinds of diarrhea which the people attribute to causes such as the evil eye, or *mal aire*, they may not even report these episodes, which thus do not become part of the morbidity record.

Unfortunately, diarrhea is also a frequent symptom of malnutrition, especially of the protein-calorie deficiency known as kwashiorkor. It is now generally accepted that the primary cause of most third-world malnutrition is poverty rather than ignorance of proper diet, and that malnutrition and infection work in synergy, each condition exacerbating the other. It is significant that, according to the USAID country development strategy (CDSS, USAID 1988, p 23), as well as the MPH (Suarez, 1988, pp. 165, 170), the highest levels of malnutrition and of diarrhea occur in the same regions--Imbabura, Cotopaxi, Tungurahua, Bolivar, Chimborazo, and Cañar in the highlands, and Esmeraldas, Manabi, Guayas, and Los Rios on the coast. The coast is generally worse than the sierra with respect to both conditions.

For all these reasons, the team has not been able to present any concrete evidence that the present project has had a definite impact on health. The people readily say their health has improved when they know this is the answer expected to the question, "Has the water system improved your and your family's health?". But when they are asked "What has been the primary benefit of the water system?" they mention convenience, and say the program most beneficial to child health has been vaccinations. No woman admitted to having lost any children as a result of diarrhea. When asked how many children they could think of in their community who had died of diarrhea either in the past year or longer, none could think of any. This suggests that, at least in the communities visited, diarrhea is not seen as a life-threatening condition, and reveals the need for more sensitive and adequate education on the subject. If they do not fear it, and if they do not understand that ORT and home remedies are only temporary measures, they are not likely to change their hygiene behavior in relation to water and sanitation (e.g., washing of hands before food preparation or after defecation or in child handling).

8.3 Linkages of Child Survival Activities to the Project

Because babies and toddlers are so often infected by poor handling of their food and their bodies, it is important that all water and sanitation health education be directed not only to mothers, but to all those who may take care of infants.

"Potty" training before the age of two was considered unrealistic by caretakers with whom the team spoke. Most households have a chamber pot that is used by any family member who needs it, especially at night. More attention should be paid to teaching proper waste disposal and the subsequent cleaning of these receptacles before use by other members of the family. Toddlers could just as well use the family pot if the expense of buying another one is too great.

Longer breast-feeding and better supplementary feeding should improve nutrition and reduce the incidence of diarrhea so long as sanitation is stressed in the preparation of foods.

Finally, whether ORT or home remedies are used to combat dehydration during diarrheal episodes, having clean water to start with can only be a plus. Few of the poorer families can afford to boil enough water for the needs of the entire family. For communities without adequate water systems, some form of low-cost home filter might be developed so as to improve the quality of water that families collect from rivers or streams (see section 5.5).

8.4 Effect of the Project on Women and Their Role in It

Having water in their own backyards has been tremendously important for women in several ways. It has reduced the time-consuming and hard labor of bringing water from a distant source, it has eliminated the cost and labor of boiling water for family consumption, and it has ended the practice of carrying heavy loads of washing to rivers or streams. Women can soak clothes while they do other work, and wash them when they have the time. It is likely that with appropriate education, they will learn to wash all the family clothes more often.

The women interviewed said they used the extra time to sleep (they often had to rise at 2:00 or 3:00 a.m. to get the water and return in time to prepare breakfast), or to work on handicrafts, which, of course, will increase the family income. It has been suggested that women who habitually carry heavy loads on their heads suffer inordinate damage of the vertebrae, as well as pinched nerves leading to chronic headaches. Relief from this should lead to a general improvement in health and sense of well-being.

With family planning now widely practiced, women have more frequent menstrual periods. Although they tend not to bathe during their periods, they do wash themselves and the cloths they use to absorb the discharge, so an adequate water supply is an important benefit.

The primary role of women in the various water projects has been as workers in the *minga*. The team saw women wielding shovels and picks, carrying sacks of sand, and doing other kinds of unskilled labor. (Ing. Arratia has numerous photographs of women hard at such work.)

There are a few women on the CWBs. The team found one who was a president and several who were secretaries or treasurers. More frequently, however, women in the community have stimulated group actions that have ended in petitions to IEOS being approved and systems being built.

The team was surprised to find that IEOS has only one woman *promotore* out of 140 in the entire country. Officials in Quito gave such reasons as: "women cannot do the hard physical labor in construction required of a *promotore*"; "their husbands won't let them go out into the communities"; "they cannot get around because *promotores* most often travel on motorbikes and women who apply for jobs with us won't ride these or work in the field." The team heard the same comments elsewhere, yet found that women's actual behavior belies the fears expressed. As evidence that women can work very well as *promotores* in rural areas is the fact that of the 130 *promotores* CRS employs, only one is a man.

The team was pleased to hear that there are a few women engineers at IEOS, but found none in the zonal offices or on the modules. The female member of the team excited great interest among the local women, who were curious to learn more about her. Simply knowing that women elsewhere can occupy various non-traditional roles is itself a kind of developmental experience.

8.5 Prospects for Project Sustainability

The team sees no reason why the social marketing approach, if appropriately designed in the next stage to reach different kinds of populations, cannot be sustained indefinitely. By definition, of course, the more successful it is, the less it will need to be perpetuated. But it will be a long time before Ecuador's entire population is served by potable water systems and adequate sanitation facilities. Until that time, what proves successful in the first communities can be used in others with similar characteristics. Good record keeping and accurate diagnosis of community type and needs will be essential for continued success, however.

8.6 Summary of Issues to Be Addressed in the Next Project

- The social marketing plan at the community level will be enhanced by having a professional social anthropologist, preferably an Ecuadoran, conduct a survey of all the sectors to be involved with the help of existing literature and some additional field work. Once a typology is established, *promotores* might use criteria such as those suggested in Appendix E for classifying the communities.
- The messages to be presented in the mass media part of the social marketing plan might be reconsidered in light of the reservations expressed in this report. The next project might provide more models of clean public restrooms in urban and small town areas, and raise public consciousness about the proper disposal of human and animal wastes and about personal cleanliness.
- Both the social marketing plan and the child survival project will be more effective if they direct their educational

efforts to the caretakers of children as well as to the mothers.

- The team believes that promotion at the local level will be greatly improved by having women in the field. They will be of use in cases where men cannot gain access to the homes because the husbands are absent. But they will also be as effective as men, especially since it appears that they have often been instrumental in getting things started.
- Since the modular system was developed by a woman engineer during her Peace Corps assignment in Ecuador, and since women are increasingly prominent among engineering graduates here and elsewhere, it seems appropriate that more women engineers should serve as role models in the provinces.
- A more careful study of the ethnic and religious components seems warranted. It may be fruitful to work with various religious and peasant-oriented organizations at the national or provincial level to avoid many potential problems. It is at least important to identify all religious preferences and ethnic differences, and the extent to which these may hinder or enhance health education.

Chapter 9

CONCLUSIONS AND RECOMMENDATIONS

9.1 Decentralization

9.1.1 Conclusions

The project goal during the last three years has been to establish a decentralized delivery system within IEOS to construct RWSS that would be operated and maintained by the community through a self-financed water board. Key elements of decentralization have been: delegation of financial and technical authority through the operational module concept; community ownership, involvement, and self-financed operation and maintenance; and delegation of community and project selection.

The evaluation team reached the following conclusions:

- Operational module. The operational module is more than a team working to meet operational targets. It has been at the heart of administrative and technical delegation and is an expedited promotion and construction system. Its value and efficiency have been demonstrated but it has not yet been institutionalized. The team believes a great deal can be done to strengthen the concept (discussed in sections 9.3 and 9.7) as a system for promoting community water boards. If community health education and hygiene elements are added to a follow-on project, the module will need to be strengthened in this area as well or alternatives will need to be found.
- Decentralization/Delegation. The key assumption for any future water and sanitation project is that IEOS finds delegation and modular system construction desirable and is willing to use FONASA and other funds to meet rural community needs. This will be the measure of institutionalization. The team believes there is enough evidence that IEOS is willing to work with USAID to this end.
- Self-sustaining Community Water Boards. The concept of local participation, ownership, and self-management has been totally accepted, demonstrated, and institutionalized by IEOS. However, a great deal can be done to strengthen promotion, operation and maintenance, and tariff management. This is discussed in section 9.3.
- Decentralized Project Selection. USAID has not established adequate guidelines for IEOS to develop a system for project

planning nor to set up socioeconomic criteria for community selection.

- Demonstration Effect in Decentralization. The fact that USAID has provided funds for construction and limited funds for vehicles and equipment has been critical to development of the systems (community involvement, modular construction, delegation) for decentralization.

9.1.2 Recommendations for Decentralization

The institutionalization of a decentralized rural water and sanitation delivery system by IEOS should be the key to meeting sectoral goals for 70 percent coverage over the next five years. The follow-on project should attempt to achieve this by strengthening provincial operations and those central offices that directly support provincial staff. The following specific project targets are recommended:

- Institutionalization of the operational module system with contract or in-house staff for at least 90 percent of all systems constructed
- Delegation of financial authority for rural water system construction, including authority to purchase needed materials and enter into local contracts, and development of annual operating budgets and operational plans
- Delegation of technical decision making for system design and construction within pre-established norms to provincial chiefs and through them to project engineers
- Joint decision making and collaboration with local community water boards to decide level of service, willingness and ability to pay recurrent costs, establishment of realistic tariffs, and contribution to system construction. At least 20 percent of construction costs should be paid by the community in labor or cash
- Strengthening of local community water boards and continuation of community ownership, participation, and operation and maintenance
- Expansion of the concept of the community water board to a community water and health board, and use of this community structure as a vehicle for community hygiene, water use, and health education
- Delegation to provincial chiefs of the authority to select at least 50 percent of the communities financed by FONASA, with required use of specified socioeconomic, health, and technical

feasibility criteria which would be developed as a project activity and for which management could hold provincial operations accountable

To achieve the above targets, the team recommends the following actions:

- Set up one operational module and nine RWSS per target province (the annual projected output of one operational module) for training and demonstration in the institutionalization of a decentralized capability. (Target provinces should be the subject of a follow-up study and negotiation prior to project design.) Appropriate transportation (motorbikes, four-wheel-drive rigs, and trucks) should be included.
- Develop and conduct a full range of training for *promotores*, provincial chiefs, provincial engineers, and related central support offices.
- Develop and implement a decentralization/delegation action plan in collaboration with IEOS top leadership that will specify when and how delegation will be accomplished parallel to the demonstration of performance by provincial offices.

This plan should specify qualitative and quantitative performance targets for provincial staff in the provision of RWSS (e.g., meeting construction standards, demonstrating efficiency in building systems, numbers of household visits, demonstrated community understanding of the hygienic use of water, functioning of community water boards, payment of tariffs, etc.).

- Develop a project learning system to bring project staff together periodically to review accomplishments and share lessons learned in engineering design and construction, sanitation and hygiene education, promotion and community organization, project administration and accounting, team work and the function of operational modules, and use of appropriate technology. The team recommends that part of these discussions should include the use of a project pre-implementation workshop (project startup) with all key project participants, and the use of annual project monitoring and review exercises and workshops.
- Assign short- and long-term technical assistance consultants to assist in skill transfer. The subject areas to be covered would be: training technology and curriculum development, community sociology and health practice (including understanding of local health and healing customs), promotional techniques, engineering design and appropriate

technology, management development and administration, accounting and project administration.

9.2 Training and Human Resource Development

9.2.1 Conclusions

The training department has made a good beginning in the past year to setting up a structure and curriculum for provincial training. The next project will need to enlarge this curriculum by adding new elements and expanding some that are insufficiently covered at present.

The training of operators in duties and technical areas, with the exception of process control-chlorination and filters, has been sound. *Promotore* training has been very strong in construction technology but weak in promotion. Health and traditional medical practice have been greatly neglected.

The training department will need strengthening in advanced methodologies, curriculum development, preparation of instructors' manuals, and the use of audiovisual equipment.

9.2.2 Recommendations

The following targets should be set in the area of training and human resource development:

- Ninety percent of current system operators and water board members should be given refresher courses in operation and maintenance, system management, water use, and health and hygiene. (There are 825 registered community water boards, each with one operator and at least three active members, making a total of 3,300 individuals.)
- Ninety percent of all new system operators and water board members should be trained in water use, operation and maintenance, board functions and responsibilities, and health and hygiene.
- All project engineers, current and new (a total of about 60), should be trained in appropriate technology, system design, operation and maintenance, and health and hygiene.
- All provincial chiefs and their deputies, usually the chief engineers, (a total of about 50) should be trained in management skills for decentralization.
- All appropriate IEOS project staff (provincial chiefs, chief engineers, central office heads of departments), technical

assistance team members, and USAID project staff should participate in a project start-up workshop and three annual project monitoring and review workshops.

- Four subject-area workshops per year should be held for the first three years in such areas as appropriate technology, promotion techniques, and community health practice. Workshops would be for different combinations of project personnel—*promotores*, administrators, engineers—and would accommodate from 15 to 30 participants.

To achieve these targets, the team recommends the following actions:

- Provide two years of technical assistance to the training and promotion department to assist them in advanced training methods for trainers, and curriculum design and development, with a focus on higher-level skills for *promotores* and engineers. This should include needs assessment methods and task analysis, case study method, techniques of interaction (such as role playing and simulation), and advanced communication.
- Expand the current curriculum for *promotores*, operators, and engineers by adding health, hygiene, and sanitation, traditional KAP, and operation and maintenance. About six person-months of technical assistance will be required for these subject areas and for curriculum writing.
- Strengthen *promotore* training by stressing work with the community, in-depth promotion practice, and leadership development.
- Develop a methodology for community health training that includes elements of anthropology and an understanding of popular perceptions of disease and treatment. The people of Ecuador have confidence in indigenous medicine, and any new ideas they are offered to improve health and hygiene will have to contend with that belief system. People will not change without compelling reasons they can understand.

The training of *promotores* and high-level IEOS personnel should devote at least one day to traditional KAP. With operators and administrators, they should be made aware of the historical roots of these traditional patterns, how they relate to modern biomedical KAP, and why some behavior patterns should be changed. An explanation of how biomedicine has made discoveries unknown to their ancestors should enhance the acceptability of the new recommendations by the people.

- Develop and conduct a management training program for provincial chiefs and engineers to assume increasing levels of responsibility. Curriculum elements should include motivating staff, communication, improving team performance (especially of operational modules), developing and monitoring work plans, developing performance indicators, and using management information. This will require four person-months of technical assistance.
- Conduct project start-up and monitoring activities to ensure a project learning and planning opportunity for key project participants. This will require approximately three person-months of technical assistance, probably from WASH.
- Provide sufficient audiovisual and curriculum materials to support a human resources development function in the central office.

9.3 Community Management of Operation and Maintenance

9.3.1 Conclusions

- The current IEOS system of record keeping on community management does not provide the type of information needed to monitor operation and maintenance.
- The fact that about 50 percent of the water systems are properly maintained and community water boards are working well is very promising. This is a strong indicator that communities take their responsibilities seriously and that operator training is working. But these achievements can be improved.
- The operation and maintenance systems need to be improved from beginning promotional activities through follow-up. While *promotores* are addressing some of the issues during the promotional phases, their heavy responsibility for construction supervision is an improper use of resources. This should be changed to require engineers to spend most of their time in the field instead of making weekly or biweekly visits, so that the *promotore* can devote time to training and community education.
- All systems visited were using chlorine, which may not be totally necessary and could be more expensive. No real attention is given to process control. Some systems have very secure sources in clean watershed areas or deep wells, so that pure water goes in and chlorinated water comes out. In these cases only periodic system disinfection is required

- More attention needs to be paid to long-term operation and maintenance requirements, particularly the strengthening of community water boards, and the formation of associations of water boards to achieve economies of scale in purchases and increased community responsibility and initiative.
- The sanitation aspects of the program, particularly the latrine component, need improvement. There is a lack of quality control in construction and a low use rate by community members. Greater emphasis is needed on promotion and user education. Notwithstanding this, it is very encouraging that communities that use latrines and understand their benefits are upgrading them to include showers and washing facilities.

9.3.2 Recommendations

The project should set the following targets:

- All existing systems should be operated and maintained with an efficiency of 80 percent or more as measured by the administration of the water board (appropriate tariffs, appropriate wages to the operator, timely payments, books in order) and the standard of system operation (pure water in sufficient quantity, system in good repair, cleaning routines followed and recorded, meters in good repair, no leaks in the system, appropriate chlorination).
- All future systems should meet the above norms within the first year of operation and continuously thereafter.
- All existing and new latrines should meet quality standards of construction and be in use.
- An operation and maintenance unit should be established within IEOS to maintain a computerized record of all past and future target communities and reports of current status.

To reach these targets, the team recommends the following actions:

- Conduct a survey of existing systems and determine present operational costs and tariffs. This will provide a baseline for the design of an operation and maintenance development project.
- Establish a procedure requiring monthly visits by a *promotore*/educator. Expand the cadre of *promotores* to provide

one for every 20 systems. The *promotore's* time should be devoted exclusively to O&M follow-up and community hygiene and health education (water use, latrine use, washing of hands). *Promotores* can be used to assist in the health education campaign currently under development.

- Continue training of operators and water board members to ensure that every operator receives follow-up training at least once a year, and that all new board members are trained at least every two years, when boards must change by law.
- Clarify the respective duties of project engineers and *promotores*, taking into account the fact that *promotores* need more time to conduct in-depth promotion and education during the initial and construction phases, and should not be burdened with supervising construction.
- Examine alternatives to calcium hypochlorite, such as domestic disinfection for small communities, in view of its rising cost. Water supplies should be analyzed to determine if they need as much disinfection as they are getting, and other methods for dosing with HTH should be explored to replace the obsolete device now being used.
- Move communities along a continuum of increasing autonomy and independence from state-required supervision and assistance by fostering the development of independent user associations.
- Expand the latrine program to provide communities with enough blocks and cement to construct a complete structure. Provide uniform roofing and door material along with appropriate hardware, leaving the community to complete plastering and painting. An education campaign to encourage latrine use should be an integral part of the program.

9.4 Construction and Cost-Saving Technology

9.4.1 Conclusions

- A construction target of 18 systems per year for the operational module has proven unrealistic. Actual output has been six to seven systems. A realistic target should be nine systems per year.
- Logistic problems, principally lack of transportation, have hampered USAID-funded construction, and a lack of funds has slowed FONASA-funded construction started in 1988 and 1989. Many incomplete projects await the release of money.

- Unclear definition of the role of the project engineer and the *promotore* has significantly reduced the time devoted to promotion work and affected its quality. The CWBs have been the principal sufferers.
- Latrines with the concrete pour-flush device are not being used because the people find them hard to clean and unaesthetic.
- Appropriate technology experiments have not yielded expected results. Recent developments in the use of ferrocement hold promise for cost savings. Better conceived and monitored experimentation should continue.
- The team was unable to get verifiable investment data from 1988 through the present. But it is clear that institutionalization goals cannot be met if USAID continues to provide most of the construction funding. Counterpart contributions from FONASA should be a condition for USAID participation.

9.4.2 Recommendations

The following targets should be set in the area of construction and cost-saving technology:

- Constructing eight to nine RWSS per module
- Equipping each operational module with transportation and tools
- Improving management and teamwork of each operational module to serve the institutionalization goals of the project
- Providing at least three options for upgrading latrines
- Continuing the search for cost-saving technologies in chlorine production or substitution, soils, process control, and construction

The following activities to meet these goals should be included in the next project:

- Continued support of the operational module concept
- Equipping each operational module with one with four-wheel drive pick-up truck for light material transport and the use of the engineer, and providing one motor bike for each

promotore. All transportation should be available at the beginning of the project.

- Engineers and *promotores* should be included in project pre-implementation activities, and roles, responsibilities, and team-building of operational modules should be covered. It is also important for regional chiefs, chief engineers, and chief *promotores* to attend startup activities. Follow-up team building should occur with project educational and monitoring events.
- Three types of latrine upgrading options should be made available to communities during promotional activities. The design should allow for incremental addition as the community is able to pay.
- Research in appropriate technology should be organized with the project engineer's assistance, and with full responsibility assigned to a section of IEOS to be determined.

9.5 Technical Assistance

9.5.1 Conclusions

The technical assistance provided has been effective, and major contributions have been made in assisting IEOS to develop policy in community ownership. Important cost-saving has been achieved in RWSS design, and the operational module concept has been effectively demonstrated, if not institutionalized.

Technical assistance can be improved if the dual roles of the USAID project officer as quality control monitor and skill transfer trainer-mentor are separated.

9.5.2 Recommendations

The next project should provide a full range of technical assistance, the details of which are as follows:

- A project monitoring officer working for USAID should provide quality control in construction, appropriate technology, and project strategy and management.

Estimated time: four years

- A separate team working with IEOS—under a USAID, host country, or personal services contract—should provide technical assistance and project strategic planning and management of institutionalization.

- This team should be led by a senior manager/engineer to serve as counterpart to top management, regional chiefs, and the technical departments. Duties would include sanitary engineering advice and training, engineering design assistance, development of a management information system for regionalization, and management advice and assistance in developing a decentralization and delegation strategy.

Estimated time: three years.

- An assistant project engineer skilled in operation and maintenance, small system design, and appropriate technology should assist IEOS in developing an operation and maintenance system at the provincial level. Duties would include working with the operation and maintenance division, the education and promotion office (for curriculum development), and all provincial offices to provide advice on setting up routines for O&M and strengthening community management.

Estimated time: two years

- A training specialist should provide assistance to the promotion and education department. Duties will include advanced training of trainers and advice on setting up an improved training system (conducting needs assessment and task analysis, training evaluation); assistance in curriculum development (for a revised and expanded training curriculum); assistance in designing a series of core curriculum instructor manuals (working with training counterparts); and audiovisual use and development.

Estimated time: two years

- Short-term technical assistance will be required for events related to a project learning system (project startup workshop, annual project monitoring workshops and institutional development advice, project evaluation, and subject area seminars), a management development program for provincial staff, assistance in health and hygiene training and curriculum development, and understanding of local cultures. Other assistance will be required in administration and accounting training, computerization, and subject-area curriculum development.

Summary of short-term technical assistance

<u>In-put</u>	<u>Estimated time</u> (person months)
Project monitoring/startup	4
Management training and development	4
Subject area specialists	5
Administrative systems	6
Computerization	3
Seminars	6
Local cultures/promotion	3
	<hr/>
Total:	31

- IEOS should provide a project administrative assistant-accountant and support staff.

9.6 Community Impacts: Organization, Hygiene, Health Education, Role of Women, and Social Marketing

9.6.1 Conclusions

The project goal is to improve health through increased hygiene, especially the appropriate use of water and sanitation facilities. The acquisition of water and latrines has been an important first step, and there is evidence that the 800 or so communities now served are willing to undertake the responsibilities of maintaining and administering their systems. The next project aims to add health and sanitation education to that relating to construction and maintenance. IEOS personnel are enthusiastic about the new emphasis and will work to support it.

The project also recognizes that the child survival and WID projects have goals that coincide with this, and that some integration of these efforts would be useful.

The following are conclusions relating to the communities:

- Organization of the communities served by AID/IEOS RWSS varies considerably. Sociocultural factors in some communities pose impediments to the optimum use of the water and sanitation systems.
- In many communities latrines are accepted merely as the price for a water system and are often unused.
- The team was unable to find evidence that health had been improved as a direct result of the installation of water and sanitation facilities.

- An adequate water supply has brought numerous benefits to the communities. But it has not improved the hygiene of people who have failed to see the relation between water and sanitation and health.
- Although women play a prominent role as community leaders in the informal sector, they are underrepresented on water boards and in the IEOS promotional corps.
- Health education efforts have suffered because *promotores* have not fully understood the social and cultural differences in the population, and because of failures in communication between male *promotores* and female recipients. In addition, there are simply too few *promotores* to take on the new duties of health education.
- The social marketing plan has been thoughtfully designed for communities sampled. Specific messages will need to be developed for the diverse populations it is expected to reach. It may not have the expected impact in the entire country because it is designed primarily for communities provided with water systems by IEOS.

9.6.2 Recommendations for Improved Community Impact

The following targets are recommended:

- Making the entire rural population aware of the economic, health, and comfort benefits of improved sanitation, particularly in relation to the disposal of excrement and the washing of hands
- Eliminating all resistance to the use of latrines in communities
- Achieving an understanding by 90 percent of adults and 75 percent of children over the age of five in the target communities of the necessity to wash their hands before handling babies or eating food and after using sanitary facilities
- Increasing the number of women employed as *promotores* and engineers—the former should eventually approach 50 percent of the total promotional corps, the latter should reflect the percentage of graduate women engineers in the country

To achieve these targets, the following actions are recommended:

- Hire a social anthropologist as a permanent member of the IEOS health administrative team with the following duties:
 - Conduct a socioanthropological survey to identify community types, and recommend interventions suitable for each.
 - Review all present promotion materials for sociocultural appropriateness.
 - Develop modules on traditional KAP for use in training courses for *promotores*.
 - Develop materials showing how modern biomedical KAP can build on traditional KAP for use in courses for operators and water board officials.
 - Lecture senior IEOS administrative personnel on subjects such as ethnocentrism and cultural relativity.
 - Work with other members of the social marketing team in developing socioculturally appropriate messages and intervention techniques.

- Hire female *promotores* and engineers to work in the provinces, on the one hand to enhance communication with women, who are the primary water users, and on the other to serve as role models of what women can do for the general public. These should be employed first in the modules, but the principle should be institutionalized within IEOS.

Appendix A

SCOPE OF WORK

Appendix A

SCOPE OF WORK

ECUADOR: Evaluation of the AID Rural Water and Sanitation Project

I. Background

Since 1981, USAID has provided over 10 million U.S. dollars worth of assistance (DA, ESF, and PL-480 local currency), mainly to the Ministry of Public Health's Institute of Sanitary Works (IEOS) but also to CARE, CRS, and directly to communities for rural WS&S construction, technical assistance, training, appropriate technology development, and, recently, education and communication. Anecdotal evidence indicates that the project has been very successful especially in six areas: 1) decentralization of authority to provincial offices in planning and construction of RWSS systems using modular systems developed with AID assistance; 2) community management, administration, and financing of operation and maintenance; 3) development, acceptance, application, and use of cost-saving technologies; 4) wide-scale training and human resources development at provincial and community levels; 5) influence of long-term technical assistance on policies and programs; 6) development of model mass media, communications, and education programs to improve hygiene behavior and increase health impact.

The focus of the evaluation report should be towards making recommendations for improvement based on experience and written so as to be used for design of the new project.

II. Purpose

The purpose of the evaluation is to review experience with water supply and sanitation (WS&S) assistance to date and make recommendations that can be used for design of new five-year project, which mission is planning to design and initiate in FY 89.

Specifically, evaluation team will review in systematic fashion progress of assistance to date with focus on six items mentioned. Team will be expected to review inputs of AID and other organizations and explain how they relate to achievements or lack of achievements in these areas.

III. Specific Questions for the Evaluation:

- a) What percentage of communities are properly maintaining and financing AID-assisted rural WSS systems?
- b) What can be done to improve operation and maintenance at the community level?
- c) Has IEOS accepted the modular system as a method of construction for government financed construction? How much is the GOE spending in construction?

- d) Who has been trained? How has training affected the program?
- e) How have appropriate technologies been applied to improve effectiveness?
- f) What has been the impact of long-term technical assistance?
- g) Is the design of the new social marketing plan appropriate?
- h) What kind of impact has AID assistance had on health status and conditions to date? And how could this be improved in the new project?
- i) What has been the role of women in the project?
- j) What are the prospects for sustainability?
- k) What is the potential for linkages with child survival activities, particularly ORT?

Appendix B

REFERENCES

Appendix B

REFERENCES

- Acero Coral, Gloria y M.A. Pianalto de Dalle Rive. Medicina Indigena Cacha-Chimborazo. Mundo Andino, Quito. 1985.
- Aponte Schieber, Christian Gregory. Hidratacion Oral con Comidas Liquidas Caseras: Su Composicion y Factibilidad de Uso en el Tratamiento de Las Diarreas en Hogares Quichuas del Ecuador. Universidad de San Carlos de Guatemala, Facultad de Ciencias Medicas. 1988 (Octubre).
- Arellana, Bambi. USAID/Ecuador WID Action Workplan. Ms. 1989.
- Benitez, Lilyan and Alicia Garces. Culturas Ecuatorianas Ayer y Hoy Ediciones Abya-Yala, Quito. 1988.
- CEPAR. Boletin Socio-Demografico, Imbabura. Centro de Estudios de Poblacion y Paternidad Responsable, Quito. 1985 (Diciembre).
- CEPAR. Boletin Socio-Demografico, Cotopaxi. Centro de Estudios de Poblacion y Paternidad Responsable, Quito. 1985 (Diciembre).
- CEPAR. Boletin Socio-Demografico, Tungurahua. Centro de Estudios de Poblacion y Paternidad Responsable, Quito. 1985 (Diciembre).
- CEPAR. La Mortalidad y las Politicas de Salud en el Ecuador. Centro de Estudios de Poblacion y Paternidad Responsable, Quito. 1985 (Junio).
- CEPAR. Boletin Socio-Demografico, Bolivar. Centro de Estudios de Poblacion y Paternidad Responsable, Quito. 1986 (Diciembre).
- CEPAR. Migraciones Internas en el Ecuador. Centro de Estudios de Poblacion y Paternidad Responsable, Quito. 1986 (Junio).
- CEPAR. Boletin Socio-Demografico, Pichincha. Centro de Estudios de Poblacion y Paternidad Responsable, Quito. 1986 (Mayo)
- CEPAR. Boletin Socio-Demografico, Chimborazo. Centro de Estudios de Poblacion y Paternidad Responsable, Quito. 1986 (Mayo)
- CEPAR. Boletin Socio-Demografico, El Oro. Centro de Estudios de Poblacion y Paternidad Responsable, Quito. 1988 (Diciembre).
- Chancoso, Blanca y Fausto Jimbo. Jambi-Huasi: Sistemas Formal y No Formal de Salud. In Sistemas de Salud en Ecuador, Segundo Seminario Nacional, Ministerio de Salud Publica, Organizacion Panamericana de la Salud, Quito. pp. 117-130. 1987.

- Coloma, Carlos. Sistemas de Salud. In Primer Seminario Nacional Sobre Sistemas de Salud en Ecuador, Ministerio de Salud Publica y Organizacion Panamericana de la Salud, Quito. pp. 55-106. 1985.
- Consejo Nacional de Desarrollo. Politica de Poblacion de La Republica del Ecuador: Objetivos y Estrategias. In Los Problemas de Salud en el Ecuador, pp. 169-177. 1987.
- de la Torre, Patricia. Comunidad Indigena y Politicas de Salud con Participacion Comunitaria: El Caso Columbe 1975-1980. In Sistemas de Salud en Ecuador, Segundo Seminario Nacional, Ministerio de Salud Publica, Organizacion Panamericana de la Salud, Quito. pp. 157-193. 1987.
- Direccion Nacional del Seguro Social Campesino. Los Problemas de Salud en el Ecuador 1987: Memorias de los Simposios. AID, OPS/OMS, Universidad Central del Ecuador. 1987.
- Elmendorf, Mary, and Patricia Buckles. Sociocultural Aspects of Water Supply and Excreta Disposal. World Bank, 1978.
- Harari, Raul. Estructura Socio-Economica del Pais y Salud. In Primer Seminario Nacional Sobre Sistemas de Salud en Ecuador, Ministerio de Salud Publica y Organizacion Panamericana de la Salud, Quito. pp. 9-22. 1985.
- IEOS/MSP. Resumen Climatologico de la Red Meteorologica Nacional. IEOS/MSP. 1983.
- IEOS. Manual de Adiestramiento Para Operadores de Sistemas Rurales de Agua Potable a Bombeo. AID/Ministerio de Salud Publica, Quito. 1983 (November).
- IEOS. Agua: Conocimientos Basicos. IEOS, Quito. 1987.
- IEOS. Ley y Reglamento de Juntas Administradoras de Agua Potable Para el Area Rural. IEOS. 1988.
- IEOS. Manual del Promotore Sanitario. MSP/IEOS, Quito. nd.
- IEOS. Bombas de Mano: Conocimientos Basicos. MSP/IEOS, Quito. nd.
- IEOS. Desinfeccion: Manual Practico Para el Operador de Acueductos Rurales. IEOS/AID, Quito. nd.
- IEOS. La Letrina Sanitaria. IEOS/AID, Quito. nd.
- IEOS. Manual Sobre la Conexion Domiciliaria. IEOS/AID, Quito. nd.
- IEOS. Manual Practico del Operador de Sistemas Rurales de Agua Potable. IEOS/AID, Quito. nd.

- IEOS. Normas para Sistemas de Agua Potable y Saneamiento Rural. IEOS/
Quito. nd.
- Ministerio de Salud Publica, Ecuador. Saneamiento Ambiental, Curso Basico
Para Promotores. Instituto Ecuatoriano de Obras Sanitarias/AID.
1988.
- Ministerio de Salud Publica, Ecuador. Diagnostico de Salud con
Participacion Comunitaria en la Localidad de San Bartolo Grande
Provincia de Chimborazo. MSP, Division nacional de Desarrollo
Comunitario, Quito. 1988 (April).
- Ministerio de Salud Publica, Ecuador. Plan Nacional de Salud (Lineamientos
Basicos) 1988-1992. Ministerio de Salud Publica, Quito. 1988
(Noviembre).
- Morales, Homero y Galo Cuasapaz. Aspectos Basicos de Saneamiento. IEOS,
Quito. 1982.
- Organizacion Panamericana de la Salud. Guias para la Calidad del Agua
Potable. OPS. 1987.
- Ortega, Fernando. Culturas Medicas Tradicionales. In Primer Seminario
Nacional Sobre Sistemas de Salud en Ecuador, Ministerio de Salud
Publica y Organizacion Panamericana de la Salud, Quito. pp. 109-140.
1985.
- Ortega, Fernando, editor. Sistemas de Salud en Ecuador, Segundo Seminario
Nacional. Ministerio de Salud Publica, Organizacion Panamericana
de la Salud, Quito. 1987.
- Ortega Perez, Fernando. Hierbas Medicinales. ININMS, Quito. 1988.
- Pacheco, Victor. El Ejercicio de las Medicinas Paralelas. La Actitud
Preliminar Adoptada por El Colegio Medico de Pichincha. In Sistemas
de Salud en Ecuador, Segundo Seminario Nacional, Ministerio de Salud
Publica, Organizacion Panamericana de la Salud, Quito. pp. 51-66.
1987.
- Pedersen, Duncan, Carloc Coloma, Helena Landazuri, Pilar Perez. Estructura
de los Sistemas No Formales de Salud. Programa de Antropologia para
el Ecuador. 1979 (Diciembre).
- Pederson, Duncan y Martha Escobar. Analisis de Contexto y Factibilidad
Social del Proyecto de Supervivencia Infantil en el Ecuador.
Segundo Informe, PRITECH, Quito. 1989 (January).
- Rutstein, Shea Oscar, Aurora V. Fermo, Antonio Crespo. Child Survival in
Ecuador. Report to the USAID Mission in Ecuador. 1987 (November).
- Secretaria de Salubridad y Asistencia. Manual de Saneamiento. Direccion
de Ingenieria Sanitaria, Mexico. 1980.

- Sola, Jose. La Salud en la Comunidad Andina. In Sistemas de Salud en Ecuador, Segundo Seminario Nacional, Ministerio de Salud Publica, Organizacion Panamericana de la Salud, Quito. pp. 107-115. 1987.
- Suarez, Jose. Niveles de Salud en Areas Rurales del Ecuador. In Primer Seminario Nacional Sobre Sistemas de Salud en Ecuador, Ministerio de Salud Publica, y Organizacion Panamericana de la Salud, Quito. pp. 25-52. 1985.
- Suarez, Jose, et. al. La Situacion de la Salud en el Ecuador 1962-1985. MSP, IINMS, OPS, OMS. 1988.
- Torres, Marco Polo and Janice Burns. Social Marketing Strategies for Hygiene Education in Water and Sanitation for Rural Ecuador. WASH Field Report No. 245, Washington, D.C. 1988 (December).
- USAID, Ecuador. Project Paper, "Integrated Rural Health Delivery System". AID/LAC/P-079. 1981 (June).
- USAID, Ecuador. Integrated Rural Health Delivery System. AID Project No. 518-0015, Amendment No. 3. 1987 (July).
- USAID, Ecuador. CDSS and Action Plan. 1988.
- USAID, Ecuador. Child Survival Strategy. Quito, Ecuador. 1988 (February).
- USAID, Ecuador. Economic Stabilization and Recovery Program. No. 518-0058, Implementation Letter No. 074. 1988 (March).
- USAID, Ecuador. Integrated Rural Health Delivery System. AID Project 518-0015, Amendment No. 9. 1988 (May).
- WASH. Evaluation of the SEDRI/IEOS Rural Water and Sanitation Program in Ecuador. WASH Field Report No. 127. 1984 (September).
- WASH. Proyecto de Sistema de Entrega de Salud Rural Integrado, Ecuador. WASH Field Report No. 13. 1983 (March).
- WASH. Endurance Tests of Robovalves in Ecuador. WASH Field Report No. 102. 1983 (September).
- WASH. An Assessment of the Method of Training Promotores of the Ecuadorian Institute of Sanitary Works. WASH Field Report No. 49. 1982 (September).
- World Bank. Appropriate Technology for Water Supply and Sanitation A State of the Art Review. 1980 (December).

Appendix C

PERSONS INTERVIEWED

Appendix C

PERSONS INTERVIEWED

Agencia de Mercadeo Social

Dr. Marco Polo Torres, Director. G'

CARE

Ing. Vinicio Basantes, Supervisor. L

Dr. Raul Cadena, Deputy Director. E

Mr. Douglas Clark, Coordinator of Health Programs. E

Catholic Relief Services

Ms. Carole Monroe, Director. G

Cuerpo de Paz

Lic. Napoleon Cevallos, Associate Director for Health. E

Cusubama (Cotopaxi) Parrochia

Sr. Luis Aurelio Vizuete, Pres. de la Junta de Agua. G, L

Cusubama, Buena Esperanza Comm.

Sr. Vicente Chillazana, Pres. de la Junta de Agua. G

Cusubama, Quatro Esquinas Comm.

Sr. Gonzalo Martinez, Treas. Junta de Agua . G, L

Cusubamba (Cotopaxi) Parrochia

Sr. Gonzalo Calero, Operador. G

Fe y Alegría

Padre Jorge Galeaz, Dept. de Pastoral. G

Padre Tulio Tobar, S.J., Division de Educacion. G

FONASA

Lic. Julio Ayala, Director Nacional. E

Guabillo/Bausalito, El Oro

Sra. Carmen Piedad Castro, Presidente de la Junta. E, G

San Vicente de Guayllabamba (Pichincha)

Sr. Francisco Vinuesa, Presidente, Junta de Agua. G, L

Sra. Gloria Lopez de Munoz, Storekeeper . G

* Initials indicate interviewer's surname.

IEOS

Ing. Ramiro Acosta, Provincial Chief, Imbabura. E, L, G
Ing. Ronaldo Aguirre, Provincial Chief, Carchi. E
Ing. German Anda, Provincial Chief, Tungurahua. E
Ing. Miguel Arias, Subdirector Ejecutivo. E,
Ing. Barragan, Prov. Engineer, Tungurahua. E, L
Sr. Clemente Bone, Superv. Zonal de Promocion y Educ. E
Sr. Fernando Cadena, Promotore, Piquiucho. E, G, L
Ing. Marco Morillo, Subsecretario Saneamiento. E, G, L
Sr. German Munoz, Promotore, Imbabura. E
Ing. Wilson Ordonez, Jefe de Modulo, El Oro. E, G, L
Sr. Magno Perez, Superv. Zonal de Promocion y Educacion. E
Ing. Marcelo Piedra, Director Nac. Planificacion. L
Ing. Hector Reynoso, Cotopaxi. G, L
Ing. Luis Ruales, Jefe del Proyecto Piquiucho, Carchi. E
Sr. William Velastequi, Promotore, Tungurahua. E
Sr. Cesar Velazco, Promotore Ugshuloma, Imbabura. E, G
Dr. Galo H. Guasapaz Cadena, Jefe de Personal. E
Sr. Gustavo Solis, Promotore Provincial, Cotopaxi. G, L
Sr. Pablo Andino, Promotore, Tangali. E, G
Lic. Jose Orozco, Promotore Zonal, Chimborazo. G
Ing. Carlos Vallejo, Jefe Provincial, Chimborazo. G, L
Ing. Ivan Maldonado, Jefe de Modulo, Chimborazo. G, L

La Florida Regional

Sr. Humberto Campos, Presidente de la Junta de Agua. E
Sr. Melchor Martinez, Presidente del Junta de Agua. E

La Isla (Pichincha)
 Sra. Zoila Tipantaxi, Housewife, Community Advocate G

Lupaxi (Chimborazo)
 Sr. Pedro Mayanza, Pres. de la Comunidad. G

MSP/Chimborazo
 Lic. Hernando Chamorro, Educador de Salud. G

MSP/Quito
 Dr. Jose Castro, Jefe de Desarrollo Comunitario. E

Palacio Real
 Sra. Maria Taguiy, Housewife.

Pansaleo (Pichincha)
 Srta. Maria Ortiz Alarcon, Household manager. G
 Sr. Juan Castro, Sec. Junta de Agua. G
 Sra. Maria Hawaco de Alarcon, Housewife. G

Piquiucho
 Sr. Nelson Melidio de Jesus, Treasurer, Junta de Agua. G
 Sr. Saul Celiano Tadeo, Operador. G

San Andres (Chimborazo)
 Sr. Silverio Huilcapi, Pres. Junta de Agua. G, L
 Srta. Gloria Mantilla, Tes., Junta de Agua. G. L

Tangali
 Sra. Maria Francisca Panama, Housewife. G

Tarata
 Sra. Yenni Yagurana de Vanegas, Wife of Pres. of Junta. G

USAID
 Sra. Bambi Arellana, WID. G
 Ing. Jorge Castillo, IEOS. L, G
 Sr. Francis Conway, RHUDO. E
 Sr. Michael Deal, Proyectos. E, G
 Dr. William Goldman, Health. E, G, L
 Dr. Katherine Jones, Health. G
 Dr. Fernando Ortega, Health. G

Appendix D

COMMUNITIES VISITED

Appendix D

COMMUNITIES VISITED

El Oro

Guabillo-Balsalito	March 17	E*, G, L, Arratia
Torata Regional	March 17	E, G, L, Arratia

Carchi

Piquiucho	March 20	E, G, L, Morales
-----------	----------	------------------

Imbabura

Tangali	March 20	E, G, L, Morales
Ugsholoma	March 20	E, G, L, Morales

Cotopaxi

Cusubamba Regional	March 21	G, L
--------------------	----------	------

Tungurahua

La Florida Regional	March 21	E, Castillo
---------------------	----------	-------------

Pichincha

Panzaleo	March 22	G, L, Castillo
Pucara	March 22	G, L, Castillo
Sta Ana Pedregal	March 22	G, L, Castillo
San Vicente Guayllabama	March 23	G, L, Castillo
La Isla	March 23	G, L, Castillo

Chimborazo

Palacio Real	March 27	G, L, Coral
Huacona la Merced	March 28	L, Coral
Cebollar	March 28	G
Pichiloma (Cebollar)	March 28	G
Puelazo	March 28	L, Coral
Amula Chico	March 28	G

* Initials indicate interviewer's surname.

Appendix E

ENHANCEMENTS FOR THE SOCIAL MARKETING APPROACH TO HEALTH EDUCATION

Appendix E

ENHANCEMENTS FOR THE SOCIAL MARKETING APPROACH TO HEALTH EDUCATION

Technical assistance should be sought to review the Social Marketing Plan in some detail, particularly during the remaining period of the project in 1989 and before beginning activities in the new project. Although it may be suitable for most of the target sectors (based upon the original study of water-using IEOS communities) of the Ecuadorian public, many of the messages will be incomprehensible and/or impractical for those outside of the study area whom the mass marketing part of the program is intended to reach (particularly those who do not now have water or who may because of cultural factors not comprehend the intended message). The following are some enhancements that might be addressed:

I. The Part of the Project that Might Benefit Entire Ecuadorian Public (Mass Campaign)

- The planned massive radio-television campaign, stickers placed in kitchens, toilets-latrines and on faucets, poster, lapel pin, etc. campaign will only reach selected audiences:
 - None in the Oriente
 - None of those without television sets or whose radios will only pick up local stations
 - None of those without water supplies (will be meaningless to them)
 - None of those who will turn it off because they are bored or think they already know.

Therefore, it must be considered whether it is worth the expense? Who will write the "soap" or "novella"? Will it really appeal, and to whom?

II. Enhancements for the Mass Campaign Strategy

- Urban and small town Ecuadorians with water supplies (in addition to the selected former IEOS project communities) could profit from:
 - Posters about contamination and need to wash hands frequently
 - Posters about need to use facilities (private and public) and not the open road, parks, empty lots, etc.

- More model public restrooms that are well kept and attended (in markets, parks, municipal and state offices, airports, bus stations, on highways near major intersections, etc.)
- More attention to clean restrooms in offices, restaurants, etc.
- More attention to advertising dangers of diseases spread through urine.

Potential impacts of the above enhancements are:

- All social classes will be reached, since all come into contact with some of the above every day. Posters should be placed in offices, buses, bus stops, all public buildings, all lavatories.
- Migrants to the cities will learn new behavior patterns characteristic of the city.
- City sanitation will improve.

II. Community Level Enhancements

Since this campaign will only be carried out in communities already served by IEOS or in those where new systems are to be constructed, many or most of the messages can be adjusted to suit the needs of the individual community. However, the communities differ, and in order to be effective, the *promotores* need guidance in how to determine what kind of community they face.

- A socioanthropological study should be made to create a typology of communities in rural Ecuador to guide *promotores* in determining what actions to take. Diagnostic criteria should be suggested, along with recommended interventions for each type of community.

The following questionnaire gives a set of suggestions for diagnostic criteria

Diagnostic Criteria for Classifying Communities

1. Size (No. Households; No. Inhabitants)
2. Settlement Type (Centered on Plaza; Football Field; Dispersed)
3. Ethnicity [Indigena; Cholo; Mestizo; Mixed (percent of each)]

4. Land Tenure (Range in Size of Parcelas; percent of households owning land)
5. Animals (Sheep, Cows, Cuys, Conejos, Chickens, Other)
(Products Sold: Cheese, Milk, Eggs, Whole Animals)
6. Labor and/or Marketing Patterns (Nearby Haciendas, Nearby Factories,
Nearby City, Distant City, Coastal Plantations)
Men: Women:
7. Predominant House Type: (Concrete Block; Bajareque; Mud Block; with Roof
of Lamina, Paja, Tile)
8. Marriage Patterns: (Endogamous; Exogamous [Women Out, Men Out, Both])
9. T.V. Antennas (None; Few; Numerous)
10. Churches (None; Catholic; T.J.; 7th Day Ad.; Mormon; Bahai; Evangelical;
Pentecostal; Other) percent of pop. in each
11. Schools (Public____; Private____)
12. Community Linkages (Name other communities with which have relations:
Kinship, Political, Marketing, Sports, Other)
13. To what regional or national organizations does the community belong?

FISI, FENOC, etc.
14. What public and/or private agencies are operating in the community or have
operated there in past two years?

CARE, Fe y Alegria, CRS, IEOS, CEAS, Vision Mundial, Family Planning, MSP
vacunas, Etc.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

