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UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D. C. 20523

PERU

PROJECT PAPER

RURAL WATER SYSTEMS AND
ENVIRONMENTAL SANITATION

AMENDMENT

AID/LAC/P-062/1

Project Number: 527-0221
Loan Number: 527-U-074A

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PROJECT AUTHORIZATION

(Amendment N° 1)

Name of Country: Peru
Name of Project: Rural Water Systems and
Environmental Sanitation
Number of Project: 527-0221

1. Pursuant to Section 104 of the Foreign Assistance Act of 1961, as amended, the Rural Water Systems and Environmental Sanitation Project for Peru was authorized on September 22, 1980 (the "Authorization"). The Authorization is hereby amended as follows:

a. Lines 3, 4 and 5 of Section 1 of the Authorization are amended by deleting the words "or not to exceed \$5 million in Loan funds and \$500,000 in Grant funds over a four-year period", and substituting in lieu thereof the words "of not to exceed Ten Million United States Dollars (\$10,000,000) in loan funds ("Loan"), and One Million United States Dollars (\$1,000,000) in grant funds ("Grant") over a six (6) year period".

b. Line 2 of Section 2 of the Authorization is amended by deleting the words "approximately 420".

c. Line 3 of Section 2 of the Authorization is amended by deleting the words "up to six".

d. Section 4.f. of the Authorization is re-numbered Section 4.h.

e. The following new Section 4.f. is added to the Authorization:

"f. Condition Precedent to Disbursement for Commodity Procurement in the Departments of Ica, Ayacucho, Piura and Lambayeque (Loan).

Prior to any disbursement, or to the issuance of any commitment documents under the Project Agreement, for commodity procurement for the Departments of Ica, Ayacucho, Piura and Lambayeque, Peru shall, except as A.I.D. may otherwise agree in writing, furnish, in form and substance satisfactory to A.I.D., a commodity procurement plan for the life of the Project for the Departments of Ica, Ayacucho, Piura and Lambayeque which includes a detailed list of the commodities to be acquired."

f. The following new Section 4.g. is added to the Authorization:

"g. Conditions Precedent to Disbursement for Project Activities in the Departments of Ica, Ayacucho, Piura and Lambayeque (Loan).

Prior to any disbursement, or to the issuance of any commitment documents under the Project Agreement to finance any Project activity in the Departments of Ica, Ayacucho, Piura and Lambayeque, Peru shall, except as A.I.D. may otherwise agree in writing, furnish, in form and substance satisfactory to A.I.D.:

(a) A revised implementation plan for the life of the Project, which details how new Project activities will be carried out in all Health Regions, including the Departments of Ica, Ayacucho, Piura and Lambayeque, and describes the selection criteria to be used for choosing sub-projects in the Health Regions.

(b) A revised financial plan for the life of the Project for the Departments of Ica, Ayacucho, Piura and Lambayeque.

(c) A detailed staffing plan for the life of the Project for the Departments of Ica, Ayacucho, Piura and Lambayeque.

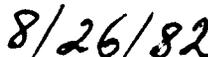
(d) A detailed plan which explains the role of the Departmental Development Corporations in the selection of communities for participation under the Project, and explains the role of private sector contractors in the design and construction of sanitation systems under the Project."

g. Line 2 of Section 4.h(3) of the Authorization is amended by deleting the word "six".

2. Except as expressly modified or amended hereby, the Authorization remains in full force and effect.



Director
USAID/Peru



Date

Extension of Peru Rural Water Systems and Environmental Sanitation

Loan/Grant Project - 527-U-074/527-0221

Project Paper Amendment

1. SUMMARY: The proposed expansion represents Mission's response to critical need for improved water and sanitation services in sierra departments not included in the scope of the present project, and the opportunity to take advantage of the recent creation of Departmental Development Corporations to ensure efficient and effective project planning and implementation at regional and community levels. The proposed expansion will assist the GOP to improve the health and well-being of sierra dwellers by addressing one of the major constraints to improved health status - the lack of adequate potable water and excreta disposal facilities in rural areas. The purpose of the proposed expansion is to provide potable water, excreta disposal services and health education to communities in sierra and high jungle zones of Ayacucho, Ica, Piura and Lambayeque and to integrate those components with on-going or planned primary health activities.

In order to accomplish the purposes and objectives of the proposed extension, a total of \$5.5 million is required, as follows:

<u>Investment Category</u> ^{1/}	<u>AID Loan</u>	<u>AID Grant</u>
Construction	3,700	
Vehicles/Equipment	203	
Technical Assistance		150

Training/Education		200
Studies/Evaluation		100
Support Costs	97	
Contingencies/Inflation	1,000 *	50**
Total	5,000	500

* 25% inflation/contingency factor included

** 11% inflation/contingency factor included

1/ Counterpart financing is contained in detailed financial tables in part 15.

The proposed extension expands on the base established in the Rural Water Systems and Environmental Sanitation Project, 527-0221. The same strategy, purpose, range and general scope of activities already approved by AID/W in the on-going loan are retained. However, there are also several characteristics that represent additions or modifications to the original project design.

Briefly, these are:

A. Inclusion of Departmental Development Corporations to decentralize cross-sectoral planning, implementation and follow-on operational and maintenance assistance;

B. Participation of private sector in the design of sub-systems (See section 9);

C. Development of improved design standards for communities of under 500 inhabitants and participation of para-professionals rather than engineers in the field study, design and implementation phases of rural water systems;

D. Inclusion of simple drainage systems for household connections and public taps and reuse of run-off to supplement water required for family gardens;

E. Development of health education materials and teaching techniques for primary health promoters, preschool and primary school teachers;

F. Development of materials for administrative and managerial skills training at the community level, e.g. basic record keeping, arithmetic, etc.

G. Training for three engineers in administration and management of rural water and sanitation programs.

These characteristics are be described more fully in the body of this cable.

The analyses undertaken in the PP for Project 527-0221 found the project's design to be technically, economically, socially, administratively and financially feasible. These analyses, along with the environmental assessment, are still valid because no significant design changes are proposed. Therefore, the expanded project is ready for immediate implementation upon approval and authorization. The implementing agency has demonstrated its technical and institutional strength and its ability to provide substantial counterpart funding to the on-going project.

The design for the on-going project has selection and screening criteria that will also be used in the extension to ensure that benefiting communities provide a share of the human, material and financial resources

needed to meet investment costs, and bear the primary responsibility for supporting the operational and maintenance costs of systems from the initial year of operation. Community financing for operation and maintenance activities will be raised through users fees, special fund-raising activities by local water committees and some assistance from the national or regional water offices.

2. CURRENT STATUS OF PROJECT 527-0221: Activities under Project 527-0221 were slow in getting underway due to several health sector strikes, two major changes in the implementing agency's relationship with the Ministry of Health, a change in Ministers and subsequent change in regional health officials, and the normal start-up delays. The project is now in full implementation. Training has taken place at several levels, research studies have been initiated, the first 30 water system sub-project sites have been identified and all field work and design studies have been completed at these sites. WASH technical experts recently reviewed the implementing agency's subproject designs and found them to be well formulated and technically sound. A local bid for acquiring PVC and accessories is underway, construction of the first three regional warehouses and offices is 85-95% complete and civil works for a number of the first 30 sub-projects has been initiated. All 30 sub-projects will be in operation this calendar year.

In order to gain lost time, the Directorate of Rural Sanitation (DISAR), formerly the Directorate of Sanitary Engineering (DIS), plans to initiate project activities in two new regions next year instead of one. Communities are being identified and some of the next year's engineering studies have already been developed. DISAR has clearly demonstrated its capacity for planning, technical design, procurement and implementation during

this start-up phase. DISAR is firmly committed to the project, technical quality of its personnel is high and GOP support in terms of personnel and budget has been forthcoming. DISAR has demonstrated that it has the institutional capacity required to successfully implement the on-going project and this proposed extension.

3. RATIONALE AND NEED: The rationale for undertaking a substantial additional investment in the rural water supply and sanitation sector, and for this request for project extension, is that provision of safe water in sufficient quantities and in connection with other conditions such as improved health practices, hygiene education and the adoption of safe excreta disposal and related sanitation measures, improves health status. Rural sanitary conditions are extremely poor in Peru and cultural practices related to sanitation, personal hygiene and water use continue to contribute to the spread of water-related diseases. High incidence of disease, high mortality rates and severe malnutrition are particularly acute in Peru's sierra and high jungle regions. During the period 1970-75, mortality rates in rural areas were twice those of urban areas. Approximately 50% of total deaths in rural areas occur in children under five years of age, due primarily to infectious and parasitic diseases which could be controlled by vaccines and simple environmental sanitation measures. Nutritional deficiencies are related to the principal cause of death in approximately 60% of the total deaths of children under five years of age. About one-third of all pregnant women show nutritional anemias.

These problems are being addressed by AID's primary health projects and the Rural Water Systems and Environmental Sanitation Project, but the on-going project covers only six of the ten health Regions included in AID's

primary health projects. DISAR and the Mission are receiving numerous requests from other sierra departments which show clear need and effective demand for water and sanitation assistance over and above the scope of our current program. More than 1000 unmet requests are on file with DISAR for water assistance in sierra and high jungle communities. This extension is requested to maximize the positive impact of other GOP and AID health interventions and to improve health status of sierra dwellers.

5. PROJECT DESCRIPTION: The goal of the proposed extension is to assist the GOP to improve the health and well-being of sierra and high jungle dwellers. The purpose is to provide potable water, excreta disposal facilities and health education to sierra and high jungle communities and to integrate these services with Peru's primary health program. The goal and purpose are unchanged from the current project. The outputs which will achieve this purpose are the following:

A. Approximately 240 water systems functioning in communities of less than 500 inhabitants.

B. Three to five environmental sanitation technicians in each of the participating regional water offices trained in administration, community organization and/or system maintenance procedures.

C. Staffed and equipped maintenance units in each of the participating regional water offices and in each benefitting community.

D. Latrines installed in all communities with potable water sub-projects.

E. Community education regarding water and sanitation in all participating communities.

F. Improved coordination among water engineers, primary health personnel and regional development officers.

At the end of the proposed extension, the following conditions should exist indicating achievement of project purpose:

A. Two new decentralized regional environmental sanitation offices serving in four additional health regions, tentatively identified as Ayacucho, Ica, Piura, and Lambayeque.

B. DISAR's central and regional offices upgraded so that they have improved capability to develop, implement and maintain rural potable water and excreta disposal systems.

C. Training programs developed and implemented to assist the environmental sanitation technicians in community organization activities for construction and maintenance of safe water systems, and to assist health promoters and Ministry of Education school teachers in effective health education activities.

D. Latrine use increased.

E. Health conditions and general well-being improved in benefitting communities.

EOPS conditions will be achieved when beneficiaries are enjoying a clean, convenient and dependable water supply, e.g., have access to a minimum of 30-40 liters per person per day of uncontaminated water, have a clear understanding of appropriate sanitation practices and proper use of water to prevent water- and excreta-related disease, and have the interest and capability to operate and maintain the water supply system largely from community resources.

Achievement of the purpose will result in the removal of a major constraint to improved health status, the lack of adequate supplies of clean, convenient water. The provision of safe water supply, discrete disposal facilities and health and hygiene education will affect different groups of diseases in different ways: an increase in water quantity will reduce water-washed diseases such as typhus, trachoma and various skin diseases, while improvement in water quality will protect individuals against a number of water borne diseases such as typhoid, dysentery and hepatitis. Drainage facilities should reduce standing water where insects breed, thus reducing mosquito and other such pests. The general quality of life at the household and community levels will improve. Knowledge of and concern with health care related to water-borne and water-washed diseases will result from health/hygiene educational outreach. Children as well as adults will not only become more healthy as a result of water and excreta disposal systems, but will become more aware of the relationship of water to health through the educational component.

6. PROJECT COMPONENTS: The proposed extension includes eight major project components:

A. Rural Water Systems - As in the on-going loan, the preferred design will be simple gravity fed systems with household connections or public taps. Water quality will be enhanced by appropriate means where necessary. Sanitary units with public showers and wash basins for laundry will be constructed in selected communities. Appropriate drainage construction will be an integral part of system designs.

B. Latrines - Public latrines will be constructed in all benefitting communities. Private latrine construction will be encouraged and a program of education and motivation to promote latrine use will be carried out in all communities.

C. Community Participation - Community participation is required, in the design, construction, operation and maintenance of water supply and sanitation systems. Communities will provide self-help labor, locally available materials for construction, monetary contributions for assisting with capital construction costs and one or more community members to serve as system operators and maintenance personnel. Water users will pay monthly quotas to provide operating capital for costs of operation and maintenance.

D. Health Education - Health education for adults and for school children will be provided by sanitation technicians, community-level promoters and other health personnel, and by Ministry of Education teachers. Educational materials and audio visual aids will be developed for these programs. Training courses will be developed at the regional level for upgrading teaching skills and techniques for non-health professional personnel.

E. Special Studies - A series of studies to complement those

programmed under the on-going project will be financed by this component.

F. Training - Training will be provided for sanitation technicians and supervisors at the regional level, and for administrators, operators and maintenance personnel at the community level, classes in arithmetic, bookkeeping and other similar courses areas will be developed and offered to members of community water committees to improve their administrative and management skills. U.S. training and observation visits to the U.S. and third countries will be financed for regional and Lima-based technicians.

G. Technical Assistance - Approximately 15 months of technical assistance will be provided in cost analyses, technical design, communications, and administration. TA will also be used for studies, evaluations and other short-term assignments.

H. Equipment, Vehicles and Support Costs - Funds will be provided to purchase vehicles, construction materials and equipment, engineering, laboratory office and water testing equipment and to partially cover skilled labor, vehicle operation and maintenance, per diem and travel and warehouse construction costs.

7. IMPLEMENTING AGENCY AND ADMINISTRATIVE FEASIBILITY: The Ministry of Health is responsible for providing potable water and sanitation services to rural communities of less than 2,000 inhabitants but its resources are insufficient to meet a sharply increasing demand. In rural areas an estimated 78% of the population lack potable water; 98.7% of rural households lack house connection to functioning potable water systems; and 98.4% of rural households have no bathroom facilities. The Ministry is using GOP resources to address

these problems in communities of up to 2,000 inhabitants. To complement these resources, the IDB is financing water systems for communities at the larger end of this scale. AID Project 527-0221 is financing systems for communities of less than 500 inhabitants. However, a significant number of sierra communities within the less than 500 size group are left outside the on-going AID project. These communities are increasingly requesting GOP assistance. More than one thousand unmet requests are currently on file in the DISAR office. Other donors are unlikely to support these activities because of the difficulties of extending services to these small, dispersed communities and because AID and IDB are already significantly involved. The GOP has requested AID to give additional support through the DISAR for potable water and environmental sanitation services to small sierra communities.

DISAR will be directly responsible for the planning and management of the project. DISAR is comprised of five major divisions and the office of the Director. The Director and Assistant Director are both sanitary engineers. DISAR's staff includes 44 engineers, 15 environmental sanitation promoters and technicians, 49 technical auxiliaries and nearly 200 additional support staff. An institutional capability study was conducted for Project 527-0221 and DISAR, then known as DIS, was found to be a competent and dynamic institution. This finding has been substantiated by DISAR actions and there is no reason to believe that DISAR will encounter difficulties in meeting the additional demands levied by this project extension.

In consonance with both GOP and Mission policies of strengthening

decentralization, implementation of the project will be carried out by DISAR's regional staff. Four new health regions will be covered under the extension - Piura, Lambayeque, Ica and Ayacucho. New regional water offices will be established in two regional health offices to service the four health regions. DISAR will hire engineers to staff the two new regional water offices. These offices will carry out water and sanitation projects with technical and administrative guidance from DISAR's central office. The regional offices will also supervise system operation and maintenance, providing a source of timely TA and basic spare parts to participating communities. Training for community-level operation and maintenance personnel will be conducted at the regional level. DISAR will work with the primary health personnel and with the Departmental Development Corporations in carrying out project actions at the regional level. Private sector firms will be contracted to carry-out sub-system engineering designs and a study will identify other possible private sector roles (see section 9). Promising ideas will be financed on a pilot basis in selected regions and/or communities.

Acting on a recommendation from WASH, DISAR is simplifying design norms for small water systems and exploring the use of para-professionals rather than engineers in many of the activities related to system design and construction. Studies will determine the extent to which these responsibilities can be delegated to non-engineers; recommendations will be tested on a pilot basis in one project area and incorporated into on-going implementation if successful.

8. BENEFICIARIES: Direct beneficiaries will be up to 120,000 sierra dwellers, who will have access to safe water and excreta disposal facilities constructed under the proposed extension. Women will be important beneficiaries since they are responsible for most food-and water-related tasks, child care and education, household maintenance and family health. They will benefit from time saved in water collection and the improved family health resulting from the availability of clean water. Other benefits include increased community awareness, through education programs, of development needs and opportunities, and the income distribution or subsidy benefits to the sierra regions arising from the allocation of GOP resources into project communities. The strategy will maximize benefits by focusing resources on those communities where adequate water supplies are not currently available, by ensuring the most cost-effective water system is selected for each benefitting community and by applying a screening process that will identify communities that can and will fully participate in system construction and contribute with human and financial resources to the continued operation and maintenance of the installed system.

9. PRIVATE SECTOR INVOLVEMENT: Recently, requests for water projects have been received from the Departmental Development Corporations of Ayacucho and Piura. The Development Corporations were created by the Belaunde government as a principal institution in the decentralization of government services and investment decision making. They are a keystone in the effort to increase local participation in sector activities and are responsible for

identifying local development priorities and for designing flexible and effective operating modalities to address those priorities.

The Corporations will play several important roles in the water project extension. First, they will, along with the Ministry of Health, identify recipient communities. As overall coordinator of development programming in the region, the Corporation will bring added depth to the selection process, ensuring that water, primary health, agriculture and other regional development activities are programmed to minimize competition for scarce human and financial resources and to maximize overall benefit for recipient communities.

Second, Corporation personnel will be used as trainers and monitors of community water and sanitation system operation and maintenance and will serve as information liasons between the community water committees and DISAR technicians in the regional water offices. This involvement will encourage a continuing local interest in the system after the construction phase-- an interest which many studies have concluded to be the critical factor in the successful operation and maintenance of systems over time. The contact and information function will enable DISAR to provide continued technical service to communities when needed without the necessity of keeping one or more engineers on a costly maintenance inspection circuit.

Third, the Corporation is structured so that it can flexibly respond to local development priorities in a timely manner. DISAR will have to

implement almost 200 projects per year during the last three years of the project. With its regional water office structure, DISAR will be able to construct that number of systems but will not be able to do that quantity of field work and sub-project designs. The Corporation mechanism will be used to contract with private sector engineering firms to do the field work and design studies. This private sector participation represents a significant and innovative policy shift in the rural water sector.

Three other innovative policy shifts will be studied and implemented if they are feasible. First, the role of the private sector in aspects of the project other than field and design work will be studied. Training by the private sector of professional and para-professional water specialists, community-level collaborators such as primary health workers or school teachers, and of community members as system administrators, operators and/or maintenance workers will be studied as a possible private sector role in follow-up monitoring and maintenance tasks.

Second, national level design norms appropriate for use in water systems for small, dispersed communities will be developed under this project. Treatment of these communities as a special category which can be addressed with simpler design standards is a policy shift which should result in the construction of more appropriate systems, responsive to the needs of these communities and at costs substantially cheaper than those associated with current norms.

Third, DISAR has agreed to explore the possibility of doing project field study and design work using para-professionals rather than engineers. This will be possible if the simplified design norms are adopted. DISAR will collaborate with a private sector firm to study how and to what extent current engineering functions can be delegated to para-professionals. If shown to be feasible, all of the above innovations will be meshed with the on-going project as well as its extension.

10. TECHNICAL ASPECTS AND FEASIBILITY: Approximately 240 communities of 500 or fewer inhabitants in the sierra zones of Ayacucho, Ica, Piura and Lambayeque will be provided with potable water and other services. DISAR has developed a number of standard designs which use locally available materials, are labor-intensive, and use local labor, can be maintained easily and largely from locally generated funds and are consistent with water availability and with the size community DISAR is mandated to serve. The following table provides a basic description of each system, and its per capita operating and maintenance costs per family per year.

WATER SYSTEM COST DATA ^{1/}

<u>Type of System</u>	Cost Per Capita ^{2/}	System Operating and Maintenance Cost Per Family Per Year
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I. Gravity-fed ^{3/} with

household		
constructions	\$40.00	\$14.40
II. Gravity-fed mixed		
system with some		
household ^d		
connections and		
some public taps	\$36.40	\$10.90 ^{4/}
III. Gravity-fed with		
public taps	\$20.50	\$ 7.40
IV. Hand-dug wells with		
hand-pumps	\$13.50	\$ 5.05

1/ Based on calculations on Annex II, Exhibit H.2. of Project paper

2/ Based on an average of 350 inhabitants/community, including administration costs.

3/ Cost given for gravity-fed systems is the average for spring-fed and surface water gravity-flow systems. Surface water systems are approximately \$2/inhabitant more expensive than spring-fed systems because surface water must be purified by means of a chlorination treatment.

4/ This cost is estimated by taking the average of the operating and

maintenance costs for system types I and II.

The preferred systems are gravity fed with household connections and project costs are based on installing this type of system. This extension presents no variations from the approved technical descriptions and analyses presented in the PP (except the addition of appropriate drainage, which is an existing and simple technology that will have only a minor impact on overall cost). Therefore, technical feasibility is established.

Additional description and detail on technical aspects of these water systems and for excreta disposal systems can be found in the PP and the Project Agreement Annex. Per capita cost calculations will be up-dated by using actual costs after the first 30 sub-projects under the on-going loan have been installed. This will be done as a part of the first evaluation. Drainage measures for the disposal of waste water will be included as a part of every water supply sub-project. Drainage has received low priority in the past but health hazards associated with waste water accumulation are recognized and DISAR is committed to improving this situation. In addition, local technology is available for the design and construction of simple drainage systems. Most costs associated with drainage construction are community costs met by the provision of local labor and materials. Where possible, drain water will be used for productive purposes such as supplemental irrigation of small garden plots.

The minimum daily consumption goal for this project will be 40 liters of water per capita per day. This design standard falls on the lower end of the spectrum of the consumption range of 40-80 liters per capita per day recommended by some international health experts and at the upper end of the more realistic AID-recommended standard of 20-40 liters per capita per day.

11. COMMUNITY PARTICIPATION/LOCAL MAINTENANCE CAPACITY: Community participation is required in the design, construction, operation and maintenance of water supply and sanitation systems. This participation provides a focus for community action in a context which benefits all in that the leadership and collaboration which emerges will enhance the community's ability to articulate its demands for development to governmental agencies. In this regard, direct involvement by the Development Corporations as well as the MOH will expand the access that sierra communities have to development officials.

One of the major weaknesses of past rural water efforts worldwide has been the lack of continued maintenance services. The engineering division charged with constructing water systems seldom has the interest or the staff to support continued assistance in operation and maintenance and often community members are not trained to maintain and operate the systems the engineers construct. This extension will address this problem by training community members and by relying on other agencies primary health promoters, school teachers, development corporation personnel, etc. to provide continual

follow-up and monitoring of system operation and maintenance.

Community members will be trained in the operation and maintenance of their system. This training can be effective because of the simplicity of gravity-fed systems. Community fund raisers and special water user fees will be used by the community to purchase spare parts needed for simple maintenance. The establishment of regional water offices which will provide training, spare parts and technical assistance will have a positive impact on maintenance as will the use of health promoters, school teachers, and Development Corporation personnel. They can provide training, and serve as information points to and from the communities, regarding operation and maintenance problems.

The on-going project is financing an operation and maintenance study to determine causes of system success and failure. Using information from this study, a community manual designed to give simple, practical guidelines to community water committee members, health promoters and other interested individuals on how to raise money and use it to do preventative and rehabilitation maintenance of water systems will be financed under this extension. All of these elements will contribute to the local community's ability to operate and maintain its water and sanitation system, largely using its own resources.

12. HEALTH EDUCATION: Knowledge about practices which contribute to water and excreta-related diseases and measures that can be taken to reduce

the chances of contracting these diseases will be widely disseminated through the project. The information will be communicated to community members by primary health workers and to village children by their teachers. The face-to-face information will be supported by posters, pamphlets, comic books, school curriculum materials and radio broadcasts. Technical assistance and training will be used to develop more appropriate motivational techniques and skills for community health workers and other information agents. This will result in more effective interpersonal communication at the village level; and better communication, combined with the simple visual aids, curriculum and educational materials and radio messages for health education outreach activities to be developed, tested, and utilized in this extension, will result in better informed villagers.

Simple, but important changes in household and personal practices which are within the means and control of sierra dwellers will occur as a direct result of the health education component. These changes - improved hygiene and sanitation practices-will result in lessening the incidence of water-and-excreta-related diseases, thereby, improving the health and well being of sierra dwellers.

Reducing water-and excreta-related disease through water and sanitation interventions and education will improve nutritional levels, especially in children, because these diseases cause diarrhea, dehydration and dysentery, all of which reduce the body's capacity to absorb nutrients and contribute to lowering the nutritional status. It will also result in an

increase in the potential productive capacity of the beneficiaries.

Beneficiaries will be better able to undertake their day-to-day responsibilities because project interventions will lessen the loss of potential attributable to chronic incapacity. It is anticipated that project beneficiaries will pass hygiene-related information to others through their family, social, work or political networks, and that people in non-project villages who are reached only by the media messages or children learning about health and sanitation in school will also diffuse information and contribute to spread effect.

13. TRAINING: The project will include a substantial training element for technical and professional personnel. Support will be provided to 3 engineers to receive long-term training in rural water system management, administration and/or planning was recommended by the WASH consultants as a way to up-grade DISAR's staff. In addition, approximately 1500 technical personnel will receive short-term pre-and in-service training in sanitation system maintenance, community motivation and participation, communications techniques and other related topics. One foreign advisor will work to develop programs to strengthen pre-and in-service training for sanitarians, health promoters, Ministry of Education teachers and other personnel.

Regional level activities will train community operators and maintenance workers and provide primary health workers and school teachers with materials and knowledge needed for sanitation and hygiene education

programs. Educational and motivational materials for training courses and for mass media distribution will be designed and produced at the central and regional levels.

14. TECHNICAL ASSISTANCE AND STUDIES: The proposed extension will provide both short and long term advisors to work directly with DISAR's central and regional offices to improve their capability to develop simple, low-cost, low maintenance water supply and discreta disposal systems and to expand DISAR's ability to work with beneficiary communities to implement health and sanitation measures. An estimated 15 person months of technical assistance will be provided, tentatively in the following areas:

Design Engineer to review and refine simplified desing norms for small communities and to assist to define tasks for para-professionals: 6 person months

Economist to assist in the evaluation of per capita costs and project this for the life-of-project: 3 person months

Communication expert to develop training materials and tecniques for community-level workers: 3 person months

Training expert to develop curriculum materials and training programs for Ministry of Education personnel: 3 person months

Special studies will be conducted to:

Identify Private Sector Role in Water Projects

Develop a Hygiene in Public Schools Study

Identify roles for Para-professionals in System Design and
Construction.

These studies will be headed by technical assistance experts or, in the case of the Para-professional study by a private sector engineering firm working in close collaboration with DISAR and the technical assistance person.

15. FINANCIAL PLAN: The financial plan is not significantly different from the approved plan for the on-going project. Therefore, the existing financial and economic analyses are valid for the extension.

One difference however between the on-going project and the extension is that for roughly the same amount of resources, only 240 rather than 420 systems will be constructed.

Implementation of the first thirty sub-projects indicates four factors that contributed to a reduction in the number of systems from that of the on-going project. First, project beneficiaries will exceed the 350 per system average used to estimate costs in Project 527-0221. The tendency is to serve larger communities. Second, sub-project systems are requiring more PVC than was calculated in the PP because the communities are larger, more

dispersed and the distance of the water source from the communities is greater than was originally estimated. Third, the cost of construction material, including PVC, has increased considerably since the PP estimates were made. Thus, the 420 figure appears to have been an over estimate.

Following are tables summarizing the overall financial aspects of the extension.

Investment Category	AID				Total
	Loan	Grant	GOP	Community	
1. Construction					
-Equipment/materials	3000	-	300	150	3450
-Labor					
-Skilled	700	-	-	-	700
-Unskilled	-	-	-	330	330
2. Vehicles/Equipment					
-Transportation	112	-	-	-	112
-Construction	15				15
-Engineering/Drafting	30				30
-Promotion	20				20
-Office	10				10
-Tools/Water Testers	16				16
3. Technical Assistance	--	150			150
4. Training/Education	--	200			200
5. Studies/Evaluation	--	100			100
6. Support Costs					
-Salaries	--		800		800
-Per Diem/Travel	20		200		200
-Vehicle O and M	25		200		225
-Office Supplies	--		95		95
-Warehouses	52		110		162

Total (1) to (6)	4000	450	1705	480	6635
Plus: Inflation & Contingencies	1000 ^{2/}	50 ^{1/}	426 ^{2/}	-	1476 ^{2/}
<hr/>					
Grand Total	5000	500	2131	480	8111

1/ Includes inflation factor of 11%

2/ Includes inflation/contingency factor of 25%

Table III.B.2

Requirements of Foreign Exchange and Local Currency

(Thousands of U.S. Dollars)

<u>Investment Category</u>	Loan		Grant		GOP	Comm.	Total
	<u>FX</u>	<u>LC</u>	<u>FX</u>	<u>LC</u>			
<u>1. Construction</u>							
Equip. & Materials	1945	1055	300	180			3480
Labor							
-Skilled			700				700
-Unskilled						300	300
<u>2. Vehicles & Equipment</u>							
Transportation	112						112
Construction		15					15
Engineering/Drafting		30					30
Promotion		20					20
Office		10					10
Tools & Water Testers	9	7					16
<u>3. Technical Assistance</u>			150				150
<u>4. Training & Education</u>			130	70			200
<u>5. Studies & Evaluation</u>			60	40			100
<u>6. Support Costs</u>							
Salaries					800		800
Per Diem & Travel		20			200		220
Vehicle Operation &							
Maintenance		25			200		225
Office Supplies & Space					95		95
Warehouses		52			110		162
Total (1) to (6)	2066	1934	340	110	1705	480	6635
Plus: Inflation &							

Contingencies	516.5	483.5	38	12	426	-	1476
Grand Total	2582.5	2417.5	378	122	2131	480	8111

AID loan funds (\$5.0 million) will cover the cost of PVC pipe and accesories, 4 pick-ups and 2 dumptrucks, engineering and office equipment locally available construction materials, skilled labor costs and partial coverage of selected support costs. AID grant funds (\$0.5 million) will provide technical assistance, training and will finance evaluation and other studies.

GOP funds will cover the cost of some equipment and materials, project regional water offices, operational expenses such as vehicle maintenance, gasoline and travel costs. Recipient communities will provide the unskilled labor for system construction and locally available materials such as sand, rock and gravel.

AID will procure PVC for the first 70 extension systems in FY 82, immediately after authorization and as part of the planned Project 527-0221 international bid. A second AID procurement of PVC will be made in extension year two, for the remaining systems. AID Procurement of 4 four wheel drive pick-up trucks and 2 dumptrucks will be programmed to coincide with creation of regional offices in the two new areas.

16. IMPLEMENTATION SCHEDULE: The implementation of this extension will have a four year duration and will be fully integrated with the on-going effort (which will have to be extended for 1.5 years to meet the following construction schedule):

Number of Systems Programmed Per Year

<u>Region</u>	<u>Years</u>	Year	Year	Year	Year	<u>Total</u>
		I	II	III	IV	
Ancash ^{1/}	10	20	20	10	10	70
Cajamarca ^{1/}	10	20	20	10	10	70
Junín ^{1/}	10	20	20	10	10	70
La Libertad ^{1/}	-	10	20	20	20	70
Cuzco ^{1/}	-	10	20	20	20	70
Ayacucho ^{2/}	-	10	20	20	30	80
Puno ^{1/}	-	-	10	30	30	70
Piura/						
Lambayeque ^{2/}	-	-	20	30	30	80
Ica ^{2/}	-	-	20	30	30	80
	30	90	170	180	190	
				Total		660*

* 420 under Project 527-0221, 240 under extension

1/ Project 527-0221 Regions

2/ Extension Regions