

PD-AAU-932  
51031

UNCLASSIFIED  
CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) - PART I

Report Symbol U-447

1. PROJECT TITLE  RURAL WATER AND SANITATION PROJECT			2. PROJECT NUMBER  632-0088	3. MISSION/AID/W OFFICE  USAID/Lesotho
6. KEY PROJECT IMPLEMENTATION DATES			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>632-85-6</u>	
A. First PRO-AG or Equivalent FY <u>79</u>	B. Final Obligation Expected FY <u>85</u>	C. Final Input Delivery FY <u>87</u>	<input type="checkbox"/> REGULAR EVALUATION <input checked="" type="checkbox"/> SPECIAL EVALUATION 7. PERIOD COVERED BY EVALUATION From (month/yr.) <u>July 1981</u> To (month/yr.) <u>June 1983</u> Date of Evaluation Review	
G. ESTIMATED PROJECT FUNDING				
A. Total \$ <u>14,003,500</u>				
B. U.S. \$ <u>12,142,100</u>				

B. 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

1. The TA team should accelerate the institutionalization of the WSS, with a gradual diminishing of their active operational role.	USAID Project Officer; USAID Chief of Party	Continuing
2. A project budget should be prepared by the TA team showing estimate of proposed expenditures by line item over life of project including a reasonable contingency for approved expenditures.	USAID Project Officer; USAID Chief of Party	January 1984 with annual update
3. In lieu of latrine construction as presented in the Project Paper, the project should provide materials within budgeted amount of \$100,000 for the UN to undertake the construction of latrines and washing slabs in coordination with WSS and Ministry of Health.	USAID Project Officer; USAID Chief of Party	January 1984
4. The health educator's tour of duty should be extended for another full year. If he is not available, another health educator ought to be hired for the additional year.	USAID Project Officer	July 1984
5. Project funds should be made available to train two health workers from each of the 200 villages supplied with water systems, and for an epidemiologist to conduct a baseline study on health-water linkages.	USAID Project Officer; USAID Chief of Party	January 1984
6. AID should increase the value of the existing waiver to allow for additional purchase of materials and spare parts from Code 935 countries.	USAID Project Officer	As required.

B. 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.  Continue Project Without Change  
 B.  Change Project Design and/or  Change Implementation Plan  
 C.  Discontinue Project

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

Neal Cohen, USAID-Swaziland, Team Leader, Economist  
 Charles Debose, USAID-Swaziland, Asst. Leader, Health Sci.  
 Rosalie Fanale, REDEO-FA, Social Scientist  
 Clarence Groocman, USAID-Zambia, Engineer  
 William Osborne, Consultant, Water Well Driller

12. Mission/AID/W Office Director Approval

Signature: *Edna A. Boorady*  
 Typed Name: Edna A. Boorady  
 Date: January 15, 1984

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

- |  |   |            |
|--|---|------------|
| 7. Existing technology needed for the project does not justify additional long term training in the U.S.   | USAID Project Officer; USAID Chief of Party | Immediate  |
| 8. Short term management training should be given to selected mid and upper level VWS officials.   | USAID Project Officer                       | Continuing |
| 9. The Mission should have periodic high level discussions with the MOH and MCRD regarding the health and social aspects of the village water systems.   | USAID Project Officer                       | Continuing |
| 10. The Mission should continue monitoring the GOL's ability to provide financial support for the project.   | USAID Project Officer; USAID Chief of Party | Continuing |
| 11. Undertake a study to consider desirability/feasibility of contributions from villagers for support of major maintenance costs.   | USAID Project Officer; USAID Chief of Party | Continuing |
| 12. Health Education   |   |            |
| Improve coordination between MCRD, MOH, USAID, VWS and Project to identify and prioritize health-water linkages. Following KAP study and that of epidemiologist (see 5 above) develop a health component implementation strategy for achieving the health outputs of the project. A meeting should be held at least semi-annually or more often as needed. | USAID Project Officer; USAID Chief of Party | Continuing |
| 13. A social scientist should be contracted with for a three month period to undertake a study of (a) current VWS procedures to organize villagers for water system management, (b) options to increase user payments and contributions for system construction, operations and maintenance.   | USAID/REDSO                                 | March 1984 |

## ABBREVIATIONS

CIDA	Canadian International Development Agency
DRDO	District Rural Development Officer
EEC	European Economic Community
GOL	Government of Lesotho
IVS	International Voluntary Service
KAP	Knowledge, Attitudes and Practice
M	Maloti
MCRD	Ministry of Cooperatives and Rural Development
MOH	Ministry of Health
RSA	Republic of South Africa
VWS	Village Water Supply
VWSS	Village Water Supply Section

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EXECUTIVE SUMMARY

PREPARED BY: Fred Zobrist/Mulugeta Yohannes, USAID/Lesotho

DATE : October 1, 1983

PROJECT : Rural Water and Sanitation (632-0088)

COUNTRY : Lesotho

COST : \$12,142,100

I. What constraint did this project attempt to relieve?

The project is attempting to relieve the scarcity of water, the prevalence of water-borne and water-related diseases, and time wasted and energy expended on water collection.

II. What technology did the project promote to relieve this constraint?

The project is promoting the use of single hand pumps to draw water from wells, and gravity type supply systems from spring sources, utilizing very simple design and construction technologies. These are improvements over the traditional source and method of collection of water.

III. What technology did the project attempt to replace?

The project is attempting to replace the arduous traditional way of carrying water over long distances, the use of contaminated water from unprotected water sources of springs and the use of rope and pail to draw water from hand-dug wells.

IV. Why did project planners believe that intended beneficiaries would adopt the proposed technology?

Project planners believed that eliminating or minimizing the hardships of water collection as well as attending to the scarcity and unimproved quality of water would easily be perceived and recognized by the beneficiaries thereby facilitating the adoption of the proposed technology. The simplicity of the proposed technology was also a good ground for its adoption by the beneficiaries.

V. What characteristics did the intended beneficiaries exhibit that had relevance to their adopting the proposed technology?

Literacy level amongst the rural poor is relatively high (about 50%) when compared to that of many other developing countries. Hence the training component built-in the project to promote the proposed technology is being easily perceived by the waterfinders and the rural populace in general.

On a higher technical or mechanical level, substantial portions of the rural population have been exposed through the labor market to modern technologies that exist in Lesotho and the Republic of South Africa. Many artisans such as drilling mechanics and operators, plumbers, and masons are currently serving in the project.

- VI. What adoption rate has this project achieved in transferring the proposed technology?

The adoption rate of the project is very high. At the start of the project, there were some 20 applications from local communities for some form of water supply facilities. Currently, some 1100 such applications have been received by the project. At the moment, the project is working on a priority basis to select projects for immediate execution and more applications are flowing in.

- VII. Has the project set forces into motion that will induce further exploration of the constraint and improvements to the technical package proposed to overcome it?

Yes, the project has mobilized the self-interest forces of the people to the extent that more people have come up with cash contributions to have water supply systems installed in their villages. However, no improvement on the technical package proposed has as yet been induced.

- VIII. Do private input suppliers have an incentive to examine the constraint addressed by the project and to come up with solutions?

The private sector is not involved at the moment, but its interest may be revitalized thru this grant assistance project. The promoted technology opens a chance for the participation of the private sector. Pumps, storage tanks, etc., could be manufactured locally.

- IX. What delivery system did the project employ to transfer technology to intended beneficiaries?

The project has provided a six-man TA team to coordinate and direct the project. Further in-country and participant training programs were built into the project. On the field level, waterminders, masons, etc., were formally trained. Seminars and gatherings were also utilized to transmit knowledge and ideas.

- X. What training techniques did the project use to develop the delivery system?

The training techniques used are on-the-job training, formal training to supervisors, masons and waterminders, and technical training in the technical schools of the country. Participant training was also conducted in the U.S. (See answers to Question IX.)

So far, approximately 60 masons, 20 foremen, 7 mechanics, 350 waterminders, six senior technical officers (STO) have been trained locally. Three students are enrolled in a U.S. university and are expected to finish their degree work in 1985.

- XI. What effect did the transferred technology have upon those impacted on it?

Although it is too early to quantify, the transferred technology is nonetheless relieving the rural poor from the hardships of carrying and collecting water, and from the hazard of water-borne and water-related diseases. Further, the technology is greatly desired and the project is one of the most popular donor programs in Lesotho. To date over 23,000 villagers have benefited from the project.

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6083

EVALUATION

RURAL WATER AND SANITATION PROJECT

632-0088

PROJECT EVALUATION SUMMARY

MASERU, LESOTHO

17 JUNE 1983

### 13. Executive Summary

In 1979 AID approved and funded a grant of \$12,142,000 to the Government of Lesotho (GOL) for a Rural Water and Sanitation Project. Its goal is to assist the GOL in improving the health and basic living standards of Lesotho's rural poor, who comprise approximately 94% of the population. The provision of safe and adequate water supplies to thousands of rural villagers, along with institutional development of the Village Water Supply Section (VWSS) of the Ministry of Cooperatives and Rural Development (MCRD) are principal focuses of the project.

As stated in the PP, the purpose of this project is to assist the GOL in developing the institutional capacity of the VWSS to design, construct, and maintain new and existing rural water supply systems which adequately reflect health and sanitary education considerations. To reach this purpose, the project has five specific outputs:

1. Twenty-three Basotho trained and assigned to positions within VWSS by the end of the project;
2. 142 new water systems and 68 reconstructed systems installed by the end of the project;
3. 547 village waterminders trained and provided with basic tool kits by the end of the project;
4. One regional and three district maintenance centers constructed and operating by the end of the first year of the project; and
5. Health Education Coordinator functioning within MCRD, in cooperation with MOH, to improve coordination on health and sanitary aspects of installing and maintaining rural water supply systems.

Two years after the TA team had been in the field, the Evaluation Team found:

1. Thirty-one Basotho trained, and assigned positions in VWSS;
2. By May 1983, 31 AID-funded systems reaching 17,200 people constructed, with 29 projects under construction expected to reach 20,000 people;
3. 217 village waterminders trained and provided with basic tool kits, with 100 scheduled for 1983;
4. One regional and three district maintenance centers constructed and operating with a vehicle maintenance center nearing completion.

By any standards of water supply design, construction and maintenance, this is a successful water project. The Evaluation Team attributes the success to these factors:

1. The Technical Assistance (TA) team is very good;
2. The counterpart staff assigned to the TA team appears to be well-qualified;
3. The recruitment of staff and in-house training is excellent; and
4. Commodity procurement has been implemented in a timely manner.

The major benefit to villagers served by new systems is increased access to a more reliable water supply which brings a saving in time and energy expended on water collection. Benefits of improved health cannot be assumed at this time. The project should directly benefit up to 20 percent of the rural population by 1988.

The evaluation recommendations center around the institutionalization of the project - training Basotho to take over as many aspects of project work as possible, as soon as possible. We also make recommendations to insure that some of the potential health benefits are realized by the project. Finally, there are a few technical recommendations involving a well drilling advisor, greater use of the private sector, and the development of contingency plans to deal with possible GOL financial difficulties and the GOL's inability to promote people as required after they successfully complete training.

The next phase of this project is the institutionalization of project activities. This phase will be difficult but the Evaluation Team is confident that the contractor will do everything possible to guarantee the ability of Basotho to take over village water system design and management.

#### 14. Evaluation Methodology

This external evaluation was held at the end of the second year of the project, as stipulated in the Project Grant Agreement, to (1) assess progress in achieving project output and purpose and meeting Two-Year Work Plan predictions, (2) identify problem areas which may cause the project not to reach its intended purposes, (3) assess the effectiveness and significance of the project, and (4) recommend changes in work plan or design which are likely to improve project performance and impact.

According to the scope of work prepared by the Mission, the evaluation team was to pay particular attention to social, health and economic --in addition to engineering-- aspects of project performance and impact. Accordingly, the evaluation team was composed of:

Neal Cohen	USAID/Swaziland	Team Leader/Economist
Charles DeBose	USAID/Swaziland	Assistant Leader/Health Scientist
Rosalie Fanale	REDSO/ESA	Social Scientist
Clarence Groceman	USAID/Zambia	Engineer
William Osborne	Consultant	Water Well Driller

Mulugeta Yohannes, Engineer, USAID/Lesotho, assisted the team. The evaluation was carried out from June 6 to 17, 1983.

Evaluation methodology included interviews and meetings with persons associated directly or indirectly with the project, as well as review of project documentation and reports. Visits were made to project sites in Mafeteng, Mohale's Hoek, and Quthing Districts, where the team saw village water systems completed and under construction and traditional water sources; spoke with and observed the work of VWSS staff; met with District representatives of the Ministry of Cooperatives and Rural Development and the Ministry of Health; and held discussions with some village water committee members and individual users of water supplies. The team also visited regional and district facilities constructed as part of the project. Discussions were held with representatives of the EEC and UK to ascertain the degree of donor coordination. The team met with officials in the Ministries of Cooperatives and Rural Development, Health and Finance. Attachment A on the next page is a list of persons contacted and villages visited in the course of the evaluation. Team findings were discussed with key persons in the GOL, USAID/Lesotho, and Morrison-Maierle, Inc.

ATTACHMENT A

PERSONS CONTACTED

Morrison-Maierle, Inc.

David Wadsworth	Project Manager
William Arnold	Maintenance Engineer
Alan Tudor	Construction Engineer
Phil Howard	Health Education Coordinator

Ministry of Cooperatives and Rural Development

S.T. 'Mota	Permanent Secretary
William Lesaoana	Chief Engineer, Village Water Supply Section
Uli Graf	Senior Engineer, VWSS
Molebatsi Ntja	Engineer, VWSS
Ben Rafoneke	Mechanical Engineer, VWSS
Mr. Mohapi	District Rural Development Officer, Mafeteng
Mr. Morai	Rural Development Officer, Mafeteng
Ian Freilyng	Engineer, VWSS (IVS Volunteer)
Brian Rush	Engineer, VWSS (IVS Volunteer)

Ministry of Health

Ms. N.T. Borotho	Chief Health Planning Officer
Dr. A.P. Maruping	Director of Health Services
Dr. J. LaRose	Physician Trainer, Lesotho Rural Health Development Project
Ms. M. Ivy	Health Center Coordinator, Tsa Kholo Area
Mr. F.T. Mosoang	Health Educator
Mr. K. Ntoampe	Health Educator
Mr. C. Webster	Technical Advisor, EPI, WHO
Ms. Mpeta	Village Health Worker, Nurse Clinician Tutor
Ms. Thakhisi	Principal Nursing Officer, Public Health
Mr. Petlane	Chief, Health Education Unit
Mafeteng District Health Education and Coordination Team	

Donor Representatives

Brian Robertson	British High Commission
Jean deRyckman deBetz	EEC

USAID/Lesotho

Edna A. Boorady  
Tom Friedkin  
Fred Zobrist  
Tony Cully

Mission Director  
Deputy Mission Director  
Chief Engineer, Project Manager  
Controller

Other

Steven Esrey  
Judith Gay  
John Gay

Epidemiologist  
Social Scientist  
Social Scientist

Villages Visited

Mafeteng District

Mapotu  
Tsakholo  
Ha Patsa (Maphathe)  
Joele  
Khatleng  
Sekameng

Mohale's Hoek District

Siloe  
Maphutsaneng  
Blue Gums

Quthing District

Villa Maria

15. External Factors

The table summarizes the demands made by the project on the GOL recurrent budget. The PP was written in 1979, to Two Year Work Plan's figures were calculated in January 1982, and the Second Annual Report in April 1983. ✓

RURAL WATER AND SANITATION BUDGETS  
in thousands of U.S. dollars

	<u>2 YEAR WORK PLAN</u>			<u>2ND ANNUAL REPORT</u>
	<u>Project Paper</u>	<u>Total Project</u>	<u>Est. of Expenditures Thru 4/83</u>	<u>Expenditures Thru 4/83</u>
Support for Maintenance Program	761	1329	90	30
Administrative Support	374	255	48	19
Lands, Roads, etc.	71	71	71	170
Furnishings	24	29	29	33
Village Self-Help	368	368	37	244
POL	0	642	89	58
TOTAL GOL Contribution	1597	2693	364	554
As % of Total Project Spending	11.6%	17.7%	6.2%	13.6%

Recognizing that Lesotho is one of the least developed countries, and has recurrent budget difficulties a waiver of the 25% minimum host government contribution to a project was sought from AID/W and received. The GOL's contribution to vehicles operation, in the form of petrol, oil and lubricants (POL) was not included in the PP, but was added in the first Two Year Work Plan. The Work Plan estimated that POL would amount to 23.8% of all Basotho contributions. To date it appears that total Basotho contributions will be above the PP level, but this is because the contributions in the form of POL and village self-help are greater than anticipated.

The Project Paper had the GOL picking up an increasing proportion of the maintenance expenditures each year. The Two Year Work Plan estimated maintenance and project support expenditures of \$133,400 by September 1983 (approximately \$90,000 through April 1983).

The GOL budgetary deficit which first emerged two years ago was estimated to be M59.8 million (16% of GDP) in 1981/82. Most of the deficit is financed by borrowing in South Africa and locally at commercial rates. From 1979/80 to 1981/82 revenues increased 21% while expenditures increased 102%. In large part, the deficit can be attributed to the GOL's inability to control growth of expenditures in face of declining growth rates in revenues. Because of the high level of debt, it is expected that the recurrent budget problems will grow more severe in the next few years.

Thus, while the GOL views the provision of water to the villages as vitally necessary, and one of its highest priorities, its ability to provide financial support for certain line items is likely to be less than anticipated in the PP. This includes not only the ability to take over the operation of the project in 1988, but also the ability to make anticipated GOL project contributions. The GOL may be unable to purchase vehicles for the project when the USAID-purchased ones need replacement. It probably will not be able to provide the level of support necessary to purchase spare parts, perform regular vehicle and water system maintenance and possibly fund all the local staff promised in the PP and the Two Year Work Plan.

The project ought to develop contingency plans to deal with probable shortfalls and these ought to be more than shutting down operations, possibly including reduction of selected line items to provide funds for system/vehicle maintenance. These should be vetted by USAID/Lesotho.

## 16. Inputs

### A. Progress

The first project evaluation (May 1982) listed a number of deficiencies. As described in the Second Annual Report, the status of these problems in May 1983, was as follows:

1. "Deficiency: Establish and select counterparts.  
Action: All appointments have been made." (There is technically no counterpart for the Project Manager (PM) although the head of VWS works with the PM.)
2. "Deficiency: Establish and fill positions required for project implementation.  
Action: In July 1982, GOL approved the establishment of 43 new positions of which 36 qualify for project salary support. Candidates were recommended from VWS established employees qualified to be promoted and from daily paid (temporary) employees qualified for establishment and/or promotion. After 8 months some promotions have been approved. No daily paid employees have yet been brought into establishment."
3. "Deficiency: Implement a stronger budgeting system.  
Action: This has been accomplished."
4. "Deficiency: Implement a system to effectively use village monetary contributions for maintenance.  
Action: No practical system has yet been devised owing, in part, to government regulations. First, the Ministry is not authorized to collect revenues. Second, funds collected for spare parts do not revert to VWS but are

channeled into a general government fund. One solution to this problem is for a supplier to bill the village water committee directly, but this is effective only in the case of major repairs." (The Evaluation Team urges renewed effort to establish a VWSS village supported main finance fund and feels that this system should be used for minor and major repairs.)

5. "Deficiency: Improve financial management control."

Action: A financial control and reporting system has been established for project allotments and expenditures that is acceptable to USAID. These reports are made monthly and quarterly to the USAID Controller."

Below is a detailed review of contractor progress to date in providing technical assistance, training, construction, commodities and health-related inputs.

#### B. Technical Assistance

The AID-funded contract support staff, with counterparts, consists of:

- D.L. Wadsworth, Project Manager (1988)/ Counterpart - none\*
- W. Arnold, Maintenance Engineer (1985)/ Counterpart - B. Rafoneke, VWS Mechanical Engineer
- A. Tudor, Design and Construction Engineer, Mohale's Hoek (1986)/ Counterpart - M. Ntja
- R. Johnson, Financial Specialist (1984)/ Counterpart- B.K. Sefako, Senior Accountant
- P. Howard, Health Education Coordinator (1984)/ Counterpart - T. Mosoang, Health Educator

( ) indicates completion of assignment.

\* K.W. Lesaoana, Senior Engineer, VWS, is in charge of the VWS. The TA team performs in an operating capacity and, as such, is responsible to the GOL through Mr. Lesaoana.

The project manager arrived in-country in May 1981. The balance of the team arrived within the next two and one-half months. The quality of the AID-funded technical assistance team is very good. Their time assigned to the project appears to be of sufficient length to construct the water systems outlined in the Project Paper. However, it appears that the development of institutional capacity will not be met at the pace envisaged in the Project Paper.

The counterpart staff assigned to the team appears to be well-qualified; however, it will take time for this staff to gain the necessary experience to manage the construction and maintenance on a continuing basis.

Other donor-funded support staff for the VWSS consists of 8 Swiss, 2 U.S. Peace Corps Volunteers, 3 Danish, and 2 IVS volunteers. Donor funds also come from the UK, EEC, Canadian and Saskatchewan governments. The UN provided hand pumps for testing purposes.

Disciplines covered by these personnel range from regional engineer to village engineer coordinator, to supervisor of hand pump installation. These personnel are generally well-qualified, motivated and perform satisfactorily. Experienced personnel from donor organizations will be needed by the VWS for several years beyond the end of this project, because of the lack of qualified and experienced Basotho available to fill the positions.

### C. Training

The Project Paper included funds to send three people to the U.S. for Bachelor's Degrees in civil engineering. They began their studies in September 1981 at Montana State University and are expected to complete a B.S. no later than September 1985.

While they all began training leading to a B.S. in civil engineering, one person transferred, because of low math grades, to a B.S. in construction engineering technology. This change was approved by USAID and the project. All the trainees have had problems adjusting to the severe Montana winters, and have had social problems. All are progressing reasonably well, but none have high grade point averages (ranging from a C to a C+/B- average).

Because they were all lonely they asked permission to return, at project expense, for the summer 1983 quarter. This was rejected and they were "devastated." One is paying his own way back. The other two will take the summer quarter away from Montana for a "change of scenery."

The Evaluation Team feels that the Mission ought to explore how the MSU students can be brought back to Lesotho for the MSU winter 83/84 quarter. This will enable the students to work with VWS thus improving student motivation, helping them better understand the value of their education, their relationship to VWS and future employment possibilities. It also helps them avoid one Montana winter and improves the likelihood of their working for VWS when their studies are complete. (Some of the students probably blame the USAID VWS project for the rejection of their request to travel, at U.S. Government expense, to Lesotho in June 1983.)

Six graduates of the Technical Training School in Maseru (British operated and funded) have been assigned to the VWS. Two people are presently in training at TTS and 12 more are to receive TTS training during the life of the project. The three-part program consists of one year at the TTS, one year in practical experience and the last year at the TTS. VWS-sponsored students spend the second year with the VWS. The quality of the instruction in the school appears to be very good. After graduation from the TTS those hired by VWS are assigned as technical officers working under the supervision of experienced senior technical officers. After receiving experience, and depending on capability, they are expected to be promoted to senior technical officer or district engineer supervising VWS programs.

Well drillers are hired directly by the VWS and receive their training under the direction of a well-drilling foreman. After practical experience they are promoted to rig foreman. Comments on this training are included in a subsequent section of the evaluation.

The VWS hires masons who have recently graduated from one of Lesotho's trade schools. These "apprentice" masons receive formal and practical instruction from the Swiss-funded team. The Swiss instructors are experienced masons, and their instruction appears to be very good. The Swiss trainers have taken over the tasks formerly performed by the AID-funded training specialist. With the departure of one design and construction engineer, the training specialist, a trained civil engineer, has taken over design and construction responsibilities in the Southern Region.

After receiving three-months of training from the Swiss instructor, the masons are assigned to work on the various village projects. With improved skills they can take the government tests, and if they pass be promoted to Class C, B or A mason. They can next attend the foreman and after that the supervisor's courses. Overall, we consider the project's training program to be very good.

Temporary day labor masons who passed the VWS forman course and are acting now as foremen, have not been promoted to permanent foremen by the GOL. This is causing morale problems, with increased likelihood that these people will resign from VWS. A course will be held later this year open to foremen which will enable them to upgrade their skills to supervisory level. If the GOL is unable to pay the graduates at a supervisory level, the project's training objectives may be jeopardized.

#### D. Construction

The Water systems used in the project are:

1. gravity fed
2. boreholes with hand pumps
3. boreholes with windmills
4. boreholes with pumps driven by a diesel or electric engine
5. streams with hydro ramjets

The project's village selection criteria states that ".....ideally the [water] supply should be feasible without the use of diesel or electric driven pumps."

The engineering design of the gravity fed system is very good. The construction of these systems is being performed in a timely manner and is technically correct.

Three types of hand pumps have been installed: the Moyno (U.S.), Mono (RSA), and the Mark II (India).

The Moyno hand pump is rugged yet of simple design. The pump uses a single screw-line helix rotor turning eccentrically within a double helix stator. This produces sealed cavities that are positive displacing and self-priming. There are two handles, one on either side of the upper gear box. This the pump operator(s) use to turn the helix rotor. These handles turn in a vertical plane. Ninety of these pumps have been installed since November 1982. There has been no maintenance required on any of the pumps.

The Mono pumps are manufactured along the same principle as the Moyno except the Mono has an exposed drive shaft between the bottom of an upper oil lubricated gear box and a water seal near the lower part of the pump stand. Oil has leaked from the gear box onto the water seal which in turn leaks and allows oil to penetrate into the well water. The Mono manufacturer is redesigning his pump which will have a handle that operates in a horizontal plane.

The Mark II pumps are designed along the common "pitcher pump" principle. They use a plunger inside of a pipe to push the water up. The sand in the water causes abrasion between the plunger and the inside of the pipe and will eventually wear out the plunger. This type of pump requires considerable maintenance.

Three ramjet systems have been installed. Ramjets can be used where there is a large fast flow of water. About 10% of the water is pumped by the ramjet to the higher reservoirs. The ramjets are relatively maintenance free but can be used only where there is a large fast flow of water since 90% of the water is used to operate the ramjet.

Some windmills have been repaired/maintained by the VWS. Since windmills require considerable maintenance, no new windmills will be installed.

The pumps powered by diesel or electric engines are used where high heads have to be overcome. This type of pump is expensive to operate, requires a high level of maintenance capability and is used as a last resort.

#### E. Water and Drilling / Technical

##### 1. Current Situation

The bailer testing program to evaluate the borehole yield is working out well. Once the borehole penetrates a water producing zone, the well is tested for yield and, if it appears that the yield is adequate, the drilling machine is moved to a new location. The drill foremen, for the most part, have the tools, instruments and understanding to conduct these tests. The bailer test data compiled by drilling crews appear to be excellent.

Formation sampling is done regularly, systematically, and accurately by the drilling crews. The samples are kept in order of sequence at work site so they can be readily and easily observed and evaluated by supervisors.

The provision of supplies is very good. The rigs have extra bits, basic fishing tools (to recover lost or broken tools from the boreholes), electric water level measuring devices, coal, record keeping forms, etc., on site. The District VWS "stores" are well stocked and effective in supporting the drilling activity.

Servicing and maintenance of rigs and support equipment has improved consistently since the arrival of the TA team and with the provision of a service truck with a portable welder, oxy-acetylene torch and stock of tools. This enables the rigs to be repaired at the well site soon after break down. The transport problem of moving the rigs has been possibly solved with the purchase of two large trucks.

The rigs are being run efficiently with three-man crews, compared to five to seven-man crews at beginning of Project.

The five new rigs --four USAID-purchased and one provided by another donor-- are well equipped and are contributing to increased production of VWSS borehole program. Eighty successful boreholes were completed in 1982 and 53 through May of 1983. Prior to this period four to five boreholes a year were constructed by VWSS with their six drilling machines.

With experienced, competent personnel, adequate transportation, good tools and large stocks of supplies, the hand pump installation and service program is proceeding excellently. Standardizing on the Moyno hand pump was very wise as they are simple to install and service, are not easily broken, and have a long useful life.

Villager participation in the cable tool drilling operation is excellent. The villagers carry water needed for drilling, dig ditches and do other site work necessary to keep the rig drilling and provide accommodation for the crew.

## 2. Problems

Bits are not being properly shaped or sharpened. The team observed the operation of 8 of the 11 drill rigs and saw only two properly sharpened bits. These could have been new or near new and sharpened by the manufacturer. As in any system of drilling, the bit in cable tool drilling does the actual cutting. To have a dull or improperly formed bit is counter productive. Cable tool bits are shaped and sharpened by forging and/or welding. The Basotho drillers have been forging their bits and accept it as part of their job. It is very hard necessary work and requires a lot of skill and knowledge to do it properly.

With the addition of five new rigs to the drilling program, the former crew teams have been broken up and reorganized to those new rigs. Laborers with little experience have been put in as drillers; drillers with limited experience have been promoted to drill foremen. Consequently many people in the drilling program are working at the limit of, or beyond their abilities.

The drilling program has been expanded from six rigs (four working) to 11 rigs without increasing the number of supervisors. The drill supervisor plus the TA team Project Manager (who has taken a real interest and a position of total involvement in the drilling program) have more to do than can possibly be done properly. With 11 rigs operating the wider geographical area they are deployed in, the supervisory problems are compounded.

There is little evidence of any effort being made to conduct a drillers' training program, even though the drilling of the boreholes, and success of the program, is dependent upon the performance of these drillers.

Drilling crew pay and social status is not commensurate with the knowledge, skills and consciousness required to do the job.

Tools for the cable tool rigs require more care than they are getting. New tools at the Mafeteng yard are lying on the ground with the unprotected tool joints rusting. They are also exposed to damage from vehicular traffic and from materials being dropped on them. Tool joints on tools at drilling sites are, for the most part, not protected.

Formation logs of materials penetrated are not being recorded and kept. This is valuable and relevant information both for understanding conditions at the immediate site and studying and understanding the geological and hydrological conditions of the area. Until we can see under the ground we need all the information we can get.

In an effort to reach maximum production in number of boreholes and total meters drilled some of the boreholes are being terminated before reaching optimum depth. The point of termination is a judgment based on the data obtained at that particular site as the well is being drilled. Once a borehole has penetrated the water table the chances of penetrating more porous and permeable strata increases as the well is drilled deeper.

It has been reported that some supervisors, foremen and drivers "disappear for days at a time" when sent out to remote areas.

Recommendations:

1. Training and Supervision of Rig Personnel. A qualified drilling advisor could improve the skills level of the rig crews and production. He could train an experienced Mosotho that has been promoted from the ranks to drilling supervisor. This Mosotho could, in turn, contribute to training of new drillers and foremen.
2. Formation Logging of Boreholes. Samples are being taken and laid out in order as standard practice now. It is a small step to record the information gathered. The formations need only to be logged as to color, hardness, whether the cuttings are fine or coarse and whether the driller or drill foreman feels that zone will yield water. This will provide valuable information and should be kept with other information on the borehole, such as yield and recovery data from bailer or other tests.
3. People Disappeared for Days at a Time. Unsupervised supervisors and drivers should make out daily reports or activity logs to account for their time.

While the Canadian leased air rotary rig will enable the project to provide water to additional villages, the Evaluation Team is worried about its demands on scarce engineer time and reduction in village self-help contribution (its water demands are likely to be high and the South African driller is not likely to live with Basotho villagers, as do the percussion drill team). Self-help has been critical in making VWS a village water system and not a government one. We are also concerned about the effect on the morale of the operators of the "old-fashioned" percussion rigs currently in use.

## F. Commodities

Commodity procurement has been implemented in a timely manner and in accordance with AID regulations and AID approved waivers. A substantial amount of commodities has been incorporated into the job. There are sufficient essential commodities now stocked in the various project warehouses for current use. Additional commodities have been ordered and are expected to arrive on site in the near future. To date, 900 tons of pipe and pipe fittings have arrived in-country, with another 800 tons scheduled to arrive in September, 1983.

Two hundred fifty-nine Moyno hand pumps have been purchased, of which 90 have been installed. A PIO/C has been issued to AID/W for the purchase of 141 additional Moyno hand pumps. This will complete the purchase of the 400 pumps envisioned in the Project Paper.

Four cable tool rigs and accessories have been purchased from the RSA and are operating successfully. Twenty-seven project vehicles (24 light and 3 heavy) have been purchased and are being effectively used by the project. The source/origin for procurement of commodities for this project is Code 941 countries. Waivers have been granted by AID/W to procure drill rigs and parts from Code 935 sources. The Standard AID Waiver applies for purchase of right-hand drive vehicles from Code 935 countries.

The Project Paper anticipated a budget amount of \$7,602,200 to purchase equipment and commodities. The second annual report prepared by the TA team anticipates that \$6,076,400 will be needed to purchase these commodities. The apparent \$1,515,800 savings comes mainly from the procurement of pipes and fittings. Due to the highly competitive nature of this commodity the suppliers bid considerably lower than originally estimated, and additional savings are expected.

The TA team, in their second annual report, stated that they expect to spend over \$500,000 on local construction materials, spare parts and commodities. The present limit for these purchases is \$250,000. The TA team should evaluate the estimated amount needed for the waiver and request the Mission for a waiver increase or a mutually agreed upon amount. The evaluation team concurs in the request to increase the waiver as mutually agreed by the Mission, GOL and TA team.

The Project Paper authorized the purchase of 400 Moyno pumps. The TA team has requested that AID approve the purchase of an additional 600 Moyno pumps. The Evaluation Team recommendation on this is dealt with in the recommendation section.

## G. Health

The implementation of the health component of the Project is effectively administered by a health educator who has developed practical and decentralized administrative procedures which can be implemented by extension workers who are not health professionals. To implement health education activities simultaneously in three districts, he helped create a multi-sector health education team with personnel provided by several ministries.

Two health educators from MOH have been assigned as part of their job description to work with the health education coordinator. They form an effective team. This team provides training for others and holds periodic working sessions for staff of other ministries to identify problems and seek solutions. However, one of the health educators is scheduled to depart for long-term training this fall, and the other health educator, the more experienced of the two, is employed on a temporary status with GOL. The health education component of the project will be jeopardized unless a permanent establishment post for the counterpart is secured.

One of the health educators from MOH assigned to the project was sent to Malawi to participate in a water supply and sanitation on-the-job training course in May 1983. The course was conducted by the AID/W centrally-funded WASH project to support the Malawi Rural Water Project. Included in the course were user education for water supplies and sanitation facilities, simple water systems and various types of latrine construction techniques.

As identified in the May 1983 project evaluation "outside of furnishing a TA Health Education Coordinator, the PP does not identify any other inputs to the Project by AID for health education". It appears that the health component was simply added to the PP without being integrated into the project design. First, the Health Education Coordinator was funded in the project for a two year period only. Second, there was no budget allocated for the health education activities. Without funds for training of health facilitators at the village and district levels and for village health workers, and studies to determine villagers' knowledge, attitudes and practices and gather baseline information on health-water linkages, the outputs under the health component of the project will not be known and are less likely to be realized.

Recognizing this dilemma, a revised budget was developed for the "Second Annual Report", May 1983, allocating \$100,900 in AID project funds for the health component. An additional \$100,000 is now programmed to support a UN sanitation project's latrine and washing slab construction.

The revised budget was intended to support health education activities for individuals at the village level; in-service education for village and district extension workers; a knowledge, attitudes and practices (KAP) survey; and purchase of necessary health education equipment and supplies.

However, due to the lack of sufficient manpower and other resources at MCRD and MOH, a multi-sectoral approach is being taken to implement the health education plan. Extension workers and district staff from the Ministries of Health, Rural Development and Education have been invited to participate in health education activities. District workshops are used to teach village and district staff concepts of health education, team building and foster inter-ministerial coordination. To reach large numbers of villagers the multi-sectoral teams organize and conduct large health education meetings (pitso). A pitso lasts from 2 to 3 1/2 hours, with attendance running from 75 to 1,400 villagers. The major deficiency is that after the health education pitso there is not sufficient manpower to allow the necessary

follow-up health education to families, groups and communities. Village-based volunteers can play an important role in providing water and sanitation education and primary health care services to those rural communities with improved water supplies. Therefore, the Evaluation Team supports funding Village Health Worker training for two village volunteers from each of 200 villages supplied with water by the project.

The K.A.P. survey is planned as a health education evaluation scheme to measure village health educators' performance and impact. The survey questionnaire was pre-tested in 8 villages by students from the National University of Lesotho. Each student spent two weeks living in a village to become acquainted with the villagers and the environment. Later the students administered the questionnaire and recorded personal observations regarding water collection, storage, use and defecation habits.

Based on the favorable results of the pre-test of the questionnaire and methodology, a national K.A.P. survey is planned to evaluate knowledge, perceptions and practices of rural villagers in Lesotho. The Evaluation Team supports the K.A.P. study and recommends that an epidemiological baseline study on health-water linkages be conducted to obtain data on a selected group of villagers from which judgments about health impact can be made.

High effective demand for both water supplies and sanitation facilities has been shown in Lesotho. However, water supplies have a higher priority than sanitation in the rural villages. Inclusion of latrines as demonstrations in villages where new or reconstructed water systems are constructed is probably justifiable if villagers would supply volunteer labor, some local materials and a cash contribution toward the construction cost. However, due to the time requirements for appraising soil conditions, sociological needs and opinions of the types of sanitation facilities, income levels, costs, construction and monitoring latrine units, the Evaluation Team concurs with the TA team proposal to provide funds from the project to support the UN Rural Sanitation project for construction of demonstration latrines and washing slabs.

The following table shows the breakdown of funding for the health component as established in the Second Annual Report, and the budget as recommended by the Evaluation Team.

	Second Annual Report <u>May 1983</u>	Evaluation Team <u>May 1983</u>
Education	\$69,000	
Equipment and Supplies	23,000	
K.A.P. Study	<u>8,500</u>	
	\$100,000	
Education - Equipment and Materials, already spent		12,200
Village Health Worker Training		12,000
District Workshops		21,000
Training Aids		6,000
K.A.P. Study		20,000
Health-Water Baseline Study		50,000
Contingency		<u>10,000</u>
		\$131,200

The increase in cost for the health component reflects the increased costs for completing a national K.A.P. study, training 400 village health workers and conducting a health-water baseline study. The proposed increase in funding amounts to \$30,300.

## 17. Outputs

### A. Project Implementation Status

The logical framework of the Project Paper summarizes five categories of outputs:

1. Increased numbers of trainee Basotho personnel to staff VWSS;
2. Increased numbers of rural water systems newly constructed or completely reconstructed.
3. Increased numbers of village representatives (waterminders) trained to perform minor maintenance on their respective village water supply systems.
4. One regional and three district maintenance centers constructed and operating.
5. Improved coordination between MOH and MCRD on health and sanitary aspects of installing and maintaining rural water supply systems.

### B. VWSS Personnel and Organization

One of the principal purposes of the project is to assist the GOL in developing an institutional capacity through the Village Water Supply Section of the Ministry of Cooperatives and Rural Development to design, construct and maintain new and existing rural water supply systems in Lesotho.

To date three engineering students have been placed in the U.S. As mentioned earlier there are some minor problems with the students. Upon their graduation and return to Lesotho these graduates are indentured to serve five years with the GOL. They may, or may not, work for VWS when they return to Lesotho, since their ultimate assignment depends upon position openings and the success of the engineer in getting assigned to a position of his choice. We might note that the type of engineering work performed by the VWSS is relatively simple and routine. This condition is not conducive to retaining the U.S. trained engineers in the VWSS.

The VWSS is having difficulty filling the assistant engineer's position that was vacated by the promotion of the former assistant engineer to that of Senior Engineer. There is a lack of engineers in Lesotho and the relatively poor salary scale of the GOL does not attract appropriately qualified people.

The VWSS should rely upon utilizing the capability of the TTS graduates to fill their mid-management positions. Since the required technical and supervisory know-how can only be gained by lengthy time experience, the Evaluation Team feels that these mid-management positions will have to be filled by expatriates for a considerable period beyond the life of this project. The project will probably want to send some people for mid-management training.

Sixty-six masons and 18 foremen have been trained, and ten additional foremen are now in training. This training program is proceeding satisfactorily. The GOL does not recognize the mason training school as such and therefore the graduates do not always receive the salary increment for the certification they receive. The VWS is in the process of having the GOL officially recognize the school. After the recognition the morale problem faced by the masons should be reduced.

### C. Water Systems

The Two Year Work Plan anticipated that 142 new rural water supply systems and 68 completely reconstructed systems, serving 180,000 people, would be realized over the project life. The contractor anticipates that this goal will be exceeded, with the likelihood that 150 gravity systems will be constructed, serving 120,000 to 140,000 people, and that 1,000 hand pumps will be installed, serving 75,000 to 100,000 people in about 200 villages. The Evaluation Team finds these figures realistic if GOL can provide the required recurrent budget support.

At the end of 1982, 13 AID-funded systems reaching 7,300 people were constructed. For the first five months of 1983, 18 AID-funded systems, serving 9,900 people were constructed. The contractor's Monthly Report for May 1983 shows 29 projects financed wholly or in part by AID under construction. These are expected to reach an additional 20,000 people.

### D. Waterminders

Two hundred seventeen waterminders have been trained and provided with basic tool kits. The TA team plans to train additional waterminders and provide them with tool kits as conditions require. This program is progressing in an excellent manner. The Evaluation Team finds this aspect of the project to be critically necessary if villagers are to participate in water system maintenance.

### E. Maintenance Centers

One regional and three maintenance centers have been constructed and are operating satisfactorily. In addition a vehicle maintenance center is nearing completion in Maseru. This vehicle maintenance center will provide major and minor maintenance to the VWS vehicles. Included are engine overhaul, transmission repair, routine maintenance, etc.

One of the TA team is now managing this center, with a Mosotho mechanical engineer in the position to assume management after receiving the proper experience. Spare parts for the maintenance of non-U.S. donor provided vehicles are provided by the donors. There is a problem in repairing non-project GOL vehicles because the GOL does not provide the funding to purchase parts for these vehicles. The GOL is required to provide 20 percent of the funding in the initial year with an increase of 15 percent each year until the sixth year of the Project when the GOL will be responsible for all costs. Since the GOL presently has problems providing the lower amount of funding for maintenance, a greater amount of GOL contributions may not be forthcoming. Unless other funding sources are found, this will cause a drastic reduction in the performance of the VWS crews in their construction of water systems.

The maintenance of the water systems is being performed by the VWS with no capital contribution by the villages. Before the project begins construction each village must collect funds for a maintenance account (the project provides the funds for the purchase of commodities and provides the necessary skilled labor for construction). There is currently no way that the project's maintenance people can repair a system, bill the villagers and have the funds go into a VWS controlled maintenance fund. All such funds are transferred to the general GOL budget. Except where willful destruction can be

demonstrated, the project finds it easier to do the repairs and not charge the fillage. This destroys part of the concept of village self-help and village responsibility for maintaining the water system. Procedures should be established to: (1) bill villagers for work performed and (2) establish a separate fund controlled by VWS for these funds. The second recommendation was also made by the Evaluation Team last year. The billing performed is necessary even if the funds cannot be directly used by VWS. Government needs to determine whether villagers ought to pay all or some proportion of total costs. The Evaluation Team feels villages should pay at least one-third of total costs. Relying upon the VWS to perform this work using only GOL appropriated funds has not proven reliable in the past, and based upon the present budget restraints with the GOL, the future funding by the GOL for this purpose does not seem to be a proper solution to the problem.

F. Coordination Between MCRD and MOH

Specific health outputs include:

1. A health education plan to guide the implementation of the health education component of the project.
2. Four District Health Education and Coordination Workshops, with over 200 representatives from all ministries with district and/or village extension and field workers participating.
3. Eight Village Health Education and Information pitsos with over 4,200 villagers from Mafeteng and Mophale's Hoek participating.
4. Two health educators from MOH working with the Rural Water Supply and Sanitation Project.
5. A practical, relevant and high quality training program for GOL District and Village Extension Workers, adapted to the Lesotho environment.
6. Training materials concerning rural water and sanitation for villagers, adapted to the Lesotho setting.
7. Preliminary K.A.P. surveys in 8 villages in the southern region.
8. Training of the health education coordinator's counterpart in a rural water and sanitation course in Malawi.

Continued close coordination in program development, implementation and evaluation must occur if the health impacts of this project are to be realized.

The spirit of cooperation and coordination is shown by several meetings of the two permanent secretaries of the two ministries related to water supply and sanitation and health. Also, it is shown by both ministries' participation in revising the village selection criteria, district workshops, sharing of health education resources and the training of village health workers.

The Health Education Unit (MOH) is the principal supporter of health education activities in Lesotho. This unit has a staff of seven health educators. Health education activities for water and sanitation programs are coordinated by a national manager. Given the limited manpower resources at MOH it is essential to the health component of the Rural Water Supply and Sanitation Project that training at the district level be undertaken to provide a cadre of individuals for village education activities.

The health education coordinator has achieved excellent cooperation, coordination and joint programming with the Health Education and Environmental Health Units and the Rural Health Development Project within the MOH. However, a program of joint coordination and planning must be achieved with the Maternal and Child Health (MCH), Expanded Program of Immunization (EPI), Diarrheal Disease Control and Nutrition Surveillance programs if this project is to help reduce the occurrence of water-borne and water-related diseases as stated in the Grant Agreement. To achieve the level of coordination needed, the health education coordinator will need skilled consultancies in sanitary engineering, public health epidemiology, social science research and mass communications.

#### 18. Purpose

The major purpose of this project is to provide safe water to 210 villages, to promote health education at the village level, to provide demonstration latrines and washing slabs and to provide training for a corps of village water supply personnel. The purpose assumes that safe, reliable rural water systems will improve health, and provide other beneficial effects to women and children, the bearers of water and the population most affected with preventable health problems. Therefore, one of the major objectives of rural water improvements is to promote health, through reduction of the ingestion of pathogenic agents. Of the water-related diseases it is the gastro-enteric and diarrheal disease group which are most prevalent in Lesotho. It would be expected that improved rural water supplies would reduce diarrheal morbidity and mortality.

Improved water supply systems operators are normally concerned only with the bacteriological quality and quantity of water produced by the system. Yet, fecal contamination can occur at many points after collection of water of good quality and sufficient quantity. This is the justification for the inclusion of health and user education as a component of most water supply programs.

The Evaluation Team feels that funds should be made available from the project to gather baseline data from a selected group of villages, with and without water systems, to determine the differences in health profiles on a before and after basis. Comparison of the situation now and closer to the project completion date will facilitate determination of health benefits. The data gathered will also assist in making some judgements about the impact of water systems in the selected villages.

The economic justifications of the Rural Water and Sanitation Project which were discussed in the Project Paper were the time saved by having a dependable water supply closer to villagers, the reduction in illness and mortality rates and the likelihood of success for other cooperative development activities resulting from improved villager cooperation in the provision of water.

As discussed elsewhere there has been no baseline data collected which will allow the project to show reductions in illness or mortality rates. No work has been done to show whether there is a relationship in Lesotho between the availability of sufficient quantities of clean water and health.

The relationship between clean water and health might be minimal if contamination of water takes place after leaving the water source, or if the water buckets that are used are themselves contaminated.

The influence of village self-help and cooperation on future development is speculative. When the project installs a hand pump over a borehole the amount of village cooperation is primarily the establishment of a village water committee, the collection of funds for a maintenance account, the provision of water to the drilling rig, housing the drillers, helping make the concrete base for the pump and having one (or two) people attend a course on how to become waterminders. The proposed rotary drilling program which the Canadian and Saskatchewan governments are funding will reduce some of the village self-help, and thus may reduce the future development impact. There is considerably more village self-help that takes place with a gravity system that requires construction of distribution and storage systems and the digging of trenches.

The only development impacts that have been noticed to date are an increase in home construction near the village water supply and a change in settlement patterns. There may be some increase in irrigation of small kitchen gardens in those villages that have more than adequate water.

The major impact that can be quantified and evaluated is the savings in time that takes place because a water system is constructed closer to the village than was previously true. Women usually spend at least two hours per day gathering water and frequently more. With the water system much closer they ought to be able to get all their water needs within half an hour a day. Thus the savings in time is around 90 minutes a day. This evaluation did not make an extensive survey of the opportunity cost of labor in rural Lesotho, but in one of the villages we visited, a soil erosion project nearby was regularly hiring eight people from the village and every 15 days paid them M7.50, 12.5 kg of maize meal, 12.5 kg of wheat flour and 2.5 liters of fish oil. The total value of this package is M23 per 15 days, or M1.50 per day.

This project is not having any trouble recruiting people and thus the opportunity cost of labor in the community is probably somewhat less than M1.50 per day. If we use 80% of the M1.50 to reflect the opportunity cost of labor, then for an 8 hour work day, village labor is worth about M0.15 per hour and the savings per family is M0.225 per day (M0.15 per hour times 1.5 hours of time saved per day).

This analysis further assumes a five person family, and that maintenance costs come to M12 every five years. (The PP estimated 1979 maintenance costs of M7.25 to M15 per family every five years for the type of systems this project is building. There is no project data on maintenance costs of the new systems.) If time is the only benefit of this project, then in order to have a real IRR of over 6% the cost of a water system per capita must be less than M12 with a ten year cost/benefit stream, and M165 with a twenty year cost/benefit stream. If costs are less the IRR is higher. The "Second Annual Report" estimated the cost per capita of a small gravity system at \$50, and for a hand pump at \$34 per capita. However, these estimates exclude the value of village labor, the expatriate engineers, depreciation and maintenance of vehicles used.

Even excluding presumed health and village cooperation benefits, the simple delivery of more accessible water is likely to be an economically rational use of scarce funds. This result is slightly less likely to be true for those systems that are relatively remote, have higher transportation costs, and require greater quantities of the engineer's time than an average system. The economic justification of these systems require use of those benefits not quantified here. They may also be justified on grounds of equity.

In order to properly evaluate the cost of the various water schemes the TA team should determine the actual cost of representational types of systems. Items that are part of the cost of the water system should include, but not be limited to, the following: preliminary data gathering, survey, design, supervision, equipment (rental or depreciation), POL, spare parts, VWS direct labor, VWS overhead, person days of village donated support, materials purchased by the VWS, materials provided by the village.

A small number of representative water systems should be costed out. The sample should include gravity fed and hand pumps in both remote and accessible locations. This information is needed to properly advise future donors interested in funding the same water system.

#### 19. Goal

The project goal is to "assist the GOL in improving the health and basic living conditions of Lesotho's rural poor." The evaluation team feels that it is too soon in the project to expect significant progress toward the project goal. We have noted in several parts of the evaluation report specific steps which can be taken to strengthen the linkage between developing institutional capacity within the VWS -- the project purpose -- and the goal of improved health for the rural population. Our recommendations include, as well, actions which should be taken to measure and evaluate health impacts of improved water supply.

This project will assist the MOH in achieving its Health Plan goal of providing primary health care to the rural population, including water supply and health education. The Third Five Year Plan (1980-1985) states that "the government intends to make primary health care available to the entire population." Specific objectives of the primary health care as outlined in the Third Plan are to:

- bring health services to every village;
- improve and expand the national network of clinics and outpatient departments;
- promote family planning and programmes to improve the health of mothers and children;
- minimize the prevalence of the most prevalent communicable diseases;
- upgrade curative services.

Specifically, the Third Plan of Development emphasizes community participation and the principle of self-help in primary health care, with planning that involves the community at all levels. It recommends decentralization of the organizational structure of the delivery of health care to "provide administrative and professional back-up for primary health care programmes through district medical officers and Health Service Areas (HSAs)."

GOL activities during the Third Plan attest to the strong commitment of the Government of the Kingdom of Lesotho to primary health care. Government commitment in financial terms has not been as good as expected. By judicious use of extra-governmental funds the Government has succeeded in making much progress by mid-point of the Third Plan, and is committed to continue this same course of action.

AID has already been instrumental in assisting the MOH to restructure its health services, through its Rural Health Development Project, which will terminate in 1984. The training which has been developed for village health workers contains material which are designed to follow the WHO recommendations for water and sanitation field work and education of users, and is compatible with the needs of the Rural Water Supply and Sanitation Project. The Evaluation Team feels that the Nurse Clinician Training for village health workers to serve in all villages with AID funded water systems should be supported from this project. In the spirit of village self-help, each village ought to provide the funds to feed the people attending the course. The project should fund other costs.

## 20. Beneficiaries

As envisioned at the time of project design, the primary direct beneficiaries of the project are rural women served by newly-constructed or rehabilitated village water supply systems.

The project should directly benefit up to 20 percent of rural population (using the 1981 rural population figure of 1.15 million). It was estimated that about 160,000 persons -- or 14 percent of the rural population -- were served by a total of 430 projects prior to the start of project construction. Those who gain access to newly constructed Village Water Supply systems, funded by other donors or GOL alone, will benefit indirectly from the project. Due to the institutionalization process underway in the project, improvements in water supply for all of Lesotho's rural population can in part be attributed to the AID effort.

Project-funded training provides direct benefits to VWS engineers, technical officers, supervisors, foremen and masons; numerous village water-minders; and Village Water Supply counterparts to the contract team. Numbers benefitting to-date from long-term and in-service training are as follows:

<u>Category</u>	<u>Trained</u>	<u>In-Training</u>	<u>Scheduled For 1983</u>
Waterminders	217	0	100
Drivers	6	1	0
Mechanics	7	1	0
Masons	66	2	15
Foremen	18	10	0
Supervisors	0	0	5
Engineers	0	3	0
Senior Technical Officers (TTS)	6	2	2

The Two-Year Work Plan shows a life-of-project total for short-term training of 93 masons, 40 foremen, 17 supervisors; B.S. training for 3 engineers; long-term training at Lesotho technical schools for 35 technical officers; and 1,280 participants in the waterminder course. Except for the three engineers, these are significant increases over numbers proposed in all categories in the Project Paper.

The major benefit to villagers served by new systems is increased access to a more reliable water supply, which brings a savings in time and energy expended on water collection. Benefits of improved health cannot be claimed or assumed at this time. Health benefits do not follow automatically from improved access to water -- rather, they depend on such variables as actual quantities of water used, patterns of collection, water handling, and sanitary practices. Other benefits which were suggested at the time of project design, and which may or may not be associated with the new supply, include social benefits from increased community participation in self-help activities, and the administrative experience gained by water committee members.

The Evaluation Team feels that the omission, in project design, of a plan to monitor project benefits and impact is unfortunate. Without such an assessment, it will be difficult to demonstrate such important project benefits as the use of increased quantities of water or improved water handling practices; to describe the productive uses to which freed time is put; or to attempt to document the project's impact on the incidence of water-borne or water-related disease. Thus, aspects of progress toward reaching the project goal, described in the Project Paper as including improvements in health, will not be measurable.

It should be noted that women benefit from this project disproportionately to men. In Lesotho as elsewhere in Africa, women are the water collectors, water bearers and prime users of water in rural areas. Most of Lesotho's water committee members and village water minders are women. In addition, characteristics unique to Lesotho should be taken into account when assessing the value of improved access to water and time saved: (1) Up to one-third of rural households are headed by women, and another one-third are managed by women whose migrant husbands are away; (2) In addition to primary responsibility for household management and agricultural production, women are actively involved in most aspects of rural economic, social and political life; (3) Women have a long history of access to education and have higher rates of literacy than men; (4) According to some analysts, women are more willing than men to innovate in rural development.

The evaluation team reviewed the selection criteria used by VWSS to set priorities and plans for construction. To date, the number of villages who qualify for a water system far exceeds the capacity of VWSS to provide the systems, and this pattern of demand is expected to continue. The criteria, and an application process open to all villages, is now institutionalized within the VWSS and MCRD. Past problems with villagers' misunderstanding of procedures to qualify for water systems appear to have been cleared up, as do some of the problems with selection of villages on political grounds. Village selection criteria used by VWS are:

1. Villages whose permanent water source has proven adverse water quality and impacts negatively on the health status of the villagers. These villages must have a history of repeated and/or frequent incidence of water-borne or water-related diseases (e.g., Typhoid, Cholera, etc.).
2. The village should be accessible by vehicles.
3. Villages with clinics and schools should be given priority for a village water supply.
4. Those villages at risk either because of perennial drought or because of unsafe water source coupled with sanitation risks (e.g., villages with many pit latrines but whose water source is below the village itself).
5. Villages whose current water source is at least 500 meters from most households.
6. The population served by the supply should be at least 400 in lowlands and 200 in the mountains, including students if the village has a school.
7. If selected 60% - 90% of the households in the village must have or be willing to contribute a stated nominal sum and the village, in the judgement of MINRUDEV, be willing to contribute labor for construction.
8. The total cost of construction will be a consideration for selecting villages for a water supply, and ideally the supply should be feasible without the use of diesel or electric driven pumps.

The Evaluation Team found no evidence that particular subgroups within communities are likely to be excluded from project benefits, unless they choose not to contribute to system costs and thus exclude themselves. Those individuals unable to contribute cash are permitted by most water committees to participate by increasing their labor contribution. Thus, benefit incidence within communities where systems have been installed under the project is remarkably uniform.

Project activities are geographically concentrated in Lesotho's lowland areas, where most of the rural population lives -- population density is about 115 persons/sq. km. in the lowlands, 73 persons/sq. km. in the foothills, and 24 persons/sq. km. in the mountains. To date, the majority of AID-funded project activities have been in the southern districts, with plans to expand in the northern districts in later stages of the project. Concentration of project activities helps to reduce transport costs and the management burden on VWSS, while maximizing number of beneficiaries.

Over the long term, the extent to which project benefits are maximized and sustained will depend on the degree to which communities assume costs of system construction, operations and maintenance, and are successful in managing access to and use of systems. Single-purpose village water committees (separate from village development committees) are the institutions which manage participation in the water supply program at the village level. The evaluation team found that water committees command village support, appear to be able to enforce decisions and function effectively to organize labor. As now constituted, committee members appear to be freely elected and representative. Their success over the past two years in mobilizing village contributions and organizing labor is notable, especially given Lesotho's history (which is not unique) of unmet government commitments and community disillusionment concerning water.

Credit must be given to Village Water Supply staff (including contractor staff and counterparts) for promoting the ethos of self-help, working closely with the communities, and matching verbal commitments with timely construction and successful completion of systems. Although staff from the District Rural Development Offices (DRDO) are involved in the development of each village system as soon as a community submits a request, and visit communities during the construction phase, it appears that VWSS engineers, particularly the expatriates, have been devoting a significant proportion of their time to community liaison work. The DCDO office, with the range of tasks assigned to it, cannot at this point perform all of the community development work required to implement Village Water Supply. The Evaluation Team is aware of cases where, with greater involvement by persons trained in community development, problems could have been avoided. An example is the selection of a site where the system crosses two politically-split communities and eventual sabotage of the system is very likely.

An interim evaluation by a sociologist is included in the contract, but is not part of the contractor's current work plan. The evaluation was to examine progress involving communities in management and maintenance of water supply, and to serve as a progress report on social aspects of the project. The evaluation team feels that such a study could serve as a timely and appropriate review of the momentum generated by the project to date, to monitor aspects of project impact, and to provide recommendations to ensure that community participation in system construction, maintenance and management is maximized.

The scope of work for such a study should include, as first envisioned, a review of progress with establishment of village committees and village waterminders. In addition, it could (1) suggest guidelines and procedures for community liaison for water development, with particular emphasis on the role of the district MCRD staff; (2) recommend strategies to maximize village contributions within the self-help context; (3) recommend additions or changes in the village selection process and selection criteria, so that the likelihood of sustained good management of the systems is assessed as part of the selection process. This study should be closely coordinated with any evaluations of health impact. It could include, in addition, an assessment of other impacts of the project at the household and community level, for example, uses of freed time, and changes in settlement pattern as a result of new water sources.

We see such an evaluation as a positive effort to document the successes of Village Water Supply as a self-help program, as well as a way to help maximize the long-term benefits of AID's investment in the program.

21. Unplanned Effects

Improved access to a more reliable and better quality water supply can change the way a community is viewed in the eyes of its residents and those living in surrounding areas. One effect which the evaluation team noted in its visits to communities with new systems is increased settlement near the new sources of village water. It is too soon to tell what the magnitude of new settlement will be or what it might imply for project execution. Changes in settlement pattern or population density could result in overburdened water supply systems or bring an increase in management and maintenance problems. The Evaluation Team suggests that this process be monitored and that settlement effects be examined in later evaluations.

22. Lessons Learned

Failure to include an adequate health component in the project design resulted in failure to take advantage of opportunities to assess possible health benefits of improved water, sanitation and health education. AID should recognize that most water projects terminate too soon to be able to see health impacts upon the beneficiaries. An improved source of water can have a positive impact on the health of the village, even though it is difficult to prove. Baseline data needs to be gathered at the village level as a basis from which professional judgments, if not statistical evidence, about health impact can be made.

23. Special Comments or Remarks

A. Institutionalization

Throughout the evaluation remarks have been made about the lack of GOL staff, recurrent budget difficulties and no foreseeable GOL funding to purchase foreign made materials and equipment. In designing future projects of this nature AID should take these deficiencies into account when they prepare the Project Paper and be more realistic about the time, effort and steps required to help create functioning and independent institutions. Contingencies ought to be thoroughly investigated. Institutionalization often requires a substantially longer time period and greater amounts of donor funding than project designers anticipate.

B. Private Sector Potential

The Project lacks the resources to build and maintain sufficient water systems to meet everyone's needs in Lesotho. It can and ought to assist those people in the private sector interested and competent to do some of this work. Further, some people trained by the project may elect to quit and set up their own businesses if government is unable to pay sufficiently high wages. In keeping with AID's policy of encouraging private sector development this Project ought to consider what it can do.

### C. Criteria for Success

Evaluations of rural water projects in developing countries often show that, where systems have not been effective, the reasons lie not in technical problems but in problems of system management. AID's "Project Impact Evaluation Reports" series includes several impact evaluations of rural water projects which are remarkably consistent in their findings. For example, in Thailand ("The Potable Water Project in Rural Thailand", Report No. 3), "where systems have not been effective, the reasons appear due not to technical shortcomings, but to under-estimation by project planners of the importance of community participation and management aspects of maintaining and financing the systems" (p. 5). Success involved sustained community contributions of time, labor and funds, and sustained involvement of a hierarchy of district and regional officials, along with community representatives, in managing the systems.

We are concerned that, in the Lesotho case, it is easy to get carried away with technical successes, e.g., numbers of systems installed and functioning now, and lose sight of the non-technical side.

Community participation does not appear to be a problem at this point, and it is easy to get carried away with recent accomplishments, e.g., numbers of systems installed and functioning now. Indeed, popular support for the program is strong. However, the local institutions and management procedures are not yet in place which can help to ensure that in 5 to 10 years village water systems will still function. We caution that a more rigorous approach is needed to develop the non-technical or community participation aspects of the program.

### D. VWS Organization

While there will not be sufficient GOL funds to permit it to take over the recurrent and capital costs of VWS when donors leave, the project needs to emphasize training of Basotho for not only the skilled labor and engineering positions but also the Chief Technical Officer and Senior Engineering levels, where extensive management training is necessary. In order for these courses to be successful the TA team must be able and willing to delegate increasing decision-making control to Basotho.