PD-AAS-892
ISN 43940

CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) – PART I

Report Symbol U-447

1. PROJECT TITLE	2. PROJECT NUMBER	3. MISSION/AID/W OFFICE
Rural Water and Environmental Sanitation	527-0221	USAID/Peru 000146

4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) 05/86

☒ REGULAR EVALUATION ☐ SPECIAL EVALUATION

5. KEY PROJECT IMPLEMENTATION DATES

A. First PRO-AG or Equivalent FY 80
B. Final Obligation Expect FY 85
C. Final Input Delivery FY 87

6. ESTIMATED PROJECT FUNDING
A. Total $ 16,000,000
B. U.S. $ 11,000,000

7. PERIOD COVERED BY EVALUATION
From (month/yr.) 9/80
To (month/yr.) 9/84
Date of Evaluation Review 3/85

8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED

After nearly 5 years of project operation in the Peruvian Sierra, the project continues to make substantial gains despite its initial start up problems during its first 3 years. At the present rate of implementation the project will be on schedule by mid 1986.

The present rate of progress is significant if not spectacular as indicated by the following achievements:

- Construction Activities	Project Goals	completed	% of Goals
Engineering Field Studies	660	689	104
Water System Designs	660	432	65
Water Systems Constructed	660	300	46
Sanitary Latrines Constructed	7600	3136	41
Regional Office & Warehouse	12	12	100

- A Human Resources Development unit has been formed at DISAR which responsible for all training and educational activities.
- Operation & Maintenance training plans have been designed and will be implemented CY 1986.
- Field reporting proceedures have been established.
- Quarterly reporting proceedures have been initiated allowing for closer project tracking and monitoring.

Major Evaluation Recommendations:
- Improve field supervision and inspection
- Delegate project design and construction approvals to the field

(Cont.)

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

☐ Project Paper ☐ Implementation Plan e.g., CPI Network ☐ Other (Specify)
☐ Financial Plan ☐ PIO/T
☐ Logical Framework ☐ PIO/C ☐ Other (Specify)
☐ Project Agreement ☐ PIO/P

10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT
A. ☒ Continue Project Without Change
B. ☐ Change Project Design and/or ☐ Change Implementation Plan
C. ☐ Discontinue Project

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)

Project Manager - Gerardo Arabe
Technical Advisor - Salvador Reyes
Host Country:
Project Coordinator - Nestor Esquivel, DISAR
Principal Contact - Renato Escobar, Executive Director

12. Mission/AID/W Office Director Approval
Signature John Sanbrailo
Typed Name John Sanbrailo
Date 12/16/85.

A D 1330-15 (1-18)

- Increase training for Sanitary Technicians
- Increase Operation & Maintenance Training for technicians
- Establish Human Resources Development Unit
- Provide technical assistance in H.R.D.
- Improve material inventory procedures
- Organize advance procurement of construction material
- Designate DISAR project coordinator
- Prepare new project implementation plan for remainder of project
- Include additional Region to construction program

Action Taken to Date:

- A system of regional supervisors has been designed and will be in place by CY 1986
- Delegation of authority for approval of designs and construction has been given to the Regional Engineers
- With formation of H.R.D. unit it is expected that training will improve
- Program underway for providing operation & maintenance training for system operators
- H.R.D. unit has been formed and staffed
- Technical assistance for H.R.D. unit will begin CY 1986
- Material inventory procedures will improve with installation of computer system at DISAR
- Material procurement for remainder of project underway
- DISAR project coordinator named
- Project implementation plan for remainder of project completed
- Arequipa Region added to program

Action to Be Taken	Responsible for Action	Date Action to Be completed
- Contract Regional Supervisory Engineers	DISAR - AID	April 86
- Acquire technical assistance for H.R.D. unit	DISAR - AID	April 86
- Install micro-computer system at DISAR	AID	May 86
- Complete final material procurement	AID	Sept. 86

Contractor Performance

The evaluation team was provided under a contract with Water and Sanitation for Health (WASH). It is the opinion of this Mission that the evaluation team did an exemplary job in conducting the evaluation as well as in their preparation of a final report. The report was accurate, concise, and useful in helping to identify strong points as well as aspects requiring additional effort.

XD-AAS-892-A Reyes

WATER AND SANITATION FOR HEALTH PROJECT

WASH

Operated by
CDM and Associates

Sponsored by the U.S. Agency for International Development

1611 N. Kent Street, Room 1002
Arlington, Virginia 22209 USA

Telephone: (703) 243-8200
Telex No. WUI 64552
Cable Address WASHAID

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.

A SUMMARY OF THE PROGRESS EVALUATION OF THE RURAL WATER SYSTEMS AND ENVIRONMENTAL SANITATION PROJECT PERU

ISN 42943

WASH FIELD REPORT NO. 134-S

MARCH 1985

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Prepared for
USAID Mission to the Republic of Peru
Order of Technical Direction No. 190

3

WASH Field Report No. 134-S

A SUMMARY OF THE PROGRESS EVALUATION OF THE RURAL WATER SYSTEMS AND ENVIRONMENTAL SANITATION PROJECT PERU

Prepared for the USAID Mission to the Republic of Peru
under Order of Technical Direction No. 190

Prepared by:

Jacques Faigenblum

March 1985

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Water and Sanitation for Health Project
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Chapter 1

BACKGROUND

1.1 Introduction

This document presents the findings and recommendations of a progress evaluation of the Peru Rural Water Systems and Environmental Sanitation (RWSES) Project, U.S. Agency for International Development (AID) Project No. 527-0221. The evaluation was undertaken in September 1984 by a four-person evaluation team staffed by the Water and Sanitation for Health (WASH) Project, Arlington, Virginia, U.S.A. It entailed four weeks of documentation review, interviews, and observation of field activities and resulted in an assessment of progress to date, existing problems, and expected future progress.

The RWSES Project provides for seven years of assistance by AID to the Government of Peru (GOP), between September 30, 1980, and September 30, 1987. The project is implemented and managed by DISAR, the Directorate of Rural Sanitation, an agency within the Peruvian Ministry of Health (MOH).

The project budget consists of a $10 million loan and a $1 million grant from the U.S. government and $4.3 million of counterpart funding by the GOP. The funds are to be used for technical assistance, vehicles, equipment, materials, construction of regional storage facilities and offices, limited travel for DISAR personnel and vehicle operating and maintenance expenses, short-term in-country training, and special scientific studies.

1.2 Project Purpose

The general health sector goal of this project is to improve the health and well-being of the rural poor in Peru by addressing one of the major constraints to improved health status: the lack of adequate potable water and waste disposal facilities. An estimated 78 percent of the rural population have no potable water and over 98 percent of the households have no sanitation facilities.

The GOP and external donors have been attempting to provide these services. Communities with 500 to 2,000 inhabitants have been served by the MOH, larger communities by the Ministry of Housing. The GOP has estimated that more than 65,000 Peruvian communities have populations under 500. This AID-approved project is directed specifically at this size community, which has not been targeted by previous and existing external aid programs.

The RWSES Project's purpose is to expand the capacity of the MOH to deliver effective preventive health services, via water supply, health education, and sanitary facilities, in order to reduce mortality and diseases related to contaminated water, poor sanitation, and unhygienic personal behavior. This purpose will be achieved when project beneficiaries are enjoying a clean, convenient, and dependable water supply and when they have a clear understanding of appropriate sanitation practices and proper use of water to prevent water- and excreta-related diseases as well as the interest and

capability to operate and maintain the water supply system largely from community resources.

The project also has two ancillary objectives: to integrate the water and sanitation work supported by the project into the MOH's primary health care activities in participating communities and to strengthen the infrastructure of the Regional Health Authorities by creating an environmental sanitation team that would remain in place following the conclusion of the project.

1.3 End-of-Project-Status Conditions

The RWSES Project has eight major program elements. By the end of this project it is expected that the following conditions will exist:

1. Construction of rural water systems: 660 water systems will be functioning in communities of less than 500 persons in 10 health regions.

2. Latrine construction and promotion: Latrines will be installed in all of the communities receiving water supply systems, with more people using latrines throughout the project regions as a result of information developed and disseminated through the project.

3. Community participation in water supply system operation and maintenance: DISAR will be able to develop, implement, and maintain the proposed community water supply systems using the increased financial, human, and material resources made available as a result of this project. Three to five sanitation technicians, trained in community organization and system maintenance skills, will be placed in each regional DISAR office.

4. Health education: Community education programs, focused on water, excreta disposal, and sanitation behavior, will be carried out in all participating communities; program technicians will be able to carry out those community organization activities needed for the construction and maintenance of water and sanitation systems built under the project and will know how to assist health promoters and the Ministry of Education school teachers in effective health education activities.

5. Special studies will be carried out by DISAR to assist the planning and implementation of the project.

6. Training: Sanitation technicians and regional sanitation technician supervisors will be trained; three engineers will be trained in administration and program management; DISAR professional staff will be trained in the United States or will visit other countries to see rural water and sanitation projects in operation.

7. Decentralization of DISAR programs: An upgraded and decentralized regional environmental health office will be operating in 10 of the 18 regional health areas. These regional DISAR offices will be staffed for design, construction, operation, and maintenance of the

systems built or already existing in the region. Coordination among DISAR engineering and technical staff, primary health care personnel, and regional health officers will be improved.

8. Technical assistance: Experts will be used on both long- and short-term bases to help achieve project objectives.

1.4 Project History

The project was originally authorized for five years in 1980 and was to reach 420 communities in six of the MOH regions. It was funded by a $5.0 million loan and a $0.5 million grant. In August 1982, AID approved an amendment to extend the scope of the project to its present 660 systems and to increase coverage to 10 health regions. The loan and the grant were doubled, and the project was given two extra years for completion.

Within AID/Lima, management of the project passed through several hands in the first three years, and there was a delay in getting started. In January and February of 1983, the U.S. General Accounting Office (GAO) did a project audit and reported that several serious problems existed:

1. With 40 percent of the initial five-year life of the project elapsed, fewer than 30 of the proposed 660 systems had been constructed and less than 2 percent of the original $5.5 million in project funds had been used. Major project activities, such as health education, community training, and long-term technical assistance, had not yet been started.

2. Progress had initially been hampered by a number of events: an eight-month delay by the GOP in meeting the conditions precedent to disbursement of the loan by AID; strikes by MOH personnel; reorganization of MOH units; the creation of a new agency (DIGEMA) to manage DISAR; personnel changes at AID/Lima; and lack of technical assistance.

3. Vehicles requested for the regional offices in 1981 had not been delivered (and in fact were not to be delivered until late 1983). Procurement delays for pipes and other hardware stretched the normal water system construction period from three to twelve months. In part, procurement delays were due to the AID Mission's lack of expertise in preparing specifications and requesting bids.

4. Low salaries offered by the MOH created hiring difficulties for staffing both DISAR's central and regional offices. There was a high attrition of engineering design and supervision staff as they left DISAR for the private sector and other GOP agencies offering higher salaries.

The GAO team recommended that AID/Washington take back $5.5 million from the project. The AID/Lima Mission director contested this recommendation and stated that after the GAO evaluation, major changes had occurred on the project and that it then had the potential for reaching all stated project

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objectives. The GAO responded by withholding its deobligation recommendation pending a reassessment of project progress.

After the GAO evaluation, the project changed to its current AID/Lima manager, Lic. Arabe, an economist and AID project analyst.

In August 1983, Ing. Reyes, a sanitary engineering technical advisor on leave from the U.S. Public Health Service, arrived for a two-year term as consultant to assist Lic. Arabe with the engineering and procurement aspects of the project. In addition, since that time, several short-term consultants have assisted the project, principally in the areas of project-planning and human resources development.

In recent months the AID Mission in Lima has made significant efforts to achieve progress in solving the problems enumerated in the GAO report. The construction target of 660 systems by 1987 will be met if the current momentum is maintained. The regional DISAR offices have been significantly strengthened. The per capita costs for the systems are lower or coincide with those anticipated, and there are fewer delays in materials purchase and disbursement of funds.

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Chapter 2

WATER SYSTEM CONSTRUCTION

2.1 Introduction

The principal project input is material for the construction of 660 water systems. System design is predominantly gravity-fed with household connections, but designs incorporating public faucets and handpumps are permitted. Chlorination is provided to those systems requiring it. Where feasible, sanitary units with public showers and laundry facilities are supposed to be constructed.

2.2 Community Selection

In order to qualify for consideration, a community submitting a solicitation must fulfill the following minimum conditions: it must not already have an adequate potable water system within reasonable access; it must have an appropriate water source available; the population served by the system must be less than 500; and the community must be included in the Health Region's primary health care program.

Communities satisfying these eligibility criteria are also ranked according to five additional selection criteria. The selection process is supposed to favor those systems that can receive household connections. Additional considerations are as follows: the relative density of the population to be served; technical feasibility and complexity; and the ability of the community to pay for a connection fee and to operate and maintain the system. The estimated per capita cost of the population served generally should not exceed $50.

A site visit is necessary to inspect the potential water source, make a rough estimate of the costs of the available options, carry out a socio-economic survey, and discuss feasibility and the required community commitments with community members and leaders. All communities wishing to participate must agree to set up a special committee, the Junta Administradora, to organize the community's inputs and efforts.

2.3 Progress to Date and Expected Progress

In late 1983, after a delay of over three years, the construction of water systems started to make significant progress despite the many problems created by the very serious economic situation in Peru. This progress was spearheaded by key personnel at the AID Mission and DISAR/Lima who succeeded in setting up ten regional DISAR offices staffed with engineers, engineering survey staff and sanitation technicians. This successful decentralization of DISAR was a major objective for the project.

It is fully expected that DISAR will meet the project objectives of constructing 660 systems by September 1987 within the project's budget. The evaluation team estimates that the average direct monetary cost per capita of

the systems already constructed is approximately $30, which is lower than the cost anticipated in the project design.

2.4 Principal Recommendations

1. DISAR/Lima should establish a system of continual regional inspection to be carried out by engineers, each of whom would be in charge of three or four regions. These regional engineers, reporting directly to the proposed DISAR Project Coordinator in Lima, would have the responsibility of verifying that the regions are meeting their objectives in all phases of the project and of checking the quality of the regional office outputs.

2. Existing bottlenecks in project design and authorization should be removed.

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Chapter 3

LATRINE CONSTRUCTION

3.1 Introduction

The evaluation team found that the project's latrine construction program at present is geared towards the production and delivery of latrine units to the community without an effective follow-up system to determine actual installation and use for excreta disposal.

3.2 Progress to Date

Communities chosen to receive water systems have to sign an agreement with DISAR to install latrines in the majority of the households in order to receive the system. This is a motivating factor for getting latrines into the community but not for ensuring their use.

Engineers and sanitation technicians in the regions visited estimated that only 20 percent of the latrines brought into the community were actually used. This suggests that the present efforts, resources, and strategies are not achieving project objectives.

The evaluation team did not actually attend any of the presentations on latrines made to communities. However, after talking with DISAR field staff, the team concluded that the communities rarely have a say in deciding which type of excreta disposal system they will receive. No socio-cultural research is being done on the resistance to latrines that obviously exists in most project communities. Current promotion/education aspects of the program appear to be ineffective in getting people to change their excreta disposal habits.

No public latrine or school facilities were seen in the communities visited, nor were any of the called-for communal sanitation units with public showers and laundries.

3.3 Principal Recommendations

1. Socio-cultural studies on sanitation behaviors and possible cultural, social, and economic barriers to latrine use and hygiene behavioral changes should be carried out in each region.

2. Project communities should be involved in choosing their sanitation facilities from a range of low-cost excreta disposal alternatives.

3. Sanitation technicians and engineers should receive intensive training in communications skills, community involvement, and adult education techniques.

4. A follow-up evaluation methodology for measuring program impacts in terms of actual latrine use and maintenance should be developed.

Chapter 4

SYSTEM OPERATION AND MAINTENANCE

4.1 Introduction

One of the aims of the project is to promote the concept that the members of the community are responsible for the maintenance and fiscal administration of the system and the payment of an operator. In other words, the community should be essentially self-sufficient in maintenance and administration of the system with a minimum of dependence on further inputs from DISAR or any other agency of the GOP.

This involves, among other things, keeping up interest in maintenance after the initial enthusiasm and excitement of constructing the system wears off.

The constructing agency suffers from a lack of interest in maintenance, since the engineers get their professional satisfaction out of design and construction and not from follow-up on system performance. This lack of interest in follow-up is obviously also a function of the rewards system set by the agency, its statement of priorities, and its willingness to set aside appropriate resources to do the job.

4.2 Operation of the Junta Administradora

The evaluation team found a Junta Administradora in all 17 of the communities visited. These Juntas generally had fulfilled or were fulfilling their responsibilities during the pre-construction and construction phases of the project. However, none of the Juntas visited was found to be fulfilling its responsibilities in the post-inauguration phase.

Apparently there is a lack of effective two-way communication between DISAR personnel and Junta members. This lack of effective communication is due in part to the lack of training and community organization skills of DISAR field personnel.

Follow-up at the regional level on how the Juntas are doing is a crucial part of the RWSES Project, and there should be at least one sanitation technician full time on the task in each region. He should have adequate resources to be out in the field visiting all the communities and Juntas that require supervision. This supervision system should be designed to work on an exception basis. Supervision efforts should focus on those Juntas not complying with the minimum reporting requirements. The sanitation technician should visit them at least on a quarterly basis and visit those that are complying much less frequently -- say once per year.

4.3 The Need for Training and Equipping the Operators

There is a practical need for training several community residents to operate the system, in case the one trained person leaves the community. The Juntas visited were not making provisions to have a number of people trained,

although they seemed to agree that it was a good idea. With a few exceptions, each community visited had one person who had received some training on repair work from the construction foreman during the period of construction. For communities that did not name an operator until after the system was inaugurated, there was no mechanism for training the operator because the DISAR construction personnel had left.

Training is left up to the foreman. There is no official DISAR training program or supervision by the DISAR engineering staff to evaluate the quality of the training received or to test the skills and abilities of the operators.

When the system is turned over to the community, virtually no materials are left in the community that could be used to deal with any small emergency that might occur. The operator may or may not have the tools necessary to carry out repairs. DISAR staff members themselves suggested that providing a set of tools and an adequate amount of spare parts be made part of the project's original design costs. Similarly, a materials and tools bank could be set up at the regional DISAR warehouse to sell what is required for system repair and maintenance to the Juntas at cost.

4.4 Setting and Collecting Tariffs

Not one of the communities visited with a water system in operation was found to be collecting the monthly users' tariff, despite the fact that the Junta and the community had signed legally binding documents agreeing to pay monthly tariffs. This was true even in communities where the system had been in operation for a year or more.

The tariffs set by DISAR for the communities were very low, usually at a monthly rate which at the time of the evaluation was equivalent to $0.25 per connection. The original project plan had estimated that the payment for gravity-fed systems with household connections should be around $1.25, if the system was to be self-maintaining. With the high inflation rate in the economy, the purchasing power of the monthly tariff rate is decreasing rapidly with each passing year. The evaluators felt that the tariff should be amended on a quarterly basis so that communities can have some realistic purchasing power for materials to repair their systems. A way of amending the tariff automatically should be added to the system agreement document.

In many of the regions visited, the tariffs were not set by DISAR until the actual date of inauguration of the system. This means that the Junta was given no time to face up to the fact that it had to collect a tariff, and DISAR personnel did not get sufficient feedback to find out that there would be problems so that they could meet with the community and sort them out.

The tariff could be set as soon as the Junta is formed. There is generally at least a three- to six-month period between the formation of the Junta and the completion of the system. If the tariff were made known at the beginning of the period, DISAR would have time to deal with the issue as it trained the Junta.

The small stipends officially to be paid to the operators out of the monthly user tariffs do not provide an incentive for an operator to expend much energy

or pay much attention to the responsibilities of the position. Since the monthly tariffs were not being collected in any of the communities visited with completed systems, the operators were not even receiving the small stipends.

4.5 Principal Recommendations

1. AID should provide an expert in operations and maintenance programs to work with DISAR/Lima and the regional offices.

2. Seminars or meetings should be arranged for Junta members from a group of communities to provide opportunities for them to share problems and to receive training by DISAR.

3. Similar meetings should be organized for community system operators.

4. A full-time sanitation technician at the regional office should be assigned to work with the Juntas on operations and maintenance.

Chapter 5

HEALTH EDUCATION

5.1 Introduction

There is no effective planned health education program in the project at the present time. Hoped for support in this area from AID primary health care projects has not materialized. It was hoped that the AID primary health care projects would provide educational materials and train DISAR field personnel in community participation and health promotion skills. One reason for this lack of support is that the primary health care programs themselves have faced many delays; another is that the RWSES Project so far has not given emphasis to the health education aspects of the project.

5.2 Progress to Date

A very small group of health education professionals have been available in Lima and in some of the regions but have not been approached by the project to contribute their skills, apart from the case of Cajamarca. Low interest and support for health education programs on the part of senior DISAR supervisors is seen to be an important reason for the under-utilization thus far of available educational resources.

The main work on the educational component will be started when the Human Resources Development Unit is established. However, existing staff, with resources now available, could immediately start to develop programs and initiate training activities in the regions.

There has been no project activity in school health education. Also, schools are not getting latrines, as called for in the project design. The health education professionals at DISAR and in the regions see the school program as very important and say that the Ministry of Education will be forthcoming in cooperating on the development of a school hygiene curriculum for the primary schools. Teachers receive no materials aid from the Ministry and would be glad to receive some. The DISAR field staff pointed out several times the important leadership role played by the teachers in most small communities and their importance as allies to the project.

5.3 Principal Recommendations

1. The Lima-based health education staff should be given support to travel to all project regions and to set up the mechanisms for carrying out regional studies on hygiene behavior and possible barriers to hygiene behavioral changes.

2. Health education input should start from the moment DISAR first enters into the community and should be at its maximum level during the period of system construction.

3. The community promotion/health education staff at DISAR/Lima should receive funds to visit all the regions and personally evaluate the human relations and community organization skills of the regional sanitation technicians.

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Chapter 6

TRAINING AND SPECIAL STUDIES

6.1 Training of DISAR Technical Personnel

Some training of DISAR staff has occurred on technical aspects of water supply design and construction. There has also been limited training of primary health care personnel in water system and environmental sanitation principles. The required training of Junta members in system administration, operation, and maintenance has not yet taken place, nor has the training of community school teachers in hygiene education.

Ing. Lopez, the regional engineer heading the office in Cajamarca, took the initiative in organizing training courses for the construction foremen working for him. Two courses have been given so far. The regional health educator was involved in giving the sessions on community organization and human relations. Such initiatives should be strongly supported by the project and encouraged in other regions.

At the time of the evaluation, plans were being finished for a visit to several Latin American countries and the United States by a group of DISAR personnel led by Ing. Reyes, the engineering technical adviser.

6.2 Seminar-Workshops

Two large national seminar-workshops have been held. One was held in Cuzco in March 1984 to draft the 1984 project implementation plan. The seminar was a success in that it brought together all the DISAR personnel working with the AID project as well as high-level functionaries in the regional health structures. New paths of communication were opened and have resulted in greater cooperation and support from senior regional health authority personnel. It should also be pointed out that the seminars are one of the ways that the project can boost job satisfaction.

A second workshop, held in Trujillo, took place during the evaluation period, and the evaluators were able to observe the actual process. Although the presentations seemed somewhat stilted, the group workshops were very lively with everyone participating. The presence of the Regional Health Officer, the head of the regional health structure, and senior members of the staff from DISAR headquarters did not appear to act as a brake on participation by junior staff members.

This Trujillo seminar, organized by Ing. Marroquin, the DISAR director, also scored a first for the MOH by bringing together DISAR and MOH personnel from different levels and disciplines, including accountants and purchasers from the Regional Health Authorities and the Lima-based MOH offices. The discussions were lively, and the participants were satisfied that subjects important to the operation of the DISAR regional offices had been openly discussed. The DISAR regional staff had an opportunity, in open forum, to present their problems to the Regional Health Authority staff, who may have

been causing them delays and other management problems. It can be expected that the seminar will have positive outcomes for the project in the future.

6.3 The Human Resources Development Unit

The skills needed to put together sophisticated training and educational programs do not exist in DISAR at the present. Up until now, DISAR has been a technically-oriented agency with little or no practical experience in developing effective communications and community education skills in its field staff. The small number of health education and community development staff workers that there are have been under-utilized and have not received adequate encouragement or recognition of their role in the RWSES Project.

The proposed Human Resources Development (HRD) unit is to be based in Lima at DISAR headquarters. One of its functions will be to help DISAR fulfill the training and educational requirements of the AID project. In fact, the evaluation team believes that without the HRD unit, there is little probability that DISAR will be able to meet the technical, health education, and Junta Administradora training objectives of the RWSES Project.

The evaluation team also believes that the unit will play a crucial role in training or in organizing training in planning, management, and evaluation of DISAR personnel, thus making a significant contribution to its long-term institutional growth and development. The director of DISAR, Ing. Marroquin, stated that he is committed to the formation of the HRD unit. He assured the evaluation team that all that was needed was the official permission from the MOH to go ahead and that this would be given in the near future.

6.4 Integration with Primary Health Care Projects

There is some interaction in the regions between DISAR technical staff and members of the regional primary health care staff, but not as much as the project's planners had hoped for.

With the support of the AID project monitor, Lic. Arabe, the director of DISAR, Ing. Marroquin, has been maintaining a dialogue with his counterpart in the MOH, the director of primary health care programs. They have been holding regular meetings to discuss the RWSES Project and to lay the ground for increased integration.

6.5 Special Studies

The special studies called for in the project plan are intended to contribute valuable information to the project programs and to foster appropriate project modifications to increase program effectiveness.

DISAR and AID/Lima dropped several of the originally proposed studies by mutual consent. The studies that remain include: water usage, alternate systems of water treatment, evaluations of patterns of use and maintenance of latrines, and the development of materials on hygiene for elementary schools.

DISAR has proposed adding two new studies, one on the efficiency of treatment systems and one on developing a computerized management information system. The evaluation team acknowledges that carrying out these special studies is a new activity and represents a broadening of DISAR interests and capabilities.

6.6 Principal Recommendations

6.6.1 On Training

1. The HRD Unit should be established as soon as possible.

2. Support should be given to regional training and educational initiatives.

3. AID should hire a long-term, 24-month, technical adviser to help the chief of the proposed HRD unit in Lima.

4. National and regional seminar-workshops should continue to be planned and given.

6.6.2 On Integration with Primary Health Care

1. DISAR/Lima should go out of its way to support and encourage any initiatives in integration that its field staff demonstrates.

2. The Director of DISAR should continue to meet regularly with his counterpart in the MOH primary health care program, as a means of opening dialogue at this important ministry level.

6.6.3 On Special Studies

1. Priority should be given to the studies that feed into planning for the latrine and school education programs.

2. If grant fund items are reassigned to carry out the recommendations of the evaluation team, expenditures on special studies should be given the lowest weight compared to those assigned to technical assistance and training.

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Chapter 7

DECENTRALIZATION

7.1 Introduction

The project design calls for the creation of DISAR offices in ten health regions, each with a total of 20 staff members, one vehicle, office and warehouse buildings and engineering, office and laboratory equipment. These offices are intended to be highly autonomous with respect to DISAR/Lima in terms of carrying out the activities and programs needed to achieve project objectives.

7.2 Physical Infrastructure

Of the thirteen regional offices established (some regions have more than one office), Cajamarca, Huaraz, and Chimbote already have their own office and warehouse buildings and those for the other ten will probably be completed by the end of 1984. Seven offices have pick-up trucks and a further purchase of twelve more is being organized by AID. It is hoped that they will be available in the regions by April 1985. This means that each office will have at least one vehicle.

Five of the regional offices already have topographical equipment and six have design and office equipment. The purchase of the balance of the equipment is at present being organized by DISAR and should be in the regions by early 1985. Surveying equipment and laboratory equipment for water-quality testing are also to be bought and should be in the regions by early 1985.

7.3 Institutional Autonomy

The regional offices were found to have sufficient autonomy to select communities, prepare studies and designs, purchase local materials and pay local costs. However, they do not have the autonomy to authorize the construction of systems.

In general, it appears that, with the exception of planning and evaluation, the regional offices have the autonomy to enable them to achieve the project objectives.

7.4 Conclusions

Decentralization of project activities has been successful. Seven of the thirteen regional offices are now constructing water systems and the remaining six should be in a position to begin in 1985. By early 1985, all the offices should have the necessary buildings, vehicles, equipment and personnel to enable maximum progress to be made towards the achievement of project water-system construction objectives.

7.5 Principal Recommendations

1. DISAR/Lima should establish a system for planning and monitoring regional activities.

2. The procedure for authorizing system construction should be speeded up.

Chapter 8

ADMINISTRATION

8.1 Introduction

Project administration involves three government agencies. DISAR is responsible for general project administration. At the regional level, the functions of purchasing, disbursements, accounting, and the allocation and payment of some staff members are controlled by the Regional Health Authority. At the central level, in Lima, similar functions are carried out by DIGEMA, DISAR's parent organization within the MOH.

8.2 Progress to Date

In general, the administration of the project is good for the water supply system construction component. The regional funding shortages and major delays in the purchasing of materials have been overcome by DISAR and AID and no further such problems are anticipated in these areas of project administration.

8.3 Prinicpal Recommendations

1. The planning of purchases should be improved.

2. Quality checks should be performed on materials purchased at the time that they are delivered to DISAR.

3. The regional inventory systems and the provision of inventory information to DISAR/Lima should be improved.

4. Future purchases of materials should be organized sufficiently in advance to allow for the considerable delays that occur in purchasing, delivery and, in the case of imported materials, clearing customs.

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Chapter 9

MANAGEMENT

9.1 Project Coordination

There is no specific coordinator for the RWSES Project within DISAR; the overall management at present is being carried out by the director, Ing. Marroquin. However, he cannot devote all his time to this project, since he has many other responsibilities. Some management functions are performed by the AID project monitor, Lic. Arabe, but his time too is limited by his responsibilities for other AID projects. At the present time, therefore, no one person has the responsibility and the time to coordinate the entire RWSES Project.

The project is currently executed via the five functional divisions of DISAR:

- o Programming and Evaluation
- o Administration
- o Projects
- o Works
- o Preservation and Supervision of Services

This arrangement does not always enhance the effectiveness of a given RWSES Project component. For example, responsibility for the community water committees (the Junta Administradoras) is shifted from division to division. The Works Division works with them up until the new system is installed. After that they pass into the hands of the Preservation and Supervision of Services Division. According to staff in both divisions, there is no communication or cooperation between these two divisions on their work with Juntas. Each division runs a separate program, and there is no consistent program or follow through from one program to the other.

9.2 Planning System

The project planning system involves the preparation of an overall plan for the length of the project, 1984-1987, and a plan for each year. However, neither the overall nor the annual plans are sufficiently detailed.

The present plans do not establish detailed calendars of key events that must take place if objectives are to be met by a specified date. In addition, the annual plans are not integrated with the overall project plan. Such integration is necessary to assure that all final project conditions are achieved by 1987. At present it is difficult to evaluate progress, since there are no guideposts to measure it against.

The plans concentrate mostly on the objectives of system construction and decentralization and do not adequately cover the objectives of latrine construction, health education, operation and maintenance, training, and special studies.

The overall plan is not revised periodically, using actual progress information from the field, to determine what changes need to be made in order to achieve project objectives.

9.3 Financial Monitoring

Each year, regional and national project budgets are prepared. However, these budgets are not drawn up in accordance with a program of activities.

9.4 Principal Recommendations

9.4.1 On Management

1. A project coordinator should be designated within DISAR.

2. The division chiefs in DISAR and the above-mentioned project coordinator should be trained in modern management and administration techniques.

9.4.2 On Planning

1. A planning and monitoring system should be introduced so that timely corrective actions can be taken when necessary.

2. A system of seminars and meetings should be organized to facilitate participatory multi-level planning and evaluation and to focus on key problems impeding project progress.

3. A detailed work plan for the remaining time of the project should be prepared.

9.4.3 On Financial Monitoring

1. A budget monitoring system should be introduced so that progress can be measured and budgets can be revised to reflect progress.

2. Regional budgets should be prepared and monitored at the regional level and reports submitted to Lima for revision and control.

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Chapter 10

TECHNICAL ASSISTANCE

10.1 Current Situation

The project plan provides for approximately 50 person-months of technical assistance. Ing. Reyes has been active in helping DISAR make its advances in water system construction. Sanitary engineering was the only long-term technical assistance called for in the project plan.

10.2 Principal Recommendations

1. The proposed short-term health education promotion expert (six months), communications expert (three months) and training expert (three months) should be replaced by one long-term technical adviser with experience in all three areas. This person should work specifically with the chief of the proposed HRD unit.

2. The economist who was to have advised on evaluating costs per capita of the water systems (three months) should be replaced by an expert who can teach key managerial personnel planning and evaluation.

3. A person with broad experience in successful operations and maintenance development programs should be brought in for up to three months to work with DISAR/Lima and all the regions in implementing an effective operations and maintenance program.

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Chapter 11

GOP AND COMMUNITY INPUTS

11.1 GOP Inputs

According to the Project Paper, GOP inputs to the project are financing of support costs for technicians and community training programs, vehicle operating expenses, and salaries and travel expenses for all project personnel. However, it was agreed that AID would pay 75 percent of the vehicle operating and travel expenses in the first year and a declining percentage in subsequent years until, by the fifth year, the GOP would be providing all funding for vehicle operating and travel expenses.

This agreement was amended so that AID has continued to pay 75 percent of the costs for the two items. This change was called for because, with delays in starting up the project, it is only now that the major impact of these costs is being felt. In addition, the GOP's ability to cover counterpart funds has been reduced by the worsening economic situation.

Up to mid-1984, GOP counterpart funds were falling short of the agreed level. Now, however, problems have been sorted out and funds are being provided in accordance with project budgets.

11.2 Community Inputs

According to the project design, communities receiving water supply systems are to provide unskilled labor and locally available construction materials. This has been done in all project communities, but DISAR is not consistently including the value of these inputs in calculating system costs.

In addition, the communities are to pay some percentage (usually around 10 percent) of the cost of constructing the system and a small monthly user fee. The evaluation team found that the construction costs were being paid but that users fees were not. Furthermore, communities were also failing to administer systems according to official DISAR procedures, probably because the designated operators are not being properly trained. (Recommendations elsewhere in this report suggest improvements in training).

11.3 Principal Recommendation

1. The system for recording, costing, and accounting for community inputs should be improved.

Chapter 12

CONCLUSIONS

12.1 Introduction

The evaluation team felt that the RWSES Project has responded significantly to the criticisms raised by the GAO evaluation and is making good progress in the areas of water supply system construction and in institutional growth through effective decentralization of agency activities and responsibilities. The project should immediately place increased emphasis on the non-construction and non-decentralization components and the progress of these other components should be evaluated specifically by the end of 1985.

12.2 Key Conclusions

1. The project design, as it appears in the original project planning documents, is adequate and feasible, apart from the objective of measuring project impact on infant mortality in project communities.

2. The project has made significant progress despite the problems created by the very serious economic situation in Peru.

3. AID has made great efforts to attack many of the problems raised in the 1983 GAO project evaluation, in concert with DISAR and the Ministry of Health. Project progress and major accomplishments have been due to timely actions and initiatives taken by key AID Mission and DISAR personnel.

4. Genuine institutional development has already taken place as a result of the project's setting up of regional offices and the steps taken to decentralize DISAR's operations and management.

5. The project will likely reach its objective of constructing 660 rural water supply systems by 1987.

6. Construction funds are expected to be more than sufficient to meet construction goals.

7. Currently, per capita costs for the systems being constructed are below or in line with those anticipated in the project design.

8. Problems of delays in materials purchase and in sending out funds to the regions have been dealt with by DISAR and AID. No more such problems are anticipated in these areas of project administration.

9. It is not possible at this time for the evaluation team to predict how successful the training, health education, impact evaluation, and operations and maintenance components of this project will be. Currently there are no evaluable programs in these areas.

PD-AAQ-689

PROGRESS EVALUATION OF THE RURAL WATER SYSTEMS AND ENVIRONMENTAL SANITATION PROJECT - PERU

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WASH FIELD REPORT NO. 134

MARCH 1985

Prepared for:
USAID/Mission to the Republic of Peru
Order of Technical Direction No. 190

20

WATER AND SANITATION
FOR HEALTH PROJECT

WASH Operations Center
1611 N. Kent St., Room 1002
Arlington, Virginia 22209 USA

Telephone (703) 243-8200
Telex No. WUI 64552
Cable Address: WASHAID

18 March 1985

ACT 120

Mr. John Sanbrailo
Mission Director
USAID Mission
Lima, Peru

Attention: Gerardo Arabe

Dear Mr. Sanbrailo:

On behalf of the WASH Project I am pleased to provide you with 10 copies of a report on the progress evaluation of the rural water systems and environmental sanitation project.

This is the final report by Jacques Faigenblum, Luis Moncada, Octavio Cordon, and David Collins and is based on their trip to Peru from September 2 to 28, 1984.

This assistance is the result of a request by the Mission on June 29, 1984. The work was undertaken by the WASH Project on July 30, 1984 by means of Order of Technical Direction No. 190, authorized by the USAID Office of Health in Washington.

If you have any questions or comments regarding the findings or recommendations contained in this report we will be happy to discuss them.

Sincerely,

Dennis B. Warner

Dennis B. Warner
Acting Director
WASH Project

DBW:kk

cc: John H. Austin
S&T/H/WS

WASH Field Report No. 134

PROGRESS EVALUATION OF THE RURAL WATER SYSTEMS AND ENVIRONMENTAL SANITATION PROJECT PERU

Prepared for the USAID Mission to the Republic of Peru

under Order of Technical Direction No. 190

Prepared by:

L. Moncada

D. Collins

O. Cordon

J. Faigenblum

March 1985

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ACRONYMS

AID	U.S. Agency for International Development
DIGEMA	Direccion General del Medio Ambiente, Directorate General of the Environment
DISAR	Direccion de Saneamiento Rural, Directorate of Rural Sanitation
EOPS	End-of-Project-Conditions Status
GAO	U.S. General Accounting Office
GOP	Government of Peru
HRD	Human Resources Development
IRC	International Reference Center for Community Water Supply and Sanitation
MOH	Ministry of Health
NPRWS	National Plan for Rural Water and Sewage
RHA	Regional Health Authority
RHO	Regional Health Officer
RWSES	Rural Water Supply and Environmental Sanitation
SENAPA	National Water and Sewerage Authority
WASH	Water and Sanitation for Health

EXECUTIVE SUMMARY

The Peru Rural Water Systems and Environmental Sanitation (RWSES) Project, (No. 527-0221) began in September 1980 and is due to finish in September 1987. Its purpose is to expand the capacity of the Government of Peru, and that of the Ministry of Health in particular, to deliver effective preventive health services in order to reduce the prevalence of diseases related to water and poor sanitation.

The project has eight major program elements: 1) construction of rural water systems, 2) latrine construction and promotion, 3) community participation in water supply system operation and maintenance, 4) health education, 5) special studies, 6) training, 7) decentralization of executing agency programs, and 8) technical assistance.

The project budget consists of a $10 million loan and a $1 million grant from the US Government and $4.3 million of counterpart funding by the Government of Peru. The executing agency is the Directorate of Rural Sanitation (DISAR), a unit within the Ministry of Health's Directorate General for the Environment.

This progress evaluation was undertaken in September 1984 by a four person evaluation team staffed by the Water and Sanitation for Health (WASH) Project. It entailed four weeks of documentation review, interviews, and observation of field activities and resulted in an assessment of progress to date, existing problems, and expected future progress.

The principal project input is material for the construction of 660 water systems in rural communities with populations of less than 500. No other government water supply program is geared toward serving this size community. System design is predominantly gravity-fed with household connections, but designs incorporating public faucets and handpumps are permitted.

After a delay of over three years, the construction of water systems started to make significant progress in late 1983. This was mainly due to the setting up of ten regional DISAR offices staffed with engineers, engineering survey staff, and sanitation technicians. This successful decentralization of DISAR was a major objective for the project. It is fully expected that DISAR will meet the construction objectives of the project by September 1987. The evaluation team estimates that the average direct monetary cost per capita of the systems already constructed is approximately $30.

The latrine program is not progressing well. The latrines delivered to the communities are either not being installed or are not being used. There has not been any investigation of the possible socio-cultural barriers to sanitation behavioral changes and there is no well-defined health education program to accompany the delivery of latrine units.

Community participation in water supply system construction, through donation of labor, materials and payment of initial connection charges, has been good, but the important participation in system operation and maintenance after inauguration of service has not been forthcoming. Again, there is a lack of a well-planned community training and education program especially for the

communally elected water committees or Juntas Administradoras. Monthly user fees for system operation and maintenance are not being collected, nor are the monthly operating income/expenditure records being kept.

The health education component has not yet begun. In part, the project was designed to depend on assistance from the primary health care programs for this component. Unfortunately, these inputs have not been forthcoming due to delays that have occurred with those programs. The project will have to depend on the design and development of the health education and community training components by the proposed human resources development (HRD) unit to be located at DISAR headquarters in Lima.

DISAR has started some special studies and it is planned that their results will aid the effectiveness of several components of the project.

Some training of DISAR staff has occurred on technical aspects of water supply design and construction. There has been limited training of primary health care personnel in water system and environmental sanitation principles. The required training of Junta members in system administration, operation, and maintenence has not yet taken place, nor has the training of community school teachers in hygiene education. The training component that includes the upgrading of administrative, planning, and evaluation skills of DISAR engineering staff is awaiting the establishment of the HRD unit to get off the ground.

One long-term sanitary engineer, on loan from the U.S. Public Health Service, and several short-term consultants have provided technical assistance in the areas of training and project planning.

The key recommendations of the evaluation team are as follows:

- The project should immediately place increased emphasis on the non-construction programs of the project to bring progress in these programs up to the level of that which has taken place in system construction and decentralization.

- DISAR needs to develop an effective and efficient planning, monitoring, and evaluation system for agency activities.

- DISAR should develop an effective management information system.

- An AID project coordinator should be named at DISAR headquarters in Lima.

- All aspects of regional activities should be supervised more effectively by the central office staff.

- DISAR engineers should simplify water system designs and surveys, and the project authorization process should be speeded-up.

- Technical assistance should be brought in to help plan a national-level DISAR program planning workshop on system operation and maintenance by the community.

- The HRD unit should be established in Lima and a long-term technical adviser be hired to assist the unit's manager.

- DISAR field staff should be trained in community participation, development, and adult education skills for increased effectiveness in the operation and maintenance, health education, and latrine programs.

- Health behavior studies should be carried out as a basis for the planning of the latrine, health education, and school hygiene programs.

- Changes in hygiene behavior should be used to evaluate the health impact of the project.

In summary, the evaluation team noted that it was not possible for the team to predict the eventual success of several project components: training, health education, community participation in system maintenance, and latrine installation and use. It is recommended that the project be closely monitored for progress in these components and that such progress be evaluated specifically by the end of 1985. However, it was possible for the team to conclude that:

- The project has made significant progress despite the problems created by the very serious economic situation in Peru;

- DISAR has demonstrated the institutional capability of implementing the decentralization and construction objectives of the project;

- Genuine institutional development has already taken place as a result of establishing the regional DISAR offices and decentralizing DISAR's operations and management;

- The project will reach its objective of constructing 660 rural water supply systems by 1987 if the current momentum is maintained;

- Construction funds are expected to be sufficient to meet construction targets;

- Currently, per capita costs for the systems being constructed are lower or coincide with those anticipated in the project design;

- Problems of delays in materials purchase and in sending funds to the regions have been dealt with by DISAR and AID and no such problems are anticipated in these areas of project administration;

- The AID Mission in Lima has spearheaded the progress made in recent months through timely actions and major efforts by key project personnel.

Chapter 1

BACKGROUND

1.1 Introduction

This document presents the findings and recommendations of a progress evaluation of the Peru Rural Water Systems and Environmental Sanitation (RWSES) Project -- U.S. Agency for International Development (AID) Project No. 527-0221. The RWSES Project provides seven years of assistance by AID to the Government of Peru (GOP), between September 30, 1980, and September 30, 1987. The project is implemented and managed by DISAR, the Directorate of Rural Sanitation of the Peruvian Ministry of Health (MOH). The project provides for technical assistance, vehicles, equipment, materials, construction of regional storage facilities and offices, limited travel costs for DISAR personnel and vehicle operating and maintenance expenses, short-term in-country training, and special scientific studies.

This evaluation was carried out by a team of four WASH consultants. It was conducted in the period September 2 to 28, 1984, four years after the official start of the project but only some 18 months after its actual start.

1.2 DISAR, the Executing Agency

Since before the advent of the RWSES Project and its work with communities of less than 500 persons, it has been DISAR's mission to construct and supervise rural water systems for communities with populations of between 500 and 2,000 persons. In addition to constructing rural potable water systems, DISAR also has some limited responsibility for constructing sewer systems in small communities and for the installation of latrines in communities involved with the RWSES Project. Larger communities come under the jurisdiction of SENAPA, a decentralized government agency in the the Ministry of Housing responsible for urban water and sewerage systems.

DISAR is itself part of a larger, recently created directorate within the MOH, DIGEMA or the Directorate General for the Environment. DISAR is by far the largest component of DIGEMA in terms of personnel and budget, and, since a significant percentage of its funding either comes or is expected to come from external sources such as AID, the InterAmerican Development Bank, CARE, etc., it tends to overshadow the other components of DIGEMA on several levels.

DISAR is divided functionally into five major divisions:

1. Programming and Evaluation -- responsible for formulating and monitoring long-, medium- and short-term plans, programming activities, and evaluation of the results.

2. Administration -- responsible for accounting, purchasing, storage and distribution of materials and equipment, cost control, and personnel.

3. Projects -- responsible for the preliminary assessment and design of water system projects.

4. Works -- responsible for directing, organizing, and controlling construction activities.

5. Preservation and Supervision of Services -- responsible for providing supervision and technical assistance to the community councils and committees responsible for local administration of the water systems.

In addition to its personnel at headquarters, DISAR now supervises the activities of satellite-office-based engineers, auxiliary engineers, sanitation technicians, topographers, draftsmen, warehouse-clerks, chauffeurs and other support staff. This staff is attached to 10 of the 18 Regional Health Authorities belonging to the MOH. The DISAR regional units are programmatically responsible to DISAR Central but administratively responsible to the Regional Health Officers who direct the Regional Health Authorities. The arrangement sometimes causes problems because the regional units have two bosses; however, it is consistent with the MOH's policy of decentralizing and integrating services and administration at the regional level. The ongoing changes in relationships within and between units of the MOH as this policy is carried out are a source of some strains and stresses.

1.3 Project Purpose

In Peru, an estimated 78 percent of the rural population has no potable water, and over 98 percent of the households have either no connectons to functioning potable water systems or no sanitation facilities. The GOP and external donors have been attempting to provide these services to communities of 500 to 2,000 inhabitants under the aegis of the MOH and to larger communities under the aegis of the Ministry of Housing. Since communities of fewer than 500 inhabitants had not been targeted by previous and existing external aid programs, the AID approved project was directed specifically towards this size community. The GOP has estimated that there are more than 65,000 communities in Peru with populations under 500.

The general health sector goal of this project is to improve the health and well-being of the rural poor in Peru by addressing one of the major constraints to improved health status, the lack of adequate potable water and waste disposal facilities in rural areas. The project's specific objective is to reduce infant mortality by 20 percent in the communities receiving the inputs of the project.

The project also has two ancillary objectives: to integrate the water and sanitation work supported by the project into the MOH's primary health care activities in participating communities and to strengthen the infrastructure of the Regional Health Authorities by creating an environmental sanitation team that would remain in place following the conclusion of this project.

1.3.1 End-of-Project Status (EOPS) Conditions

By the end of the project, it is expected that the following EOPS conditions will exist:

1. An upgraded and decentralized regional environmental health office will be operating in 10 of the 18 regional health areas.

2. DISAR will be able to develop, implement, and maintain the proposed community water supply systems using the increased financial, human, and material resources made available as a result of this project.

3. Program technicians will be able to carry out those community organization activities needed for the construction and maintenance of water and sanitation systems built under the project and will know how to assist health promoters and Ministry of Education school teachers in effective health education activities.

4. More people will be using latrines throughout the project regions as a result of information developed and disseminated through the project.

5. Health conditions and general well-being will be improved in the project regions as a result of the increased availability of potable water and sanitation.

EOPS conditions will be achieved when beneficiaries are enjoying a clean, convenient, and dependable water supply, and when they have a clear understanding of appropriate sanitation practices and proper use of water to prevent water- and excreta-related diseases and the interest and capability to operate and maintain the water supply system largely from community resources.

1.3.2 Project Objectives

The overall design and statement of objectives for the project are contained in the 1980 Project Paper and the 1982 Project Amendment. The RWSES Project seeks to achieve the following objectives:

1. Six hundred and sixty water systems functioning in communities of less than 500 persons in 10 health regions.

2. Three to five sanitation technicians, trained in community organization and system maintenance skills in each regional DISAR office.

3. Ten regional DISAR offices staffed for design, construction, operation and maintenance of the systems built or already existing in the region.

4. Latrines installed in all of the communities receiving water supply systems.

5. Community education programs, focused on water, excreta disposal and sanitation behavior, carried out in all participating communities.

6. Improved coordination among DISAR engineering and technical staff, primary health care personnel, and regional development officers.

1.4 Project History

The project was originally authorized for five years in September 1980 and was intended to reach 420 communities in 6 of the 18 MOH regions. The scope was limited to a maximum of 6 regions because of funding limitations and the limitations of DISAR's administrative infrastructure. The project was funded by a $5.0 million loan and a $0.5 million grant. In August 1982, AID approved an amendment to extend the scope of the project to a total of 660 water systems and increase the coverage to 10 health regions. The amendment increased the loan to $10.0 million and the grant to $1.0 million, and the completion date was extended from September 1985 to September 1987.

Until late 1982, the project was managed within AID/Peru by the chief of the mission's Community Services Division. In 1983, the monitoring of the project was passed to the program officer in charge of primary health care projects. After a few months, the project oversight and management was passed to Mr. Gerardo Arabe, an economist and mission project analyst.

Before Arabe's takeover of project monitoring, in January and February of 1983, the U.S. General Accounting Office (GAO) did an audit of the project and wrote a highly critical report entitled, "A Troubled Project--Rural Water Systems and Environmental Sanitation in Peru." At the time of its evaluation, two and a half years after the official start of the project, the GAO team found that several serious problems existed.

- Progress had initially been hampered by an 8-month delay by the GOP in meeting the conditions precedent to disbursement of the loan by AID, strikes by MOH personnel, reorganization of MOH units -- the creation of DIGEMA, personnel changes at AID, lack of technical assistance, procurement delays, and personnel shortages at DISAR Central and in the regional offices.

- Vehicles requested for the regional offices in 1981 were not delivered to them until late 1983. Lack of pipes and other hardware stretched the normal water system construction period from 3 to 12 months. In part, procurement delays were due to the AID mission's lack of expertise in preparing specifications and requesting bids.

- Low salaries offered by the MOH created hiring difficulties for staffing both DISAR's central and regional offices. There was high attrition of engineering design and supervision staff as they left DISAR for the private sector and other GOP agencies offering higher salaries.

- Due to personnel, decentralization, and material procurement problems, with 40 percent of the initial five-year life of the project elapsed, fewer than 30 of the proposed 660 systems had been constructed and less than 2 percent of the original $5.5 million in project funds had been disbursed. Major project activities, such as health education, community training, and long-term technical assistance, had not even been started.

The GAO report concluded that the AID assessment of the GOP's willingness and technical and institutional capacity to implement the expanded project might have been overly optimistic. It recommended the deobligation of the $5.5 million added to the project in 1982. The mission director contested the recommendation for deobligation and stated that since the GAO's evaluation, changes had occurred in the project that indicated it was finally on its way and that it had the potential for reaching all project objectives. Persuaded by these arguments, the GAO withheld its recommendation for partial deobligation of project funds pending a reassessment of project progress.

In August 1983, Mr. Salvador Reyes, a sanitary engineering technical adviser on leave from the U.S. Public Health Service, arrived for a two-year stint to assist Arabe with the engineering and procurements aspects of the project. In addition, several short-term consultants have assisted the project principally in the areas of project planning and human resources development.

1.5 Project Successes

In recent months the AID Mission in Lima has made significant efforts to achieve progress in the areas of concern raised by the GAO report, namely: The slow rate of installing water systems. The slow pace of decentralization; the feasibility of contracting 660 systems by 1987; and doubts as to DISAR's capability of implementing the project. The project successes can be summarized as follows:

- DISAR has demonstrated the institutional capability of implementing the decentralization and construction objectives of the project;

- Genuine institutional development has already taken place as a result of establishing the regional DISAR offices and decentralizing DISAR's operations and management;

- The project will reach its objective of constructing 660 rural water supply systems by 1987 if the current momentum is maintained;

- Construction funds are expected to be sufficient to meet construction targets;

- Currently, per capita costs for the systems being constructed are lower or coincide with those anticipated in the project design;

- Problems of delays in materials purchase and in sending funds to the regions have been dealt with by DISAR and AID and no such problems are anticipated in these areas of project administration.

The AID Mission has spearheaded the progress made through timely actions and significant efforts by key project personnel. Both USIAD/Lima and DISAR deserve credit for their efforts.

1.6 Changes in Project Goals and Objectives

Official project goals and objectives are to be found in two internal AID documents, the Project Paper of 1980 and the Project Amendment of 1982. AID/Peru felt it was inappropriate to pass on a full copy of these documents either in English or in Spanish to DISAR. Perhaps because they never read the project documents or for some other failure in communication, DISAR staff displayed a lack of familiarity with the overall project design and purpose, with the interrelationships between project components, and with their expected role in helping the project reach its main goal.

The official contract between the GOP and AID consists of the original Project Agreement, which deals with the terms of the loan and the inputs required from the GOP. Programs and activites are confirmed by Letters of Implementation.

Since AID/Peru has some flexibility in adjusting or even eliminating objectives stated in the Project Paper and the Project Amendment, it is relevant to examine the changes in tasks and objectives that have occurred between the completion of the project documents and now. In that way one can judge whether or not the project is following the intent of the project designers.

The following is a list of the original objectives with comments on their relevance to the project as it is now being conceived and executed.

1.6.1 Overall Project Goal

The overall project goal found in the Project Paper's "Project Design Summary Logical Framework," (Annex II, Exhibit A) is "to improve the health and well being of the rural poor." The "Objectively Verifiable Indicator" for measuring the level of goal achievement is the reduction of infant mortality by 20 percent, presumably in the communities benefiting from the project programs.

The means of verification are national annual reports, primary health household surveys, regional semi-annual reports, health post records and a final project evaluation. No work has been done even to start organizing for evaluating progress in meeting the overall goal. The evaluation team feels that neither DISAR nor the regional health authorities has the resources to carry out this evaluation in a statistically valid way.

The evaluation team notes that any attempt to undertake an epidemiologically sound measurement of changes in mortality, based on a limited number of small communities, is a difficult, expensive and scientifically sophisticated undertaking.

In the case of this project, the population at risk, that is to say all the children in a specified age-bracket, would be limited to the number of communities with good mortality data as well as being recipients of the outputs of the RWSES project.

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Given all the confounding variables: the impacts of economic change, epidemics, morbidity cycles, errors in reporting, regional differences, cultural differences, it is unlikely that one is going to be able to demonstrate significant changes in mortality between "test" and "control" communites with the number of children followed and in a period of two to three years.

The changes in the numbers of deaths would have to be very dramatic for it to be clearly evident that project activities have had an impact. If the principal gastrointestinal disease causing mortality in rural Peru was cholera, for which we know that improving the water supply can have a dramatic effect in a short time, that would be one thing. Where the principal causes of death are non-specific malnutrition-gastroenteric-related diseases, as is the case in rural Peru, the mortality changes due to water supply and sanitation changes can be expected to be much less striking over the short term and may take as long as ten years to be epidemiologically evident.

The evaluation team was not aware of any existing project plans to employ the services of an experienced epidemiologist to design the infant mortality evaluation program, to organize the collection of data, the handling, verification and analysis of data.

The evaluation team feels that neither DISAR nor the regional health authorities presently has the personnel to design and carry out this evaluation in an epidemiologically sound way and it recommends that the verification of the overall project goal be dropped from the project unless there is a serious commitment of personnel and funds to do it by mid-1985.

1.6.2 Rural Water Systems

Water systems are in the main to be gravity-fed with household or public standpost connections. Systems may be constructed using excavated wells and handpumps. Six hundred and sixty systems in all are to be constructed by the end of the project in 1987. These objectives still hold.

The project design calls for including chlorination where required. This objective still holds.

Sanitary units -- public showers and laundries -- are to be constructed where feasible. This objective has not been acted upon yet, but it still holds.

The community is to contribute a monthly tariff to cover the costs of operation and maintenance of the system after completion and official inauguration. This objective still holds.

The system used to select beneficiary communities has not been changed.

The Project Amendment adds the objective of introducing a system of drainage for public faucets and reusing wastewater for domestic irrigation. Although these systems have not been built, surpluses of water from the water source, storage tanks and household connections are, in a large number of cases, being used for domestic irrigation. Thus this objective has been revised for cultural and practical reasons.

1.6.3 Latrines

The Project Paper calls for stimulating the use of latrines in beneficiary communities and constructing public latrines in schools, health posts, and other public buildings in those communities. These objectives still hold. The project in practice has gone one step further by insisting that all communities receiving a water supply agree to construct latrines as a condition for being selected.

1.6.4 Operation and Maintenance

The Project Paper calls for a supervisor for community maintenance in each community and a supervising sanitation technician at the regional level who coordinates the maintenance program through quarterly visits to the communities. These objectives still hold.

1.6.5 Health Education

Health education material is to be provided by the primary health care projects. Sanitation technicians and other health personnel are to coordinate water and sanitation and primary health care activities in a continuous manner. Community health promoters and school teachers are to be trained and educational material and teaching methods for community health promoters and primary school teachers are to be developed. Communities are to be educated in the utilization of latrines and in the relationships between health, disease, and environmental sanitation. These objectives still hold.

1.6.6 Conditions of Health and General Well-Being

The Project Paper calls for a health evaluation survey to be carried out by primary health care personnel. This includes simplified household sample surveys including health, environment, sanitation, nutrition and population elements. This objective has been eliminated.

1.6.7 Training

The Project Paper says that sanitation technicians and regional sanitation technician supervisors are to be trained to carry out their work. Three engineers are to be trained in administration and program management of rural water and sanitation projects. DISAR professional staff are to be trained in the United States or to visit other countries to see programs in operation.

Educational material at the community level on administrative and managerial techniques is to be developed. These objectives still hold.

1.6.8 Special Studies

The Project Paper and the Amendment envisage a series of special studies carried out by DISAR to assist the planning and implementation of the project.

Studies that are either in progress or are still part of the objectives of the project are on the following subjects:

- patterns of water use,
- alternate systems of water treatment,
- evaluation of patterns of use and maintenance of latrines, and
- developing a hygiene program in community public schools.

Studies that have been dropped were on the following subjects:

- the efficiency of different water delivery systems on diarrhea,
- handpumps,
- the role of the private sector in water projects, and
- the role of paraprofessionals in the design and construction of water systems.

DISAR has proposed adding two new studies to the roster -- one on the efficiency of treatment systems and one on computerized information system development.

1.6.9 Decentralization of DISAR Regional Offices

According to the Project Paper, decentralized offices are to be created in six health regions; the Project Amendment increases the number of regions to ten. This objective still holds. The mission is actively considering adding an eleventh region, Arequipa, to compensate for the slow progress being made in Ayacucho, a region with a restricted military zone.

The Project Amendment adds the objective of participating with Regional Development Corporations for planning, implementation and operations and maintenance follow-up. Whereas this objective has been dropped in some regions, it has been met in regions where it has been institutionally possible, e.g., Piura, La Libertad, Cajamarca and Ayacucho. Piura is an example of a region where the regional DISAR office has designed and built water systems proposed and funded by the Regional Development Corporation.

The full complement of staffing for the regional offices is projected to be 22 for each office, including an engineer, an engineering assistant, a topographer, a draftsman, and five sanitation technicians. The Project Amendment changed the number of sanitation technicians specified from five to "between three and five." This objective still holds.

Regional offices are to be equipped with vehicles, office equipment, engineering and laboratory equipment and warehouses. This objective still holds.

1.7 Evaluation Purpose and Methodology

The purpose of this evaluation of the RWSES Project is to examine its progress to date in achieving project objectives and outputs; to assess the appropriateness of methods being employed by the GOP; to determine if the project schedule is realistic; and to make recommendations regarding work-plan priorities. A full copy of the Scope of Work is in Appendix A.

A two-day orientation session was organized by WASH in its offices in Arlington, Virginia. The orientation program was greatly appreciated by all the members of the evaluation team. It offered several important advantages to the team members. First, there was ample discussion of the objectives of the evaluation mission. Second, plans for the first few days in Peru were mapped out, including the agendas for the first meetings with officials. This meant that the team lost no time getting organized when it arrived in Lima and was able to hold substantive meetings the first day there. Third, it gave the team members time to interact and work together before actually arriving in Peru.

A Latin member of the team with extensive experience as director of a national water supply agency, Ing. Luis Moncada, was chosen to be team leader. The team planned its work in Peru as much as possible, assigning responsibilities for project components to individual team members and making rough estimations of time to be spent in Lima, in the regions, in preparing the report, and in giving feedback on team conclusions and recommendations to DISAR, DIGEMA, and AID/Peru.

While in Peru, team members met together or individually with AID and GOP personnel and community members.

During the first week, briefing sessions were held in Lima with AID and DISAR personnel. A thorough examination was made of the contents of the project file at the mission. All project-related reports and documents were reviewed.

The second and third weeks were spent visiting five out of the ten DISAR regional offices and 17 communities chosen by the evaluation team, in consultation with the regional staff, out of the 100 or so communities which have completed systems or which are in the process of having a system constructed. The evaluation team visited at least one community in each of the life-cycle stages of a community water system, i.e. the pre-construction, construction, and post-delivery stages.

The fourth week was spent in interviewing and preparing conclusions and recommendations. These were discussed at length with the Directors of DIGEMA and DISAR. A brief summary of the evaluation was presented to the Vice Minister of Health. Several briefing sessions were held with senior AID Mission staff and with the Mission Director.

A final debriefing session was held at the WASH Project offices in Arlington on October 4 for AID and WASH personnel.

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Chapter 2

WATER SYSTEM CONSTRUCTION

2.1 Introduction

The Project Paper states that the design preference for project water systems will be gravity-fed systems with individual household connections. Such designs are expected to maximize water-use and minimize water contamination before consumption. Where household connections are not feasible either because of engineering or economic reasons, preference is to be given to gravity-fed systems with public standpipes. For a limited number of communities, a system based on hand-dug wells with handpumps can be considered.

Chlorination is to be provided to those systems requiring it. Where feasible, sanitary units with public showers and laundry facilities are to be constructed in participating communities.

In order to qualify for consideration, a community submitting a solicitation must fulfill the following minimum conditions: it must not already have an adequate potable water system within reasonable access; it must have an appropriate water source available; the population to be served by the system must be less than 500 persons and the community should be included in the region's primary health care program.

Communities that meet the above eligibility criteria are ranked according to five additional selection criteria. The selection process is supposed to favor those systems that will have household connections. The additional criteria are as follows: the relative density of the population to be served; technical feasibility and complexity; the capacity of the community to pay for a connection fee and for operating and maintaining the system; the estimated cost per capita of the population served should generally not exceed $50 per capita.

A site visit is necessary to inspect the potential water source, make a rough estimate of the costs of available options, and discuss feasibility and the required community commitments with community members and leaders.

2.2 Community Selection Phase

Small communities wishing to receive a water system submit an official request to DISAR. These solicitations may result from the promotional activities of sanitation technicians, health post sanitarians, or other community workers. Those communities that meet the selection criteria and that are most insistent and more accessible are generally selected first. Of course, accessibility is a relative term given the road conditions in most of rural Peru. "Accessible" communities still take two to three hours to reach by truck. Some communities where projects are being constructed require several days to reach by mule. It can be expected that as the regional offices construct more and more systems and as the more accessible communities are served, they will have to select increasingly isolated communities. The selection process needs to be kept simple; complex formulae or weighting systems are not called for.

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A team from the regional office visits the community to identify potential water sources, to carry out a socio-economic survey, and to talk with the community about its commitments and responsibilities. All participating communities must set up water committees at Juntas Administradoras to organize community inputs.

Care needs to be taken during this first contact with the community that as many inhabitants as possible are involved in the discussions with the DISAR staff. Special efforts should be taken to involve women. A number of studies have shown that it is the women who stand to gain most from a new water supply system both in terms of convenience and time saved as well as health benefits for their young children.

Attempts should also be made to identify peripheral settlements that may wish to be included in the population served by the proposed system. A quite common problem faced by a community is that soon after the system has been completed peripheral households ask to be added to it. This is usually not feasible at that stage, and a lot of rancor can be generated to give the Junta a bad name and thus make Junta members wonder why they took on the responsibility in the first place.

In the event that two potential communities are located close to each other, the same level of service should be provided to each one, even if this means that the two communities share the same source in order to make the equal level of service possible. The evaluation team visited neighboring communities -- one with public faucets, the other with household connections. Soon after inauguration, the community with public faucets was petitioning DISAR to change it to one with household taps. Explaining the engineering and economic reasons why such a change is no longer possible does very little to calm down irate community members who feel that they have been snort-changed.

2.3 Initial Community Surveys

Springs identified by the community are measured for flow and samples are sent off to the laboratory in Lima for physico-chemical tests. Bacteriological testing of the source is not carried out. When the laboratory equipment called for in the project budget is purchased in 1985, bacteriological and chemical testing will be possible in each region.

The engineer or auxiliary engineer, with the aid of other members of the office, carries out a topographical survey to be used in the design of the transmission and distribution lines. The evaluation team feels that the topographical surveys and the calculations and drawings are excessively detailed, given the size and simplicity of the systems. Reducing the time spent on system surveying and design would help eliminate the existing "bottleneck" that occurs at the early stage of a project. The evaluators also feel that the early engineering work should be simplified so that it could be done by the engineering auxiliaries under the supervision of the regional engineer.

Despite the great amount of topographical detail, the unevenness of the terrain makes necessary frequent on-the-site design changes during construction which is a further reason for not spending so much time and

effort at the planning stage. It is suggested that the surveys could be done to the required level of engineering accuracy using a precision altimeter and compass rather than a theodolite and staff.

With the field information in hand and some recently formulated design guides, the engineer begins to make system-design calculations. The designs take into account the present and estimated future population to be served by the project. All the engineers have attended a basic design course for small water systems but are somewhat inexperienced. The design guidelines are not very detailed. A design manual such as that written for Acueductos Rurales de Venezuela might be of greater use to them. A probability method for the water demand made by household connections ought to be employed for choosing the size of the pipes. Given the number of people to be served and the daily water use per person, it should actually be possible for the auxiliary engineer, with training, to make a preliminary in-situ design, sizing the pipes by using standard hydraulic engineering tables.

The plans that are prepared are of good quality and the drawings are sufficiently clear. In many situations, actual construction does not follow the blueprint of the project plan. The engineer who designed the project and the person in charge of constructing it are often different people. The person in charge of construction may encounter and have to cope with problems and contingencies for which the initial design serves only as an approximate guide. This can be an occasional source of future difficulties, in that variations introduced during construction may not necessarily get documented. When subsequent expansion or repair of the system is contemplated, a precise definition of the system facilities may not be available. The evaluation team found that whereas changes or extensions of the network are noted on the plans, changes made to standard designs for tanks and other system appurtenances are often not documented.

2.4 Structural Designs

The structural designs for captation and break-pressure tanks do not take into account the diversity of seismic zones in Peru. There is a lack of structural designs using rubble masonry even in those areas where stones are readily available. Tank covers are generally of poor quality, especially when made out of concrete. Metal chamber covers, while expensive, would give much better service in the long run.

The design for break-pressure tanks is inadequate and gives rise to a pulsating flow in the examples seen in the field. Transmission lines lack air and/or drain valves. The typical designs for valve boxes appear to be inappropriate. In some regions, the engineers have opted for better solutions such as the use of concrete latrine seat risers or pieces of 6-inch PVC pipe.

2.5 Materials

Construction materials are bought by DISAR or AID in Lima or abroad through public bids or in the main town of the region or are supplied by the community itself.

For materials purchased in Lima or abroad, quality specifications are published for the bidding process. But there is no system for verifying that the materials arriving in the DISAR warehouses actually meet specifications. The piping stored in various regional warehouses lacked working pressure markings and diameter size usually found on this type of material.

Materials acquired in the regional main town are usually reinforcing steel and cement which are manufactured in Peru and are of equal quality throughout the country. Materials purchased in Lima are cheaper because of volume-purchase prices, but regional purchases help stimulate the local economy.

PVC fittings are being used in the construction of public standpipes. They frequently break soon after the system is put into operation. Bronze fittings should be used for these public taps.

The materials donated by the community -- aggregate and water for the concrete -- are of variable quality. Construction supervisory personnel need to be instructed in how to determine if the aggregate is of sufficient quality to make good concrete.

2.6 Methods

The water supply systems are constructed under the direction of one or two foremen, a mason, and a pipe-fitter, paid directly by the regional DISAR office. One foreman is needed for each construction site to direct and organize the labor donated by the community.

The construction time for a project depends not only on the size and complexity of the system but also on the availability and quality of the labor given by the community.

Concrete quality is variable but generally acceptable for this type of construction in rural areas. When DISAR improves its standard designs, the regional engineers will have to construct the works accordingly.

The engineers need to be told that it is important that the material used to backfill trenches that comes into contact with the PVC piping should be free of stones. It should also be emphasized that PVC tubing left uncovered is damaged by exposure to the sun.

2.7 Management and Inspection

The construction planning is done by the regional engineer. On receiving the go-ahead order from Lima to construct a system, he prepares a construction schedule and budget based on the cost of local materials and hand labor. With this budget, the engineer plans the funds disbursement for local payments.

A budget for the system is also made by the engineers in Lima at the time that the project design is being reviewed and before the go-ahead is given. The two budgets probably differ somewhat; however, the transfer of funds to pay for the project is based on the Lima-prepared budget, not on the regionally-prepared one. If decentralization is to be enhanced, this procedure should be

changed. The Lima-prepared budget is probably not accurate on local costs, and, with the rapid price rises due to the 5 to 10 percent monthly inflation rate, projects are often under-budgeted before they begin. Sufficiently large contingencies for inflationary effects on construction input prices are not being made by the DISAR Central engineers.

Work quality is checked during construction by the engineer or his engineering auxiliary. DISAR Central has printed a special book of forms for construction-work control that ought to remain on the job during the entire period of construction. Copies of this book are beginning to arrive in the regions, where personnel are making an effort to complete the forms for systems already constructed. The forms have to be filled out by the construction foreman and countersigned by the engineer. However, in some regions, although the foremen all know how to read, some of them apparently have great difficulty writing down required information. In cases where foremen have such difficulty, closer supervision by regional DISAR staff will be necessary.

A report on the progress of all work in a region has to be filled out each month by the regional offices. The information collected can vary from office to office: complete standardization does not exist. This monthly report is sent to Lima for use in preparing the DISAR quarterly reports on the AID project. The evaluators made spot-checks comparing information on progress held by Lima with that supplied in the field. These checks indicated that sometimes the Lima information is out of date, and reports do not reflect the actual progress made in the regions.

For final inspection of the systems, each region needs to be equipped with test equipment for hydrostatic testing of the pressure capability of the transmission and distribution lines before filling in the pipe trenches. The pipes should be able to take 1.5 times their given working pressure.

A comparator for measuring residual chlorine strength is imperative for testing the contamination of the system before it is handed over to the community.

The lack of hydrostatic and chlorine residual test equipment noted in several regions means that these official tests of the system may not be getting done according to specifications.

Since it is difficult to obtain chlorine in Peru and since there are major routes of fecal contamination in the home other than the water route, it is recommended that the chlorinator be dropped from project design and construction unless there are indications that the source has a significant bacteriological quality problem. It is suggested that all sources be tested bacteriologically before the systems are built to see if a problem with water quality exists.

2.8 Provision of Pipes and Other Materials

In the past, delays in the central purchasing of pipes and accessories have affected the completion of construction targets. However, enough piping has now been purchased for approximately 570 systems. If a complementary purchase of accessories for 310 systems, which is being processed by AID at present, is

delivered by early 1985, there should be no delays in construction schedules due to shortages of these materials.

The RWSES Project has also seen delays in acquiring construction materials at the regional levels because of funding shortages in the regions, inadequate planning, and a cumbersome purchasing system specified by the regional health organization. However, the funding problem has recently been solved and internal efforts have been made to speed up the system; therefore, local purchases will probably cause no further delays, providing they are planned well in advance.

2.9 Progress to Date and Expected Progress

The Project Paper calls for the construction of 660 drinking water systems in a total of ten regions by the end of September 1987. The annual plan per region as prepared by DISAR Central is shown in Table 1. The number of systems completed has fallen considerably behind this schedule. To date only 71 systems have been completed, compared to the 254 that should have been completed according to the schedule. However, most of the problems that caused the delays appear to have been solved. The evaluation team concludes that the target of 660 systems can be achieved in the remaining time, provided that the design and project authorization stages can be speeded up and there are no major delays in construction schedules (see Table 2 and Figure 1).

Cajamarca and Ancash regions expect to construct between 15 and 20 systems each in 1984. It appears reasonable to expect that each of the regions can produce 20 projects per annum if the infrastructure and personnel are in place. In view of the probably limited production in Ayacucho, DISAR and AID may include Arequipa as a new region. Even excluding Arequipa, however, it is feasible that the target can be achieved since, with the exception of Ayacucho, all the regional offices will probably have excess capacity by 1987.

The average direct monetary cost of construction (excluding non-monetary community inputs) will probably be approximately U.S. $30 per beneficiary, which means that the budget for construction should be sufficient.

2.10 Recommendations

2.10.1 Project Implementation

High Priority

1. DISAR Central should establish a system of continual regional inspection to be carried out by engineers, each of whom would be in charge of three or four regions, with a permanent base in one of the regions. These regional engineers, reporting directly to the proposed DISAR/AID Project Coordinator in Lima, would have the responsibility of verifying that their regions are meeting their objectives in all phases of the project and of checking the quality of the regional office outputs.

Table 1

Water System Construction Schedule

REGION	1982	1983	1984	1985	1986	1987	TOTAL
Ancash	9	20	20	20	15	6	90
Cajamarca	6	20	20	20	14	10	90
Junin	10	20	20	15	15	10	90
La Libertad	-	20	15	10	15	10	70
Piura	-	10	20	20	15	5	70
Ayacucho	-	-	10	20	20	20	70
Lambayeque	-	-	10	15	15	10	50
ICA	-	-	10	15	15	10	50
Cuzco	-	10	20	10	10	-	50
Puno	-	10	10	10	-	-	30
TOTAL	25	110	155	155	134	81	660

Source: Ministry of Health, Plan de Implementacion, 1983

Table 2
Rescheduled Construction Plan 1984-1987
(Prepared by the Evaluation Team)

YEAR / REGION	ACTUAL[a] 1982/3	ACTUAL[a] 1984 To 9/84	EXPECTED[b] 1984	ESTIMATED[c] 1985	ESTIMATED[c] 1986	ESTIMATED[c] 1987 to 9/87	TOTAL
Ancash [d]	7	9	15	20	30	25	97
Cajamarca [d]	7	12	19	20	30	26	102
Junin [e]	9	10	19	30	30	26	114
La Libertad	-	7	7	20	20	13	60
Piura	-	-	-	10	20	13	43
Ayacucho [f]	-	-	-	5	5	5	15
Lambayeque	-	-	-	10	20	13	43
Ica	-	-	-	10	20	13	43
Cuzco	-	6	10	20	20	13	63
Puno	-	4	4	20	20	13	57
Arequipa	-	-	-	-	10	13	23
	23	48	74	165	225	173	660

a Source: DISAR construction report prepared for the evaluation team.

b Source: DISAR verbal communication.

c Estimated on the basis that each region can construct 10 systems per year in the first year of operation; 20 per year after that; and 30 per year if a region has 2 offices.

d These regions will have 2 offices functioning beginning in 1985.

e Junin has had 2 offices in operation since early 1984.

f Expectations for Ayacucho are less due to security problems in the region.

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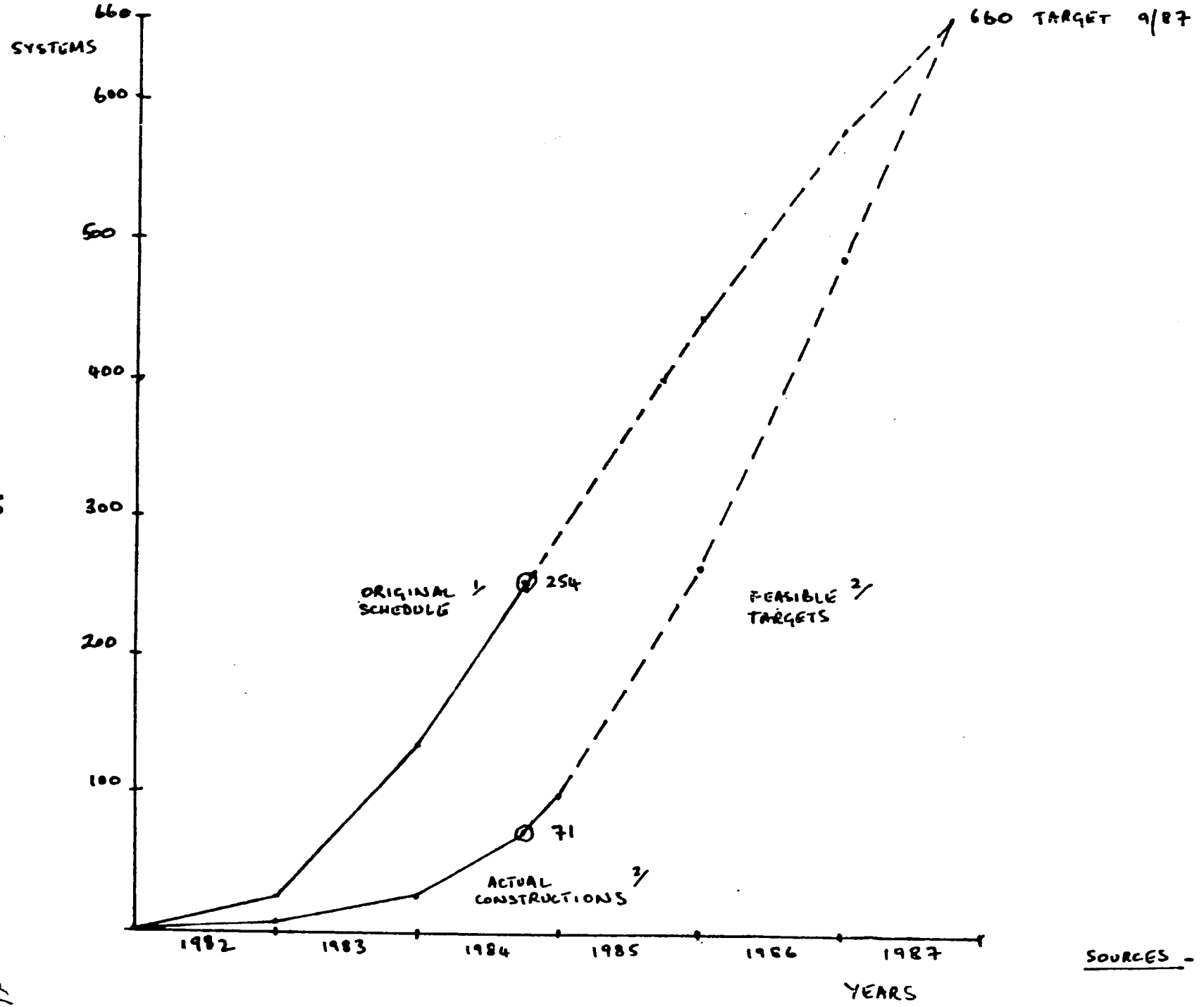
FIGURE 1 - Water Systems Construction - Original Targets Compared with Actual/Feasible Targets



SOURCES - Tables 1 & 2

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2. Existing bottlenecks in project design and authorization should be removed, and regions should be encouraged to have projects in reserve as an aid to the efficient use of regional resources.

Medium Priority

3. A format for a budgeting and materials schedule should be designed to help the regional engineer carry out cost accounting and solicit funds from Lima on time.

4. The control and reporting system for work progress should be improved and simplified.

5. Annual training courses for engineers and auxiliary engineers should be held on the following topics:

   - basic hydraulics,
   - transmission line and distribution system calculations,
   - preparation of project budgets and project timetables,
   - management of the non-construction component parts of a project,
   - low-cost excreta disposal options,
   - quality control in construction,
   - pressure testing and disinfection of systems.
   - overall project management, and
   - use of hygiene education.

Lower Priority

6. DISAR should standardize all forms and documents used in the central and regional offices.

7. To facilitate inspections and access to the communities, the purchase of 185cc trail-type "areneras" motorcycles should be considered for regions such as Puno with generally flat terrain. To improve the user's sense of responsibility for the motorcycle, a system whereby the vehicle is sold to the user on deferred terms should be considered. (A monthly stipend could cover fuel and maintenance costs.)

2.10.2 Field Surveys and System Design

Lower Priority

1. Chlorinators should not be part of the system design unless they are absolutely necessary.

2. Air and drain valves should be placed at the high and low points of the transmission line.

3. Bronze fittings, not plastic ones, should be used on public taps. A means of effective drainage should be designed for each public tap.

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4. DISAR should decide now what handpumps will be used when projects arise that call for their use. It is suggested that principal consideration be given to the pumps currently being manufactured in Puno, Peru.

5. A cheap standard model for valve boxes using PVC pipe or concrete latrine risers should be designed.

6. Gravity system designs should be simplified in terms of the engineering surveying work and drawing details.

7. Topographers and auxiliary engineers should be trained in the design of water supply piping so that they can do preliminary system design while present in the community for the initial surveys.

8. The break-pressure tanks now used in the transmission lines should be redesigned.

9. While the project is awaiting the results of the special study on water demand being carried out by DISAR Central, the systems should be designed with a method based on probability of use, using 60 to 70 percent of the total number of connections to obtain the design flow, as suggested by the IRC (International Reference Center for Community Water Supply and Sanitation).

10. Construction drawings should contain a map of the roads and distances from known points to reach the community.

11. A standard model using rubble masonry should be designed for use in regions where there is an abundance of available stone.

2.10.3 System Construction and Testing

High Priority

1. Systems should be thoroughly disinfected before they are placed in service. One month after the system has been in operation, a bacteriological test should be run on a sample from the system source. On the basis of the result it can be decided whether or not it is necessary to have permanent chlorination of the system.

2. A hydraulic test should be carried out for approximately 30 minutes before covering up the pipes with backfill. The pipes should take 1.5 times their given working pressure.

3. Each region should be equipped with hydrostatic testing equipment and a comparatat for measuring residual chlorine strength.

4. All supervisory personnel involved directly in the construction of systems should receive training in hydraulic testing and disinfection of completed water systems.

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Medium Priority

5. Construction materials should be inspected by persons trained to verify the quality of aggregate used for the concrete and of other materials purchased in the regions.

6. A number of improvements should be made in handling PVC piping:

   - The material used to backfill trenches that comes into contact with PVC piping should be free of stones.
   - PVC piping should not be left uncovered, as it is damaged by exposure to the sun.
   - Pipes should be buried sufficiently deep in areas where the ground becomes frozen.

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Chapter 3

LATRINE CONSTRUCTION

3.1 Introduction

The Project Paper states that the construction of private latrines will be encouraged in communities where water systems are installed. Construction is to be accompanied by a program of education and motivation to encourage latrine utilization. Public latrines are to be provided for schools, health posts, and other public buildings in the community. A special study of latrine utilization and maintenance patterns and user attitudes and experiences is to be carried out in other communities already possessing and using latrines, in order to improve the implementation and effectiveness of the project's latrine program.

3.2 Design and Technical Options

In four of the five regions visited by the evaluation team, the only latrine design seen was a concrete platform with an oval hole in the center, an oval concrete riser, and a wooden cover. In some regions, the platforms are cast in two halves to make them easier to transport. In Puno region only a squat plate with a keyhole-shaped hole and two raised foot rests is offered. This design has been chosen because of known community antipathy toward the slab-and-riser-type latrine.

These three components, the platform, riser, and cover, are supposed to be delivered to the community household only when a proper pit has been dug according to instructions given by a sanitation technician or engineer. Every household intending to pay for a connection to a new water system is supposed to agree first to construct and use a latrine.

Discussions with DISAR personnel indicated that a community is presented a very limited choice of options for excreta disposal, usually only one in fact, since that is the only type the regional workshop is geared up to make.

The evaluation team feels that the latrine program would stand a better chance of success if DISAR personnel were able to talk to the community about a range of available low-cost excreta disposal technological options, their advantages and disadvantages and the costs associated with each type. That way, the community could explore options that they perceive to be in conformity with their beliefs, habits, and need for privacy and cleanliness.

Much effort has been and is being put into low-cost excreta disposal options all over the world. The sanitary engineering technical adviser would be the right person to take responsibility for organizing a short course on excreta disposal options for central and regional DISAR staff using the abundant information on the topic that the AID/Peru office has or that is available from the WASH Project.

3.3 Fabrication

The slabs and risers are fabricated in regional workshops belonging either to DISAR or to the regional environmental sanitation unit. A DISAR report states that six regions have the capacity to produce about 1,700 latrine units a month. The official objective for the latrine program was the installation of 4,967 units in the program year 1983-1984. As of September 1984, according to reports 1,655 units had been fabricated, or 33 percent of the year's target.

Construction foremen who are not currently assigned to a community to supervise and/or assist with the construction of a water system are given the job of supervising the latrine fabrication process in the workshop. In general the quality of the latrine components is acceptable; only in one region, Huaraz, were units of questionable quality inspected.

3.4 Installation

The latrine components are delivered by DISAR to the president of the Junta Administradora. The president then has the reponsibility of distributing these units to all those who have excavated a pit. Unfortunately, it was a common sight on visiting a community one year after the inauguration of its water system to see the slabs still resting against walls in the main square of the village.

In the 17 communities visited one installed latrine was seen in Cajamarca region and several in the process of construction in the two communities visited in Puno region. There were reports of cases where high groundwater tables ruled out the use of deep pits. In such cases there had been some experimentation with putting the latrine unit on top of a chamber built above ground level.

The September 1984 DISAR report states that 1,151 latrines have been installed to date. That figure represents 23 percent of the year's target number of installations.

3.5 Use

DISAR has a one page, double-sided instruction sheet for the regional engineers on the execution of the AID project latrine program. The sanitation technicians have forms that are supposed to be used to monitor the installation and maintenance of latrines on a household basis. However, on the basis of what it saw in the communities and after talking with DISAR field personnel, the evaluation team concluded that there is no functioning program of follow-up in any of the project communities. In other words, no effort is being made to see if latrines are actually being installed and used for what they are intended (as opposed to such unintended purposes as storage, keeping animals, etc.) and to systematically find out why units are not being installed or used such information could be fed back into the program to improve acceptance and utilization.

3.6 Sanitation Education

There is no professionally-developed program of sanitation education in the project at the moment. What education takes place occurs on those few occasions when the engineer or sanitation technician is present in the community during the planning and construction phases of the system and talks about the need for latrines. There is no professional health education control over the quality of these "educational" encounters, and no educational materials have been developed for this program to date.

The original project design called for the use of inputs from the primary health care projects in this aspect of the program, but such inputs have not been available. The primary health care projects have not yet developed the educational materials that they planned to share with DISAR personnel. However, in some regions DISAR staff have participated in training courses for primary health care personnel by giving classes on water supply and sanitation.

3.7 Latrine Study

The Project Paper called for a special study to be carried out in communities already using latrines to see what the problems of use were or why latrines were underused or not maintained. The study was to be part of an effort to discover what the possible barriers to acceptance were in the project communities, and the results were intended to guide and modify further implementation of the latrine component. DISAR Central does not see the need to do this study. Its comment on the report on progress in meeting project objectives reads, "the latrine study will not be done, as this has been already amply studied and holding the opinion that the type of latrine utilized in the communities is adequate".

The GAO report mentions that in April 1982 a team of WASH consultants recommended that the latrine study be carried out and that further construction of household latrines be postponed until the results of the study could be analyzed and incorporated into the project. Nevertheless, construction of latrines has continued unabated.

3.8 The Wellin Study

The October 1982 "Wellin" study was funded by AID at DISAR's request. The objective of the study was to explore the multiple factors that condition the effectiveness of village water systems. It was carried out in 25 communities in the province of Ica and neighboring coastal and sierra provinces. The scope of work was to investigate the range of community, economic, and technical factors related to the use, management, maintenance, and operation of village water systems and to determine the relative importance of factors which contribute to the success or failure of these systems and related sanitation efforts. The same WASH team mentioned above suggested that DISAR take advantage of the Wellin study and its methodology to obtain valuable information on excreta disposal. This information was to include personal preferences and customs considered to be even more critical to the success of an excreta disposal program than to a water supply program. Wellin amplified

the section of his survey instrument dealing with latrine use, although by that time he had already completed the survey in three-quarters of his sample.

In his report Wellin developed a diagram on the decision-making stages and processes in considering latrine installation and provided some germane and useful information for the proposed latrine study; nevertheless, he proposed that more study was needed on preferences, customs, and defecation habits and on details of latrine use: who uses latrines, when are they used, who keeps them clean, what do people use to clean themselves after defecation, what is the usual life-cycle of a latrine, and how do patterns of use and cleanliness vary with different types of latrines?

Wellin recommended that a social-science trained fieldworker conduct informal in-depth interviews with samples of residents in order to get at the underlying feelings and meanings associated with elimination patterns and latrine attitudes. This in-depth approach would get at feelings and meanings not elicited by standardized questionnaires.

He also recommended that the sanitation technicians make periodic visits to households with latrines in order to gain first-hand knowledge of whether and how latrines are used and maintained. The same visits could have an educational function.

3.9 Progress to Date

The evaluation team found that the RWSES Project latrine program at present is geared towards the production and delivery of latrine units to the community with no effective follow-up system to determine actual installation and use for excreta disposal. A distinction needs to be made between the factors that motivate people to install latrines and those that motivate them actually to use them. For example, the communities chosen to receive water supplies have to sign an agreement with DISAR that they will install latrines -- otherwise they will not receive a system. This may be a motivating factor for installation but not for ensuring use.

In fact, such pressure can also lead to an unfortunate paradox. In Puno region, latrine units are reserved for RWSES Project communities, which in the main do not want them. Communities who approach the regional office with requests for latrines but who are not involved in the RWSES Project are being denied their requests.

Informal estimates made by engineers and sanitation technicians in the regions visited were that perhaps 20 percent of the latrines installed were actually used. This would imply that present efforts and resources being put into the program are not very well spent.

The evaluation team did not attend any of the presentations on latrines made to communities but it appears that the communities do not have much of a chance to participate in deciding which type of excreta disposal system they want. No research is being done on the resistance to latrines that obviously exists in most project communities. The promotion/education aspects of the program appear to be ineffective in getting people to change their excreta disposal habits.

No public latrine or school facilities were seen in the communities visited, and it was reported that only one communal sanitation unit -- public showers and laundry -- had been constructed anywhere in the regions. Since the Project Paper contains DISAR plans and designs for these units, the fact that they have not been constructed shows that DISAR Central's staff has not given them priority. Likewise, the regional engineers have put a low priority on these units. When beneficiary communities are being identified, no preliminary research is done as to possible acceptance or rejection of communal sanitation units.

There is a lack of input by skilled professionals -- health educators, anthropologists, social scientists, community development specialists -- into the design and implementation of this program. The existing DISAR field staff, with their technical background and professional orientation, may not appreciate the time, research, and planning efforts needed to develop a program that achieves long-term behavioral changes. The educational techniques being used by those DISAR people working in contact with the communities are ineffective in obtaining behavioral change.

The evaluation team is also concerned that the engineers and sanitation technicians seem not to appreciate the importance of programs other than water supply systems per se in reaching the ultimate objective of this project, i.e., the reduction of infant mortality due to sanitation related diseases.

3.10 Recommendations

High Priority

1. Socio-cultural studies on sanitation behaviors and possible cultural, social, and economic barriers to latrine use and hygiene behavioral changes should be carried out in each region of the project using social scientists and/or health educators from the Regional Health Authorities and from DISAR Central. These studies will require attention being paid to sociological and anthropological as well as health, political, and economic factors. They will need to address questions of options, community pressures, and motivating forces for adoption. The outputs of these studies need to be such that they can be used to design an effective community promotion program.

   The project should set up a workshop by early 1985 in which MOH health educators, sociologists, anthropologists, and other social science professionals discuss the design of regional latrine studies and then help the regions design individualized, culturally appropriate latrine promotion programs based on the results of these studies. The human resources development unit could act as the workshop organizer and facilitator, if it is in operation by that time; however, the workshop should proceed whether the human resources development unit exists or not.

2. Target communities should be involved in decision-making on excreta disposal alternatives. DISAR staff should receive training in the design and construction of low-cost excreta disposal systems. WASH

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could supply DISAR with appropriate information and educational material in Spanish for use in developing a seminar or a short course on the topic.

3. A follow-up evaluation methodology for measuring program impacts in terms of actual latrine use and maintenance should be developed by the DISAR human resources development unit and health education staff at both the national and regional level.

4. Sanitation technicians and engineers should receive intensive training in communications, community development skills and adult education techniques.

Medium Priority

5. The DISAR technical staff need to receive education on the global view of health and the role played by all components in the project in achieving its ultimate objective -- decreased sanitation-related mortality. A seminar should be organized to present the conclusions from worldwide studies on the efficacy of various programs in breaking the cycle of sanitation-related infection. The seminar should stress the importance of programs that try to change hygienic behavior, such as handwashing, latrine use, etc., in addition to the importance of available potable water. Such a seminar could be a further opportunity for primary health care personnel to interact with DISAR staff.

Lower Priority

6. Educational materials for the latrine program should be developed at the regional level by DISAR and primary health care staff with assistance from the DISAR human resources development unit.

Chapter 4

SYSTEM OPERATION AND MAINTENANCE

4.1 Introduction

The Project Paper states that community operation and maintenance of the system after delivery is viewed as a critical element. The project is to promote the concept that the members of the community are responsible for the maintenance and fiscal administration of the system and the payment of an operator. In other words, the community should approach self-sufficiency in maintenance and administration of the system with a minimum of dependance on further inputs from DISAR or any other agency of the GOP.

The project's objective is to overcome the maintenance problems caused by lack of interest after the initial enthusiasm and excitement of constructing the system wears off. As Wellin points out in his report, the constructing agency suffers from lack of interest too, as engineers get their professional satisfaction out of design and construction and not from follow-up on system performance. (This is obviously also a function of the rewards system set by the agency and where it places its priorities.)

4.2 Operation of the Junta Administradora

The implementation of the RWSES project is predicated on the participation of the community during the planning, construction, and post-inauguration phases of the water supply system.

DISAR decides whether or not to construct a water supply for a community, based partly on an appraisal of the ability of the community to bear the allocated costs of construction and maintenance, its willingness to help with labor and materials during the construction phase, and its ability to get rights to land needed for spring protection, construction of a captation tank, rights-of-way for pipelines, etc. .

The community has to agree to form a water committee or Junta Administradora that will be responsible for organizing the community during the pre-construction and construction phases and for managing the system after it has been officially handed over to the community.

The Junta is an officially constituted and recognized body consisting of at least three people, a president, secretary, and treasurer. Every Junta visited also had two other members called vocales or spokespersons. The Junta is supposed to be democratically elected by an assembly of the community members. In reality, however, in some places elections are not quite democratic and Juntas are named by the most influential people. In some cases, persons are named to the Junta who spend little time in the community and therefore are not available when decisions have to be made.

The sanitation technician, attached to the DISAR regional office, is responsible for helping the community to get organized and to elect the Junta and for explaining, at the time of the general assembly called to discuss the

water system, the responsibilities the community must assume if it wishes to participate in the project.

Once officially constituted, the Junta becomes the official organ of communication between DISAR and the community. The Junta is instructed on how to keep records of donations of money, materials, or labor made by individual households wishing to get individual connections, or, in the case of a system with public taps only, wishing to contribute to the construction of the system.

The Junta is responsible for seeing to it that there are a sufficient number of people present when required to help the construction foreman and any other skilled laborers needed for system construction. Junta members also see to it that these people from outside the community are supported with food and lodging during their stay in the community.

In addition to assisting in system construction, the community is supposed to participate in such preliminary activities as identifying the water source, locating local sources of building materials, and defining the level of service to be delivered by the system. It appears that in actuality the level of service is more determined by engineering considerations than by community desire. DISAR policy is primarily to construct systems with household connections and to shy away from constructing systems with public faucets only. There is a real reluctance by communities to accept a public faucet system.

Prior to completion of the system, the Junta names a person to be the system operator. This operator receives the necessary training from DISAR personnel and receives a monetary stipend from the Junta for carrying out his responsibility.

Before delivery of the system, the Junta has to collect the agreed-to initial payment for the system by the community, generally approximately 10 percent of the estimated cost. After construction, the Junta is supposed to collect the monthly tariff agreed to by the community to cover maintenance costs, the stipend of the operator, and other miscellaneous costs connected with administering the system. The Junta is also supposed to complete a monthly accounting of income and expenditures to be submitted to DISAR for system monitoring, keep a record of all fee payments, and give legal receipts for all such payments.

The community is supposed to receive at least quarterly visits from a sanitation technician after inauguration to monitor the progress of the community in maintaining the system according to the agreements signed with DISAR.

The evaluation team found a Junta Administradora in all 17 communities visited. These Juntas generally had or were fulfilling their responsibilities during the pre-construction and construction phases of the project. However, none of the Juntas visited was found to be fulfilling its responsibilities in the post-inauguration phase.

4.3 Training the Operators

With a few exceptions, the evaluation team found that one person in each community had received some training in repair work on the system from the construction foreman during the period of construction. However, the evaluation team never found a situation in which more than one person had been trained. The Project Paper talks about the practical need for training several people in case the one trained person leaves the community. The Juntas visited were not making provisions to have a number of people trained although they seemed to agree that it was a good idea.

In communities that had not named an operator by the time the system was inaugurated, there was no mechanism for training that operator after the departure of DISAR personnel.

The operators interviewed felt that they had received adequate training for the job. Training is left up to the foreman; there is no official DISAR training program or supervision by the DISAR engineering staff to evaluate the quality of the training received or to test the skills and abilities of the operators.

It was noted that the extremely small stipends officially to be paid to the operators out of the monthly user tariffs did not provide much of an incentive for an operator to expend much energy or pay much attention to the responsibilities of the position. Since the monthly tariffs were not being collected in any of the communities visited with completed systems, the operators were not being paid either.

At the time of inauguration, virtually no materials are left in the community to deal with any emergency that might occur. The operator may or may not have the tools necessary to carry out repairs. The evaluators could not understand why providing a set of tools and an adequate amount of spare parts could not be made part of the project design costs. Similarly, a materials and tools bank should be set up at the regional DISAR warehouse to sell what is required for system repair and maintenance to the Juntas at cost.

4.4 Setting and Collecting Tariffs

As mentioned already, not one of the communities visited with a water system in operation was found to be collecting the monthly users tariff, even in communities where the system had been in operation for a year or more.

On several occasions the evaluators were present at meetings with the Junta, in the presence of the regional engineer or sanitation technician, when some heated discussion developed on the need for the community to collect the monthly maintenance tariff. These debates occurred despite the fact that the Junta and community had signed a legally binding document agreeing to pay monthly tariffs and despite the fact that the engineer and the sanitary technician had supposedly been working with the community to answer its questions and to assure that it understood its obligations.

Sometimes Juntas claimed that the community members could not afford to pay the monthly tariff. Sometimes they were told by university students doing

volunteer work in their communities that it was the government's duty to install a water supply system and that the community should refuse to pay anything.

The evaluation team found the common tariff to be set at a monthly rate of $0.25 per connection. The Project Paper, which was written in 1980, had estimated that the payment for gravity-fed systems with household connections should be much higher -- in the range of $1.25 if the system was to be self-maintaining. Because of inflation, the tariffs being set at the equivalent of $0.25 in national currency were expected to have an equivalent value of $0.13 by the end of 1984.

The tariff is fixed at the time the system is handed over to the community, and it remains at that level until changed by the Junta or by DISAR in cooperation with the Junta. To change the tariff means calling together the community to decide the issue in assembly. The Juntas interviewed did not seem to be willing to take the responsibility to increase monthly tariffs. After all, none of them were having any luck collecting even the $0.25. One would reasonably expect that a Junta will not want to face its community on the need to raise rates more than once a year. However, the evaluation team feels that, given the rate of inflation in Peru for the past few years, the tariff should be amended at least on a quarterly basis so that communities can have some realistic purchasing power for materials to repair their systems.

A legal way of amending the tariff automatically should be sought. One suggestion made by a DISAR regional engineer was that the tariff amount be indexed to the cost of a familiar item, such as a bottled soft drink, which also costs about $0.25 at present.

The evaluation team noted that in many of the regions, the tariffs were not set by DISAR until the actual date of inauguration of the system. This meant that the Junta was given no time to face up to the fact that it had to collect a tariff, and DISAR personnel could not meet and sort out the problem with the community.

The tariff could be set as soon as the Junta is formed, for it is based on the socio-economic survey DISAR conducts in the community at the beginning of the pre-construction phase. By analyzing the results of the survey on economic conditions in the community, DISAR is supposed to estimate the ability of the community to pay both its share of the system's cost as well as the monthly tariff. There is generally at least a three- to six-month period between the survey and the completion of the system. If the tariff were made known at the beginning of the period, DISAR would have time to deal with the issue as it trains the Junta.

4.5 Training the Juntas

The evaluation team concluded that the existing program to train Juntas to assume their reponsibilities after the inauguration of the system is inadequate and ineffective. As mentioned before, not one Junta visited was collecting the monthly tariff; neither was a Junta found that was filling out the monthly income and expenditure reports that are to be submitted to DISAR according to the project agreement. This was borne out by the examination of

the records held in the Supervision Division in Lima. Of the 30 systems constructed for the RWSES Project in 1983, only one community had submitted an economic report.

Not all Juntas were found to have the minimum documents specified in the Community-DISAR agreement, i.e., a copy of the rules and statutes for the Junta, an Operation and Maintenance Manual, forms to be used for tracking payments of tariffs and for completing monthly accounts of income and expenditure, and a receipt book for tariff payers. Where documents were found to be missing it was later ascertained that the regional office had run out of copies of that particular document and that they were awaiting replacement copies from Lima. Juntas visited with systems in operation for a year still had not been given all the legally required documents.

The materials at present being used to inform the Junta and presumably to train them are inadequate and need to be thoroughly revised. They were designed for Juntas or Municipal Councils operating larger, more technically complex systems in communities where one could expect some previous experience among community members in handling funds. This project is specifically aimed at small communities, the type that DISAR has not targeted before, and the Junta members in those communities may even have problems with reading and writing. DISAR needs to rethink its training approach for these smaller, less institutionally-developed communities.

The Project Amendment discusses training Junta members in arithmetic and other basic administrative and managerial skills, but to date there is no systematic, organized training program for them.

The whole issue of getting an effective operations and maintenance program going -- including the problems facing the Juntas -- is given detailed treatment in the 1982 Wellin report. For that reason the evaluation team strongly recommends that the report be translated as soon as possible into Spanish and given to the DISAR staff to read.

One of Wellin's conclusions -- one with which the evaluation team is in complete agreement -- is that far too little attention is paid by DISAR to the important need for community members to be guided and oriented by appropriately trained DISAR personnel. The DISAR personnel are trained primarily to deal with one set of problems -- the technical ones. They are effective in doing this but are of significantly less help in assisting the Juntas and their communities to deal with financial dilemmas and administrative and social-political difficulties.

As Wellin notes:

> Indeed, Water Program personnel appear to be little more prepared to render effective assistance to villagers struggling with problems of the administration and social organization of the water system than are the villagers themselves.
>
> The regional engineer and technicians themselves cannot be blamed for this situation. The national thrust of the Rural Potable Water Program is to install new facilities and see to the repair or rehabilitation of malfunctioning and inoperative ones. This leaves little time, only

fleeting attention, and low priority at the regional level to helping villages cope with management problems. Moreover, reflecting existing priorities, only technical expertise is represented in the complement of regional personnel, and no personnel are trained to deal with problems of community organization, issues of village management of water systems, etc. (Wellin, 1982, p. 24.)

This is still the situation as far as the DISAR RWSES Project is concerned. There is an apparent lack of effective two-way communication between DISAR personnel and Junta members. This lack of effective communication is due in part to the lack of training and community work skills of DISAR personnel working in the communities.

4.6 Supervision of the Juntas

Even for systems that have been in operation for a year or more, there seems to be no effective means to supervise Junta performance. Presumably, if there was an effective supervision program in operation, the problems that the Juntas have would have been picked up and resolved by the DISAR staff responsible for overseeing the work of the Juntas, namely the sanitation technicians.

However, the sanitation technicians lack training in community development skills and resources to carry out their supervision work, i.e., means of transport or payment for transportation to the communities and adequate per diems. They also need to be convinced that their work with the Juntas is in fact an important priority for this project and for DISAR; many sanitation technicians are being used as auxiliary water system survey and construction inspection technicians by the engineers.

Follow-up at the regional level on how the Juntas are doing is a crucial part of the RWSES Project, and there should be at least one sanitation technician full time on that task in each region. He should have adequate resources to be out in the field visiting all the communities and Juntas that require supervision. This supervision system should be designed to work on an exception basis. Supervision efforts should focus on those Juntas not complying with minimum reporting requirements. The sanitation technician should visit them at least on a quarterly basis and visit those that are complying much less frequently -- say once a year.

The Project Paper states quite clearly that one of the objectives is community self-sufficiency when it comes to administration and repair of the completed system. Communities are not to count on further inputs from DISAR directly unless it is to deal with technical problems clearly outside the capacity of a community to deal with. However, talks with DISAR personnel in charge of the Operations and Maintenance program in Lima indicated that they are still working on the assumption that all maintenance and repair of systems belonging to the RWSES Project will be carried out by DISAR personnel, as has been the policy for projects built with InterAmerican Development Bank money.

This is not the view of the DISAR director, and he needs to clarify what is going to be the policy of the institution for this project as opposed to its policy for projects that deal with larger and more technically complex systems that must depend on DISAR's continued input.

4.7 Recommendations

High Priority

1. AID should provide an expert in developing operations and maintenance programs to work with DISAR Central and the regional offices for a period of up to three months. This technical assistance should end with a seminar-workshop at a national level, with the technical adviser acting as facilitator, the result of which would be the development by each region of a detailed plan for an effective operations and maintenance program.

2. Seminars or meetings should be arranged for Junta members from a group of communities to provide opportunities for them to share problems and to receive training by DISAR.

3. Similar meetings should be organized for community system operators.

4. A full-time sanitation technician at the regional office should be assigned to work with the Juntas on operations and maintenance; and he should be given the necessary resources to do this.

Medium Priority

5. A set of tools and a supply of materials for immediate emergencies should be provided each Junta at inauguration time. The cost should be included in the estimated cost of the system when designed.

6. DISAR documents for the Juntas need to be revised and improved.

7. The Wellin report should be translated into Spanish and distributed to the DISAR staff.

Lower Priority

8. A materials and tools bank should be set up at the regional warehouses to sell what is required for system repair and construction to the Juntas at cost.

Chapter 5

HEALTH EDUCATION AND PROJECT IMPACT EVALUATION

5.1 Introduction

The Project Paper lists health education among one of the eight major elements of the project. The health education program, designed to encourage proper utilization and maintenance of the water systems and latrines, is to be carried out by the sanitation technicians and other health personnel. Additional materials for this purpose are to be provided through AID primary health care projects in Peru.

Health promoters/leaders on the community level are to be responsible, under the direction of the sanitation technicians, for stimulating interest in environmental sanitation services, organizing the community to receive the project, and carrying out educational efforts to encourage proper use of the services.

The Project Amendment adds that sanitation technicians, promoters, and school teachers are to provide health education to adults and school children. The project is to develop educational materials and audio-visual aids for these programs. Training courses are to be provided to upgrade teaching skills.

The water use and latrine studies and technical assistance input were to provide the strategies for the health education activities.

5.2 Community Health Education

There is no effective planned health education program in the project at the present time. Hoped for support from AID primary health care projects has not been forthcoming. It was hoped that they would provide educational materials and train DISAR field personnel in community participation and health promotion skills. One reason for the non-support is that the primary health care programs themselves have faced many delays; another is that the RWSES Project so far has not concerned itself with the health education aspects of the project.

Professional health education staff have been available at both the central and regional levels but have not been approached by the project to contribute their skills. Lack of interest and support for health education programs on the part of senior DISAR supervisors is seen to be an important reason for the under-utilization thus far of the available educational resources. Work on the educational component is awaiting the establishment of the human resources development unit, although existing staff, given the resources, could be used immediately to develop programs and initiate training activities in the regions.

5.3 School Health Education

There has been no project activity in school health education. Schools are not even getting latrines, as called for in the Project Paper. The health education professionals at DISAR and in the regions see the school program as very important and say that the Ministry of Education will be only too glad to cooperate on developing a school hygiene curriculum for the primary schools. Teachers receive no material aids from the Ministry and would be glad to receive some. The DISAR field staff pointed out several times the important leadership role played by teachers in most small communities and that they would be good allies for the project.

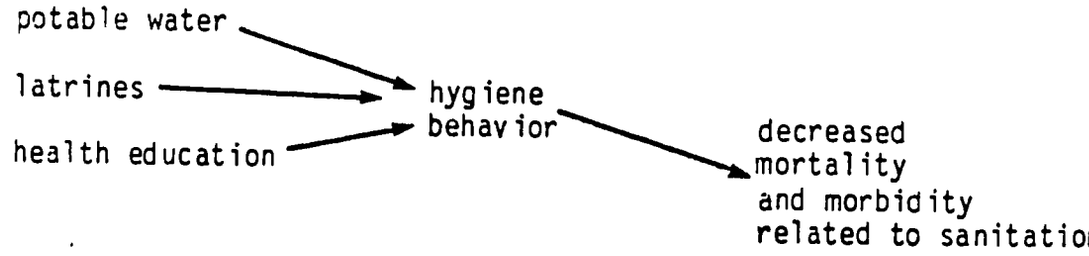
5.4 Evaluation of Behavioral Change

The Project Paper originally called for the project to measure the impact of the RWSES Project on infant mortality. The evaluation team concluded that doing an evaluation that would have scientific validity was out of the question given the resources available to the project.

The evaluation team suggests that measuring changes in hygiene/sanitation behavior would be a more feasible focus of evaluation. Improvements in health behavior imply that associated health problems will diminish. If people use latrines properly, wash their hands before touching food, keep animals out of the kitchen, and use lots of water for cleaning clothes and dishes, one would expect to see an associated drop in diarrheal morbidity.

The project should develop a scientifically sound methodology to measure health behavior changes by means of non-verbal observations. A small group of communities should be chosen at random and observed perhaps every three months on the same set of behaviors. Over the next three years, the project could then have a number of measurements for each community to analyze to see if an impact could be discerned. A seminar for health educators could be organized to develop the methodology.

Figure 2
Health Behavior Model



5.5 Recommendations

High Priority

1. The community promotion/health education staff at DISAR should receive funds to visit all regions and personally evaluate the human relations and community work skills of the regional sanitation technicians. The results of these evaluations should

then be used as the basis for designing individual and/or group training sessions.

2. Central-level health education staff should be given support to travel to all project regions and to set up the mechanisms for carrying out regional studies on hygiene behaviors and possible barriers to hygiene behavioral changes. The results from these studies are then to be used as input into the design of regional health education programs.

3. Health education input should start from the moment DISAR first enters into the community and should be at its maximum level during the period of system construction.

Medium Priority

4. A methodology (not using a questionnaire) should be developed to measure change in hygiene and sanitation related behaviors through direct observation in households receiving potable water, latrines, and health education.

Lower Priority

5. Central-level health education and community promotion specialists should be given the necessary support to travel to all project regions to encourage contacts between regional staff members and professionals from other disciplines and programs: primary health care, social science, health education and community development. These contacts should provide the basis for integrating this project with other health region resources. The basis for discussion should be training, community education, and the development of regionally-focused educational materials.

6. Central-level health education specialists should develop contacts with Ministry of Education counterparts to develop health education materials for use in the primary schools and to train teachers in hygiene curriculum development.

Chapter 6

TRAINING AND SPECIAL STUDIES

6.1 Introduction

The Project Paper refers to training in its presentation of the End-of-Project Status conditions. Training programs are to have been developed and implemented to assist the environmental sanitation technicians in carrying out community organization activities for construction and maintenance of community potable water systems.

In addition, the Project Amendment refers to training activities that will assist community-level health promoters and Ministry of Education school teachers to carry out effective health education activities.

The amendment states that training in arithmetic, bookkeeping, and other subjects will be provided for members of the Junta and the system operator, to improve their administrative and management skills.

Training courses are also to be developed at the regional level for upgrading the teaching skills and techniques of health personnel.

Training and observation visits to the United States and other countries will be financed for regional and Lima-based technicians.

6.2 Training DISAR Technical Personnel

A three-week training course was held in September 1983 for eight new engineering personnel hired by DISAR to head the regional offices. In October, another three-week course was held for 28 sanitation technicians hired by the regional offices or seconded to them from the regional health authority staffs.

Engineers and technicians interviewed in the regions who had attended these courses were satisfied with the content and quality of the courses and said that they were looking forward to more such courses. The didactic material reviewed showed an almost complete concentration on the technical aspects of water system design and construction.

Community work and work with the Juntas were included in the syllabuses, but there were indications that not very much time was spent on these topics or very much emphasis placed on them. Based on the observations of technical staff in the field, the evaluators concluded that these staff members need further training in communications with community members.

To date, there has been no substantive training for sanitation technicians in health education program planning or delivery, and there has been next to no contact between the health education/community promotion staff at the central level and the technicians at the regional level

The regional engineer from Cajamarca took the initiative to organize training courses for the construction foremen working for him. Two courses have been given so far. The regional health educator was involved in giving the sessions on community work and human relations. Such initiatives should be strongly supported by the project and encouraged in other regions.

Two large national seminar-workshops have been held. One was held in Cuzco in March 1984 to draft the 1984 project implementation plan. While the resulting plan left much to be desired, the seminar itself was a success in that it brought together all the DISAR personnel working with the AID project as well as high-level functionaries in the regional health structure. New paths of communication were opened and have resulted in greater cooperation and support from senior regional health authority personnel. It should also be pointed out that, given the low salaries paid to MOH personnel, paid travel is a luxury and the seminars are one of the few ways that the project can boost morale.

The second seminar-workshop, held in Trujillo, took place during the evaluation period, and the evaluators were able to observe the actual process. Although the presentations seemed somewhat stilted, the group workshops were very lively and everyone participated. The presence of the Regional Health Officer, the head of the regional health structure, or senior members of the staff from DISAR headquarters did not appear to act as a deterrent to participation by junior staff members.

Apparently, this seminar also scored a first for the MOH by bringing together DISAR personnel from all levels, including accountants and purchasers from the Regional Health Authorities and the central MOH offices. The discussions were lively, and participants were satisfied that subjects important to the operation of the DISAR regional offices had been openly discussed. The DISAR regional staff had an opportunity, in open forum, to present their problems to the Regional Health Authority staff, who may have been causing them delays and other management problems. It can be expected that the seminar will have positive outcomes for the project in the future.

6.3 Training the Juntas

No special training courses have been held as yet for the members of the Juntas involved with the RWSES project. All that has taken place are haphazard, unstructured, and unmonitored interactions between the DISAR field staff and the Juntas. As stated elsewhere in this report, given that the Juntas have not been fulfilling their responsibilities in administering the systems even after one year of system operation, it has to be concluded that this unsystematic training of the Juntas is not having the effect intended by the project.

6.4 Training Teachers and Primary Health Care Workers

In October 1983, eight four-day courses were given by DISAR staff for 226 MOH health auxiliaries and sanitation technicians from seven regional health offices. The courses were on the management, operation, and maintenance of rural water supply and sewerage systems. The objective of these courses was to strengthen the coordination between water and other health projects at the

regional level by providing the participants with basic technical and administrative knowledge. The AID quarterly report dealing with this course states that as a result of the courses, five out of seven of the health regions have issued resolutions authorizing heads of their health centers and sanitary posts to supervise the Juntas. Unfortunately, no evidence of such supervision was found in the field by the evaluation team.

Interaction between the project and school teachers has been minimal, and no training of the teachers has taken place. The evaluation team found out that teachers in the primary schools receive no educational materials from the Ministry of Education but are expected to develop their own. Materials on hygienic behavior and the relationships between health, water supplies and excreta disposal would be warmly received by the teachers. Preparing such materials offers an opportunity for the project to develop an educational program that could have a potentially significant health impact on participating communities.

One of the special studies to be financed by the project is on hygiene education in the schools. This study could serve as a basis for the development of an effective school hygiene program.

6.5 The Human Resources Development Unit

In early 1984 a consultant (Dicker) was selected by AID and DISAR to develop a design for the organization and implementation of a human resources development (HRD) unit within DISAR. Other specific outcomes of the consultancy included short-, medium- and long-term training schedules, a model for curriculum design, and a plan for coordinating DISAR's training and community promotion activities with those of the primary health care programs.

The purpose of the unit will be to assist the National Plan for Rural Water and Sewage (NPRWS) in meeting its objectives through promoting the optimum performance of the human resources available to DISAR. Figures 3 and 4 show the organizational structure of DISAR and the HRD unit.

The general objectives of the unit are to be as follows:

- To promote the optimum performance of DISAR personnel in Lima as well as in the regions, through orientation, training and education programs, according to the requirements of the various dependencies of the Directorate.

- To promote the organizational effectiveness of DISAR through activities directed to reinforcing teamwork at all levels.

- To contribute to improving the health of rural communities through promotion, education, and training related to potable water and sewage systems.

- To act as a source of information for DISAR through collecting and diffusing current information on appropriate technology, community participation, and other aspects related to potable water, sewage, and latrine systems.

Its general functions will be:

- To elaborate and propose human resources development policies for DISAR, in accord with goals established by the Directorate.
- To forecast the human resources required by DISAR to enable it to meet the goals and objectives of the NPRWS.
- In coordination with other units of DISAR, to direct, program, execute, and evaluate activities to train and improve individual and team performance at all levels of the Directorate.
- To program, execute, and evaluate educational materials and activities to support the motivation, education, and training of the population of rural communities in the NPRWS, reinforcing their knowledge and skills in the use and maintenance of potable water, sewage and latrine systems.
- To coordinate activities with other dependencies of the MOH and other public sector agencies to support the NPRWS.
- To promote, organize, and coordinate socio-cultural studies related to DISAR's purpose, in order to obtain and disseminate information that supports the implementation of the NPRWS.
- To identify and utilize educational resources of other public and private entities to support training and up-dating for DISAR's personnel.

The unit's general activities are to design, implement, and coordinate skills training in technical areas, management and supervision, project management, and community promotion and organization. The unit is also to develop and acquire training and educational materials, coordinate its training activities with those of the training units in the regional health organizations, and supervise community promotion activities.

The HRD unit, when in full operation, will help DISAR fulfill the training and educational requirements of the AID project. In fact, the evaluation team believes that without the HRD unit there is little probability that DISAR will be able to meet the technical, health education, and Junta Administradora training objectives of the RWSES Project. The evaluation team also believes that the unit will play a crucial role in training or organizing training in planning, management, and evaluation of DISAR personnel, thus making a significant contribution to long-term institutional growth and development.

The Director of DISAR is committed to the formation of the HRD unit. He assured the evaluation team that all that was needed was the official permission of the MOH to go ahead. At the time of the evaluation, however, the Director had named neither the person to head the unit nor the staff to fill the proposed seven other positions. The evaluation team cannot say whether the formation of the HRD unit is truly imminent or not.

FIGURE 3

(ORGANIZATION CHART - DISAR)
WITH HUMAN RESOURCES DEVELOPMENT UNIT

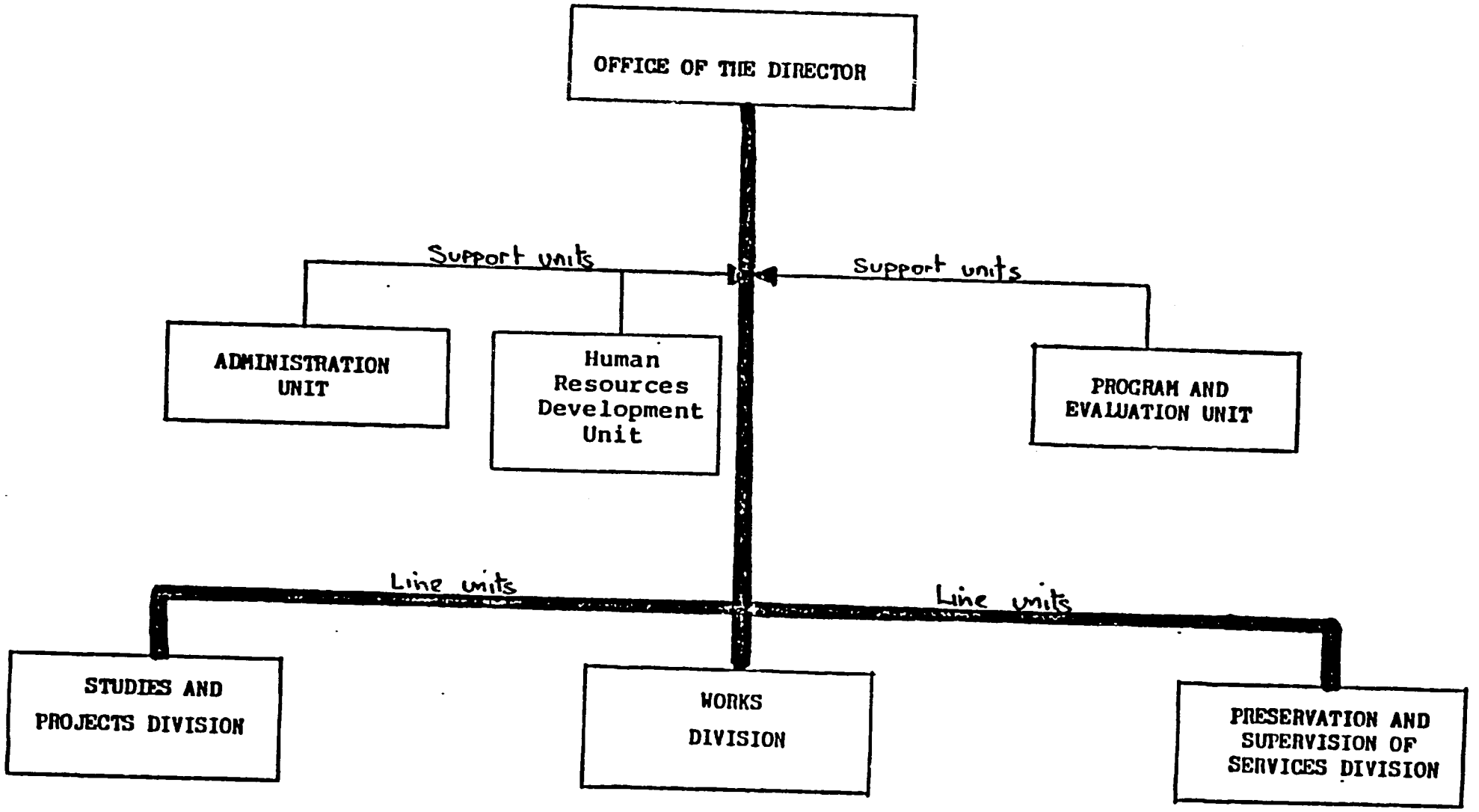
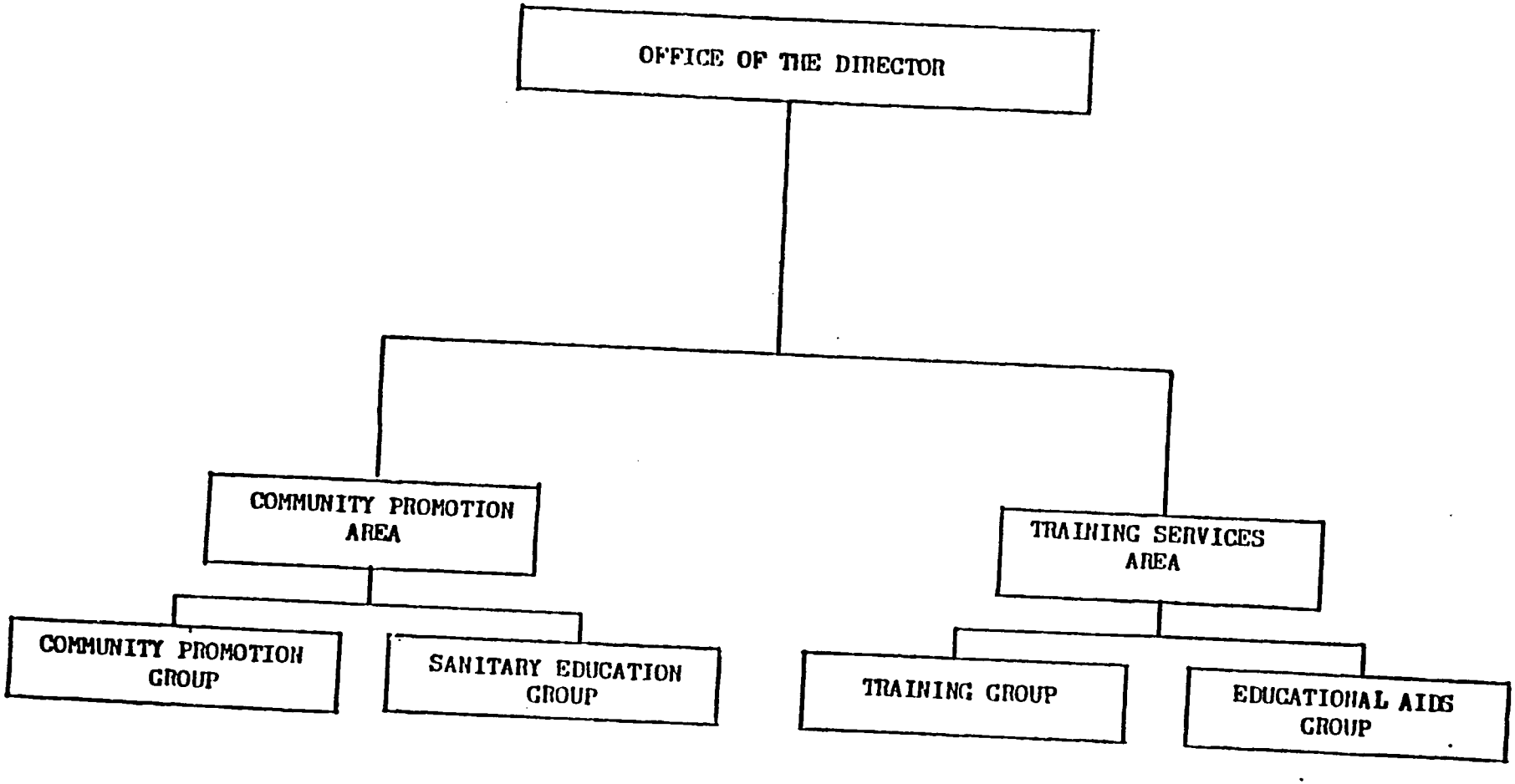


FIGURE 4

ORGANIZATION CHART
HUMAN RESOURCES DEVELOPMENT UNIT



6.6 Expected Progress in Training

The skills needed to put together effective training and educational programs do not exist in DISAR at the present. Up until now DISAR has been a technically-oriented agency with little or no practical experience in developing effective communications and community education skills in its field staff. The small number of health education and community development staff workers that there are have been under-utilized and have not received adequate encouragement or recognition of their role in the RWSES Project.

The formation of the HRD unit is crucial to the advancement of the project. Hence the evaluation team recommends that the project find some long-term technical assistance to aid with the start-up and early development of the unit.

6.7 Recommendations

High Priority

1. The HRD unit should be established as soon as possible and should follow the organizational structure and plans laid out by Dicker with the cooperation of DISAR staff.

2. AID should hire a long-term, 24-month, technical adviser to help the new chief of the HRD unit in Lima. The technical adviser should blend experience in training, communications, and educational program development. A scope of work for this adviser is presented in Appendix D.

3. Support should be given to regional training and educational initiatives. These initiatives may be used as pilot projects for adaptation by other regions if they are shown to be successful. Such initiatives could also be the basis for workshops to develop regional programs.

4. Seminars should continue to be planned and given. These seminars should have clearly defined themes limited to one subject area. The outcome of the seminar should be a concrete product such as an annual work plan, a program plan, etc.

Medium Priority

5. DISAR should give priority to training, education, and the development of human relations skills, not just to the construction of water systems and production of latrine units.

6. As a project training tool, a single file should be put together by AID/Peru containing documents, in Spanish, that explain the design, philosophy, and purpose of the project and the interrelationships among its many components, especially those that represent new priorities for DISAR, such as health behavior changes, socio-cultural studies, etc. The documents used for this file should include relevant parts of the Project Paper and its amendment, the GAO report, and consultant reports. Copies of this

file should then be disseminated to all DISAR personnel working with the AID project at both the central and regional levels.

6.8 Integration with Primary Health Care Projects

A sub-purpose of this project, according to the Project Paper, is to integrate project activities with the primary health care programs taking place within the project beneficiary communities. Another sub-purpose is to strengthen the infrastructure of the regional health offices through the promotion of an environmental sanitation team that would remain intact following the conclusion of the project.

6.9 Progress to Date in Integration with Primary Health Care Projects

The evaluation team was not able to see much evidence of integration of the project activities with primary health care programs. Talks with primary health care personnel at AID supported this conclusion. The AID-funded primary health care projects have had their own share of problems meeting objectives.

Some interactions are occurring in the regions based on the personal relationships that might exist between nursing and health education and DISAR technical staff members, but they are not the result of formal DISAR policy.

With the support of the AID project monitor, Mr. Gerardo Arabe, the Director of DISAR, Ing. Carlos Marroquin, has begun to open a dialogue with his counterpart, the director of primary health care programs in the MOH. They have regular meetings to discuss the RWSES Project and to lay the groundwork for increased integration.

In some regions, DISAR staff members have participated in training programs for nurses and other community-level health workers by giving information on sanitation and water supply. This cooperation, however, has been only one way, and the input from the regional health staff has not been sought by the DISAR staff except in the already mentioned case of Cajamarca. Interviews with senior nursing, health education, and social scientist regional staff indicated that cooperation with DISAR would be most welcome if the necessary resources were to be made available. Such resources would include per diems for community visits, materials and equipment for the preparation and delivery of educational programs, and resources for carrying out investigative studies on barriers to the adoption of healthful behavior.

Cuzco region's year-long diarrheal disease campaign shows how efforts can be integrated. A commission of six members including the Chief Health Officer of the region and the DISAR engineer meet once a month to plan and oversee the activities of the campaign. The campaign is receiving resources from and is being coordinated by the German aid agency, GTZ. Individual experiences such as this are beneficial but cannot substitute for an organized agency program of integration.

The formation of the decentralized units of DISAR has helped raise the status of environmental sanitation activities within the regional health

organizations. Because of their autonomy and health budgets and resources, the DISAR units have higher organizational status than the existing regional sanitation units which come under the regional health organizations. It is hoped that eventually these rural sanitation units will be absorbed by the DISAR units.

For all intents and purposes, this has already occurred where the DISAR engineer is also the official regional health office engineer. In such cases, one individual is responsible for the supervision of all civil engineering works taking place in the region, under the direct supervision of the Regional Health Officer. These responsibilities may be so broad that the engineer cannot participate to the extent desired in the RWSES Project.

6.10 Recommendations

Medium Priority

1. The Director of DISAR should continue to meet regularly with his counterpart in the MOH primary health care program, as a means of opening dialogue at this important ministry level.

2. DISAR Central should go out of its way to support and encourage any intiatives in integration that its field staff demonstrates.

3. The HRD unit should make it a priority to integrate the project with primary health care activities, as planned in Dicker's report.

6.11 Special Studies

The special studies called for in the Project Paper and Amendment are supposed to contribute valuable information to the project programs and foster appropriate project modifications.

Special studies on the following subjects were planned: latrines, water use, water-system/diarrheal-morbidity-reduction efficacy, simplified water treatment technology, well water-withdrawal experimentation, the private sector role in water projects, a hygiene program for schools, and the roles of para-professionals in water system design and construction.

Several of the originally-proposed studies were dropped by mutual consent between DISAR and AID. The studies that remain include: water usage, alternate systems of water treatment, evaluation of patterns of use and maintenance of latrines, and the development of materials on hygiene for elementary schools.

DISAR has proposed adding two new studies, one on the efficiency of treatment systems and one on developing a computerized management information system.

The evaluation team is somewhat skeptical about the short-term value to the project of the engineering technical studies and would push for the commencement of the latrine and school hygiene studies. No technical studies have been completed.

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The evaluation team wishes to acknowledge that carrying out these special studies represents a broadening of DISAR interests and capabilities.

6.12 Recommendations

High Priority

1. Priority should be given to the studies that feed into the planning for the latrine and school education programs.

Medium Priority

2. If grant fund line item budgets are reassigned to carry out the recommendations of the evaluation team, expenditures on special studies should be given the lowest weight compared to technical assistance and training.

Chapter 7

DECENTRALIZATION

7.1 Introduction

The Project Paper has as a principal objective the creation of offices in 10 health regions, each with a total of 20 staff members, one vehicle, office and warehouse buildings, and engineering, office, and laboratory equipment. These offices are intended to be highly autonomous with respect to DISAR headquarters in Lima in terms of carrying out the activities and programs needed to achieve project objectives.

7.2 Physical Infrastructure

Of the 13 regional offices established (some regions have more than one office), Cajamara, Huaraz, and Chimbote already have their own office and warehouse buildings, and those for the other 10 will probably be completed by the end of 1984. Seven offices have pick-up trucks and a further purchase of 12 more is being organized by AID. It is hoped that they will be available in the regions by April 1985. This means that each office will have at least one vehicle.

Five of the regional offices already have topographical equipment and six have design and office equipment. The purchase of the balance of the equipment is at present being organized by DISAR and should be in the regions by early 1985. Surveying equipment and laboratory equipment for water-quality testing are also to be bought and should be in the regions by early 1985.

7.3 Institutional Autonomy

The regional offices have sufficient autonomy to select communities, prepare studies and designs, purchase local materials, and pay local costs. They do not have the autonomy to authorize the construction of systems; this function is still performed by the central office in Lima. While it is reasonable that this authority be given from a higher level, there is a need for the process to be speeded up. The money alloted to a project is based on a budget prepared in Lima and not in the region.

It should be added that many activities carried out by the regional offices such as purchasing materials and making cash disbursements, require approval by the Regional Health Authorities (RHA). Some of the staff working on the projects are employees of the RHA and are responsible to that organization rather than to DISAR. Furthermore, the implementation of project health education activities will require close collaboration of the project with personnel in other RHA primary health care programs in the communities.

While the regional engineers are now involved in the planning process, it is necessary that project planning and progress evaluation be decentralized to the regional level and that key members of the regional staff participate. This should assist in the setting of realistic objectives, a closer

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identification by staff with those objectives, and a more critical appraisal of results versus planned achievements. Plans would still require central office approval and close supervision, and assistance with planning and monitoring would be necessary at the beginning. This assistance would be one of the functions of the to-be-formed HRD unit in Lima.

In general, it would appear that with the exception of planning and evaluation, the regional offices have sufficient autonomy to enable them to achieve the project objectives.

7.4 Human Resources

Each region now has at least one engineer, and in most regions there is an adequate number of support staff in the area of system design and construction. In addition, sanitary technicians have been assigned to most regional offices, although not all offices have the three to five technicians called for in the Project Paper.

7.5 Conclusions

It appears that decentralization of project activities has been successful. Seven of the 13 regional offices are now constructing water systems and the remaining 6 should be in a position to begin in 1985. By early 1985 all the offices should have the necessary buildings, vehicles, equipment, and personnel to enable maximum progress to be made towards the achievement of project water-system construction objectives.

It is recommended that DISAR Central establish a system for control and evaluation of activities carried out in the regions. Such a system should include regular planning and monitoring, the timely provision of accurate, useful information, and regular supervision and support visits.

7.6 Recommendations

High Priority

1. DISAR Central should establish a system for planning and monitoring regional activities involving the timely provision of accurate, useful information and regular supervision and support visits to the region. This planning and monitoring should be carried out at the regional level with the participation of key regional staff members.

2. The procedure for authorizing system construction should be speeded up. Perhaps authorizations could be given in person by DISAR Central engineers on regular supervisory visits rather than sending the design to Lima and awaiting authorization from there.

Medium Priority

3. Project funds should be used to increase the mobility in the field of all DISAR personnel involved with this project. Increasing mobility may be achieved through the purchase of means of transportation, per diem expenses, payment for the use of public transportation, etc.

Lower Priority

4. DISAR headquarters should consider dividing the project regions into three zones: North, Central and South. Central staff could then be nominated to concentrate their supervision and quality control activities in one zone so that they would benefit from developing in-depth knowledge of zonal field situations, problems, and personnel.

5. The number of project regions should be increased by adding the Arequipa health region.

Chapter 8

ADMINISTRATION

8.1 Introduction

The administration of this project involves three government agencies. DISAR is responsible for general project administration. At the regional level, the functions of purchasing, disbursements, accounting, and the allocation and payment of some staff members are controlled by the RHA. At the central level, in Lima, similar functions are carried out by DIGEMA, DISAR's parent organization in the MOH.

In general, the administration of the project is satisfactory for the water supply system construction program, now that the regional funding shortages and major delays in the purchasing of materials appear to have been overcome.

A detailed assessment of administrative problems appears in the following subsections of this chapter.

8.2 Regional Administration

8.2.1 Purchasing and Disbursements

The regional offices are responsible for purchasing construction materials, such as cement and reinforcing steel, and small quantities of accessories where there are no stocks on hand. In addition, they are responsible for the payment of salaries and per diems and construction, labor, transport, and travel expenses. The regional engineer is responsible for establishing materials need, and other expenditures. However, the actual purchasing, authorizing, paying and accounting activities are carried out by the RHA accounting and purchasing staff.

There have been delays in purchasing materials and disbursing funds at the regional office level which have slowed down the construction of water systems. These delays are due to three main problems:

- Shortages of funds. Until June 1984 funds were not getting to the regions in sufficient quantities due to the inadequate provision of counterpart funding by the GOP and the slow disbursement of AID funds by DIGEMA/DISAR in Lima. However, following the guarantee of counterpart funds under agreements between AID and the GOP, and the application of pressure by AID and DISAR on officials in the Public Treasury, both counterpart and AID funds have begun to get to the regions in appropriate amounts.

  Providing the GOP continues to provide the counterpart funds as agreed, there should be no further problems with funds getting to the regions.

- Inadequate planning. Every quarter the regional engineer prepares a plan of the water systems to be built. This plan includes only those

projects already authorized by DISAR. Since there is generally no reserve of authorized projects, it is not always possible to plan all the projects to be undertaken during the quarter. Therefore, "unplanned" purchases have to be made from time to time if a project is authorized and begun that was not included in the plan.

It is recommended that project design and authorization of construction be speeded up in order that long-term efficient planning can take place.

Cumbersome purchasing/disbursement system. The system for purchasing materials and making disbursements is generally slow and cumbersome with delays occurring mainly within the RHA. It is normal for a local purchase to take between 20 and 30 days rather than the 10 days it should take, and a disbursement can take up to one week rather than an acceptable 2 to 3 days.

The system was established by the GOP and MOH and may be difficult to change. It is therefore important to ensure that the movement through the system takes place as quickly as possible, for which support from key RHA staff is vital.

This point was covered in the Trujillo seminar in September 1984 with regional health directors, accountants and supply officers. It is hoped that as a result of this improved communication, these delays will be reduced to an acceptable level.

8.2.2 Quality Control of Purchases

Although quality checks are carried out on materials at the time of ordering, they are often not carried out on materials when delivered. It is recommended that checks be carried out on materials delivered to ensure that they are the same materials that were approved at the time of ordering.

8.2.3 Inventories

Control

The control of inventories in the regions is generally poor. The movement of materials is entered on kardex records and on bin cards. A monthly "reconciliation" (Parte Mensual) in monetary values only is prepared from the original purchase/transfer documents.

The physical verification of stocks and the reconciliation of the kardex balances (valued out) with the balance shown on the monthly "reconciliation" are apparently done only once a year. This means that any mistake in the documents, kardex records, bin cards, and monthly reconciliations or in the physical movement of stocks may not be discovered until the annual check is carried out, by which time it may not be feasible to identify the source of the error.

In order to improve the system it is recommended that a monthly report be prepared from the kardex records showing the physical quantities and values of each material in stock. The total value of these materials must agree with the balance of the monthly reconciliation. In addition, a proportion of the stocks shown on the kardex records should be physically verified each month in such a way that all the stocks are checked every few months. The checker should sign the monthly report form against each balance physically verified.

Information

It appears that there is no system for reporting inventory balances held in the regions to DISAR Central.

It is recommended that a copy of the monthly report mentioned in the section on control above be sent to Lima every month.

8.3 Central Administration

8.3.1 Purchasing and Disbursements

Purchases made at the central level for the AID program comprise mostly water pipes and accessories and equipment needed in the regions, as well as supplies and equipment for the Lima office. Purchase and disbursement orders are prepared by DISAR and checks are remitted by DIGEMA. The system seems to work reasonably well, and there have apparently been no program delays caused at this level.

The problem of shortage of pipes and accessories, which was a principal reason that construction objectives were not met, has now been solved. With the recent purchase of pipes for 310 systems, there should be enough of this material in stock for approximately 570 systems, including those already built. A complementary purchase of accessories is being processed by AID at present. The purchase of the balance of pipes and accessories should be initiated sufficiently early to take into account purchasing and delivery delays.

8.3.2 Accounting

The accounting of program expenses is in general satisfactory with the exception of the late delivery of accounts from several of the regions. In the cases of the Tarma (Junin region) and Cuzco offices, for example, accounts were only recently received for the previous four or five months. The administration office of DISAR Central has been applying pressure on the regional offices to keep up to date, and the point was reinforced during the recent seminar in Trujillo with the RHA staff who were present, since they were in some measure responsible for these delays.

The fact that the final RWSES Project accounting records are kept by DIGEMA is undoubtedly inconvenient but does not appear to have affected program progress.

8.4 Recommendations

High Priority

1. The regional inventory systems and the provision of inventory information to DISAR Central should be improved.

2. The planning of purchases should be improved. In order for this to occur, the time taken for project design and authorization needs to be shortened.

3. Future purchases of materials should be organized sufficiently in advance to allow for the considerable delays that occur in purchasing, delivery, and, in the case of imported materials, clearing customs.

4. Quality checks should be performed on materials purchased at the time that they are delivered to DISAR.

Chapter 9

MANAGEMENT

9.1 Project Coordination

The project is currently managed and executed via the five functional divisions of DISAR: Programming and Evaluation; Administration; Projects; Works, and Preservation and Supervision of Services. This arrangement does not always enhance the effectiveness of a given program. For example, work with the Juntas Administradoras before delivery of the system to the community is the responsibility of the Works Division, while work with the Juntas after delivery is the responsibility of the Division of Preservation and Supervision of Services. According to staff in both divisions, there is no communication or cooperation between these two divisions on work with the Juntas. Each one runs a separate program.

There is no specific coordinator for the RWSES Project within DISAR; the overall management at present is being carried out by the Director himself. However, he cannot devote all his time to this project, since he has many other responsibilities. Some management functions are performed by the AID project monitor, Mr. Gerardo Arabe, but his time is also limited by his responsibility for other AID projects. Unfortunately, there is no one person with the responsibility and the time to coordinate the project in its entirety.

9.2 Planning System

The project planning system involves the preparation of an overall plan for the length of the project, 1984-1987, and a plan for each year. However, neither the overall nor the annual plans are sufficiently detailed to be effective planning tools.

The present plans do not establish detailed calendars of key events that must take place if objectives are to be met by any specified date. In addition, the annual plans are not related to the overall long-term planning necessary to assure that all EOPS conditions are achieved by September 30, 1987. It is therefore not possible to evaluate progress, since there is no basis for comparison.

The plans concentrate mostly on the objectives of system construction and decentralization and do not adequately cover the objectives of latrine construction, health education, operation and maintenance, training, and special studies.

The overall plan is not revised periodically, using actual progress information from the field, to determine what changes need to be made in order to achieve project objectives.

9.3 Management Information

The information system does not provide accurate, timely information that can be used to monitor progress. The quarterly regional reports concentrate on system construction and decentralization and do not cover the other project objectives. It also appears that these reports are not used for evaluation purposes by DISAR; they are merely entered into the files as information received.

The national project reports, prepared quarterly by DISAR in Lima, provide adequate details on activities carried out, but, since there is no detailed activities timetable with which to compare them, they are ineffective as a method of project control. The reports also outline activities to be carried out in the following quarter, but this information cannot serve as a basis for effective project monitoring since it is not tied into an overall long-term plan

9.4 Financial Monitoring

9.4.1 Regional and National Levels

Each year, regional and national budgets are prepared. However, these budgets are not drawn up in accordance with a program of activities. Actual cumulative expenditures are compared monthly with the equivalent budgeted figures to verify that there have been no cost overruns, but these comparisons do not serve either to monitor progress or to see if in fact total costs for an activity will eventually come to more or less than the total budgeted amount.

It is therefore recommended that a system of financial monitoring be introduced. Such a system would involve the costing of activities programmed and the periodic comparison of actual expenditures with these costs to assess progress. The system would also include the periodic costing of updated future activities in order to reassess funding needs.

Budget and actual cost figures should be compiled and presented in a form that makes it easy to identify problem activities or areas. This financial monitoring should be carried out as an integral part of recommended quarterly planning and monitoring seminars.

Using such a system would mean, for example, that in each region the activities connected with construction of water systems would be analyzed and costed separately. If a purchase needs to be made for several systems in January, the whole cost of that purchase will go into the January purchases line item. If the actual January purchase figure is less than the amount forecast in December, it may indicate that sufficient purchases were not made and that possible construction delays will result.

It will be necessary, however, to take into account two problems. First, the presentation of monthly accounts by the regional offices must be kept up to date. In the past they have often been several months in arrears. Second, comparisons must take into account the fact that actual figures include a higher rate of inflation than that budgeted for. For example, inflation in 1984 is running at approximately 8 percent per month compared with the 2

percent used in budget calculations. On that basis the August 1984 actual figures include 60 percent unbudgeted inflation when compared with the estimates made the previous January.

9.4.2 Water System Cost Monitoring

Until recently there has been no system for calculating actual costs for each system built, with the exception of costs cards maintained by DIGEMA in Lima. The DIGEMA cost cards on each system being constructed are not kept up to date and do not include the cost of tubing and accessories taken from warehouse stocks.

There has been no financial monitoring of construction progress or comparisons of actual vs. budgeted expenditures in order to check the accuracy of the accounts and budgets.

The technical/financial reports introduced recently should alleviate this problem to some degree. However, regional office reports show only the materials purchased and expenses paid out in the regions -- not the value of the tubing and accessories used from the warehouses. These values are apparently to be added by DISAR Central. It is recommended that the regional offices include this information, since they are in a better position to identify errors. In addition, as much information as possible should be produced in the regions to promote decentralization.

The production of actual cost figures should be used to check the accuracy of the budgets (on which financial forecasts are made at an overall program level) and to establish the per capita cost of the completed systems.

It may not be worthwhile to use costs to measure the progress of each system, since the construction cycles are generally short and progress can better be measured by monitoring activities.

9.4.3 AID Financial Monitoring

AID's method of comparing progress by measuring accumulated disbursements against the total budget is not particularly meaningful. It would be much more meaningful to compare the accumulated disbursements with the accumulated budgeted expenditures in accordance with a master scheme of needed activities.

For example, a comparison of the expenditures to date for system construction, which is 26 percent of the total budgeted for this program, might appear to indicate that 26 percent of the systems have been built. However, since the bulk purchases of materials have been made in advance, the percentage of systems built is actually less -- only 15 percent.

Examples:

$$\frac{\text{construction costs to date}}{\text{total construction budget}} = \frac{1{,}888{,}654}{7{,}300{,}000} \times 100 = 26\%$$

$$\frac{\text{number of projects built or being built by Sept. 30, 1984}}{\text{total number of projects to be built}} = \frac{100}{660} \times 100 = 15\%$$

It is therefore recommended that USAID adopt a financial planning and monitoring system for this project which would make it possible to assess actual progress.

9.5 Audits

There is an internal audit department in DISAR which visits the regions from time to time. However, it is inadequately staffed and funded. The GOP carries out regular audits; the last one was in 1983.

Although external audits are required under the agreement, none have yet been carried out. It was thought that the amount of funds disbursed up to 1984 did not warrant an audit. Apparently an external audit of the operations is planned for 1985. The evaluation team recommends that this be done.

9.6 Seminars

A workshop/seminar was held in Trujillo in September 1984 to discuss purchasing, cash disbursement, and accounting problems at the regional level -- in particular the need for improved RHA collaboration to speed-up delays in these areas. This seminar was a milestone for the MOH in that it was attended by different levels of decision-makers and was problem-oriented. It is recommended that this type of activity continue. Planning and evaluation meetings involving all key staff should be held regularly at the regional and at the national level. In addition, problem-oriented meetings of staff engaged in similar activities should be held at the national level.

9.7 Recommendations

In order to achieve the objectives within the project period it is necessary that some improvements in management take place. The following improvements are recommended:

High Priority

1. A project coordinator should be designated within DISAR to coordinate the activities carried out by the functional divisions, to be responsible for the planning and evaluation of the work, and to provide a link with other agencies and with AID.

2. A detailed work plan for the remaining time of the project should be prepared. It could be based on the global planning document prepared by DISAR for the evaluation team. This work plan should be prepared before the 1985 implementation plan is formulated.

3. A planning and monitoring system should be introduced to plan project activities and to provide accurate, timely information on problems so that corrective action can be taken where necessary.

Medium Priority

4. A budget monitoring system should be introduced so that progress can be measured and budgets can be revised.

5. Regional budgets should be prepared and monitored at the regional level and reports submitted to DISAR Central for revision and control.

6. A system of seminars and meetings should be organized to facilitate participatory multi-level planning and evaluation and to focus on key problems impeding project progress.

7. The division chiefs in DISAR and the above-mentioned project coordinator should be trained in modern management and administration techniques.

Lower Priority

8. Historical costing of water system construction should be carried out completely at the regional level and reports sent to DISAR Central. Such cost figures should be compared with budgets as a control mechanism.

9. An external audit should be carried out in 1985.

Chapter 10

PROJECT INPUTS: AID

10.1 Vehicles, Equipment and Materials

10.1.1 Planned Inputs

The Project Paper called for the provision of six dump trucks, six pickup trucks, and up to 30 motorcycles for the regional offices, and two four-wheel-drive vehicles for the office in Lima. The Project Amendment called for an additional four pickup trucks and two more dump trucks. At a later stage AID and DISAR agreed that the dump trucks would not be appropriate because there were few skilled mechanics in rural areas and it was not clear that the dump trucks could be fully utilized. In addition, it was agreed that motorcyles would also not be appropriate because of problems with the GOP's financing of operation and maintenance. Both of these purchases were therefore cancelled.

A total of seven pickup trucks were purchased and delivered to the project in October 1983. The two four-wheel drive personnel vehicles were delivered to DISAR Central at the same time. An additional order for 12 more pickups is at present being processed by AID; these trucks should be in the regions by April 1985. It appears that a regional office can construct up to 20 systems per year with one pickup truck, provided that projects are closely grouped geographically. However, it may be that one vehicle is not enough to carry out all the project objectives. The transport needs for each region should be planned in terms of the work to be done. The use of public transport for personnel and hired trucks for materials should be taken into account.

It was planned that each regional office would have a set of topographical, design, office, construction, and laboratory equipment. Five offices already have topographical equipment and six have design and office equipment. It is expected that the rest of the equipment will be in place by early 1985.

There were delays in project implementation due to poor planning and organization of materials purchasing on both DISAR's and AID's part. However, sufficient piping has now been purchased for approximately 570 systems, and sufficient accessories for approximately 260 systems. A complementary purchase of accessories for 310 systems is at present being processed by AID and is expected to be delivered by early 1985. Piping and accessories for the remaining systems should probably be purchased in Peru. Although prices are generally somewhat lower in the United States, it takes such a long time to purchase and ship items and to get them through customs that local purchase is often desirable. It should be noted that the price paid for piping for 310 systems in the United States was unusually low and is not likely to be duplicated.

10.1.2 Recommendations

Lower Priority

1. Each region should plan its transport needs in terms of work still

to be done. The ability of the GOP to maintain and run transport after the project has been completed must be taken into account. The use of public transport for personnel and hired trucks for materials should be considered.

2. Materials should be bought in Peru to avoid delays in purchasing, delivery and clearing customs, unless there are considerable savings in purchasing them elsewhere.

10.2 Technical Assistance

10.2.1 Introduction

The Project Paper budgeted funds for approximately 35 months of technical assistance. Twenty-four of those months were to be used to provide a sanitary engineer to assist the DISAR regional offices in project organization and to assist DISAR as a whole with the establishment of information and control systems and other related activites. Five months of technical assistance were to be provided to design and test various maintenance procedures and 6 months to strengthen the community education and organization program.

The Project Amendment added funds for approximately 15 additional months of technical assistance: 6 months for a design engineer to review and define simplified design norms for small communities and to help define the design tasks that para-professional technicians could be allowed to do; 3 months for an economist to help evaluate per capita costs; 3 months for a communications expert to develop training materials and techniques for community-level workers; and 3 months for a training expert to develop curriculum materials and training programs for Ministry of Education personnel.

Thus the Project Paper and Amendment included approximately 50 months of technical assistance in their budgets for the project.

10.2.2 Long-Term Technical Assistance

The long-term sanitary engineer, Mr. Salvador Reyes, seconded from the U.S. Public Health Service, arrived in Peru in September 1983 to begin 24 months of technical assistance. Mr. Reyes has been active in helping DISAR make its advances in the construction part of the project. Sanitary engineering was the only long-term technical assistance called for in the Project Paper, so the project has fulfilled this part of the plan.

10.2.3 Short-Term Technical Assistance

The project has thus far not implemented most of the planned short-term technical assistance (assistance for less than six months).

So far approximately six person-months of short-term technical assistance have been provided -- mostly concerned with project planning and helping the project to get off the ground after several years of delay. The Dicker consultancy in early 1984 dealt specifically with plans for the proposed HRD unit at DISAR in Lima.

The evaluation team found the quality of the consultant reports to be uniformly high but, apart from the Dicker report, they seem to have had little impact on the actual implementation of the project. Significantly, only Dicker left a report in Spanish; the other reports were not translated for DISAR's benefit. The evaluation team was informed that none of the key personnel at DISAR read English.

A management information systems analyst, Mr. Steven Rochalt, is currently working with DISAR to improve and computerize its management information system (MIS).

10.2.4 Recommendations

The evaluation team recommends changing the planned technical assistance in the following ways:

High Priority

1. The short-term health education promotion expert (6 months), communications expert (3 months), and training expert (3 months) should be replaced by one long-term technical adviser with experience in all three areas. This adviser should work with the person named by the DISAR Director to head the proposed HRD unit in Lima. It is recommended that this assistance be given for 24 months which is 12 months more than originally planned. A brief scope of work for this proposed technical adviser is given in Appendix D.

2. A person with broad experience in successful operations and maintenance development programs should be brought in for up to three months to work with DISAR Central and all the regions in implementing an effective operations and maintenance program. This consultancy should end with a national-level DISAR seminar on operation and maintenance aimed at drawing up detailed implementation plans for each region. A scope of work is given in Appendix D.

3. Whenever possible, Latin consultants should be used. Consultants who understand the language and the cultural nuances and ways of thinking are more likely to have an impact.

4. Consultancies should be at least three months long. DISAR personnel feel that four- to six-week consultancies are not useful to them no matter how expert the consultant.

5. All significant project documents, including consultant reports, should be translated into Spanish in some form -- edited or unedited -- and presented to DISAR.

6. The economist who was to advise on evaluating costs per capita (3 months) should be replaced by an expert who can teach key managerial personnel planning and evaluation. This assistance should cover an analysis of the present system of planning and monitoring, the design of an improved system in conjunction with

DISAR staff, and the initial application of the system via a planning seminar. The current work to improve and computerize the management information systems should be taken into account.

Follow-up should be provided by the long-term HRD technical adviser who, after participating closely in the above process, should be responsible for spreading the methodology throughout the organization and participating in future planning/monitoring workshops and seminars until the system is absorbed and properly used. In terms of providing the initial technical assistance, it would be worthwhile to explore the possibility of using the resources of a good university or school of business in Lima.

10.2.5 Financial Implications

If the technical assistance recommendations are accepted by the project, the project budget will have to be readjusted. Table 3 summarizes these additional technical assistance costs. Assuming that the project cannot count on any extra funds, the additional costs will have to come from reassignment of funds from other grant items.

A statement of budgeted and committed funds is shown in Table 7 and details of the amounts committed in Table 8. The $100,000 contingency would not be enough to cover the proposed increase; thus, money would have to be reassigned to technical assistance from training and special studies, or committed technical assistance funds would have to be reallocated. The evaluation team would give first priority to technical assistance, followed by training, with special studies in third position.

It should be noted that $30,000 for computer equipment for the management information system (MIS) was not budgeted and should be taken out of the grants contingency line item.

10.3 Costs

10.3.1 Loan Agreement: Costs Incurred

The total of costs incurred under the loan agreement amount to $2,492,238 as of September 30, 1984. Of this total, $1,888,654 has been spent on the construction of water and sanitation systems, $233,151 on support costs, and $380,443 on vehicles and equipment (see Table 4). Unfortunately, more detailed figures in dollars are not available, and, although Sol figures are available, they are cumulative figures which are not up to date and which include varying rates of exchange with the dollar.

10.3.2 Loan Agreement: Future Costs

On the basis of the costs incurred as of September 30, 1984, it appears that the budget of $10,000,000 should be sufficient to cover the costs of achieving the objectives by the end of the project period (see Table 5). Table 6 lists the overall project financial plan combining the original 1980 Project Paper budget with that of the 1982 Project Amendment.

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Table 3

Recommended Technical Assistance (TA) Budget Changes

Project Paper TA budget	35 months	$250,000
Amendment TA budget	15 months	150,000
Total	50 months	$400,000
TA funds spent or committed 9/84	30 months	$304,625
TA remaining	20 months	$ 95,375
TA recommended by evaluation team		
HRD specialist (@ $11k/month)	24 months	$264,000
Planning specialist (@ $11k/month)	3 months	33,000
O&M specialist (@ $11k/month)	3 months	33,000
Total	30 months	$330,000
Additional TA costs (Recommended TA minus TA remaining.)	10 months	$234,625

Table 4

Costs Incurred as of September 30, 1984

	Costs Dollars
Construction of Systems	
Tubes and accessories	$1,321,463
Other materials, labor, etc.	567,191
	1,888,654
Support Costs (including warehouse construction)	223,151
Vehicles and Equipment	380,433
	$2,492,238

Source: G. Arabe, AID/Lima

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Table 5

Direct Construction Costs Projection to September 1987

U.S. Dollars

	Costs incurred to 9/30/84	Costs re 100 systems built and under construction at 9/30/84	Costs incurred re 467 systems to be built in future	Estimated costs re additional 93 systems	Total costs 660 systems
Tubes and Accessories:					
Bought: 27 systems purchase	105,565	(27) 105,565	-	-	105,565
110 systems purchase	315,598	(73) 209,442	(37) 106,156	-	315,598
120 systems purchase	431,852	-	(120) 431,852	-	431,852
310 systems purchase	468,448	-	(310) 468,448	-	468,448
	1,321,463	(100) 315,007	(467) 1,006,456	-	1,321,463
To be bought:					
93 systems purchase				334,614[3]	334,614
Complementary accessories			400,000		400,000
	1,321,463	(100) 315,007	(467) 1,406,456	(93) 334,614	2,056,077
Local purchases and labor	567,191	567,191	2,648,782[1]	527,488[2]	3,743,461
Total direct construction costs	$1,888,654	(100) $882,198	(467) $4,055,238	(93) $862,102	$5,799,538

1 Calculation: $\frac{567,191}{100} \times 467 = 2,648,782$

2 Calculation: $\frac{567,191}{100} \times 93 = 527,488$

3 Calculation: $\frac{431,852}{120} \times 93 = 334,614$ (based on the most expensive purchase)

Note: The above forecasts do not take inflation into account.

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Table 6

The Overall RWSES Project Financial Plan

(in 1,000 of U.S. $) (1981-1987)

Investment Category	AID Loan	AID Grant	GOP	Community	Total
1. Construction					
-Equipment/materials	6,000	-	550	300	6,850
-Labor					
-Skilled	1,300	-	-	-	1,300
-Unskilled	-	-	-	630	630
2. Vehicles/Equipment					
-Transportation	395	-	-	-	395
-Construction	45	-	-	-	45
-Engineering/drafting	110	-	-	-	110
-Promotion	45	-	-	-	45
-Office	30	-	-	-	30
-Tools/water testers	51	-	-	-	51
3. Technical Assistance	-	400	-	-	400
4. Training/Education	-	290	-	-	290
5. Studies/Evaluation	-	210	-	-	210
6. Support Costs					
-Salaries	-	-	1,730	-	1,730
-Per diem/travel	63	-	407	-	470
-Vehicle O and M	68	-	407	-	475
-Office supplies	-	-	195	-	195
-Warehouses	142	-	190	-	332
Total (1) to (6)	8,249	900	3,479	930	13,558
Plus: Inflation & Contingencies	1,751	100	802	-	2,653
Grand Total	$10,000	$1000	$4,281	$930	$16,211

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The direct cost to AID of building the 660 water systems is estimated at approximately $5,800,000 (based on past costs and excluding inflation). This would result in an underspending of $1,500,000 of the $7,300,000 budgeted for this line item. Direct construction costs (monetary costs only -- excluding non-monetary community inputs) have come to a total of $882,198 for the estimated total of 100 systems built and under construction. Taking an average of 300 beneficiaries per system, this gives a direct monetary cost to AID of $29.40 per beneficiary. This figure may in fact be on the high side in terms of future forecasts. A study of costs carried out by the evaluation team of 11 systems built in Cajamarca and Cuzco in 1984 showed that direct monetary costs came to no more than $20.00 per capita, and the recent large international purchase of tubing was considerably cheaper than previous purchases.

However, it is difficult to be completely sure of these cost figures. AID/DISAR should carry out a short study of historical system costs using realistic population figures (the evaluators have some doubt about the accuracy of DISAR's calculation of nine people per connection in some projects) and discriminating between systems with household connections and those with public faucets only.

It is difficult to compare the incurred costs of support and vehicles and equipment with the budgeted costs due to accounting delays and inflation accounting problems mentioned elsewhere in this report. However, it would appear that the budget of $1,098,756 for these items should be sufficient and that the contingencies reserve of $1,610,244 should be enough to cover unforeseen costs.

10.3.3 Grant Funding: Costs Incurred

Of the $1,000,000 budgeted, a total of $452,435 has been committed at the present time. That leaves a balance available of $547,565. A summary of the grant funding position is shown in Table 7.

10.3.4 Grant Funding: Future costs

As already mentioned, it will be necessary for DISAR and AID to agree on which assistance and studies are necessary.

In addition to the technical assistance recommended to provide a counterpart to the HRD unit chief, there is also a need for technical assistance to help with setting up an effective planning and control system for project management. In addition, technical assistance should be provided for three months on the operation and maintenance of water systems in accordance with the Project Paper.

As can be seen from Table 7, the balance of funds available for technical assistance is only $95,375 which would not be sufficient to cover $330,000 needed for the extra technical assistance recommended. Even if the $100,000 contingency reserve is taken into account, there would still be insufficient funds. DISAR and AID must discuss the project needs and establish priorities in accordance with the resources available.

Table 7

Grant Funding Statement as of September 30, 1984

	Budgeted	Committed	Uncommitted	Accrued/ Expenditures	Pipeline
Technical Assistance	$ 400,000	$304,625	$ 95,375	$156,904	$243,096
Training	290,000	69,051	220,949	43,112	246,888
Studies and Evaluation	210,000	78,759	131,241	40,759	169,241
Contingencies	100,000		100,000		100,000
	$1,000,000	$452,435	$547,565	$240,775	$759,225

Source: G. Arabe, AID/ Lima

Table 8

Analysis of Grant Funding Commitment as of September 30, 1984

Technical Assistance		
Long-term technical advisors	$247,925	
CDM WASH	50,000	
MIS computer study	6,700	$304,625
Training and Education		
Observation trips to Panama and Paraguay	$ 8,014	
Sundry training	1,264	
Seminar - Trujillo	16,875	
- Cuzco	42,898	69,051
Studies and Evaluation		
Wellin	$ 7,735	
1983 implementation plan	15,000	
Special studies	56,024	78,759
		$452,435

10.3.5 Recommendations

Medium Priority

1. AID/DISAR should decide which grant funded items have the greatest priority and reallocate the budget accordingly. The possibility of reallocating funds at present committed to technical assistance should be taken into account.

Lower Priority

2. AID/DISAR should carry out a short study of historical system costs using realistic population figures and discriminating between systems with household connections and those with public faucets only.

Chapter 11

PROJECT INPUTS: GOP AND COMMUNITY

11.1 GOP Inputs

According to the Project Paper GOP inputs to the project are financing of support costs for technician and community training programs, vehicle operating expenses, and salaries and travel expenses for all employed project personnel.

However, it was agreed that AID would pay 75 percent of the vehicle operating and travel expenses in the first year and thereafter a declining percentage until by the fifth year the GOP is providing all the funding for these two items. By agreement between the two parties AID is still funding 75 percent of these items. This is not unreasonable because the major weight of these costs is only now beginning to be felt. In addition, the GOP's ability to cover counterpart funds has been reduced by the worsening economic situation.

Up to mid-1984 the GOP counterpart funds provided were falling short of the agreed level. This caused delays in project implementation. However, following the guarantee of counterpart funds under agreements between AID and the GOP and the application of pressure by AID and DISAR officials on the Public Treasury, funds are now being provided in accordance with project budgets.

11.2 Community Inputs

11.2.1 Introduction

The communities receiving water supply systems are, according to the project design, to provide unskilled labor and locally available materials such as rock, sand, and gravel for system construction. They are also to make a small monetary contribution toward the cost of constructing the system and monthly contributions for operations and maintenance. The community is also responsible for managing the system fiscally and administratively.

11.2.2 Labor and Materials

Labor, materials, and accommodation and food for skilled construction labor has been provided in all project communities. At the present time, DISAR is not consistently including the value of these community inputs in the calculations of water system historical costs. It is recommended that the system for recording, costing, and accounting for community inputs be improved.

11.2.3 Financial Support

The communities are being asked to pay on the average 10 percent of the estimated cost of the systems. The actual percentage varies according to DISAR's estimation of the community's ability to pay. The evaluation team

found that these initial charges, in effect connection costs, were being paid by the communities. However, as stated elsewhere, none of the communities visited by the team were collecting the monthly tariff, although the average charge was only $0.25 per connection per month, compared with the recommended tariff of $1.25 in the Project Paper. The communities were also failing to administer the systems according to official DISAR procedures. However, this latter failure is seen as a product of ineffective programming and communication on the part of DISAR staff. Recommendations for improving community training are found elsewhere in this report.

11.2.4 Recommendation

Lower Priority

1. The system for recording, costing, and accounting for community inputs should be improved.

Chapter 12

KEY CONCLUSIONS AND RECOMMENDATIONS

12.1 General Conclusions

1. The project design, as it appears in the Project Paper, is adequate and feasible, apart from the objective of measuring mortality in the project communities.

2. The project has made significant progress despite the problems created by the very serious economic situation in Peru.

3. DISAR has clearly demonstrated its institutional capability of implementing a major decentralization program and of carrying out an accelerated and expanded water construction program.

4. AID/Lima and DISAR have made very significant efforts to resolve the problems identified by the 1983 GAO project evaluation report, and the results of these efforts are clearly seen in the project's accelerated pace in 1984.

5. Genuine institutional development has already taken place as a result of the project's setting up of regional offices and the steps taken to decentralize DISAR's operations and management.

6. The project will likely reach its objective of constructing 660 rural water supply systems by 1987.

7. Construction funds are expected to be more than sufficient to meet construction goals.

8. Currently per capita costs for the systems being constructed are below or in line with those anticipated in the project design.

9. Problems of delays in materials purchase and in sending out funds to the regions have been dealt with by DISAR and AID. No more such problems are anticipated in these areas of project administation.

10. Important documents that describe the design and overall logical framework for the component programs in this project have not been available in Spanish, and DISAR personnel working with this project at the central and regional levels are still somewhat unfamiliar with project objectives, except for those concerning system construction.

11. Planning and detailed programming by DISAR are deficient, and the systems for controlling and executing the project are inadequate.

12. Neither the latrine program nor the programs on system operation and maintenance and Junta training are functioning effectively at this time.

13. Bottlenecks exist at present in procedures for approving water system design and authorizing work start-up orders. If they persist, these delays might threaten the ability of the project to meet EOPS construction objectives on time.

14. AID/Lima project managers have concentrated their energies on the construction and decentralization parts of the project; they now need to concentrate energy on the other important components.

15. AID/Lima has not fully utilized the technica assistance resources available to the project.

16. It is not possible at this time to predict the success of the training, health education, impact evaluation, or operations and maintenance components of this project given the lack of effort by the necessary institutions and the lack of structured programs in these areas.

12.2 Key Recommendations

12.2.1 Water Systems Construction

1. DISAR Central should establish a system of continua. regional inspection to be carried out by engineers, each of whom would be in charge of three or four regions, with a permanent base in one of the regions. These regional engineers reporting directly to the proposed DISAR/AID RWSES Project Coordinator in Lima, would have the responsibility of verifying that their regions are meeting their objectives in all phases of the project and of checking the quality of the regional office outputs.

2. Existing bottlenecks in project design and authorization should be removed and regions should be encouraged to have projects in reserve as an aid to the efficient use of regional resources.

3. All supervisory personnel involved directly in the construction of systems should receive training in hydraulic testing and disinfection of completed water systems, and all regional offices should have the requisite equipment for completing these tests.

12.2.2 Latrine Installation

1. Socio-cultural studies on sanitation behavior and possible cultural, social, and economic barriers to latrine use and hygiene behavioral changes should be carried out in each region of the project using social scientists and/or health educators from the regional health organization and from DISAR headquarters.

   The results of the socio-cultural studies should then be used by health education professionals to design a culturally appropriate latrine promotion program in each region.

2. Target communities should be involved in decision-making on excreta disposal alternatives. DISAR staff should receive training in design and construction of low-cost excreta disposal systems. WASH could supply DISAR with appropriate information and educational material in Spanish for use in developing a seminar or short course on the topic. The sanitary engineering technical advisor should take responsibility for organizing the training.

3. Sanitation technicians and engineers should receive intensive training in adult education techniques.

4. A follow-up evaluation methodology should be developed for measuring program impacts in terms of actual latrine use and maintenance.

12.2.3 System Operation and Maintenance

1. AID should obtain technical assistance from an expert in developing operations and maintenance programs to work with DISAR Central and the regional offices for a period of up to three months. This technical assistance should end with a seminar-workshop at a national level, with the technical adviser acting as facilitator, the result of which should be the development by each region of a detailed plan for an effective operations and maintenance program.

2. Seminars or meetings should be arranged for Junta members and operators from a group of communities to receive training and share problems and information among themselves.

3. A full-time sanitation technician at the regional office should be assigned to work with the Juntas on operations and maintenance; he should be given the necessary resources to do this.

4. Similar meetings should be organized for community system operators.

12.2.4 Health Education and Project Impact Evaluation

1. The community promotion/health education staff at DISAR should receive funds to visit all regions and personally evaluate the human relations and community work skills of the regional sanitation technicians. The results of these evaluations should then be used as a base for designing individual and/or group training sessions in a community setting.

2. Central-level health education staff should receive the support to travel to all project regions and set up the mechanisms for carrying out regional studies on hygiene behavior and possible barriers to hygiene behavioral changes. The results from these studies are then to be used as input into the design of regional health education programs.

3. Health education input should start from the moment DISAR first enters the community and should be at its maximum level during the period of system construction.

12.2.5 Training and Special Studies

1. The HRD unit in Lima should be established as soon as possible and should follow as much as possible the plan laid out in the Dicker report which was developed in close cooperation with the DISAR staff most likely to work in the new unit.

2. A long-term technical assistance specialist in human resources development, communications, and education should be hired by AID/Peru to assist the manager of the new HRD unit.

3. Support should be given to training and educational initiatives taken in the regions, such as those that have occurred under Ing. Victor Lopez in Cajamarca. These initiatives may be used as pilot projects for adaptation by other regions. Such initiatives could also be the basis for workshops to develop regional programs.

4. National or regional seminar-workshops should continue to be planned and given. These seminars should have clearly defined themes limited to one subject area. The outcome of the seminar should be a concrete product such as an annual work plan, a program plan, etc.

5. Priority should be given to the special studies that feed into the planning for the latrine and school education programs.

12.2.6 Decentralization

1. DISAR Central should establish a system for planning and monitoring regional activities involving the timely provision of accurate, useful information and regular supervision and support visits to the region. This planning and monitoring should be carried out at the regional level with the participation of key regional staff members.

2. The procedure for authorizing system construction should be speeded up. Perhaps authorizations could be given in person by DISAR Central engineers on regular supervisory visits, rather than sending the designs to Lima and awaiting authorization from there.

12.2.7 Administration

1. The planning of purchases should be improved. In order for this to occur, the time taken for project design and authorization needs to be shortened.

2. The regional inventory systems and the provision of inventory information to DISAR Central should be improved.

3. Future purchases of materials should be organized sufficiently in advance to allow for the considerable delays that occur in purchasing, delivery, and, in the case of imported materials, clearing customs.

4. Materials purchased should be checked on receipt to verify that they meet exactly all specifications and that they bear all the necessary identification markings.

12.2.8 Management

1. A project coordinator for the RWSES Project should be designated within DISAR to coordinate the activities carried out by the functional divisions, to be responsible for the planning and evaluation of all work, and to provide a link with other agencies and with AID.

2. A detailed workplan for the remaining time of the project should be prepared. It could be based on the global planning document prepared by DISAR for the evaluation team. This work plan should be prepared before the 1985 implementation plan is formulated.

3. A planning and monitoring system should be introduced to plan project activities and to provide accurate, timely information on problems so that corrective action can be taken where necessary.

12.2.9 Technical Assistance

1. The short-term health education promotion expert (6 months), communications expert (3 months), and training expert (3 months) should be replaced by one long-term technical adviser, with experience in all three areas. This adviser should work with the person named by the DISAR Director to head the proposed HRD unit in Lima. It is recommended that this assistance be given for 24 months which is 12 months <u>more</u> than originally planned. A brief scope of work for this proposed technical adviser is given in Appendix D.

2. The economist who was to advise on evaluating costs per capita (3 months) should be replaced by an expert who can teach key managerial personnel planning and evaluation. This assistance should include an analysis of the present system of planning and monitoring, the design of an improved system in conjunction with DISAR staff, and the initial application of the system via a planning seminar. The current work to improve and computerize the management information systems should be taken into account.

   Follow-up should be provided by the long-term HRD technical adviser who, after participating closely in the above process, should be responsible for spreading the methodology throughout the

organization and participating in future planning/monitoring workshops and seminars until the system is absorbed and properly used. In terms of providing the initial technical assistance, it would be worthwhile exploring the possibility of using the resources of a good university or school of business in Lima.

3. A person with broad experience in successful operations and maintenance development programs should be brought in for up to three months to work with DISAR Central and all the regions in implementing an effective operations and maintenance program. This consultancy should end with a national-level DISAR seminar on operations and maintenance aimed at drawing up a detailed implementation plan for each region. A scope of work is given in Appendix D.

4. Whenever possible, Latin consultants should be used. Consultants who understand the language and the cultural nuances and ways of thinking are more likely to have an impact.

5. Consultancies should be at least three months long. DISAR personnel feel that four- to six-week consultancies are not useful to them no matter how expert the consultant.

6. All significant project documents, including consultant reports, should be translated into Spanish in some form -- edited or unedited -- and presented to DISAR.

APPENDIX A

Evaluation
Scope of Work

STATEMENT OF WORK FOR PROGRESS EVALUATION OF RURAL WATER SYSTEMS AND ENVIRONMENTAL SANITATION PROJECT

I. BACKGROUND

II. PURPOSE

III. STATEMENT OF WORK

A. METHODOLOGY
B. SPECIFIC TASKS

1. Evaluation of Implementation of Project Objectives

a. Decentralized Regional Offices
b. Community Water Systems
c. Training
d. Latrine Construction
e. Operation and Maintenance Procedures
f. Health Conditions Improvement

2. Evaluation of Project Development and Management

a. Planning and Programming
b. Project Designs
c. Procurement
d. Construction Activities
e. Project Promotion
f. Financial Management
1) DISAR Central Office
2) DISAR Regional Offices
g. Project Information System

IV. REPORTS

V. CONSULTANT QUALIFICATIONS

A. Evaluation Team

1. Sanitary Engineer
2. Administrative Specialist

VI. PROPOSED ITINERARY

VII. SAMPLE QUESTIONAIRE

I. BACKGROUND

In 1980 USAID/PERU authorized the Rural Water Systems and Environmental Sanitation Project, the goal of which is to improve the basic health and well being of the rural people of Peru by providing them with safe drinking water.

The project is a joint effort between AID/PERU and the Government of Peru(GOP) through which 660 villages with populations of less than 500 will be served with potable water. The Project is being managed by the Ministry of Health(MOH) through its operating agency, the Dirección de Saneamiento Rural(DISAR). USAID is providing the project with Ten Million Dollars in loan funds and One Million Dollars in in grant funds, while the GOP is providing Five Million Dollars in counterpart funds for the project. The project was initiated in September 1980 and intended to be completed by September 1987.

II. PURPOSE

The purpose of this progress evaluation is to have an independent assessment of project implementation in order to determine if satisfactory progress is being made toward project implementation and if additional resources should be applied to the project in order to fulfill original project objectives in a timely manner. The "Progress Evaluation" will be used by the Mission to identify implementation problems and to determine solutions to these problems.

III. STATEMENT OF WORK

A. Methodology

In order to conduct this evaluation the contractor shall provide a team consisting of two people experienced in the implementation of rural water systems in Latin America. (Team member qualifications are discussed in section V.)

The team will visit and evaluate the project in the central office of DISAR in Lima and in 4 of the 10 Health Regions involved in the project as per the tentative itinerary included in Section VI.

The team, working in collaboration with USAID/PERU and DISAR will evaluate the extent to which the project objectives are being met. The following objectives have been established for the project and will serve as the basis by which it is evaluated.

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PROJECT OBJECTIVES

1. DECENTALIZED REGIONAL ENVIRONMENTAL HEALTH OFFICES will be operating in all ten of the participating health regions.

2. COMMUNITY WATER SYSTEMS will have been constructed in 660 villages throughout the 10 Health Regions.

3. TRAINING EFFORTS will have been developed and implemented to ensure that program technicians can carry out the community organization activities needed for the construction and maintenance of the water and sanitation systems that will have been constructed through the project.

4. LATRINES will have been installed in all project areas and utilization will have been improved throughout the project area as a result of information developed through the project.

5. OPERATION AND MAINTENANCE procedures will have been developed and implemented assuring the continued functioning of the water systems.

6. HEALTH CONDITIONS AND GENERAL WELL BEING will have been improved in the project area as a result of the increased availability of potable water and sanitation.

The guidelines in Section B will serve to assist the team in the evaluation process. In addition to the evaluation criteria provided in section B, the evaluation team will provide specific recommendations in problem areas that they feel exist in the project.

B. Specific Tasks

Evaluation of Implementation of Project Objectives

The evaluation team will evaluate progress toward fulfilling each of the project objectives in the following manner:

a. DECENTRALIZED REGIONAL OFFICES - The team shall travel to four of the regional offices to ascertain their ability to accomplish the goals of the Rural Water Project. In carrying out this analysis the team will observe and comment on the following:

1) Adequacy of physical environment; proper equipment, adequate space, etc.
2) Adequacy of personnel, level of education and experience of office personnel.
3) Knowledge of AID program and of objectives established for the Region.
4) Support received from Central Office in Lima for implementing project.
5) Level of autonomy from Central Office.
6) Level of support from Regional Director; knowledge of project by Regional Director.
7) Procurement of goods.
8) Storage of project goods.
9) Disbursement of goods to project sites.
10) Morale of staff.
11) Attrition rates of staff.

b. COMMUNITY WATER SYSTEMS - While the team is in the 4 Regional Offices it will evaluate the progress made in constructing water systems. The team will:

1) Inspect 3 water systems at each region to determine adequacy of design and quality of construction.
2) Review projected construction targets for the region and determine if adequate progress is being made toward meeting these targets. The targets established by the region will be reviewed to see if they are adequate to meet the output targets originally established for the project.
3) Determine if the region is properly equipped in terms of transportation capability, construction equipment, construction materials, and other elements necessary for properly constructing water systems.

c. TRAINING - The evaluation team will evaluate the efforts of DISAR Central in their progress toward training efforts as pertains to the project. By interviewing DISAR administration the team will determine the efforts being proposed and the extent to which DISAR is willing and capable of executing such. The team will determine the effectiveness of DISAR's training efforts as they apply toward the final goal of implementing the project. The team will interview recipients of past training conducted by DISAR to ascertain efficacy of such. These interviews will be conducted at the 4 Regions visited with engineers and technitians who have recently attended a DISAR training course.

d. LATRINE CONSTRUCTION - While in the 4 Regions the team will evaluate the efficacy of the office in constructing latrines. The team will:

1) Inspect installed latrines to determine if they have been properly designed and properly constructed and located.
2) Determine if installed latrines are being properly utilized by the owners.
3) Determine the extent to which the Regional Office is meeting the goal of providing latrines to all participants of the Water Program.

e. OPERATION AND MAINTENANCE PROCEDURES - The evaluation team will inspect 3 operating water systems in each of 4 Regions to determine whether the systems are being properly maintained and if DISAR procedures for dealing with operation and maintenance are adequate.

f. IMPROVED HEALTH CONDITIONS AND GENERAL WELL BEING - The team will interview recipients of water services to obtain their views of the operation of the systems and how access to safe water through the systems has been of benefit to them. Comments by the users will be tabulated and presented in the final report. The team will interview five users in each of 3 water systems at each of the 4 Regions visited for a total of 60 interviews. The sample questionaire is provided in Appendix 1.

2. Project Development and Management

The evaluation team will assess project development and management. The following considerations will be used as a guide:

a. PLANNING AND PROGRAMMING - Proper planning should result in a systematic method by which unmet needs are determined. Programming should provide a scheme by which these needs will be met. Does DISAR function in this manner? Specifically the following points should be examined:

1) Do long range plans exist identifying communities in need of water service?
2) How are these communities identified and selected?

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3) Is there a system of prioritizing these communities?
4) How are planning and programming information passed on to the Regions?
5) Are the Regions involved in establishing their targets and in selecting the communities to be served?
6) Is there a method of reporting project progress to DISAR central?
7) Is there a method of reporting overall project progress to AID, the MOH, etc.?

b. Project Designs-Project design consists of two basic functions; the field study, and the development of the design from the field data. The following points should be examined:

1) Field Study

a) How is a water source determined for the community?
b) How is it determined that the water source is of acceptable quality?
c) How is water source measured for quantity?
d) How does community legally obtain use of water source? Is permission to use the water source adequatly documented?
e) Is a topographic study conducted?
f) Is sufficient detail provided in the topographic study to enable the design team to properly design the system without necessitating a return trip to the site to obtain additional information?
g) What criteria is used to select the community for a field study?

2) Design

Are standard designs utilized as much as possible?
b) Is there a set of design standards or norms for design criteria?
c) Are designs and plans prepared by qualified engineers?
d) What is the quality of final plans?
e) Are designs and plans reviewed to see if any cost-effective alternatives have been overlooked?
f) Are plans prepared with sufficient clarity for implementing construction?

Do designs take into account future growth of the community?

c. Procurement - Procurment of project commodities plays an important role in implementing a project. The following points should be examined:

1) Is there a programmed schedule for procuring project commodities?
2) Is this schedule being met?
3) If not, why?
4) Are the Regions being supplied with construction material on a timely basis?
5) Is there sufficient procurement authority in the Regions to assure that local items such as cement, wood, sand, etc. can be purchased?
6) Are there sufficient controls to assure that the material is being purchased at the best possible price?
7) Are specifications sufficiently tight to assure that quality material is purchased?
8) What procedures are established to assure that materials meet specifications?
9) Are quantity and quality checks made on material?
10) Is material ordered in sufficient quantities to take advantage of economies of scale in purchasing?
11) If so, is there adequate storage capability for this material?
12) Are there sufficient controls in disbursing materials to the projects?
13) Is there a system of inventories maintained for accounting and for reordering of material?

d. CONSTRUCTION ACTIVITIES - Actual construction activities are the responsibility of the Regions. Each Region should have an engineering staff capable of managing their construction activities. The following points should be examined:

1) Are construction schedules prepared?
2) Are maestros de obra adequately trained to read and execute plans and drawings?
3) Are plans sufficient to preclude the need for field improvising?
4) Are plans being followed in the field?
5) Is adequate inspection provided during construction?

6) Are field changes being recorded?
7) Are final inspections being conducted on systems prior to transferring them to the communities?
8) Are deficiencies being corrected prior to transferring system to the community?
9) Are systems being completed in a timely manner?
10) Are systems chlorinated or otherwise deemed safe for community to use? What kind of water testing activity is conducted by the region?

e. PROJECT PROMOTION - Promotion consists of activities that unite the community for the construction effort, train the community in operating and maintaining the system after completion, and educate the community in the proper use of water for the prevention of diseases: The following points should be examined:

1) Is the pre-construction promotion adaquate to enable the engineer to implement the system in a timely manner?
2) Is community motivated suficient to provide the unkilled labor required for the project?
3) Are Juntas Administrativas (water commitee) formed prior to beginning construction?
4) Does community remain motivated throughout construction of project?
5) Does community realize and understand the health benefits gained by having a water system, or is it viewed primarily as a convenience?
6) Is community prepared to continue operation and maintenance of the system?
7) Have water fees been establisahed to pay for operation and maintenance of the system?
8) Has a policy been established for new connections to the system?
9) Are new connections made without imparing or contaminating the system?

F. FINANCIAL MANAGEMENT - Adequate financial management is key to the success of any rural water project. Overall financial management in this project is carried out by DISAR Central in so far as disbursing funds and establishig budgets is concerned, however; every project engineer is responsible for managing the individual construction subprojects in his Region. The following points should be examined:

1) DISAR Central

a) What mechanisms are established for the transfer of funds from AID to DISAR?
b) Are these mechanisms adequate?
a) Are funds requested and disbursed in a timely fashion?
d) Is there a system for checking expenditures to assure proper use of funds?
e) Is this system adequate without being a bottleneck for funds reimbursement?
f) Is sufficient advance planning done to assure the timely flow of funds to DISAR?

2) REGIONAL OFFICES

a) Is there a mechanism by which the Regions can request advance funding for their anticipated activities?
b) Is this method adequate to assure a timely disbursement of funds.
c) Are project engineers involved in establishing budgets and requesting funds?
d) How does original funding for a subproject compare to the final cost of the project?
e) Is this information passed on to DISAR for future funding projections?
f) What procedures are used to assure that Regional financial records correspond with those of DISAR Central?

IV. REPORTS

The Contractor shall prepare a final report in English and in Spanish and will submit 10 copies of each to USAID/PERU. A draft version of the report will be submitted to USAID/PERU in English prior to departing Lima with the remaining copies and the Spanish version to follow within 20 working days via the diplomatic pouch.

V. CONSULTANT QUALIFICATIONS

The evaluation team shall consist of a team leader and an administrative specialist. The team leader shall have a background in sanitary engineering and management of rural water systems construcion. The administrative specialist shall have a background in the administrative aspects of managing a rural water project.

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A. SANITARY ENGINEER - The Sanitary Engineer shall be a graduate engineer with a graduate degree in Sanitary Engineering, Public health, or related fields and shall be registered as a professional engineer. Experience shall consist of at least 10 years in the construction and or management of rural water systems projects, with a minimum of 2 years being in Latin America. The consultant shall posess a Spanish Language equivalency of at least 3+ in speacking and reading as determined by the FSI.

B. ADMINISTRATIVE SPECIALIST - The Administrative Specialist shall have a degree in engineering, public health administration, public administration, accounting, or other related field. The consultant shall have a minimum of 5 years of experience working with the administrative aspect of rural water systems projects. A minimum of 2 years of this experience shall have been in Latin America. The Consultant shall have a thourough knowledge and understanding of accounting proceedures for publicly administered construction projects. The Consultant shall posses a Spanish language equivalenacy of 3+ as determined by the FSI.

VI. PROPOSED ITINERARY

The proposed itinerary is for the purpose of budget planning and for the benefit of the evaluation team in planning and organizing their time. The itinerary has been proposed as a guide with the idea that the actual itinerary may vary according to the needs encountered in the field. This itinerary is based on a six-day work week and may be modified if the need for such arises.

Aug. 5	Arrive Lima
Aug. 6	Meet with AID and DISAR to discuss project and plan work
Aug. 7, 8, 9, 10	Evaluation at DISAR Central
Aug. 11,12,	Week end
Aug. 13	Depart for Cuzco
Aug. 14, 15, 16, 17	Evaluate Cuzco Region Team will visit Cuzco Regional Office and various project sites
Aug. 18, 19,	Week end - Return to Lima
Aug. 20	DISAR Central, Lima
Aug. 21	Depart for Huancayo
Aug. 22, 23, 24	Evaluate Huancayo Region Team will visit Huancayo Regional Office and various project sites
Aug. 25, 26	Week end - Return to Lima
Aug. 27	DISAR Central, Lima
Aug. 28	Depart for Huaraz

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Aug. 29, 30, 31	Evaluate Huaraz Region Team will visit Huaraz Regional Office and various project sites
Sept. 1, 2	Week end - Return to Lima
Sept. 3	DISAR Central, Lima
Sept. 4	Depart for Cajamarca
Sept. 5, 6, 7,	Evaluate Cajamarca Region Team will visit Cajamarca Regional Office and various project sites
Sept. 8	Week end - Return to Lima
Sept. 9, 10, 11, 12,13	Lima Team will work on reports
Sept. 14	Depart for U.S.

APPENDIX I

Questionaire

1. Health Region _____
2. Department _____
3. District _____
4. Village _____
5. Family: _____
   A. Father _____
   B. Mother _____
   C. Number of Children _____
6. Type of System: _____
   A. Gravity without treatment _____
   B. Gravity with treatment _____
   C. Pumped without treatment _____
   D. Pumped with treatment _____
7. What was primary drinking water source, before the system was constructed?

   _____
8. How much water was used daily by family?

   _____
9. How far was the water source?

   _____
10. Who was principle water bearer?

    _____
11. How much time of each day was dedicated to providing water?

    _____
12. To what degree does family rely on new water system? i.e., do they get all, most, or some of their water from the system?

    _____

    _____

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13. How much water is now used daily; if unknown-do they use more water now than before the system was constructed?

_____

_____

14. Is water still stored in containers at the home?

_____

15. How much time of each day is now dedicated to providing water for family?

_____

_____

16. Are they satisfied with the water system in terms of:
    1. Quality of water: _____
    2. Quantity of water: _____
    3. Reliability of System: _____

17. Are they paying for water service?
    How much? _____
    How often? _____
    Who collects? _____

18. Who provides maintenance for the water system?

_____

_____

19. Who is on the water committee?

_____

_____

20. How did they participate in the construction of the system?

_____

_____

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21. Comment on problems that exist with the water system?

22. In their opinion what benefits do they attribute to having a water system? Is it looked at as a convenience or are they aware of the health aspects?

23. Do they have a latrine? If so, what type?

24. Do they routinly utilize the latrine?

25. How was latrine constructed? How did they participate?

26. Who maintains the latrine? Who cleans it? Who digs the new hole?

27. Were they given any form of health education associated with the construction of the water system and use of latrines?

APPENDIX B

Persons Interviewed

Persons Interviewed

DISAR - Lima

Ing. Carlos Marroquin	Director
Ing. Renato Escobar	Sub-Director
Ing. Roxana de Leon	Chief, Planning Department
Ing. Nestor Esquivel	Chief, Works Department
Ing. Jose Tello	Chief, Systems Maintenance Departı
Ing. Luis Valencia	Chief, Designs Department
Ing. Francisco Rivera	Chief, Administration Department
Lic. Julio Meza	Administration Department
Prof. Ciro Escobar	Works Department
Ing. Ricardo Santos	Works Department
Sr. Ramon Concha	Works Department
Prof. Jorge Vorgas	Works Department
Sr. Nilo Florian	Administration Department

DISAR - Huaraz

Ing. Elias Boliva	Chief, Regional Office
Ing. Teofilio Cossio	Engineer
Sr. Jesus Villacosta	Sanitation Inspector
Sr. Washington Dextre	Sanitation Inspector

DISAR - Trujillo

Ing. Julia Bedoy	Chief, Regional Office
Sr. Jose Luis Valdivia	Sanitation Inspector
Sr. Teodulo Perez	Sanitation Inspector

DISAR - Cajamarca

Ing. Victor Lopez	Chief, Regional Office
Ing. Hugo Tirado	Engineer
Sr. Maestro Quispe	System Constructor
Sr. Ramirez Pena	System Constructor

DISAR - Cusco

Ing. Hugo Lingan	Chief, Regional Office
Ing. Carlos Suarez	Engineer
Sr. Jesus Calderon	Sanitation Inspector
Sr. Dario Villegas	Accountant

DISAR - Puno

Ing. Edgar Zencenaro	Chief, Regional Office
Sr. Humberto Nina	Sanitation Inspector
Sr. Efrain-emilio Romero	Sanitation Inspector

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Ministry of Health

Srta. Georgina Valverde	Ancash Region PHC Coordinator
Sra. Nelida de Calderon	Head Nurse, Huaraz
Sra. Maria de Serrano	Chief of Nurse Training, Cuzco
Srta. Luzmila Chevarria	Biologist, Cuzco
Dr. Salustio Munoz	Regional Health Director, Cajamarca

USAID - Lima

John Sanbrailo	Mission Chief
George Hill	Mission Sub-Director
Joan LaRosa	Program Officer, Health, Nutrition and Education Office
Gerardo Arabe	-do-
Arthur Dannert	Acting Chief, Health, Nutrition and Education Office
John Gillespie	Westinghouse Health Systems, Long-term Consultant
Aurelio Tasso	Controllers Office
Stephen Roshalt	Consultant to DISAR on MIS

DIGEMA - Lima

Ing. Javier Bacigalupo	Director
Lic. Paico	Chief Accountant

InterAmerican Development Bank - Lima

Ing. Ruben Flores	Sectoral Specialist

Pan American Health Organization - Lima

Ing. Carlos Cuneo	Regional Engineer

Water and Sanitation for Health Project - Rosslyn, Virginia

Fred Rosensweig	Task Manager

USAID - Washington

Paula Feeney	Latin America Bureau
John Austin	Science and Technology Bureau

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APPENDIX C

Maps and Itinerary of Field Visits

Field Trips

The team visited five of the ten project regions in order to assess progress. In each region offices and warehouses were visited and personnel were interviewed. In each of the five regions there appears to be an adequate complement of human resources for system design and construction and these offices are producing designs and building systems. Each region will have a vehicle and topographical equipment by early 1985.

Team members, accompanied by a DISAR engineer and sanitation technician visited several communities per region to evaluate work completed and underway. These visits helped to show the enormous difficulties of road communication faced by the project.

The attached table shows the 17 communities visited together with the state of each water project inspected. The attached maps show the location of the communities visited.

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Table C-1

List of Water Projects Inspected

Date	Region	Community	State of Water Project
September 6/7	Ancash	Cochapampa	Finished
		Hualcan	Finished
		Los Monos	Finished
		Ucucha	Finished
September 11/12	La Libertad	Julgueda	Finished
		Manchacap	Finished
September 13/14	Cajamarca	Amillas	In construction
		Magdalena	In construction
		Puylucana	Finished
		Sagoron Bajo	Finished
		Tambomayo	Finished
		Poyoc	Preparation of study
September 17/19	Cusco	Rayanniyoc	Finished
		Huancalle	Finished
		Yuncaipata	Finished
September 20/21	Puno	Jipata de Jachapaa	Finished
		St. Domingo de Jachapaa	Finished

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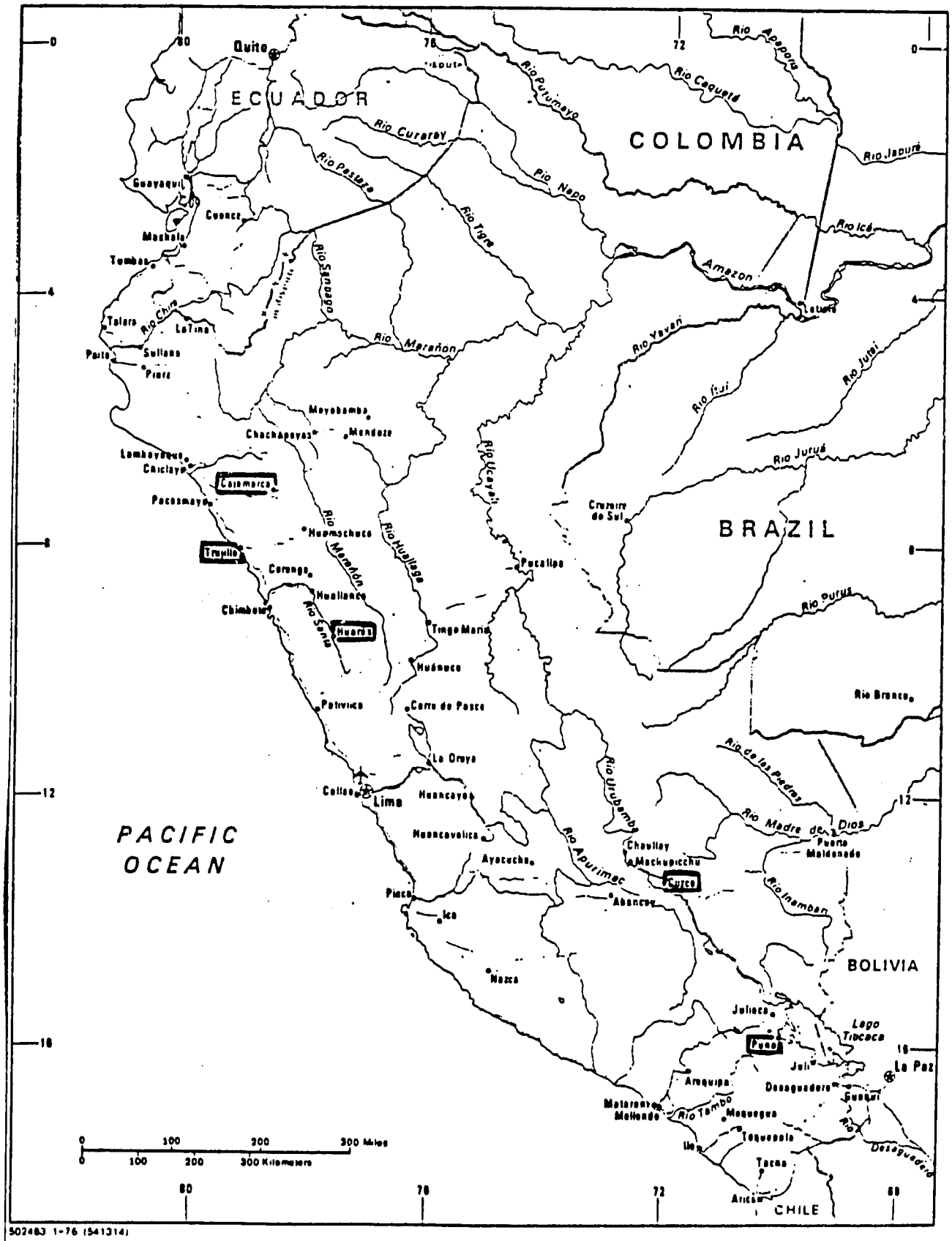
Peru



502483 1-76 (541314)
Lambert Conformal Projection
Standard parallels 3°00' and 15°20'
Scale 1:10 000 000
Boundary representation is not necessarily authoritative

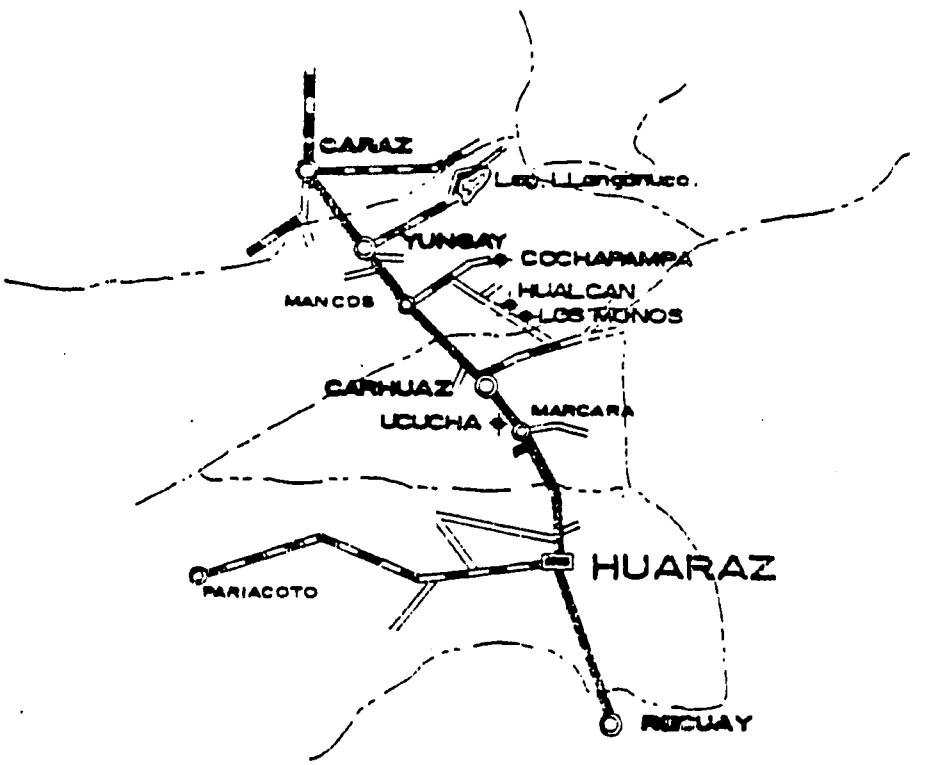
= REGIONAL OFFICES VISITED

Railroad
Road
Airport

140

REGION DEL DEPARTAMENTO DE :

ANCASH

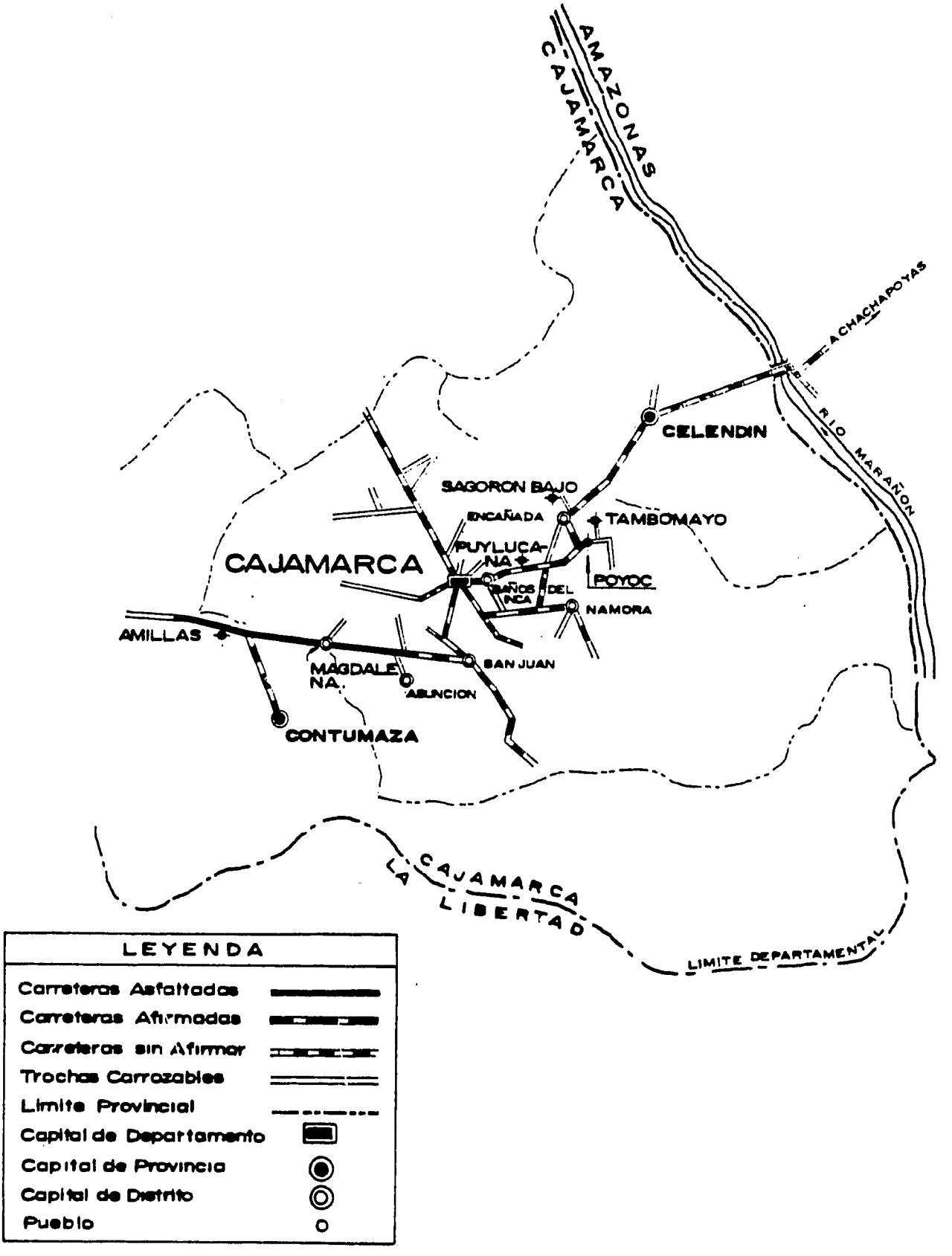


LEYENDA	
Carreteras Asfaltadas	
Carreteras Afirmadas	
Carreteras sin Afirmar	
Trochas Carrozables	
Limite Provincial	
Capital de Departamento	
Capital de Provincia	
Capital de Distrito :	
Pueblo	

141

REGION DEL DEPARTAMENTO DE :

CAJAMARCA



142

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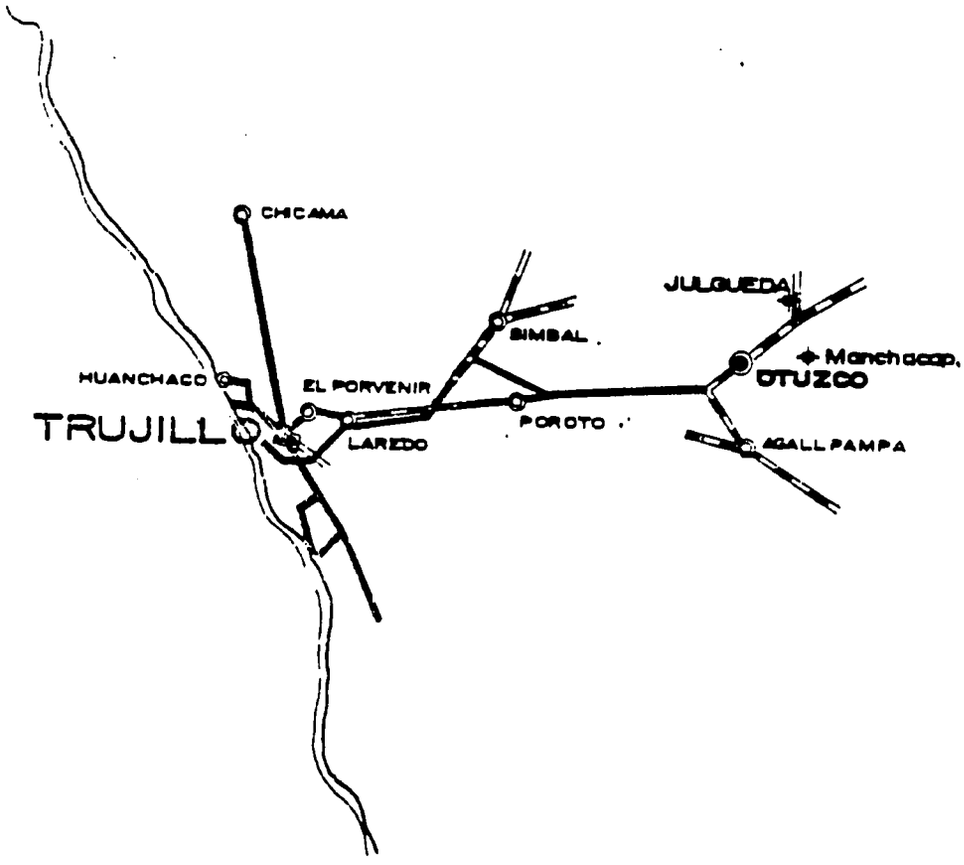
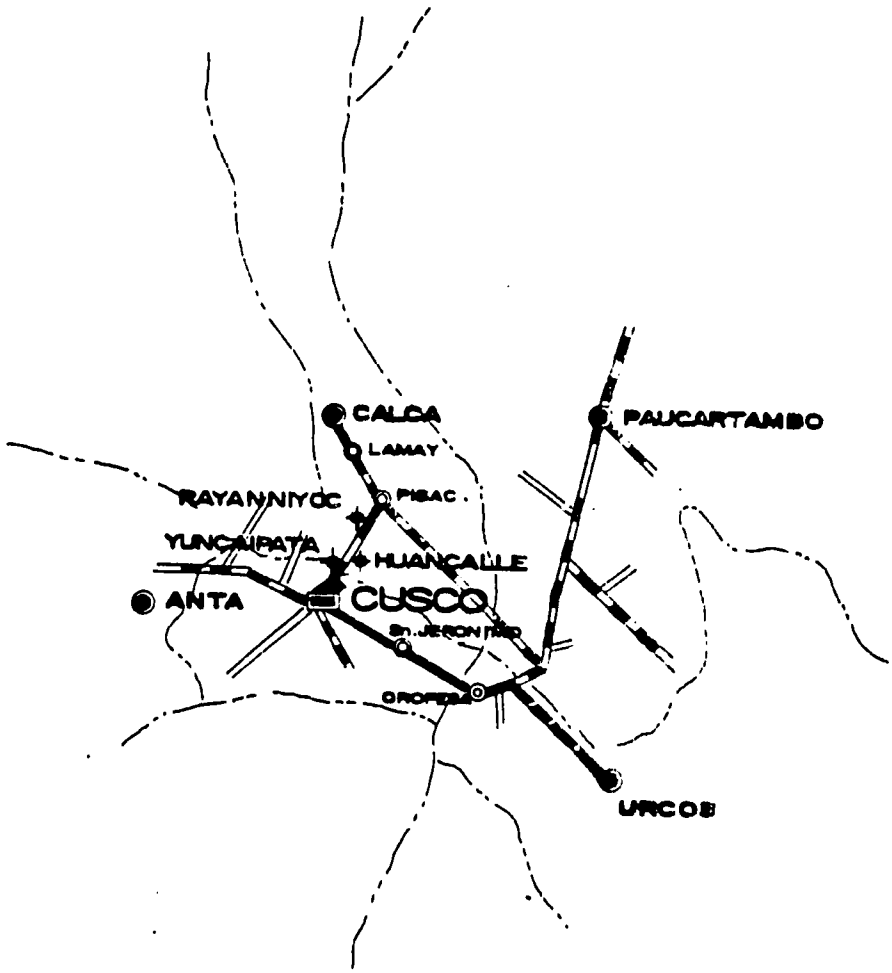
LA LIBERTAD



LEYENDA	
Carreteras Asfaltadas	
Carreteras Afirmadas	
Carreteras sin Afirmar	
Trochas Carrozables	
Limite Provincial	
Capital de Departamento	
Capital de Provincia	
Capital de Distrito :	
Pueblo	

142

REGION DEL DEPARTAMENTO DE CUSCO



LEYENDA	
Carreteras Asfaltadas	
Carreteras Afirmadas	
Carreteras sin Afirmar	
Trochas Carrozable	
Limite Provincial	
Capital de Departamento	
Capital de Provincia.	
Capital de Distrito :	
Pueblo	

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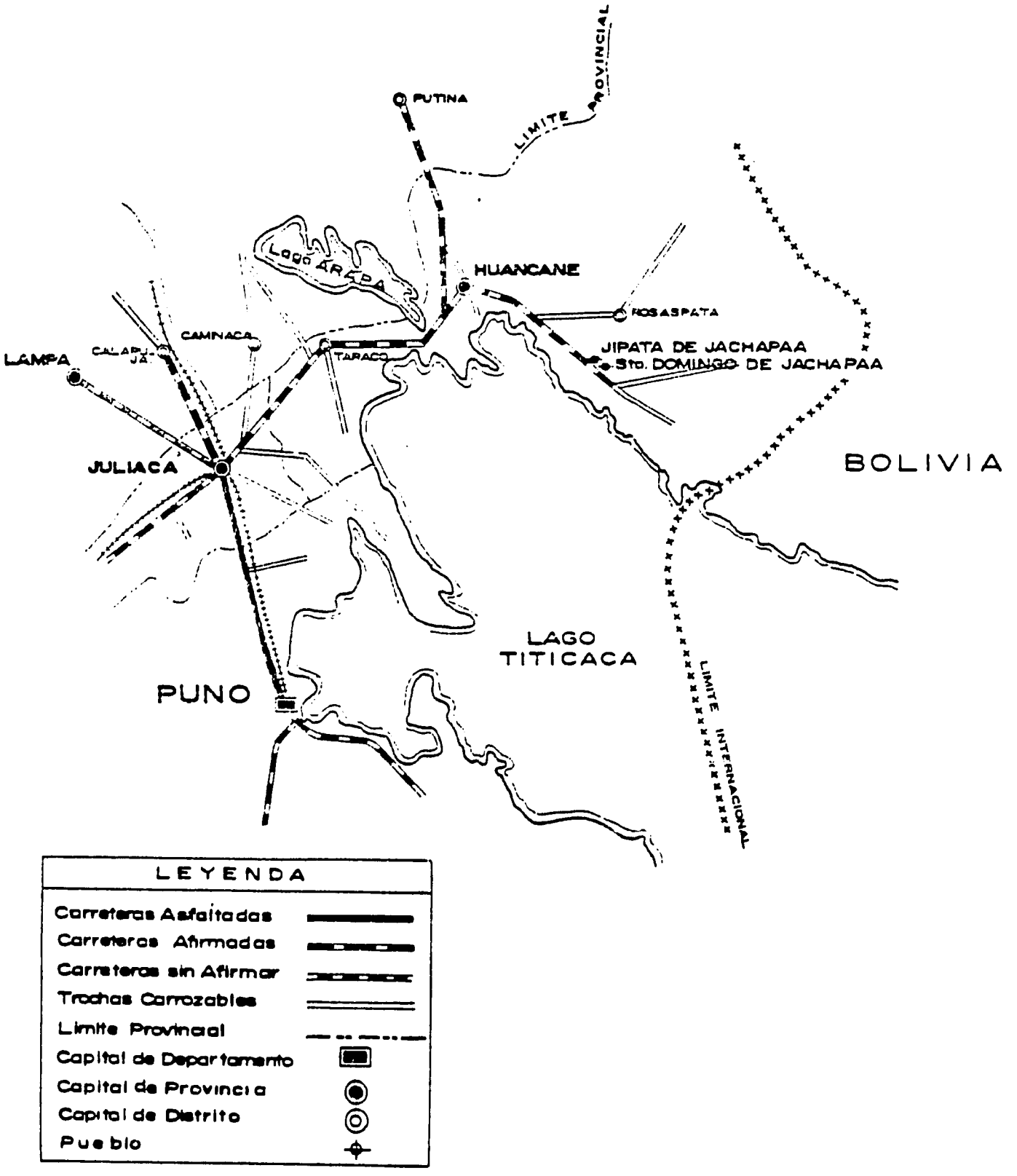
REGION DEL DEPARTAMENTO DE

PUNO



APPENDIX D

Scopes of Work for Technical Assistance

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Scopes of Work for Technical Assistance

I. Scope of Work - Technical Advisor on Project Planning and Minotoring for DISAR

Objectives

To bring about, at all levels of DISAR, the use of participatory planning and monitoring in order to establish and program activities, to assess progress regularly, and to take timely, corrective action where necessary. Both physical events and financial costs should be taken into account.

Tasks

1. Analyze the present system of planning and monitoring at national and regional levels.

2. Design a suitable planning and monitoring system in conjunction with appropriate levels of DISAR staff.

3. Initiate the use of the new system in at least one regional-level and one national level planning seminar.

4. Work closely with the long-term technical advisor in training the person who will be responsible for the ongoing training in system use.

II. Scope of Work - Long Term Technical Adviser to the Human Resources Development Unit at DISAR, Lima

Objective

To assist the chief of the newly formed HRD unit to implement the Dicker plan for its first two years.

Tasks

1. Assist the HRD chief in supporting, proposing and assessing for DISAR its objectives, plans, and development programs for its human resources so that DISAR can achieve the objectives of the AID water and sanitation project, number 527-0221.

2. Assist the HRD chief in planning, organizing, implementing and monitoring the educational and training programs for DISAR personnel and for rural community members.

3. Assist in organizing, directing, and supervising the effective and efficient functioning of the unit.

4. Assist in planning, organizing, supervising, and evaluating the teaching norms and methods used by the educational components of the unit.

5. Assist in promoting the teaching norms and methods for all the teaching and training activities of DISAR,

6. On behalf of DISAR's Director, assist in coordinating DISAR's activities and programs with the various educational and training units in the Ministry of Health and with other similar institutions in the public and private sectors.

7. Assist in developing the training inputs required specifically for the health education, latrinization, and operations and maintenance components of the AID water and sanitation project.

8. Assist in planning the health education, latrinization, and operations and maintenance components of the AID project.

9. Assist in organizing and evaluating the training program in management and planning proposed for the senior staff at DISAR.

10. Assist in establishing a mechanism for sharing technical information with national and international institutions working in the field of human resource development, with special emphasis on information related to sanitary engineering, health education, community development, adult education, and communication.

11. Assist as requested by the chief of the unit.

III. Scope of Work - Short Term Technical Adviser on Development of Operations and Maintenance Programs for Small Rural Water Supplies

Objectives

To assist DISAR, over a period of up to three months, to develop an effective self-sustaining operations and maintenance program in the small rural communities served by the AID/DISAR water and sanitation project.

Tasks

1. Work with DISAR personnel at headquarters and in the regions on preparations for a workshop-seminar on the development of effective operations and maintenance programs in small communities.

2. Prepare written plans for individual regional programs. (Participants at the workshop/seminar will also work on these plans.)

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APPENDIX E

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