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CLASSIFICATION
PROJECT EVALUATION SUMMARY (PES) - PART I

Report Symbol U-447

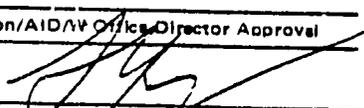
1. PROJECT TITLE Improved Water and Land Use in the Sierra	2. PROJECT NUMBER 527-T-059	3. MISSION/AID/W OFFICE USAID/Peru
	4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) <u>8</u>	
<input checked="" type="checkbox"/> REGULAR EVALUATION <input type="checkbox"/> SPECIAL EVALUATION		

5. KEY PROJECT IMPLEMENTATION DATES			6. ESTIMATED PROJECT FUNDING A. Total \$ <u>21,000,000</u> B. U.S. \$ <u>11,000,000</u>	7. PERIOD COVERED BY EVALUATION	
A. First PRO-AG or Equivalent FY <u>76</u>	B. Final Obligation Expected FY <u>82</u>	C. Final Input Delivery FY <u>81</u>		From (month/yr.) <u>10/79</u>	To (month/yr.) <u>4/81</u>

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
See page 20 for list of Recommendations and Actions		

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS <input type="checkbox"/> Project Paper <input type="checkbox"/> Implementation Plan e.g., CPI Network <input type="checkbox"/> Other (Specify) _____ <input type="checkbox"/> Financial Plan <input type="checkbox"/> PIO/T <input type="checkbox"/> Logical Framework <input type="checkbox"/> PIO/C <input type="checkbox"/> Other (Specify) _____ <input type="checkbox"/> Project Agreement <input type="checkbox"/> PIO/P	10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT A. <input type="checkbox"/> Continue Project Without Change B. <input type="checkbox"/> Change Project Design and/or <input type="checkbox"/> Change Implementation Plan C. <input type="checkbox"/> Discontinue Project
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11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles) Deborah C. Schulze, USAID/Peru Evaluator Loren L. Schulze, Acting Chief, Ag. Division, USAID/Peru	12. Mission/AID/W Office Director Approval Signature  Typed Name <u>Leonard Vaeger, Director</u> Date <u>May 22, 1981</u>
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Summary

The Project was originally designed to improve water and land use in the Sierra through the construction and improvement of small irrigation systems at 27 sub-projects sites in two sierra regions. At the present time 24 sub-projects have been selected for feasibility studies to be presented to USAID.

Following sub-project construction, agricultural development assistance is to be provided to the small farmers in each sub-project area to insure improved crop yields, better cropping alternatives, and a reduction in soil loss from erosion. The project loan agreement was signed September 26, 1976. The final contribution date is July 18, 1981 and the final disbursement date is January 18, 1982.

Project implementation activities have not progressed according to the targets established in the implementation plan of the Project Paper. The transfer of the implementation responsibilities within the MOA from the Direccion General de Aguas (DGA) to the Direccion General Ejecutiva (DGE) at the beginning of the Project resulted in a 10 month delay in early implementation. Staffing of regional offices and the organization of these offices were not completed until mid-1978. Feasibility studies have been completed for 18 sub-projects. Construction has been completed at 4 sub-project sites supplying irrigation to 3,184 has. (12%) of the planned Project total of 27,013 has. Agricultural development activities, which are a major part of the purpose and goal, are just beginning. At the present rate at which feasibility study preparation and sub-project construction are progressing, the prospects of achieving the purpose by the Project completion date are doubtful. Based on a financial analysis of construction costs and the time needed to complete sub-projects it will be necessary to reprogram project activities and possibly cut some projects originally planned. This will require an in-depth study by the project manager and implementation officer in conjunction with Plan MERIS. An extension of the final project completion date by two years is recommended in order to complete project activities.

Evaluation Methodology

This formative evaluation was conducted in order to measure the progress of the project and to develop suggestions for improving implementation. This is the second evaluation of the project since project initiation and consisted of a review of existing project

documentation such as the Project Paper, the Loan Agreement, USAID Monthly and Quarterly Reviews, Project Correspondence Files, and on-site inspections by the USAID Project Manager and Implementation Officer. A financial analysis of construction costs has also been included.

External Factors

There have been no modifications in GOP priorities which have had a significant impact on project implementation. In the agriculture sector, the GOP considers coastal irrigation and improved production of high value export crops as first priority but also recognizes the importance of increasing agricultural production in the Sierra in order to reduce the migration of the rural Sierra poor to the coastal cities.

Although Agrarian Reform activities are nearing completion and the GOP is placing more emphasis on agricultural development, the land titling process is slow and cumbersome. Without proper titles the farmers are unable to obtain credit for agricultural development. The Agrarian Reform Office should work closely in organizing farmers into "comunidades" or "empresas" in order to speed up credit approval by the Agrarian Bank. Plan MERIS field personnel have formed committees to coordinate the land titling process for project beneficiaries.

There was a significant change in the project setting which involved the transfer of the Project from the Direccion General de Aguas (DGA) to the Direccion General Ejecutiva (DGE). The Division of Small and Medium Irrigation was created December 7, 1976 to implement the Project. The transfer was made in order to place the project in an agency relatively free of bureaucratic restrictions in the MOA. This change resulted in a loss of momentum in early implementation of the project because, being a new agency, it had to be staffed at the national and regional level. A Project Manager was not appointed by the MOA until July 1977.

Recent rains in the Sierra caused at least a two month delay in construction and field work. There has been some damage to irrigation works such as leaking of canals and cave-ins along canals being constructed. In many sub-project areas the field personnel are unable to reach the sites. Also, the drought over the past years has had an impact on yields so in many cases they are not as high as originally projected. There was severe frost damage to corn in the Mantaro Valley during February but actual losses in sub-project areas are not known at this time.

Inputs:

USAID

1. Technical Assistance -- T.A. was provided with a loan financed, host country contract between DGE and the association of two Peruvian contracting firms and the Consortium for International Development (ATA/CLASS/CID). The contract was necessary in order to supplement the technical expertise of DGE in feasibility study preparation and construction planning, water use research, and irrigation extension. The contract was signed December 23, 1977 and terminated April 30, 1980. The ATA/CLASS portion of the contract was extended through September 30, 1980 to allow them to complete the Matara study, but study progress has been slower than expected because the MOA was slow in completing necessary geological studies.

ATA/CLASS has provided T.A. in such areas as irrigation and drainage engineering, agricultural economics, hydrology, soils, rural development planning, and management of cooperative enterprises. This assistance was timely and contributed to the quality of the feasibility studies but, due to the delay in study initiation by the DGE, ATA/CLASS did not contribute to the preparation of as many studies as originally expected. If the feasibility studies had been started on schedule, ATA/CLASS would have participated in all of the studies before the termination of the contract. At the present time, they have participated in 10 of the 24 planned sub-project feasibility studies.

The CID portion of the T.A. contract was designed to provide long term and short term T.A. and training to DGE personnel.

The long term resident T.A. consisted of an expert in planning, evaluation, and management to serve as Project Chief, an expert in applied irrigation research, and an expert in development of extension techniques.

The foreign resident T.A. personnel arrived by June 1978 but, since the DGE lacked previous experience in these matters, there were problems with visas, clearing of household effects, and payment of locally incurred costs. These complications resulted in reduced productivity of the foreign T.A. upon arrival in Peru.

The Project Chief from CID did not speak Spanish so he was not effective in his area of expertise. His contract was terminated in

December 1978. A local technician became Project Chief in May 1979 and did an adequate job.

The irrigation research expert from CID, LeRoy Salazar, was highly qualified and was very effective. He developed water use requirements for various crops in the Sierra, taught courses in water management, and organized field days for farmers in the Project areas. His contract terminated in December 1979. His work is continuing as witnessed in the field. Project personnel are continuing to conduct field days and have established demonstrative sites on pasture management and crop production. LeRoy Salazar is still highly spoken of by both the staff and farmers.

The extension specialist was restricted in his effectiveness by inadequate language capability. However, he was successful in developing extension materials and conducted training courses in extension methodology for DGE. The bulletins he helped prepare are being distributed and are being utilized by farmers in the area. His contract terminated in December 1979. ATA/CLASS/CID conducted a successful training course from February to March 1979 in which 154 professionals from DGE and MOA participated.

The planned short and long term training program in the United States was changed to Mexico by the USAID Training Office because of the failure of the DGE to identify English speaking participants. USAID participated in the selection process to assure that those selected were qualified and offered the greatest potential for contribution to the success of the Project.

Three professionals (one from the regional office and two from the Lima office) attended the short term training program. They studied organization, feasibility study preparation and implementation of small and medium irrigation systems. Three professionals went to Mexico for one year of academic training in irrigation use and engineering. All six are actively participating in Project activities and consider the training to have been a great asset.

2. Construction machinery, equipment and materials - The purchase was divided into two IFBs both of which suffered from a delayed approval process by MOA. The equipment on the first IFB arrived in Peru December 1978 and the equipment on the second IFB arrived September 1980. Some equipment had to be contracted for the first sub-project and this caused delays in actual construction. 74% of the gross tonnage of goods imported under the Loan have been transported on ocean vessels originating from a United States port on private owned United States flag commercial vessels.

3. Tree Plantings - Afforestation activities are discussed under Outputs. The species being planted are Eucalyptus, Polylepis (Quinual), and Pinus Radiata. There has been a higher mortality rate than expected due to drought, frost damage, and lack of maintenance. The number of hectares planted by Plan MERIS and PRONAREF (Proyecto Especial Programa Nacional de Reforestacion) are summarized below:

Sub-project	Plan MERIS has. 1/	PRONAREF has. 1/	TOTAL has.
<u>Sierra Norte</u>			
Chingol	15.79	5.01	20.80
Namora	5.4	22.00	27.40
Santa Rita	2.8	.21	3.01
Carahuanga	-	1.24	1.24
		Sub: Total	54.45
<u>Sierra Centro</u>			
Chicche	11.0	13.2	24.20
La Huaycha	10.8	18.1	28.90
Chupaca	2.4	9.0	11.40
		Sub Total	64.50
		TOTAL	118.95

4. Contribution to Special Credit Fund - USAID has now contributed \$36,707 toward the \$1,000,000 programmed contribution. This fund is for on farm capitalization cost such as land leveling, drainage, canal hook-ups, and other on-farm improvements. The following table shows the advances in credit for individuals by sub-project as of November 1980:

<u>Sub-project</u>	<u>Requests in Process</u>	<u>Approved</u>	<u>Executed</u>
<u>Sierra Centro</u>			
La. Huaycha.	6	5	5
Chicche.	12	3	3
Chupaca	<u>31</u>	<u>20</u>	<u>20</u>
Sub. Total	49	28	28
<u>Sierra Norte</u>			
Chingol	8	2	2
Namora	<u>2</u>	<u>-</u>	<u>-</u>
Sub Total	10	2	2
TOTAL	59	30	30

The Agrarian Bank maintains that they are willing to give credit but in many instances the farmers cannot prove title. The paperwork involved with the Office of Agrarian Reform is extensive and many times discouraging to the farmers. Also, based on field observation and talking with farmers, there seems to be a great deal of misunderstanding and fear of credit. The extension agents need to prepare a better program informing farmers about credit and help alleviate the problems. For example, farmers in the Chingol area must get credit from the Agrarian Bank in Cajamarca. This involves a great deal of time and expense. The Ag Bank is willing to accept loans notarized in the area but apparently the extension agents are not helping the farmers as much as they should. There are some cases where credit has been approved and the farmers never signed the final documents. The Ag Bank needs to be pressured, once again, by USAID in order to speed up the paperwork and work closely with the Office of Agrarian Reform in helping farmers to obtain the much needed credit. Credit is central to agricultural development and without it the agricultural development program will continue to be slow in getting started even on projects already completed.

5. USAID Supervision - There will be a line item change for this component (\$300,000). USAID and DGE have collaborated on this change and have agreed that the Supervision originally planned is not necessary because DGE is to construct the sub-projects under force account and not through the contracting of consulting firms. The funds will be transferred to construction to cover increased costs.

A summary of financial inputs from USAID follows:

<u>Measurement of Inputs</u>	<u>Programmed</u>	<u>Scheduled Target</u>	<u>Actual Disbursements</u>	<u>1/</u>
Technical Assistance	900,000	900,000	773,902	
Credit Fund:	1,000,000	800,000	36,707	
Studies:	1,902,000	1,902,000	375,248	
Equipment:	2,050,000	2,050,000	1,985,538	
Construction:	4,015,000	3,750,000	1,319,630	
Reforestation:	833,000	600,000	108,460	
Supervision AID:	300,000	275,000	-	
	11,000,000	10,277,000	4,619,715	

1/ As of 3/23/81

GOP

1.. Technical Assistance to Regional Project Offices and to Farmers
The DGE has been primarily concerned with construction of sub-projects. The Lima Office of the DGE has provided T.A. to the technicians of the Regional Offices in such areas as irrigation design, sub-project administration, sub-project implementation, and agricultural development, but DGE is constrained by a small Lima based staff.

In the past year, more emphasis has been placed on agricultural development. Technicians in farmer organization, credit, and extension have traveled from the Lima Office to both Regional Offices. However, these T.A. visits have been limited. A frequent complaint from the agriculture development technicians in both Regional Offices is a lack of technical backstopping and support from the Lima Office.

Technical Assistance to the farmers from the Regional Offices has increased during the past year. Each sub-project has an agricultural development staff to promote irrigation use, credit, and improved production practices. The staff is young, well trained and generally

lives and works directly within the sub-project areas but still lacks support. In each Regional Office there is a Director of agricultural development whose main function is to program and evaluate agricultural development activities of the sub-projects and to provide logistics support. Demonstration sites have been implemented in each sub-project and field days are held to promote improved agricultural practices with irrigation. Bulletins, technical publications, audio visual courses, training courses and radio programs have also been used to promote improved irrigation use.

2. Staff and Offices - The DGE has staffed two Regional Offices with professionals, technicians, and administrative personnel. Field offices are established for the sub-projects sites and staffed with construction and agricultural development personnel. These individuals usually live within the sub-project areas and receive low salaries. They are, however, well trained and making a sincere effort to carry out their duties and responsibilities. The number of technicians working in the field offices continues to be insufficient to provide the necessary agricultural development services. As more sub-projects are completed there will be an even greater need for extension personnel. The DGE is well aware of this problem and is trying to remedy the situation. It has been suggested that some of the personnel now involved in feasibility studies could be moved to agricultural development activities.

3. Local Cost Support for Research, Advisory and Evaluation Services Research activities initiated by LeRoy Salazar (CID) are continuing in Huancayo and Cajamarca. Research involves water use requirements of crops and pastures, double cropping, variety trials, and pasture improvement. Financial support for research activities has been minimal. The technical expertise for research in Huancayo is provided by the National Agricultural Research Institute and in Cajamarca by the National Technical University of Cajamarca. No financial support for advisory or evaluation services, as planned in the Project Paper, has been provided.

4. Credit Fund - The GOP has contributed \$14,000 toward the programmed amount. This fund is for on farm development as explained under the USAID credit input. In addition to the on-farm improvement credit to be used for levelling, rock removal, drainage, on-farm hook-ups, the Agrarian Bank has made available to beneficiaries of the sub-projects a fund for production credit for the purchase of seeds, fertilizers, insecticides, etc. The following table shows the advances in credit by sub-project as of November 1980:

<u>Sub-project</u>	<u>Requests in Process</u>	<u>Approved</u>	<u>Executed</u>
<u>Sierra Centro</u>			
La Huaycha	6	5	5
Chicche	-	2	2
Chupaca	46	5	5
Sub Total	52	12	12
<u>Sierra Norte</u>			
Chingol	-	-	-
Namora	-	-	-
Sub Total	-	-	-
TOTAL	52	12	12

Obviously credit for agricultural development is behind in Cajamarca. The projects are just beginning to enter the agricultural development phase. The Director of Agricultural Development in the Regional Office has assured USAID that a committee has been formed to work closely with the Office of Agrarian Reform and the Agrarian Bank in order to speed up the process.

A summary of financial inputs from the GOP follows:

<u>Measurement of Inputs</u>	<u>Programmed</u>	<u>Actual Disbursements 1/</u>
Credit Fund	2,000,000	14,000
Studies	886,000	1,209,800
Construction	3,481,000	1,575,800
Reforestation	233,000	3,499
Administration (including Agricultural Develop.)	3,400,000	1,330,701
	10,000,000	4,133,800

1/ As of 12/31/80

Outputs

Programmed outputs are not on target due to the problems discussed under inputs and the transfer of projects from DGA to DGE at the initiation of the Project. According to the Project Paper, 50% of the 27 sub-projects to be constructed would have been completed by mid-1980. Of the 23 sub-projects planned at the present time, only four sub-projects (17% of planned) have been completed, two (9%) are more than 90% completed, and four others (17%) are to be completed by December 1981.

1. Outputs such as new and improved irrigation canals, drainage systems and dams can only be measured for the 9 sub-projects completed or nearing completion. The following table does not include all sub-lateral and other infrastructure such as intakes which would complete the construction phases but does give an idea of progress.

	<u>Actual</u>	<u>Programmed</u>
<u>Sierra Norte</u>		
Chingol**	22.56 km. .492 (tunnel)	22.56 km .492
Namora**	3.45	6.9
Santa Rita	23.39	23.39
Carahuanga	2.18	4.50
Sub Total.	<u>51.58 km.</u>	<u>57.35 km</u>
<u>Sierra Centro</u>		
Chupaca	60.1 km.	65.34 km.
Apata	2.50	2.94
Yanacancha	2.4	2.5
La Huaycha*	7.22	7.08
Chicche*	140 has. (drainage) 21.15 (2 dams)	140 has. 21.15 2 dams
Sub Total	<u>93.37</u>	<u>99.01</u>
TOTAL	144.95	156.36

* Completed Projects.

** Namora is considered completed even though it is less than planned due to a fisheries project in the area.

2. Afforestation - Proper afforestation is necessary for the long term success of this project since it is needed to maintain irrigation structures, control erosion, and reduce runoff. The first Project evaluation found that afforestation activities had not proceeded as planned. USAID insisted that these activities be initiated with and throughout construction of irrigation works. On-site inspections by USAID in February demonstrated that tree plantings had begun but that DGE lacked the expertise and personnel to manage this aspect of the Project. Many trees planted under the supervision of Plan MERIS were semi-experiments in order to determine which tree species were more appropriate for differing topography, altitude, soils and geologic formations. There was also considerable loss due to drought, frost, and lack of maintenance. DGE has now signed an agreement with PRONAREF of the General Directorate of Forests and Fauna. USAID reviewed the agreement with PRONAREF and found it to be the best institution to continue these activities. Afforestation is now proceeding at a faster pace. Both Regional Offices now have forestry staffs that are concentrating their efforts on sub-projects already completed and under construction. They also have reasonable plans for future sub-projects. PRONAREF has established nurseries and is transplanting seedlings along the canals with community labor as originally planned.

It is extremely important that the forestry component be closely monitored by both USAID and the Regional Offices. Tree plantings must be done in conjunction with construction rather than after construction is completed and there has to be proper maintenance of seedlings until they are established. Consideration must also be given to future damage of cemented canals by root growth.

After reviewing PRONAREF plans and budgets for equipment and supplies, it seems they are playing "catch-up" to the extreme and perhaps could use much of their budget in these initial activities and not have enough for projects to be completed at a later date. Because PRONAREF is just beginning their activities, and from impressions gathered at on-site inspections of tree plantings, it would be advisable to have an evaluation of PRONAREF activities in August in order to measure progress, efficiency, and number of trees actually surviving.

3. Regional Offices in Huancayo and Cajamarca have been established and staffed. As recommended by last year's evaluation, the Regional Offices have been given more autonomy and authority in making

decisions at the regional level. The personnel are competent and have responded well to increased responsibility.

As the agricultural development activities increase in importance, an organized and detailed method of reporting field data in annual and possibly semi-annual reports should be established. Problems in comparisons arise when field offices of each regional office use different reporting methods. The annual report from the Huancayo Office is fairly complete whereas the Cajamarca Office has yet to prepare one. More emphasis needs to be placed on presenting production data in a simplified manner comparing yields under the project with yields using traditional methods. From these data, the actual project impact can easily be measured. The Lima Office should provide the necessary guidance to correct the situation.

4. On-farm development investments are in operation in the Chicche, La Huaycha, and Chupaca sub-projects (See Inputs Credit).

5. Watershed Planning Studies of the two valleys of the Project area were completed and approved by USAID in 1978.

6. Sub-project feasibility studies have been completed for 18 sub-projects with 6 in progress. Private consulting firms were contracted to complete nine of the studies with the intent to accelerate feasibility study preparation. The economic analyses of the studies were not uniform and required their resubmission to USAID. Consequently, the sub-contracting did not increase the pace of study preparation.

The first evaluation suggested that Plan MERIS put primary emphasis on specific construction plans and less emphasis on agricultural analyses already covered in the Watershed Planning Studies. Apparently this suggestion was not carried through because Plan MERIS continues to prepare detailed studies which slow study time.

Purpose

The purpose of the project is to improve water and land use in the project area of Cajamarca and Mantaro.

The EOPS conditions as stated in the Project Paper will not be met by PACD. Initial delays in project implementation and delays in equipment arrival influenced start-up, but high projected construction costs will limit the number of sub-projects to be constructed.

Furthermore, the time required for sub-project feasibility study development and subsequent construction has been greater than expected.

The impact of agricultural development activities on projects under construction and completed projects has not fully been realized. Progress can still be measured and is as follows:

- 1) Increase in land under irrigation or with improved irrigation: 3,184 has. of the 27,013 planned at this time, are under new or improved irrigation. By August 1981 another 4,368 has. will be under irrigation due to the project.
- 2) Increase in total production: Total production has been increased through double cropping in completed sub-projects. For example, farmers in La Huaycha are now harvesting a fresh corn crop and a horticulture crop in one year using irrigation. Some farmers are harvesting three horticulture crops per year. At Chicche farmers are able to harvest two potato crops per year, one for seed potato sale on the coast, the other for local consumption and sale.
- 3) Average increase in crop yields: Crop yields have been increased due to irrigation and improved agricultural practices (Table 1). Yields of selected crops under irrigation increased an average of 57% and 122% over traditional methods without irrigation in the Chingol and Namora sub-projects, respectively. After one year of irrigation use and improved agricultural practices, yields approached an average increase of 104% and 91% over those predicted by the Chupaca and La Huaycha studies, respectively (Table 2). Increased yields are due to the application and proper use of irrigation as well as a function of improved varieties, agronomic practices, and pest control.
- 4) Average increase in length of growing season: On a demonstration plot basis, trials indicate that the growing season has been lengthened due to supplemental irrigation. Double cropping reported in 2 above supports the demonstration results.
- 5) More optimal cropping patterns: The production of high value horticulture crops and improved rye-grass/clover pastures in areas that formerly produced traditional sierra crops and pastures indicate that more optimal cropping patterns are being obtained due to the project.

TABLE 1

C r o p s .	C h i n g o l		N a m o r a	
	KG/Ha. <u>Traditional</u>	KG/Ha. <u>With Irrigation</u>	KG/Ha <u>Traditional</u>	Kg/Ha <u>With Irrig.</u>
Papa.	8,000	12,000	4,500	10,000
Yuca.	7,000	10,000	-	-
Camote.	4,000.	8,000	-	-
Maiz.	950	1,800	700	2,500.
Trigo	1,000	1,000.	800	1,600.
Frijol	700.	1,100	750	-
Arveja:	700.	1,200	750	1,300.
Hortalizas.	3,000.	-	-	-
Lupino.	-	-	750	1,200

TABLE 2.*

	C h u p a c a		L a H u a y c h a	
Papa.	9,000	10,500	12,000	10,500
Maiz	8,500	7,600	2,500	2,160
Trigo	1,800	2,100	2,400	1,880
Cebada	-	1,900	2,500	2,320
Quinoa	-	700	-	-
Habas verdes	4,500	5,150	5,500	4,750
Arvejas verdes	3,500	3,860	4,500	4,000
Hortalizas	13,000	14,120	12,000	14,000

* Figures based on agricultural development reports from regional offices.

6) Reduction in soil loss from erosion: No data are available but it can be assumed that there has been a reduction due to better cropping patterns and afforestation. Project personnel should begin to collect data on a long term basis in order to determine erosion reduction.

7) Increase in the efficiency of water use: Recommendations for timing and amounts of irrigation water needed for various crops and pastures have been developed by the agricultural research units. The agricultural development technicians are providing this information to farmers through bulletins, field days and demonstration sites. In the completed sub-projects, Irrigation User Committees are being formed to help monitor water use and keep the canals in repair.

8) A financial analysis (See Table 3) was conducted in order to determine with reasonable approximation the total amount of funds needed to complete construction of the 13 sub-projects already approved by USAID and compare the total with funds originally programmed. The analysis was based on total expenditures made on completed projects and projecting costs for projects under construction or on those which construction has not yet started. A time frame schedule to complete construction was prepared. With this information the total amount of sales needed was calculated using a monthly inflationary rate of 5% as an escalation factor for construction.

The new amount calculated for construction costs to be committed by AID is \$4,967,200 for only those 13 projects approved at this time. The original amount programmed for total construction costs for these and projects still to be approved is 4,015,000. Obviously funds will have to be reprogrammed and line item changes made possibly from Studies and Supervision. It is doubtful that all 23 projects planned can be funded by USAID. All sub-projects need to be ranked taking into consideration cost/ha, number of beneficiaries, and time needed to complete construction.

Similar small and medium irrigation projects are being conducted by the German Government (Plan MERIS II) and IDB (Linea Global). Cost/ha. is averaging \$1,080/ha. and \$1,227/ha, respectively. Based on actual and projected costs for Plan MERIS I sub-projects, average costs are \$638/ha.

9) Tables 4 and 5 summarize the present status of the sub-projects being administered by the two regional offices. The Watershed Planning Studies originally identified 31 potential sub-projects for

TABLE 3 - ESTIMATED COSTS OF SUB PROJECT CONSTRUCTION

Sub-projects	Termination Date	Construction Costs as of Dec. 80			Estimated Final Cost		
		A.I.D.	G.O.P	TOTAL	A.I.D.	G.O.P	TOTAL
1. Cuingol	Mar. 1981	290,800	513,600	804,400	-	54,700	54,700
2. Chicche	Mar. 1979	217,300	121,700	339,000	-	-	-
3. La Huaycha	Set. 1979	69,500	67,400	136,900	-	-	-
4. Namora	Dec. 1980	50,400	209,500	259,900	-	-	-
5. Chupaca	Oct. 1981	229,200	409,100	638,300	429,900	81,600	511,500
6. Santa Rita	Apr. 1981	47,200	99,800	147,000	72,400	43,300	115,700
7. Apata	Dec. 1981	56,800	8,200	65,000	447,200	129,600	576,800
8. Carahuanga	Dec. 1981	35,100	1,500	36,600	264,300	75,500	339,800
9. Yanacancha	Dec. 1981	46,700	5,200	51,900	313,600	79,200	392,800
10. Tabacal/Amarcucho	Dec. 1981	63,900	-	63,900	306,100	129,300	435,400
11. Cholocal	May 1982	31,900	-	31,900	536,500	257,000	793,500
12. Carrizal-La Grama	May 1982	42,200	2,100	44,300	351,500	178,000	529,500
13. Huasahuasi	Dec. 1982	-	-	-	062,800	384,400	1,447,200

TABLE 3 - (Continuation)

Sub-Projects	Estimated Final Cost			Amount Committed by A.I.D.	Balance	New Amount To be Committed by A.I.D.
	A.I.D.	G.O.P	TOTAL			
1.	290,800	568,300	859,100	230,000	- 60,800	291,000
2.	217,300	121,700	339,000	170,000	- 47,300	217,300
3.	69,500	67,400	136,900	100,000	+ 30,500	69,500
4.	50,400	209,500	259,900	200,000	+149,600	50,400
5.	659,100	490,700	1,149,800	300,000	-359,100	660,000
6.	119,600	143,100	262,700	170,000	+ 50,400	120,000
7.	504,100	137,700	641,800	350,000	-154,000	504,000
8.	299,400	77,000	376,400	250,000	- 49,400	300,000
9.	360,300	84,400	444,700	220,000	-140,300	360,000
10.	370,000	129,300	499,300	250,000	-120,000	370,000
11.	568,400	257,000	825,400	360,000	-208,400	568,000
12.	393,700	180,100	573,800	200,000	-193,700	394,000
13.	1,062,800	384,400	1,447,200	950,000	-112,800	1,063,000
	<u>4,965,400</u>	<u>2,850,600</u>	<u>7,816,000</u>	<u>3,750,000</u>		<u>4,967,200</u>

TABLE 4

S I E R R A N O R T E

<u>P r o j e c t</u>	<u>Study Status</u>	<u>Work Status</u>	<u>Begin Work</u>	<u>Terminate Work</u>	<u>Prog Has.</u>	<u>Fam. Ben.</u>	<u>Est. Final Cost</u>	<u>Cost/ha.</u>
1. Chingol	100%	100%	Feb. 79	March 81	1460	250	859,100	588
2. Namora	100%	100%	Aug. 79	Dec. 80	500	315	259,900	520
3. Santa Rita	100%	91%	Apr. 80	May 81	617	637	262,700	426
4. Carahuanga	100%	15%	Sept 80	Dec. 81	970	556	376,400	388
5. Granja-Porcon	98%	-	Apr. 81	May 82	403	38		
6. Carrizal-La Grana	100%	-	Nov. 80	May 82	683	356	573,800	840
7. Cholocal	100%	-	Nov. 80	May 82	655	255	825,400	1260
8. Tabaca-Amarcucho	100%	-	Nov. 80	Dec. 81	522	34	499,300	957
9. San Marcos	85%	-	Aug. 81	Dec. 82 est	600	68		
10. Malcas-Huayo	45%	-	Aug. 81	Dec. 82 est	2080	272		
11. Cajabamba	100%				1116	302		
12. Matara	63				2097	119		
					SUB-TOTAL: 11703 3202			

TABLE 5

S I E R R A N O R T E

<u>P r o j e c t</u>	<u>Study Status</u>	<u>Work Status</u>	<u>Negin Work</u>	<u>Terminate Work</u>	<u>Prog Has.</u>	<u>Fam. Ben.</u>	<u>Est. Final Cost</u>	<u>Cost/ Ha.</u>
1. Chicche	100%	100%	Oct 77	Mar. 79	664	350	339,000	496
2. La Huaycha	100%	100%	Feb 79	Sept 79	540	620	136,900	254
3. Chupaca	100%	100% ^{1/}	Sept 79	Aug 81	3751	3771	1,149,800	307
4. Apata	100%	10%	Nov 80	Dec 81	650	993	641,800	987
5. Huasihuasi	100%	-	May 81	Dec 82	420	590	1,447,200	3446
6. Yanacancha	100%	8%	Nov 80	Dec 81	700	350	444,700	635
7. Ullapata ^{2/}	100%	-	May 81	Dec 82	720	682		
8. Sicaya	100%	-	Jul 81	Dec 82	4400	1875		
9. Sincos	100%	-	Apr 81	Dec 82	460	230		
10. Leticia-Cochas	23%				1320	1500		
11. Jauja	90%				1500	1090		
12. Cotosh	100%		Jul 79	Nov 80	885	980		
SUB-TOTAL:					15,310	12,349		

^{1/} 100% of main canals completed but only 51% of laterals and other works.

^{2/} Study completed but no longer considered for USAID funding.

construction totalling 36,607 has. At this time, only 23 are planned totalling 27,103 has. Sub-project Ullapata was completed at the study stage but Plan MERIS has decided to complete this project at a later date without USAID funds. Final cost estimates have been included for those projects studied through the financial analysis and a cost per hectare for those particular projects is also included. Many of the projects in both regions will not be completed until late 1981 and 1982. This does not include the agricultural development phase time required after construction which, based on past experience, takes at least one year to be operative. These tables, in conjunction with the financial analysis, will be useful in determining which sub-projects will take priority when considering construction time, cost, and number of beneficiaries. An extension of two years is recommended at this time in order to reprogram funds, determine which projects should be completed, and complete agricultural development activities.

Goal/Subgoal

Not pertinent at this time.

Beneficiaries:

The direct beneficiaries of this Project as it is now planned are the 15,551 small farm families residing in the sub-project areas. These limited resource farmers will benefit from an increase in agricultural productivity and farm incomes (as already demonstrated in sub-projects completed) as a result of this project. The indirect beneficiaries are the landless poor in the rural Sierra who will be employed in the construction of the sub-projects and in afforestation activities. Employment opportunities will also be created in agricultural related activities such as farm labor and marketing and processing of agricultural products. The general population of the rural Sierra will benefit from an overall increase in food production at the successful completion of this project. Each sub-project feasibility study contains data of socio-economic parameters such as: population density, incomes, population movement, land ownership, crop yields, production costs and technological levels of production. These data will serve as a basis for comparison in measuring project impact. The GOP has assigned social scientists to begin gathering these data as the sub-projects are completed and the agricultural development activities initiated. There should be more emphasis placed on gathering these data now that more sub-projects are being completed so that over the next year a more informed assessment of socio-economic impact can be made.

Recommendations

1. A prioritization of sub-projects planned should be completed before further construction begins.

2. The project budget should be reprogrammed in order to cover construction costs of planned sub-projects.

Action: Project Manager, Implementation Officer, and a Mission Economist.

3. As more sub-projects are completed, DGE needs to put more emphasis on agricultural development by placing more extension personnel in the Regional Offices and providing more support for research, advisory, and evaluation services.

Action: Letter USAID/Director to Director Superior, MinAg.

4. The Regional Offices need to emphasize the availability of the Credit Fund to the farmers and the processing of these loans needs to be accelerated.

Action: Letter USAID/Director to Director, Banco Agrario.

5. Check with GOP to assure that requisite socio-economic data is being gathered to permit measurement of project impact.

Action: USAID Project Manager.

6. AID should review the afforestation plans for the two project areas now being done by PRONAREF within six months.

Action: USAID Project Manager.

7. A follow-up evaluation of the project needs to be conducted in the fall, possibly by a Contractor.

Action: Program Office.

8. A two year extension of the PACD is necessary in order to complete project activities.

Action: USAID Project Manager.