TECHNICAL TRAINING OF PEACE CORPS VOLUNTEERS IN RURAL WATER SUPPLY SYSTEMS IN MOROCCO

WASH FIELD REPORT NO. 43

MAY 1982

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Prepared For:
USAID Mission to the Kingdom of Morocco
Order of Technical Direction No. 61

WATER AND SANITATION
FOR HEALTH PROJECT

WASH

COORDINATION AND
INFORMATION CENTER

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for the U.S. Agency
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May 4, 1982

Mr. Harold Flemming
Mission Director
USAID
Rabat, Morocco

Attn: Mr. Jerry Bowers

Dear Mr. Flemming:

On behalf of the WASH Project I am pleased to provide you with ten (10) copies of a report on Technical Training of Peace Corps Volunteers in Rural Water Supply Systems in Morocco.

This is the final report by Keith Sherer and is based on his trip to Morocco from January 11 to February 23, 1982.

This assistance is the result of a request by the Mission on September 18, 1981. The work was undertaken by the WASH Project on October 5, 1981 by means of Order of Technical Direction No. 61 authorized by the USAID Office of Health in Washington.

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

Sincerely,

Dennis B. Warner

Dennis B. Warner, Ph.D., P.E.
Director
WASH Project

DBW:bel

cc: Mr. Victor W. R. Wehman, Jr.
S&T/HEA

WASH FIELD REPORT NO. 4[illegible]

MOROCCO

TECHNICAL TRAINING OF PEACE CORPS VOLUNTEERS IN RURAL WATER SUPPLY SYSTEMS IN MOROCCO

Prepared for the USAID Mission to the Kingdom of Morocco under Order of Technical Direction No. 61

Prepared by:

Keith Sherer

May 1982

Water and Sanitation for Health Project
Contract No. AID/DSPE-C-0080, Project No. 931-1176
is sponsored by the Office of Health, Bureau for Science and Technology
[illegible] for International Development
[illegible]

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EXECUTIVE SUMMARY

Peace Corps Morocco requested assistance from AID for a technical trainer to conduct an intensive in-country training course for 20 Peace Corps Trainees assigned to a potable water project. A training program was designed and conducted during the last four weeks of an 11-week language, cross-cultural and technical training program conducted in Morocco.

This training program demonstrated that using a community as a focal point for technical training was a productive concept. Secondary benefits resulted, especially for language and cross-cultural aspects of the training program, as well as for the community involved. For these reasons, the Peace Corps should consider using this or a similar model for future in-country technical training courses.

In order to maximize benefits from this approach, the training design, from the first, should plan to integrate language, cross-cultural, and technical training. The design should continue to use the community to provide the experiential setting.

This methodology requires careful planning and increased logistical support. It also requires close coordination among the various training disciplines at all times.

Additional in-service training is suggested, to be based on a survvey of the volunteers' needs after four to six months in their field assignments.

PROJECT NUMBER:

PROCESS:	ACTION:	DATES:	INITIALS:
CATALOGUE	1656		
ABSTRACT	SRDA		
FICHE	RANDD		

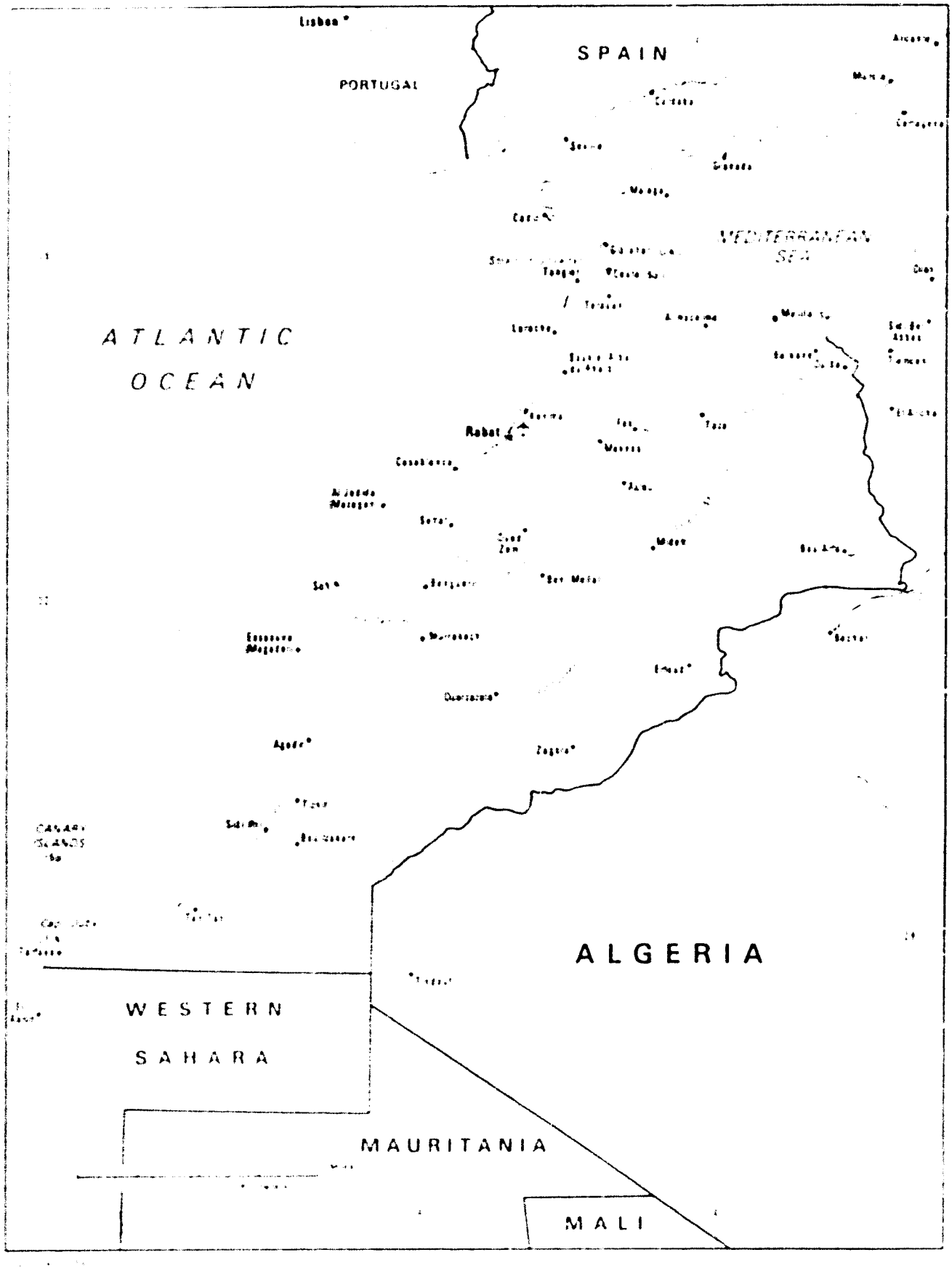
COMMENTS:

DS/DIS

ACKNOWLEDGEMENTS

The assistance provided by Gary Hartz, Indian Health Service, was very helpful is ascertaining the skills of the group and follow-up training needed. Because of the support given by the Governor of Settat Province and his staff, the consultant was able to go into the communities with a minimum of misunderstandings. This project could not have been accomplished without this support. Although AID was not directly involved Mission personnel were very interested and helpful. The Peace Corps and staff were very cooperative and supportive, and their provision of an interpreter and car was particularly helpful.

Morocco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Rabat
Casablanca
Agadir
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ALGERIA
WESTERN SAHARA
MAURITANIA
MALI

Chapter 1

INTRODUCTION

This project was developed to provide technical training, in-country, for 20 Peace Corps Trainees (PCTs) who are to work with the Moroccan government to help implement a potable water improvement program for rural villages (douars).

A joint Morocco, UNICEF, Peace Corps and AID project had been planned which would improve water supplies and provide health education for people in over 400 douars. Operation and maintenance of water systems was to be a major component of the program. This project was described in a Project Identification Document (PID) entitled "Douar Water System", prepared by AID Morocco in March 1981. Because of budgetary limitations, the project was not funded by AID. However, UNICEF, Peace Corps and the Ministry of the Interior of the Moroccan government proceeded with plans to initiate the program.

The Peace Corps began recruiting for water supply specialists. It arranged for a technical training program in the United States to begin in November 1981 and for in-country training to begin in December. The Peace Corps also requested AID to supply a technical trainer for part of the in-country training for a period of six weeks in January and February, 1982. The six-week period would be divided into two weeks of preparation and four weeks of actual training.

The overall training schedule included:

Training in the United States	Nov. 2 to Dec. 5, 1981
In Morocco before the WASH consultant arrived	Dec. 7 1981 to Jan. 23, 1982
In Morocco after the WASH consultant arrived	Jan. 24 to Feb. 20, 1982

AID approved the Peace Corps request for a trainer and authorized the Water and Sanitation for Health (WASH) Project to provide a consultant to conduct the technical training by Order of Technical Direction No. 61, dated October 5, 1981 (Appendix A). Based on this, a scope of work was developed (Appendix D), a technical consultant selected, and a preliminary set of training objectives prepared (Appendix F).

Chapter 2

BACKGROUND

2.1 UNICEF Project

UNICEF has an agreement with the Moroccan Ministry of Interior wherein approximately 440 potable water projects are to be funded in rural sectors of 13 Provinces. Under the agreement, UNICEF will provide material not indigenous to the area and equipment, such as windmills, pumps, and motors. UNICEF will also assist in funding the start-up of an operation and maintenance program. The time-frame for accomplishing the project's goal is:

1981 -- 24 projects in the provinces of Azilal and El Kelaa des Sraghna.

1982 -- 50 projects in the above provinces plus Beni Mellal, Settat and Essauoira.

1983 -- Extension of the program to include the above provinces plus Nador, Al Hoceima, Safi, Khouribga, Marrakech, Ben Slimane, El Jadida, and Agadir.

The schedule called for the first projects to start in March 1982 and for all projects to be completed by December 1983.

2.2 Rural Technology Levels and Past Experience with Water Systems

The projects are to be located in rural areas of Morocco. Electricity is not normally available and transportation is primarily by animal. Telephones are not available except in large communities.

Many of the douars have had some type of water development project in the past which has failed or is not fully functional because of lack of maintenance and repair. Wells range from a few meters to over 50 meters in depth and the majority are hand dug. Systems often consist of a windmill, small elevated concrete storage tank and a public watering facility. Existing systems which use a diesel for power are an exception and are generally found to be operating satsifactorily if a local person or "guardien" is given the responsibility to operate the motor.

2.3 Peace Corps Volunteers

2.3.1 Dimensions of Their Assignment

Peace Corps Volunteers (PCVs) are to be assigned to the Ministry of the Interior and located in nine provinces where they are to help plan and implement potable water projects and develop operation and maintenance organizations. As an important part of their role, they will eventually be expected to teach water development and maintenance and repair skills to counterparts.

The exact role to be assumed by the individual PCV will depend on the province to which he will ultimately be assigned. In all cases, PCVs will work out of a Government office located in the provincial capital. Daily contacts will include governmental officials, technical staff and, on a less frequent basis, officials from UNICEF. It is anticipated that the PCV's will work with many douars in a province, rather than just one as is more normally the case with PCV's.

2.3.2 Prior Training in the United States

Prior to arriving in Morocco, the PCTs had participated in a five-week (October 31 to December 5, 1981) water and sanitation training course in the United States. The course provided the basic technical skills for the roles outlined above and was conducted for the Peace Corps by the Indian Health Service of the U.S. Public Health Service.

This training consisted of two components, technical and cross-cultural. The trainees were also assessed for their suitability as Peace Corps Volunteers in Morocco. The assessment was conducted in part by observing and interpreting PCTs participation in case studies, role plays, simulation exercises and small group discussions. The technical component was based on an experiential learning approach that included well and privy design, construction, surveying, windmills, electricity, pumps, and diesel (Lister) engine repair.

2.3.3 Prior Training In Morocco

Following the basic technical training, the PCTs were flown to Morocco, and, on December 7, 1981, began an 11-week Arabic language, cross-cultural and advanced technical training course. During the first seven weeks, the technical training was conducted by an engineer who had recently finished a tour as a PCV in Morocco. At the completion of this period, his assessment was that electricity, hydraulics, pump adjustments, and diesels had been adequately covered.

Chapter 3

TECHNICAL TRAINING IN-COUNTRY

3.1 Introduction

In order to make the final four weeks of the in-country training as meaningful as possible, the technical training was designed to utilize future project sites in the province where the training was to take place. Fortunately, the training site was located in Settat Province, one of the 13 provinces of the UNICEF project and one of the nine provinces to which Volunteers would be assigned. The PCTs were divided into teams, with each team assigned a douar in which it would develop a project.

It was expected that this would allow the PCTs to practice the various technical skills they had been taught and thereby assess their skill levels. It would also allow all of the aspects of training--languages, cross-cultural, technical and development work skills--to be used together on one project.

3.2 Planning

3.2.1 Preliminary Planning

Prior to leaving for Morocco, the consultant held meetings with various U.S. governmental agencies which had information concerning the training program or had an interest in it. These included the Indian Health Service (IHS), Peace Corps (PC), and the Agency for International Development (AID). Conferences were held with IHS training staff about the type and degree of technical training they had provided and their view of additional training needs. In addition, the course agenda for training in the U.S. was obtained along with copies of materials for distribution.

The meetings held with AID and Peace Corps centered around the training methodologies they desired, the anticipated subjects, and protocols. These meetings and conferences were held in the Washington, D.C. area over a three-day period.

In Morocco, the training consultant spent two weeks preparing the technical component. The first days were spent in Rabat discussing the project with PC, AID, UNICEF and Moroccan officials concerning their respective roles. This was followed by a meeting with the Peace Corps training director and the technical trainer to finalize the training plans and course objectives (Appendix G). The course objectives and elements of

the training plan were presented to the trainees, and an assessment of perceived training needs was made (Appendix I).

During the development of the training schedule based on the above plan, it was learned that three hours of regular Arabic language plus two hours of technical Arabic language were planned for each day. This meant that technical training would have to be accomplished in the remaining three hours. In addition, home stay, medical considerations, guest speakers, and motorcycle training would also limit the training time available.

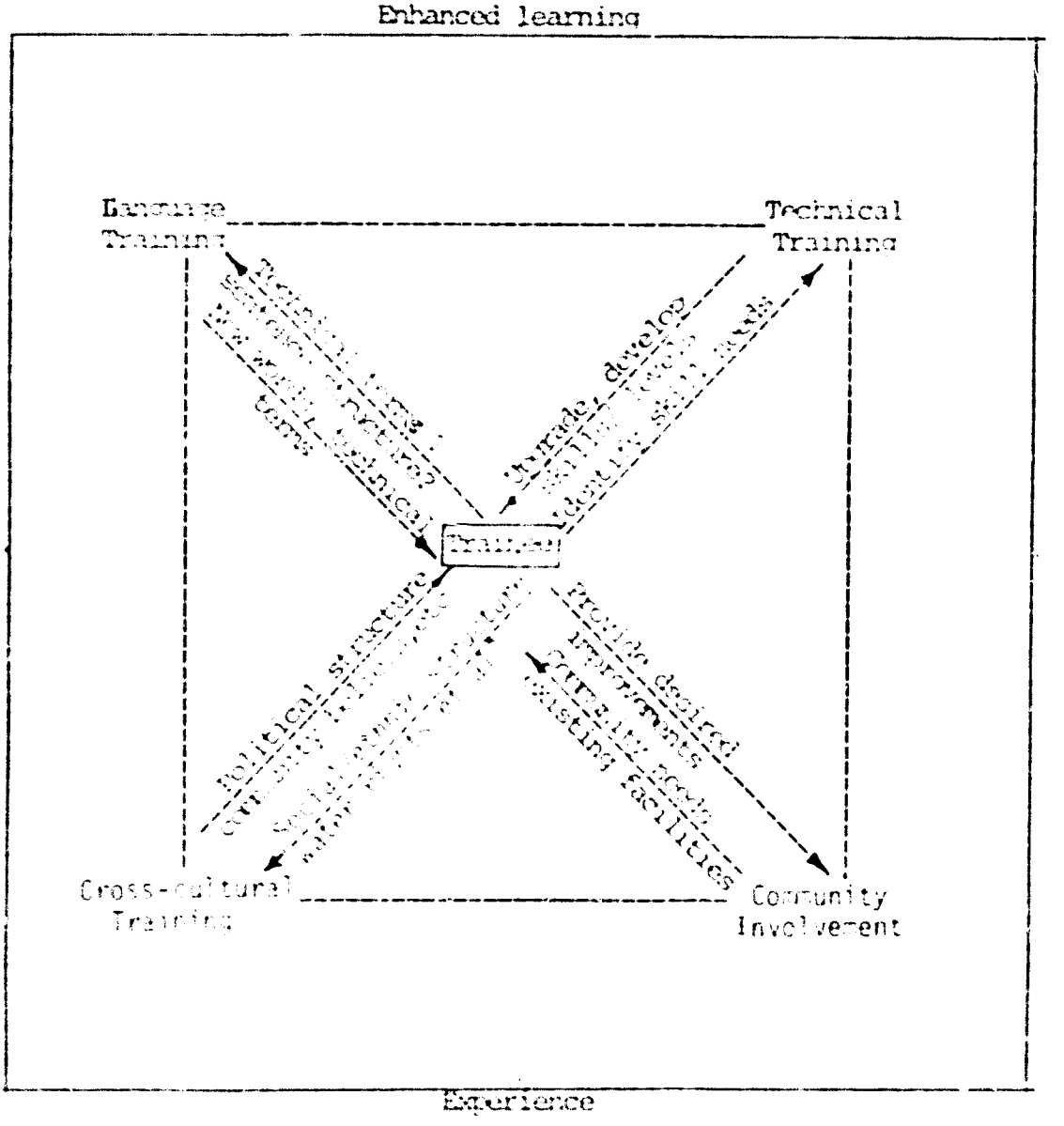
The Peace Corps trainer, who conducted the technical training in Morocco prior to the consultant's arrival, felt that he had already adequately prepared the class in electricity, pumps and controls (with the exception of installing vertical axis turbines) so these were not included in the training plan (Appendix G).

The training consultant also met with the Peace Corps Associate Director responsible for the potable water project in Settat, and with the Governor and Secretary General to obtain necessary clearances to visit the douars. The consultant was referred to the Technical Division of the Provincial Ministry of Agriculture where field trips were initiated to the douars to ascertain their suitability for training and to locate them for visits during the course of training. A visit to at least eight douars was planned. However, because the car broke down, only five were visited by the Sunday before the training was to start. It was decided to visit the remaining three douars with the PCTs as a training experience. This resulted, however, in wasting valuable time because they proved to be undesirable locations for training purposes.

3.2.2 Methodology

All training was designed to use experiential learning methods. Theory was directly related to and integrated with practical use. The trainees were actively involved in their own learning both by assessing training needs they perceived, based on job expectations, and by noting skill deficiencies, identified by conducting their assigned training projects.

Figure 1, Community Project Concept for Experiential Training, is a graphic example of how the methodology was implemented using an existing community as the training ground. Through their attempts to implement the training projects discussed in 3.2.4, Training Design, the PCTs would identify gaps in language, cultural understanding or technical skills. The trainees would then refer these needs back to the appropriate trainers for additional training (Appendix I). Thus, the



COMMUNITY PROJECT CONCEPT
for
EXPERIENTIAL TRAINING

community project became a focal point for identifying training needs not only in the technical area but also in language, cross-cultural, and development work.

Another major aspect of the methodology was the use of trainees as instructors when appropriate and when their skills so indicated. This helped to develop their training skills and provided an additional technical resource to the other trainees.

In addition, technical manuals and handouts obtained during their earlier training were used for this course in lieu of new material, as they already had some familiarity with the information. Lack of information was not the problem, it was decided, but practical experience was needed to activate the knowledge and skills learned in the U.S. portion of training.

3.2.3 Training Objectives

The training was conducted in the classroom and in the field, with special emphasis on the field component. It included those elements of a water supply program that would allow the PCV to recognize problems, develop solutions and implement corrections to assure the development and continued operation of potable water systems. At the completion of the training the volunteer would be able to:

Recognize problems:

1) Determine if the water system, including the source, pump, storage and distribution, is adequate.

2) Determine if operation and preventive maintenance are adequate

3) Determine if the pump and controls are operating correctly.

4) Determine if the motor is functioning properly as designed.

5) Identify sources of potential contamination.

Develop Solutions

1) Prepare a plan and materials list for providing a potable water system.

2) Design a plan for operation and preventive maintenance of the system.

3) Determine if the pump and controls are operating correctly.

4) Determine if the motor is functioning properly as designed.

5) Prepare recommendations for correcting potential pollution of the water source and removing hazards to safety of the water.

Implement

1) Install pumps, motors, and controls, and make necessary adjustments.

2) Repair diesel motors.

3) Implement a comprehensive long range operation and maintenance program.

4) Assist with water system construction.

5) Assist in removing pollution and safety hazards.

3.2.4 Training Design

The PCTs were split into seven teams of two and two teams of three, each team to be essentially the same as it would be when assigned to the Provinces after the training program. Each team was assigned a douar scheduled for a UNICEF project. (In two instances, two teams were assigned to the same training project because of its size.) The teams were given the following instructions:

- Gather community information, including the size of human and animal populations, and health statistics, using proper protocols.

- Locate and obtain information on existing water supply including, well size, depth, location, use, existing structures, and equipment.

- Determine size of existing reservoirs, elevation differences, and distances between storage and points of use.

- Using above information, recommend repair or replacement of existing system. If repair is needed, carry it out, if possible, in the time available. If replacement or major renovation is required, design a system including a simple plan and profiles.

- Develop an operation and maintenance scheme for the system.

- Present the proposed system to a Potable Water committee.

The intent was to provide the trainees with a project which would use their skills, including language, and bring the training goals into sharper focus. Concurrently, trainees would identify skill deficiencies, as could the instructors, through periodic project reviews. Training could then be provided to upgrade those identified deficiencies. The team which would be permanently assigned to Settat after the training program would have an additional benefit in gathering good base information with which to start its projects. Additionally, a needs assessment was conducted which identified training desired by the PCT but not addressed by the training project design, i.e. hydraulic ram design. Technical sessions were designed to meet those needs, and because of very limited training time, essentially 36 hours total, it was decided to tailor this training to the individual PCT. This training was primarily accomplished evenings and weekends.

Since one of the training objectives identified by PC Morocco was for highly trained diesel mechanics, two days were set aside for a Petters diesel presentation. The trainees had already had training on Lister diesels in their training in the U.S. Because of the common use of vertical axis turbines, a half day per individual was also planned for pump repair and installation.

3.3 Implementation

3.3.1 Training Summary

The training was implemented as planned with all initial field visits taking place on Tuesday and Wednesday, the 26th and 27th of January. During the initial visits an interpreter introduced the PCTs to the caid, the local official, and assisted at the site.

On follow-up visits, the PCTs were expected to arrange a meeting with officials and were left, more or less, on their own in the field. This developed a whole new interest in language and particularly in Arabic technical words such as well, pump, pipe, storage, etc. The interest created problems, however, in that most of the language teachers were not familiar with technical terms nor in how they were used, e.g. "the connecting rod is driven by the crankshaft and is attached to the piston".

Scheduling problems began the second week as a large portion of the group became ill. In addition, conflicts with language classes developed because the classes were structured by skill levels and the teams were structured by other criteria.

Pump installations began the third week and scheduling was less of a problem as an entire class would go out rather than teams. These sessions were very informative as each group would go out and actually install a pump that was to be used. The time of the pump installations could not be predicted exactly, because they were arranged with a local private contractor and his help hinged on pump sales and weather.

During the fourth week, the trainees presented their projects. One was presented as a role play to demonstrate how a project was presented to local officials, and the rest were presented verbally to the training staff and to the trainees who would be assigned to Settat. A complete daily training schedule for the period of time of the consultancy is provided in Figure 2.

All the session summary sheets and related handouts for the training consultant's portion of technical training are included in Appendix I.

3.3.2 Changes from Training Plan Design

All elements of the training were addressed. Some aspects were not covered as thoroughly as originally envisioned because 80 hours of technical training was not attainable due to scheduling conflicts and five hours of language training per day. Aspects not fully covered included individualized maintenance plans, construction material, and electric pumping systems.

3.3.3 Results/Trainees Evaluation

The overall objective was to provide the PCT's with the necessary technical skills to recognize problems, develop solutions and implement corrections to assure the development and continued operation of potable water systems. This objective was met. The PCTs generally expressed satisfaction with the technical training as indicated on these two evaluations criteria.

1. The degree to which the objectives of this technical rural water supply training program have been met:

1	2	3	4	5
A great deal	Quite a bit	Some	Little	None
	46%	54%		

2. The Training staff's ability to present material and/or facilitate learning has been:

1	2	3	4	5
A great deal	Quite a bit	Some	Little	None
16%	54%	30%		

The complete results of the trainee evaluations are provided in Appendix J.

FIGURE 2: TRAINING SCHEDULE FOR CONSULTANT'S PERIOD OF TIME

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
January	25 Language Project presentation	26 Groups to field all day	27 Groups to field all day	28 3:30-5:30 Trip review project sched.	29 2:30-5:30 Present project scheduled	30	31
February	1 2 groups to field	2 Peter diesels & language	3 Peter diesels & language 1 group to field	4 Language to 3:30 Rabat present-ation	5 2 groups to field Language to 3:30 Rabat present-ation Project status	6	7
February	8 2 groups to site 1 group pump install tech. 2:30-5:30	9 2 groups to field pump install Chris Warnum	10 Language to 3:30 1:30 to 4:00 pumps & pipes site selection	11 1 team to field Admin. p.m.	12 1 group install pump O & M 2:30-5:30	13	14
February	15 Language Techrical assessment	16 Language Class pre-sentation	17 Language Tech. & class presentation	18 Presentation of technical in Arabic	19 Close out Pack up	20 Swearing-in ceremony	21

Chapter 4

RECOMMENDATIONS

4.1 Overall Training Design

The training program should integrate all aspects of language, cultural, and technical training, preferrably around field excercises. This would be facilitated if at least one of the language teachers had a technical background or familiarity with technical terms.

General feedback sessions should be planned and held on a scheduled basis. PCT evaluation should be more formal with individual sessions set up for each trainee, at least weekly, to let him know where the staff sees strengths and weaknesses. The PCTs should be encouraged to contribute ideas for elements to be included in the evaluation.

4.2 Coordination

Close coordination must be developed at the start of the project between language, cross-cultural and technical trainers so that language groups which have been assigned according to skill levels are not broken up by project assignments. Cross-cultural training should take place at appropriate times and in sequence with events in order to maximize learning from the field projects.

4.3 Pre-Planning for Field Training

In the future, all project sites to be used for training should be visited and evaluated prior to assigning to the PCTs. Time must be allowed for numerous official clearances and necessary protocol visits. This kind of preparation will preclude having to reject a site because it lacks one or more essential training elements, after having spent valuable training time at the site.

4.4 Training Facility

It is recommended that future training facilities have a continuous 24-hour supply of electricity for refrigeration of food. Typing and studying late would also be facilitated.

The training facility should ideally be close to project sites and to water supply material and equipment. Some lessons could then be developed around purchasing locally available material if the PCT had easy access to town.

4.5 In-Service Training

A clearer idea of follow-on training needs will be gained by a survey of the trainees in four to six months. This assessment should include a written evaluation by the PCVs of their current duties and their needs for additional training (Appendix K). Based on the results of this survey, it is likely that each province should be visited by a technical consultant to complete the assessment.

Areas which should probably be addressed in more detail during in-service training are those not covered in depth during the pre-service training because of time constraints. These areas are: water development utilizing well drilling equipment (as opposed to digging), construction scheduling/planning, and setting up and managing a centralized operation and maintenance organization. Approximately six classroom hours were devoted to the last subject during this training program.

4.6 Wider Application of the Training Model

Conducting a technical training program in an existing village with real needs is applicable in many countries. It should be considered for all Peace Corps technical training programs as a highly desirable training methodology. When implemented in coordination with cultural and language needs, this approach enhances all skill levels and allows the trainee to participate more fully in his total learning experience. This training model ensures that the PCT will learn and retain even more.

Chapter 5

CONCLUSION

The consultant feels that, overall, the training objectives as originally planned were met, and that the trainees will be able to accomplish meaningful technical work in their jobs.

The class assessment was positive and essentially reflected the need for more time in the training schedule for technical training, especially as related to the douar project.

The chosen methodology, using an actual project as part of the training, was overwhelmingly approved by the class. This is a very useful training tool that should be expanded upon in the future.

APPENDIX A

MEMORANDUM

October 5, 1981

WATER AND SANITATION FOR HEALTH (WASH) PROJECT
ORDER OF TECHNICAL DIRECTION (OTD) NUMBER 61

TO: Dr. Dennis Warner, Ph.D., P.E.
WASH Project Director

FROM: Victor M.R. Wehman, Jr., P.E., R.S.
AID WASH Project Manager

SUBJECT: Provision of Technical Assistance Under WASH Project Scope of Work for USAID/Morocco

REFS: A) RABAT 6664, 16 Sept. 81
B) NE/TECH/HNP Memo 22 Sept. 81

1. WASH contractor requested to provide technical assistance to USAID/Morocco as per para. 2 of Ref. A Scope of Work.

2. WASH contractor/sub-contractor/consultants authorized to expend up to 65 person days effort over a six (6) month period to accomplish this technical assistance effort.

3. Contractor to provide draft final report to mission on all elements of scope of work before leaving mission, including lesson plans, training curriculum, detailed training outline, set of lecture notes, handouts, texts, and other training material, etc. Final report due according to contract.

4. Consultant to brief with Peace Corps (PC) and NE/TECH, NE/PD, USAID indepth before going to Morocco. Very likely that considerable preparation will be necessry in obtaining technical information on specific pumping brands and models anticipated to be used in PC/UNICEF/USAID project.

5. Contractor to coordinate directly with USAID/Morocco and/or PC/Morocco and with Mr. Gary Hartz at USPHS/IHS as well as Mr. Jim Bell/OPIC/PC/WASH (see para. 4 Ref. A).

6. Ensure this OTD is provided to and discussed with NE/TECH/HNP officer (B. Turner), NE/PD/Morocco officer, NE/PD/ENGR, and Morocco desk officer in an expeditious manner. Keep them informed of progress, DTA's, etc.

7. Sixty (60) person days of international and/or domestic per diem is hereby authorized.

8. Two international airfares from consultant's home base through Washington, D.C. to Morocco and return are authorized.

9. Local travel within Morocco for training purposes authorized as necessary.

10. Contractor authorized to rent vehicle for official travel outside of Rabat if PC and/or USAID vehicles unavailable to support efforts to degree necessary to accomplish mission.

11. Contractor should not initiate international travel until assured by PC that the PCVs will be available in Morocco for training and subsequent assignment to provincial potable water projects.

12. Contractor authorized up to $4,000 for printing, graphics, translation, training materials development, secretarial services, etc. in Morocco. Additional funds must be requested if needed and justified to WASH project manager.

13. Seven-day work week authorized if indicated proper by WASH consultant and certified by PC Project Officer.

14. Miscellaneous expenses authorized, NTE $1,200.

15. Contractor should contact mission immediately and technical assistance be initiated as soon as possible (see Ref. A) or convenient to USAID/PC/Morocco. Ensure WASH consultant is technically and logistically backstopped.

16. Appreciate your prompt attention to this matter. Good luck.

VAW:ja

APPENDIX B

Itinerary

Washington, D. C. to Rabat	January 10-11, 1982
Rabat to Washington, D. C.	February 24-25, 1982

APPENDIX C

Officials Interviewed

USPHS-IHS/Rockville Md

Gary Hartz, Technical Training Director, Technical Training Stateside Morocco

US Peace Corps/Washington DC

William Dant - Peace Corps Morocco Desk Officer
James Bell - OPTC/PC

USAID/ROBAT

Jerry Bowers, Health Population and Nutrition Officer
Chris Warner, Assistant Polulation and Nutrition Officer
Harold Fleming, Director
Gary Bricker, Program Officer

US Peace Corps/Robat

Baudouin du Marcken, Program Director
Ahmed Morabet, Program Officer
Stephanie Sweet, Training Coordinator
Friedl Van den Bossche, Medical Director

United Nations, UNICEF

Bernard Gilbert, Conseiller En Eau Potable

Province of Settat, Government of Morocco

Govenor of Settat Province
Secretary General of Settat Province
Director Technical Division, Dept of Agriculture
Engineer, Dept of Agriculture
Pacha, Circle Ben Ahmed
Caid, Circle Berrchid
Caid, Circle Settat

Others

Harvel Sebastial, Applied Anthropologist

APPENDIX D

OTD 61 - Scope of Work

Background

Peace Corps Morocco has requested via USAID/Rabat consultant assistance for its Potable Water Project. WASH has been asked to identify a consultant to plan and conduct the in-country technical training for Peace Corps trainees assigned to the project. These trainees have already received 5 weeks of stateside technical training in water/sanitation conducted by the Indian Health Service. Thus the in-country portion will build on what was done in the U.S. and fill in those areas which were not fully addressed.

Responsibilities

1. The consultant will consult with appropriate individuals to be briefed on the project. This includes relevant AID, Peace Corps, WASH and Indian Health Service staff.

2. Based on the briefing, the consultant will collect background material to take with him to Morocco. Such material will consist of manufacturers brochures, operation and maintenance manuals, the Peace Corps stateside training plan and materials, bio datas, and a list of supplies and materials available in Morocco.

3. The consultant will prepare a work plan that he will present to WASH before leaving the U.S. The work plan will consist of a timetable of activities to accomplish the work and a preliminary set of training objectives.

4. Upon arrival in Morocco the consultant will design and implement the technical training component which will focus on the following:

   A) Review basic concepts of pumping systems for drinking water situations with emphasis on

diesel and electrically powered equipment and provide hands-on training in trouble shooting these systems.

B) Review program and maintenance concepts that will be required in order to ensure the long-term operation of the proposed pumping devices.

C) Operation and maintenance of a variety of pumps with a special emphasis on turbines.

D) Provide hands-on experience with maintenance and repair of diesels.

E) Based on an assessment of needs, provide training in other areas. This may include principles of hydraulics, water catchment, and leveling and alignment of power-unit pumps.

5. The consultant will design and conduct training using experiential learning methods. Theory and practice will be integrated and trainees will be actively involved in their own learning. The consultant may want to use or coordinate the use of local resources in areas where assistance is needed.

6. The consultant will provide a draft final report to the Peace Corps and AID in Morocco on the technical training component. This will include a detailed training plan, designs for specific sessions, handouts, trainer notes, etc. A set of recommendations for similar future projects will also be included.

7. Upon return to the U.S. the consultant will submit the final report and conduct a debriefing at WASH to appropriate Peace Corps, AID and WASH staff.

APPENDIX E

IMPORTANT DOCUMENTS

Ministere de' l' Interieur, Project d' Alimentation en Eau Potable Dans le Milieu Rural. Royaume du Maroc, Annee 1980

Sebastian, Harvel, Development and Rehabilitation of Rural Potable Water Supplies for Morocco 1981, A study performed for AID. Rabat, Morocco, October 1980 - January 1981

Agency for International Development, Program Information Document "Douar Water System" Rabat, Morocco, March 1981.

Swanson, Wallace Jr., Rural Water Supply Stage, Mid - Training Summary Report., 1982

USDHHS, PHS, HSA, IHS, OEH, A Report on "Peace Corps-Indian Health Service Water and Sanitation Technical Training" Antlera, Oklahoma, October 31 - December 5, 1981.

TECHNICAL TRAINING OBJECTIVES
MOROCCO POTABLE WATER PROJECT
SETTAT, MOROCCO
1982

This training will be conducted in the classroom and in the field and will include those components of a water supply program that will allow P. C. volunteers to recognize problems, develop solutions and implement corrections so to assure continued operation of potable systems.

At the completion of this training the volunteer will be able to:

Recognize Problems:

1) Determine if water system including source storage distribution / pump size is adequate
2) Determine if adequate operation and preventive maintenance is being performed
3) Determine if a pump or controls are operating correctly
4) Determine if a motor is operating correctly
5) Identify sources of contamination

Develop solutions:

1) Prepare a plan and a material list for providing and adequate supply of potable water
2) Design a plan for long term operation and maintenance (O & M) to assure continued operation
3) Recommend repair or replacement for pumps and motors
4) Size pumps and motors & other system components to the community needs
5) Prepare recommendations for correcting safety hazards

Implement:

1) Install pumps and motors & controls including proper adjustments
2) Repair diesel motors
3) Initiate a long term O & M program
4) Assist with constructing concrete slabs, well covers, and watering points
5) Assist with removing safety hazards
6) Train counterparts in all of the above skills

APPENDIX G

TRAINING COURSE PLAN

POTABLE WATER STAGE
SETTAT - MOROCCO

January 25 - February 20, 1982

Course Design: The technical training will be conducted through the use of future UNICEF potable water projects located in Settat Province. Trainees will be assigned to teams of two or three people and each team assigned a village (douar) to work with. Each team will , through field visits, obtain the necessary information concerning existing facilities, population, distances and elevations, design a potable water system and develope an operation and maintenance plan. Additionaly the trainee will, when indicated, repair or recommend corrections for existinf facilities so as to provide short term improvements.

The trainees will follow the necessary protocols in doing the field work including meeting with, and obtaining necessary clearences from, appropriate officials. Arabic language skills will be enhanced as the trainees will 'be on their own' following the first visit. This will also help the trainees to identify the technical words required in their work.

Additional technical training will be designed to address skill deficiences identified by the trainees and the instructors in the course of completing their project. This training will be tailored to each teams needs.

Objectives: The training will be conducted in the classroom and in the field, with special emphysis on the field component. It will include those elements of a water supply program that will allow the PCV to recognize problems, develope solutions and implement corrections so as to assure the developement and continued operation of potable water systems.

At the completion of this training the volunteer will be able to;

Recognize problems:

1) Determine if the water system including the source, pump, storage and distibution is adequate.
2) Determine if adequate operation and preventive maintenance is being performed.
3) Determine if the pump and controls are operating correctly.
4) Determine if the motor is functioning properly as designed.
5) Identify sources of potential contamination.

Develop solutions:

1) Prepare a plan and material list for providing a potable water system.
2) Design a plan for operation and preventive maintenance of the system.
3) Recommend repair or replacement of pumps and motors.
4) Properly size pumps, motors and other system components.
5) Prepare recommendations for correcting potential pollution of the water source and removing safety hazards.

Implement:

1) Install pumps and motors and controls including necessary adjustments.
2) Repair diesel motors.
3) Imlement a comprehensive long range operation and amintenance program.
4) Assist with water system construction.
5) Assist in removing pollution and safety hazards.
6) Train counterparts in all of the above skills.

Class Schedule: The technical training will be evenly divided between language and technical over the four weeks. It is expected that 80 hours will be available for the technical training for each trainee. This will be split between class and field as shown below.

Module	Classroom	Field	Total
Diesels	2	14	16
Pumps	2	10	12
Operation & Maintenance	4	4	8
Water system design	16	16	32
Construction skills	2	10	12
	[illegible]	[illegible]	80

Participant Feedback & Evaluation: The course will be preceeded by skill needs assessment to identify the percieved needs of the PCT s. This will be used to structure classes to increase their skill levels in those areas. An trainee evaluation will be held at the end of the training to evaluate how well those needs were met.

Feedback will be by individual meetings on an informal basis and through the formal process already in place at the stage.

Training Methodology: All training will be accomplished using experiential learning methods. Theory will be directly related to and integrated with practical use. The trainees will be actively envolved in their own learning both by selecting traing they percieve a need in and by using what they have learned and are learning on their assigned project.

Training staff will allow and encourage the trainees to use their best judgement rather then making decisions for them even if the end result is a mistake as long as it is recognized by the trainee and is correctable.

The trainees will be used as instructors when appropriate and their skills so indicate. This will develope their teaching skills and provide an additional technical resource to the trainees.

Final Report: A final report which includes the training plan, specific course plans, trainor notes and handouts, as well as recommendations for future projects, will be completed within 30 days.

APPENDIX H

DAILY TRAINING SCHEDULE

RURAL WATER SUPPLY STAGE

WEEK 8

Monday, January 25, 1982

7:00 - 9:00 Breakfast

9:00 - 10:00 Orientation to Settat

10:00 - 13:00 Technical

13:00 - 14:30 Lunch

14:30 - 17:00 Language

19:00 Dinner

Tuesday, January 26, 1982

7:00 - 8:00 Breakfast

8:00 - 12:00 ½ Group--Field Visits ½ Group--Language

12:00 - 13:30 Lunch

13:30 - 17:30 ½ Group--Field Visits ½ Group--Language

19:00 Dinner

Wednesday, January 27, 1982

7:00 - 8:00 Breakfast

8:00 - 12:00 Language

12:00 - 13:30 Lunch

13:30 - 16:30 Language

16:30 - 18:30 Technical

19:00 - Dinner

20:00 Cross-cultural/Technical--water rights

Thursday, January 28, 1982

7:00 - 8:00 Breakfast

Thursday, Cont.

8:00 - 12:00 Language

12:00 - 13:30 Lunch

13:30 - 16:30 Language

16:30 - 17:30 Technical

19:00 Dinner

Friday, January 29, 1982

7:00 - 8:00 Breakfast

8:00 - 12:00 Language

12:00 - 13:30 Lunch

13:30 - 16:30 Language

16:30 - 17:30 Technical

19:00 Dinner

RURAL WATER SUPPLY STAFF

WEEK 9

Monday, February 1, 1982

7.00 - 8:00 Breakfast

9:00 - 12:00 Arabic for Robie, Scott, Will, Mo[illegible]al, Kurt, Loni, and Gunar
Field visits for balance

12:00 - 13:30 Lunch

13:30 - 14:30 Language for same group.
Field visits continue for remainder

14:30 - 16:30 Field visits continue; language class ends.

16:00 - 18:00 Language for people who were in field during day

18:00 - 20:00 Dinner

20:00 - 21:00 Language for people who were in field during day.
Cross-culture for remainder: Moroccan music

Tuesday, February 2, 1982

7:00 - 8:00 Breakfast

8:30 - 10:30 Language

10:00 - 12:00 ½ group---Petters lecture and demonstration
½ group---Language

12:00 - 13:30 Lunch

13:30 - 15:30 ½ group---Petters lecture and demonstration
½ group---Language

15:30 - 18:30 Petters lecture and demonstration--group 1
Language--groups 2,3,4,5

18:30 - 20:00 Dinner

20:00 - 21:00 Language
Cross-culture: traditional music

Wednesday, February 3, 1982

7:00 - 8:00 Breakfast

9:00 - 12:30 Language w/ Petters--groups 2,5 [illegible] ; group 3 [illegible] 10 - 12

12:00 - 17:30 Lunch

17:00 - 18:30 IBA

18:00 - 20:30 Dinner

20:00 - 21:00 Language
Cross-culture: [illegible]

Thursday, February 4, 1982

7:00 - 8:00 Breakfast
8:00 - 9:00 Language
9:30 - 10:15 Cross-culture
10:15 - 10:50 Break
10:50 - 12:00 Language
12:00 - 13:50 Lunch
13:50 - 15:00 Language
15:50 - 18:00 Motorcycle Safety
19:00 - 20:00 Dinner
20:00 - Cross-culture: Moroccan society thr 5 concepts
and how this relates your job
**Please read Chapter - Moroccan Isl

Friday, February 5, 1982

7:00 - 8:00 Breakfast
8:00 - 12:00 Language
13:00 - 13:50 Lunch
13:50 - 17:00 1 group language
1 group motorcycle safety
19:00 - 20:00 Dinner
20:00 - Cross-culture: Legal [illegible], L. Robinson

Group 1---Devin
Lori, Tim, Jack, Ted

Group 2---[illegible]
Jim, Joe, [illegible], [illegible], [illegible], Kart

Group 3---[illegible]
Lewis, [illegible], [illegible], Gray

Group 4---Fitzgerald
Don, [illegible], [illegible], Kirk, [illegible]

Group 5---[illegible]
[illegible], [illegible]

RURAL WATER SUPPLY STAGE

WEEK 10

Monday, February 8, 1982

7:00 - 8:00	Breakfast		
8:00 - 12:00	Language	Field Visit- Gunar, Lonk, Scott, Lewis	Group 2 Field Visit Pump Installation
12:00 - 13:30	Lunch		
13:30 - 14:00	Individual Technical / Individual or Small Group Tutoring Sessions		~~Jim~~ Debbie Janet Mark Kurt
14:30 - 16:30	Technical: Review of projects		
16:30 - 17:30	Technical: Preventative Maintenance		
19:00	Dinner		

*The individual/small group tutoring is to be arranged by trainees around technical classes

Tuesday, February 9, 1982

7:00 - 8:00	Breakfast	
8:00 - 12:00	Language	Groups 1 & 5 Field Visit Pump Installation
12:00 - 13:30	Lunch	
13:30 - 16:30	Individual Tech Sections--Speakers Doris Warnum- Water and Sanitation Roy Turner - Urban and Rural Development	Lonk, Tim Jack, Ned Robie, Scott
16:30 - 17:30	Technical: Pipes and Pumps	
19:00	Dinner	

Wednesday, February 10, 1982

7:00 - 8:00	Breakfast
8:00 - 12:00	Language
12:00 - 13:30	Lunch
13:30 - 16:30	Health Orientation
14:30 - 17:30	Technical: Site Planning--Ahmed Morabet & Lonk
19:00	Dinner
20:00	Cross-culture: Sensing-in

Thursday, February 11, 1982

7:00 - 8:00	Breakfast	
8:00 - 12:00	Language	Group 3 Field Visit Pump Installation
12:00 - 13:30	Lunch	
13:30 - 14:30	Individual Tech Sections	Louis, Gunar Jim V, Arnie
14:30 - 17:30	PC Admin Orientation	
19:00	Dinner	
20:00	Cross-culture: History 1912 - 1965	

Friday, February 12, 1982

7:00 - 8:00	Breakfast	
8:00 - 12:00	Language	Group 4 Field Visit Pump Installation
12:00 - 13:30	Lunch	
13:30 - 17:30	Technical Operation and Preventative Maintenance	Don Jim Steve Will Jamel
19:00	Dinner	

RURAL WATER SUPPLY STAGE

WEEK 11

Monday, February 15, 1982

***Note: During the period between 2/15 and 2/17 there will be pump installation visits

7:00 - 8:00 Breakfast

8:00 - 12:00 Language

12:00 - 13:30 Lunch

13:30 - 14:30 Evaluation of four-week W.A.S.H. technical sessions

14:30 - 17:30 Presentation of technical project -- team meeting times to be posted

(the following activities will be arranged around technical presentation --

1) small group language session on:
   a. "How to meet the Governor"
   b. "How to meet other officials"
2) Individual or small group language tutoring sessions
3) small group session on most frequently asked questions
4) individual technical sessions
5) motorcycle training

19:00 Dinner

20:00 Cross-culture: The Modernization Movement in Morocco

Tuesday, February 16, 1982

7:00 - 8:00 Breakfast

8:00 - 12:00 Language

12:00 - 13:30 Lunch

13:30 - 17:30 Presentation of technical project -- Team meeting times to be posted

(The following activities to be arranged around technical presentations:

1) individual or small group language tutoring sessions
2) individual technical sessions
3) motorcycle training

19:00 Dinner

Wednesday, February 17, 1982

7:00 - 8:00 Breakfast

8:00 - 12:00 Language -- F.S.I. interviews - times to be posted

12:00 - 13:30 Lunch

13:30 - 17:30 Technical language session presentation of project to section supervisor -- team times to be posted

Wednesday, Cont.

presentations:

1) individual or small group language tutoring sessions
2) individual technical sessions
3) motorcycle training

19:00 Dinner

Thursday, February 18, 1982

7:00 - 8:00 Breakfast

8:00 - 12:00 Language

12:00 - 13:30 Lunch

13:30 - 17:30 (The following activities to be arranged by interested parties in advance:

1) individual or small group language tutoring sessions
2) individual technical sessions
3) motorcycle training (with assistance of monitor)

19:00 Dinner

Friday, February 19, 1982

7:00 - 8:00 Breakfast

8:00 - Pack - up

8:00 - 17:00 Motorcycle training (with assistance of monitor)

Evening Cross-culture: End of stage hefla

Saturday, February 20, 1982

8:00 - 10:00 Breakfast

11:00 Swearing - in (Settat)

"LE SWIFT KICK EN FIN"

H. P. MILLS

Appendix I

Session Summary Sheets

Session Title	Page
Needs Assessment	37
Introduction of Water System Projects	42
Site Evaluation Planning	43
Field Visit to Water Project Site	56
Pump and Pipe sizing	58
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Vertical Axis Turbine Pumps	73
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Test pumping a well	83
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Operation & Maintenance Presentation	87
Technical Project Presentation	90

SESSION SUMMARY SHEET

1. Session Title: Needs Assessment Date: 1/13/82

2. Session Type (Circle One): Time: 1 hour

Field Classroom

Instructors: Sherer

3. Materials Needed:
Needs accessment grid & plotting guide handout flip chart or blackboare
Training objectives

4. Learning Objectives:
Trainees to identify necessary skills required for to do job, rate the importance of those skills and their current skill level

5. Order of Activities:
Present training objectives - get class input conduct neede accessment & graph class average
Meet individually with trainees to evaluate training needs. About 30 min per trainee

6. Evaluation of Session:
Recieved well - done at 5:30 PM after language and guest speaker lights kept going out. Recomment that session be held in morning time - frame as it takes at least an hour to do in class. Met w/ trainees individually on skills needed

PEACE CORPS

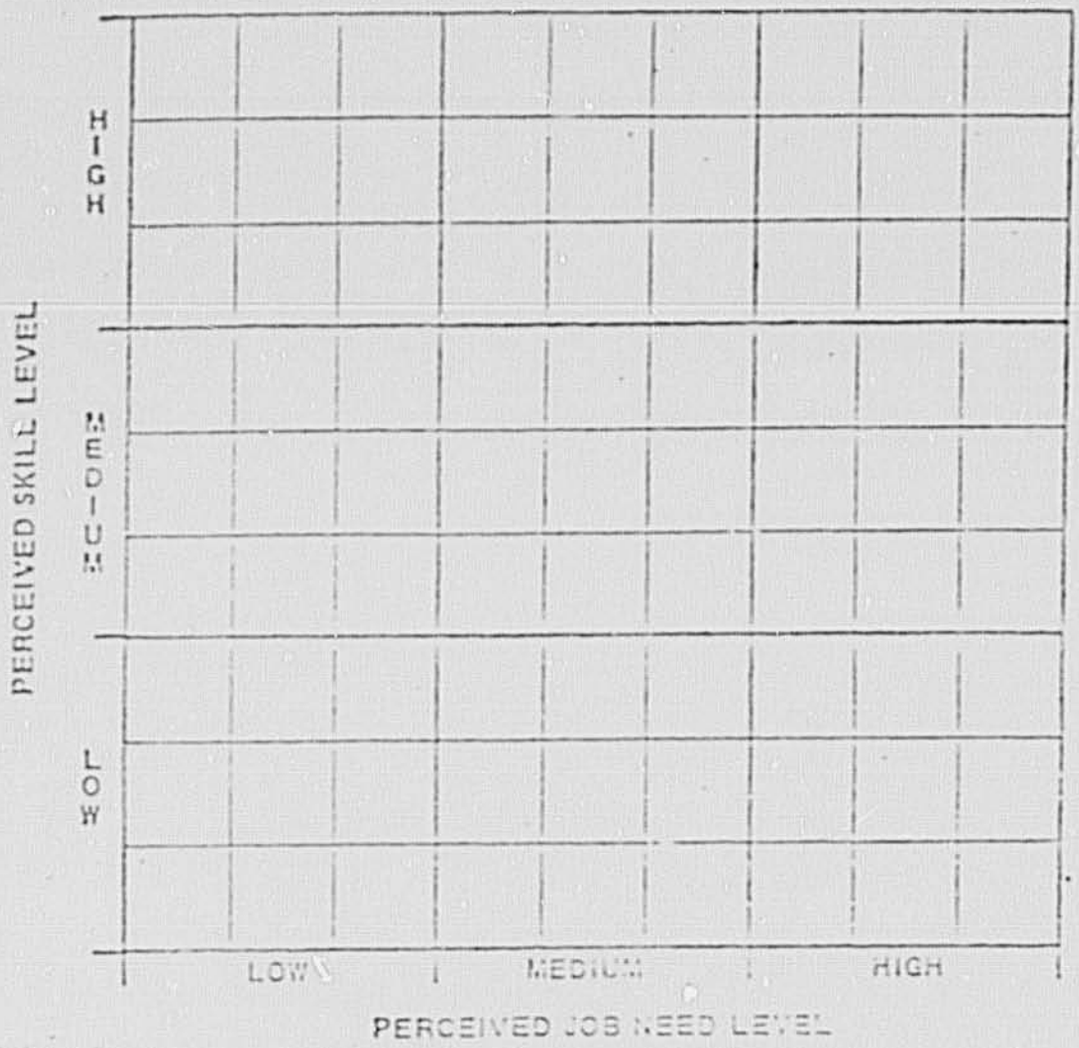
Trainee Roster: Name	Program Assignment	Province Assignment
1. Andreini, Marc S.	Water Production	Azilal
2. Brady, Edward A. Jr.	Maintenance & Supply	Safi
3. Bringgold, Kurt R.	Maintenance & Supply	Essaouri
4. Brittain, Lewis A.	Maintenance & Supply	Khouribga
5. Courts, Timothy	Water Production	El Kelaa Des Srarhna
6. Courts, Janet Wells	Water Production	El Kelaa Des Srarhna
7. Leaming, Scott H.	Maintenance & Supply	Khouribga
8. Litterer, Stephen J.	Maintenance & Supply	Safi
9. Lynch, William F.	Maintenance & Supply	Azilal
10. Mallor-McGrath, Ioni	Water Production	Bene Mallal
11. Mallor-McGrath, Micheal	Water Production	Bene Mallal
12. McNeeley, James L.	Maintenance & Supply	Settat
13. Messina, Michael J.	Maintenance & Supply	Azilal
14. Ne Jame, Jamal Kariem	Maintenance & Supply	Settat
15. O'Leary, Daniel T.	Maintenance & Supply	Benslinale
16. Robillard, Joseph	Maintenance & Supply	Bene Mallal
17. Stowell, Deborah H.	Water Production	El Jadida
18. Stowell, Jack D.	Maintenance & Supply	El Jadida
19. Vicino, James A.	Maintenance & Supply	Benslinale

NEEDS ASSESSMENT GRID - PLOTTING GUIDE

INSTRUCTIONS: As you plot your key skills and knowledges on the Needs Assessment Grid, use the following range descriptions as a guide to where you should place yourself on each axis. These indicators are not intended to be exact, but to be aids as you make judgments about your abilities and your job need.

AXIS	RANGE	INDICATORS
Perceived Skill/ Knowledge Level: Vertical Axis	HIGH RANGE	.seen by others as an expert .requires no supervision .could train others .highly satisfied with self .work usually accepted with no revision/correction required
	MID RANGE	.seen by others as adequately skilled .require some supervision but becoming increasingly independent .feel ok but not terrific about self .revisions required are generally minor
	LOW RANGE	.seen by others as a learner/trainee .requires constant supervision, always asking others for help .feel anxious, highly dissatisfied, frustrated with self .work returned frequently for correction/improvement, high error rate
Perceived Job Need Level: Horizontal Axis	HIGH RANGE	.the skill/knowledge is frequently used on the job .the skill/knowledge is a routine/regular/integral/essential part of the job .the application of the skill/knowledge is a highly visible part of the job .the application of the skill/knowledge is of major importance to the organization
	MID RANGE	.the skill/knowledge is occasionally used on the job .the application of the skill/knowledge enhances performance but is not essential/required .the application of the skill/knowledge is sometimes visible .the application of the skill/knowledge is of some importance to the organization
	LOW RANGE	.the skill/knowledge is seldom used on the job .the skill/knowledge is not a routine/regular/integral/essential part of the job .the application of the skill/knowledge is a rarely visible part of the job .the application of the skill/knowledge is of little importance to the organization

NEEDS ASSESSMENT GRID



INSTRUCTIONS: The Needs Assessment Grid relies on your perception of two things, your current level of skill in a particular area, and the need for that skill on your job.

To use the Needs Assessment Grid, ask yourself two questions:

1) "How do I perceive my skill/knowledge level in this subject area?" - vertical axis.
2) "How do I perceive the need level for this skill/knowledge in my current job?" - horizontal axis.

The definitions will help in determining where to plot points on each axis.

Technical Skill Needs Identified by Trainees at El Jadida

January 14, 1982

Diesel Repair

Electric motors and controls

Construction techniques

Surveying

Windmills

Pipe sizing

Mapping

Pump and motor sizing

Water use estimation

Privies

Maintenance organization

Material and cost estimation

Pump repair / installation

Project planning / development

Health aspects of water specific to Morocco

SESSION SUMMARY SHEET

1. Session Title: Introduction of Water System Projects Date: 1-25-82
2. Session Type (Circle One): Time: 2 hrs

(Field) (Classroom)

Instructors Sherer/Davis

3. Materials Needed:

Blackboard, area map, UNICEF project data fisch

4. Learning Objectives:

Provide trainees an opportunity to evaluate their skill levels in all phases of water supply assigning an actual project site to evaluate the existing system, repair if possible, design a future system & prepara an operation and maint. plan

5. Order of Activities:

(Clear with Province officials beforehand) Assing sites to teams discuss requirements: A. Field trip including necessary official visitations to evaluate whats existing. B. Develop project to repair, replace, or provide domestic water. C. Develop maint. schedule and parts list D. Present to total group, Project schedule to be developed to assure project completion

6. Evaluation of Session:

Project seemed to be what trainees are looking for to put all skills including communication, together

Potable Water Project Assignment

Be assigned project - Prepare a schedule for the following

Research - Where is it, how did it come to be
- What is existing
- What is needed-from douar
-Project proposed

Review - Visit site, gather/substantial data, recommend cover define community

Develop - Prepare a project proposal based on UNICEF forms-Include a material & equipment list
Define who provides what (labor, utils, tools)
Prepare project schedule w/ open start date week by week
- Prepare an operation, & preventive maintenance schedule identifying the elements in the system that need P.M. ÷ (include all elements ie Prepare list of recommended spare parts replace
- Make interim repaires if possible (even if only safety precautions)

Meet weekly with director Interior to discuss progress. Prepare trip requests is travel to field make final presentation to see General of Province.

SESSION SUMMARY SHEET

1. Session Title: Site Evaluation Planning Date: 1/25/82

2. Session Type (Circle One): Time: 1 hr.

Field Classroom

Instructors: Sherer

3. Materials Needed:
Blackboard or flip chart

4. Learning Objectives:
Importance of pre trip planning
Information necessary to plan water project value of group input

5. Order of Activities:
Establish work teams of 2 break into teams, develope list of information to be obtained and equipment needed. Reconvene & develope concensus list of information needed for community, water source, pump facilitees, water transmissions, storage, distribution & O&M

6. Evaluation of Session:
Participation good, intrest level high

Site Evaluation Planning

Break into teams or groups

1. Review UNICEF project form
2. Prepare list of information to be gathered by items
   a. from admin.
   b. from field visit

30-45 min. - Well or Water source, water delivery system, name of Duoar, distance to Duoar, elev. dif. population sanitary conditions, water quality,
production
community
source
distribution
storage
transmission

30 min. - List on black board - discuss, prepare list

2 hrs. Break into groups, develope tentative project schedule-additional tech, desires
Report back key elements
1. Whats there/wanted - week 1
2. Whats recommended - week 2
3. Project matr. list complete - week 3
4. Present project - week 4

Caveats - home live in 12-14 (Fri.-Sun.) -health Tue.
Presentations 17 & 18 -guest Wed.
5 hrs language/day - diesel/pumps

FICHE TECHNIQUE - TECHNICAL FORM

Royaume du Maroc
Ministere de l'Interieur
Direction des Collectives locales

No. de fiche

Alimentation en eau potable - Rural Water Supply
In milieu rural -

Province de:.....
Collectivite concernee
Cercle.....
Commune rurale:.....
Douar:.....

1. Captage (Water source)

1.1 Characteristics actuelles (present characteristics)
-Date de contruction
-Profondeur in m (depth in meters)
-Diametre en m (diameter in meters)
-Productivite (flow)
·essais de pompage du (date of pump test)
·realise par (achieved by)
·debit mesure (measured flow)

1.2 Amenagement a prevoir (development to plan)

-Approfondissment (deepening)

-Cuvelage (lining)

-Margelle (curb)

-Protection (protection)

-Autres (others)

1.3 Schemas

-Plan de situation sommaire (small site plan)

-Installations existantes (present installations)

-Amenagents prevus (planned development)

2. Pompage et Refoulement (pumping and output)

2.1 Evaluation des besoins journaliers en eau (evaluation of daily water needs)

-bases d'evaluation

·nombre d'habitants (number of inhabitants)

·litres par habitants (litres per person)

·autres usages (other)

-besoins actuels en m^3/j. (present needs in m^3/day)

-besoins futurs en m^3/ jour (future needs in m^3/day)

2.2 Caracteristiques du pompage par jour en m^3 (of pumping and outflow)

-volume de pompage par jour en m^3

-temps de fonctionnement maxi en h. (maximum pumping time in hours)

-debit horaire de pompage en m^3/h. (hourly flow in m^3/hour)

-hauteur geometrique de refloulement en m. (output pressure head in m)

-diametre de la conduite de refoulement en mm. (diameter of output pipe in mm.)

-profondeur d'aspiration en m (suction head in meters)

-vitesse d'ecoulement en m/s (flow speed in m/second)

-Longeur de la conduite de refoulement (output piping length)

-perte de charge en m. (pressure loss in meters)

-hauteur manometrique total en m. (total pressure head in meters)

- puissance de refoulement necessaire en ch (required pumping power in ch--hose power)

-energie electrique dispinible oui non
(available electricity)

-specification de l'equipement de pompage

·type de pompage

2.3 Abri de pompage, equipement electrique (pump house, electrical equipment)

-situation

-caracterisitques

-equipement electrique

·equipement electrique (present)

·equipement prevoir (planned)

Remarques et observations diverses relatives au captage et au pompage

2.4 Schema

-profil en long sommairement cote du refoulement
(profile in long of output piping and terrain)

3. Reservoir

3.1 Capacite

-ouvrage existant en m^3

-capacite future an m^3 (future capacity in m^3)

-capacite a realiser en m^3 (planned addition)

3.2 Descripeion des equipements a mettre en oeuvre (future minus presnet cap.)

-type de reservoir semi enteree ou sur tour
(type of reservoir half-buried or raised)

-dimensions du reservoir

-caracteristiques des equipements (type of equipment)

·alimentation (diameter of intake pipe)

·vidange (drain)

·trop plein (overflow)

3.3 Schemas du reservoir (drawings of the reservoir)

4. Distribution

4.1 Description du reseau de distribution (description of distribution network)

-reseau principal (main pumping network)

-reseaux secondaures (secondary networks)

-accessoires necessaires (required accessories)

·nomenclature: tes, coudes, reductions, robinets-vannes, colliers de (t's, elbows, reducers, faucets-valves, prise connecting collars)

4.2 Schemas

-plan de situaiton du reseau (plan of piping network)

·situation des acces/oires (vannes, ventouses...)
(present accessories--valves, relief valves)

-bornes fontaines (puvlic foundations)

IMPORTANTION NEEDED TO PLAN AND DESIGN A WATER SYSTEM

ITEM	CONSIDERATION	EQUIPMENT
Community	*Population	Notebook
	present growth	pen
	*Usage	tape
	present daily peak	drop line
	factors determining	calculator
	re. schools	
	souks	
	industry	
	development and impact	
	*Resources	
	technical	
	political	
	financial	
	What is wanted and by whom	
Water source	Type: Well - Spring	Testing equipment?
	Seasonal fluctuation	Sample containers
	quality	Mirror
	Quantity - production	surveying equipment
	site location	flashlight
	environmental condition	records of problems, ect.
	type of usage	
	sanitary conditions	
	site conditions	
	geological data	
pump	power availability	
	type of pump - make and model	
	serial number	
	age - date of installation	

ITEM	CONSITERATION	EQUIPMENT
	condition - suitability	
	availibility of parts	set of wrenches
	Preventative maintenance	crescent wrenches
	pump house, etc.	screwdriver
	who's responsible	packing
	records	penetrating oil
	in use? necessity	service materials
	conditions of service	multimeter
	how often?	
	how long?	
Transmission	as built plans	
	type of pipe, size, etc.	
	condition of pipe	
	adequacy	tape measure
	protection	valve wrench
	inspection procedures	
	legnth	
	valves, meters, etc.	
storage	clean, inside	
	type, condition	
	capacity	bar
	repairability	
	controls	
	overflow	
	location - existing and potential	
	accessability	
	height - bottom elevation	
	top elevation	

ITEM	CONSIDERATION	EQUIPMENT
	date of construction	
	design	
Distribution	location of fountains	
	protection/drainage	vise grips
	people's attitude - aesthetics	screwdriver
	type	
	use/abuse - being used?	
	type of valves/faucets	
	age	
	flow - condition of pipes	
	shut - off valves	
Treatment	type--chemical	chlorine tester
	physical	
	operative	
Preventative maintenance		
	visual observation	
	records	
	personnel	
	education	
	is equipment assessable for preventative maintenance	
	how does it work structurally	
	biochemical feedback interface	

SESSION SUMMARY SHEET

1. Session Title: Field visit to water project site Date: 26-27

2. Session Type (Circle One): Time: 6 hrs/ visit

(Field) (Classroom)

Instructors: Sherer/Davis

3. Materials Needed:

vehicles, map

4. Learning Objectives:

Necessary offical protocals

Information gathering techniques

Test language skills/needs

5. Order of Activities:

visit officials at Province, Circle and Douar level, travel to project sites

leave team at each site

information gathering by team

6. Evaluation of Session:

It had origionally been planned to have the 9 teams visit their sites during the day. The session had to be accomplished over 2 days due to travel distances and to longer times necessary for official protocol then expented. Note this project takes a lot of preplanning & time for official clearances

POTABLE WATER PROJECT ASSIGNMENT

Douar	Team Assignment
Cercle de Settat	
C.R. Ouled Said--Douar La houza	Goonar & Loni Mallor-McGrath, Robi Robillard
C.R. Mechraa Bon Abbou--Douar Souada	Tim & Janet Courts - Arni Ward & Jim McNeeley (2 teams)
C.R. Mzoura--Ecole Khemisset Chaouia	Will Lynch & Mike Messina
C.R. Sidi Rahal--Ouled Messnaouia	Mark Andrini, Dan Oleary, Jim Vicino
Cercle de Berrechid	
C.R. Reah--Douar Louled Ssyne	Lewis Brittain, Scott Leamung
C.R. Reah--Souk Jemaa Reah	Durt Bringgold, Jamal Ne Jame
Cercle de Ben Ahmed	
C.R. Zaouia gidi Haj Taghi	Jack & Debbie Stowell - Steve Litterer, Ned Brady (2 teams)

SESSION SUMMARY SHEET

1. Session Title: Pump & Pipe Sizing Date: 1/30

2. Session Type (Circle One): Time: 2-3:30

Field Classroom

Instructors: Sherer

3. Materials Needed:

Blackboard - head loss charts/nomographs Information on typical Douar - Population, animals, elevation of well, Douar, storage, Distances

4. Learning Objectives:

Review hydraulics - learn to determine total dynamic head for a pump in order to select a proper size - Includes estimating present and future water needs and pipe sizing

5. Order of Activities:

Essentially this session carried the trainees through a problem to size, pipe pumps and motors by using a 'typical' Douar. They will apply this to the water project they are now on

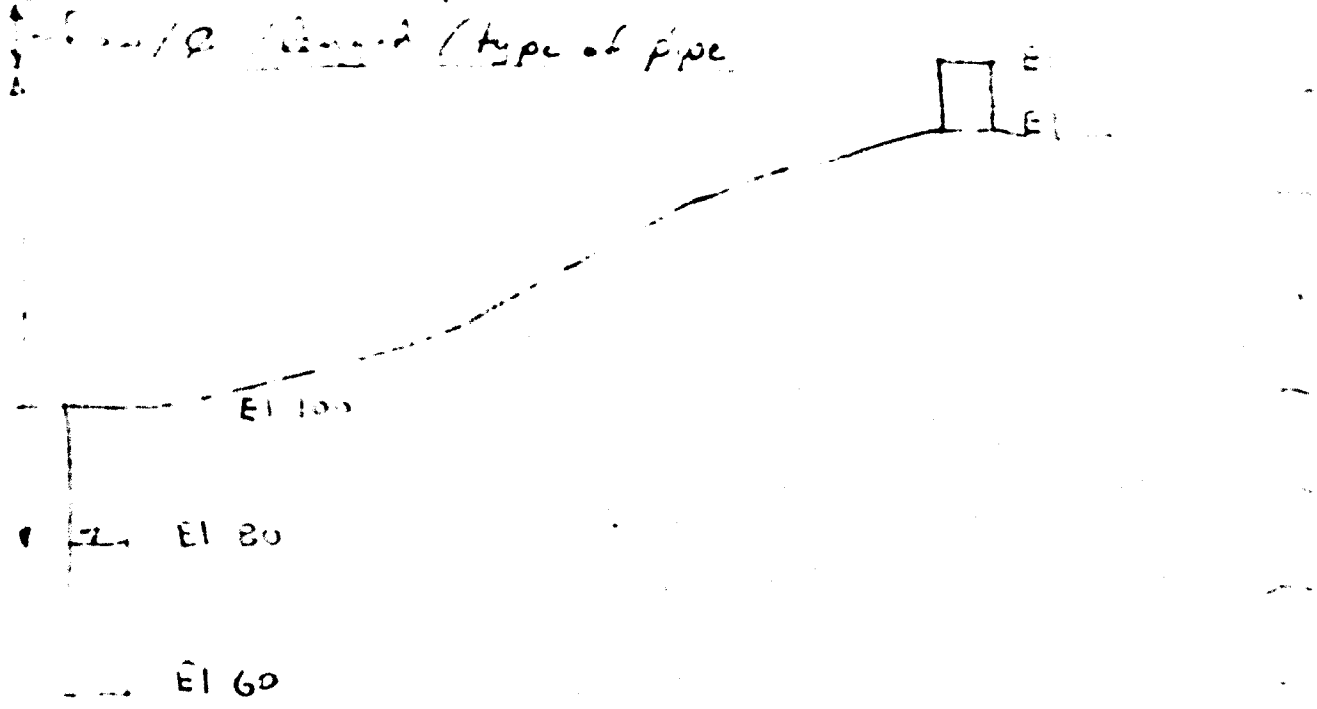
6. Evaluation of Session:

This was a Sat. afternoon session and was optional. c persons participated and requested follow on courses for Sunday in test pumping

Problem - Pipe & pump selection

Village 1,000 people 100 cattle & horses 200 sheep

[illegible] / [illegible] / type of pipe



$Q = 40 \times 1000 + 40 \times 100 + 10 \times 200 = 46{,}000$ L/d

$\times 2$ (peak 6 days) $\times 2$ (increased use) = 184000 L/d 20 yrs

Pipe diameter $d = 1.5\sqrt{Q}$ m/sec

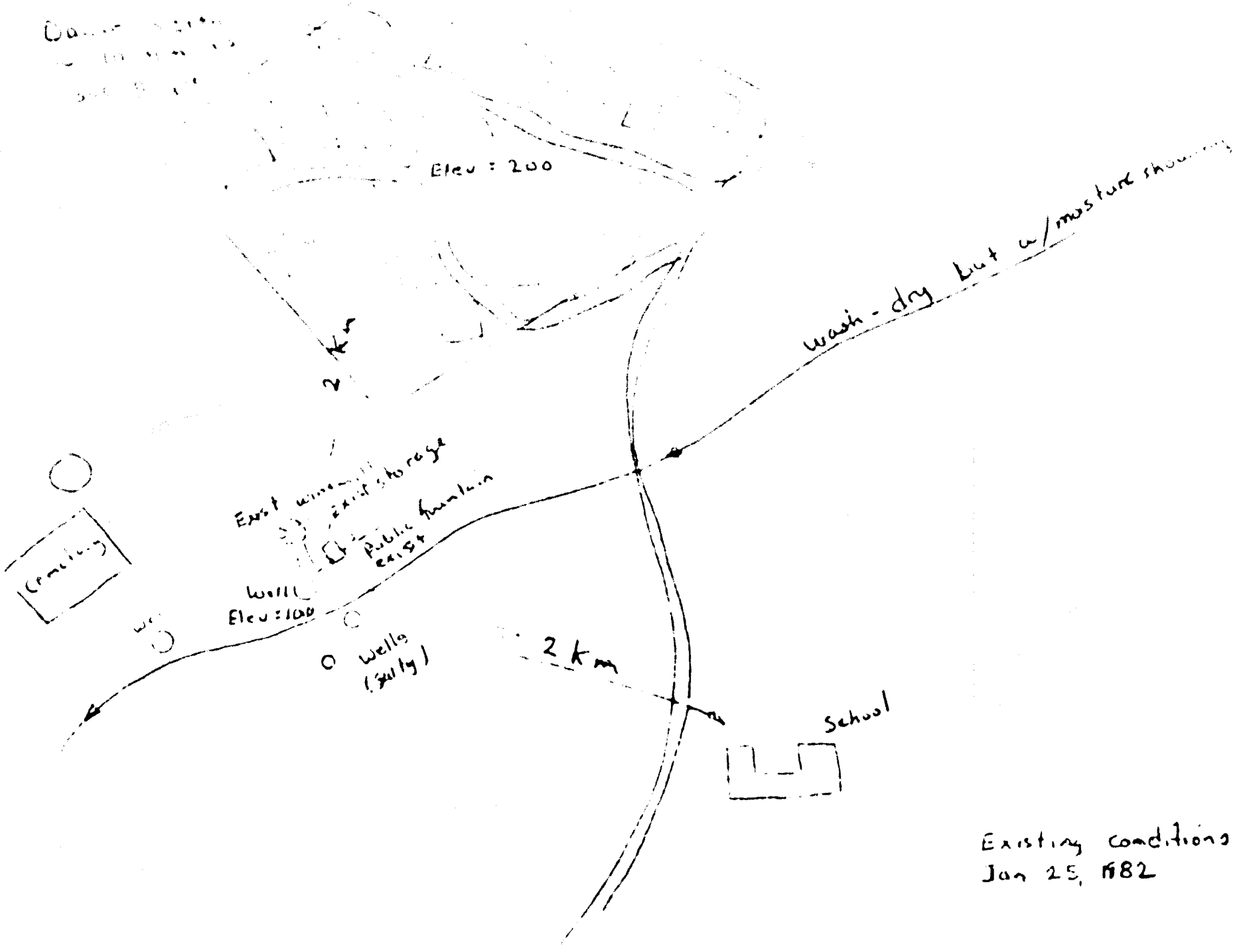
use 10 hrs = 18400 L/hr = 5.1 L/s

Ø	h_L/m	max L/s	+ length	Total h_L
1½		×	+	=
2		×	+	=
4		×	+	=

rule of thumb < 10% friction loss of total head loss

$H = H_s + H_f$

$HP_{in} = \frac{QH}{3960E}$ [illegible] $\frac{QH}{102E}$ (L/s, m) $HP = \frac{QH}{76E}$ (L/s, m)



Existing conditions
Jan 25, 1982

Friction loss chart per 100 feet of steel and plastic pipe.

FLOW	PIPE DIAMETER (inches)							
gpm	1¼		1½		2		4	
	steel	plastic	steel	plastic	steel	plastic	steel	plastic
4	.564	.304	.267	.144				
6	1.20	.649	.565	.305				
8	2.04	1.10	.962	.520				
10	3.08	1.67	1.45	.786	.431	.233		
15	6.50	3.18	3.00	1.60	.916	.495		
20	11.1	6.00	5.24	2.83	1.55	.839	.06	
25	16.8	9.06	7.90	4.26	2.35	1.27	.09	
30	23.5	12.7	11.1	6.00	3.29	1.78	.13	
35	31.2	16.9	14.7	7.94	4.37	2.36	.18	
40	40.0	21.6	18.9	10.2	5.60	3.03	.22	.111
45	50.0	28.0	23.4	12.63	6.96	3.76	.28	.148
50	60.4	32.6	28.5	15.4	8.46	4.57	.34	.186
55	72.0	40.0	34.0	18.35	10.1	5.46	.41	
60	84.7	45.5	40.0	21.6	11.9	6.44	.46	.225
70	114.0	61.5	53.2	28.7	15.8	8.53	.62	.294
80	144.0	77.9	68.1	36.8	20.2	10.9	.79	.38
90	179.0	96.6	84.7	45.7	25.1	13.6	1.0	.48
100			103.0	56.6	30.5	16.5	1.2	.59
110					36.4	19.7	1.4	.70
120					42.7	23.1	1.7	.82
130					49.6	26.8	1.9	.94
140					56.9	30.6	2.2	1.09
150					64.7	35.0	2.5	1.22
175							3.4	1.60
200					110.	59.4	4.3	2.04
250							6.6	3.20
300							9.0	4.30
400							16.0	6.90
500							24.0	10.2
600							33.8	14.0
700								18.8

FRICTION LOSSES IN FITTINGS
Equivalent Length of Straight Pipe, Feet

Size	½"	¾"	1"	1¼"	1½"	2"	3"	4"
Gate Valve (Full Open)	0.6	0.7	0.9	1.2	1.3	1.6	2.0	2.7
Elbow, 90°	3.6	4.5	5.3	6.7	7.5	8.6	11.1	13.1
Elbow, 45°	0.7	0.9	1.4	1.8	2.2	2.8	4.1	5.6
Tee (Straight Thru)	1.8	2.5	3.3	4.7	5.7	7.8	12.1	17.1
Tee (Thru Side)	4.3	5.4	6.7	8.8	10.0	12.1	17.1	21.2
Swing Check Valve	8.1	8.9	11.2	13.1	15.2	19.1	27.1	38.2

SESSION SUMMARY SHEET

1. Session Title: Individual sessions Date: 4 weeks 1-3 hours each session

2. Session Type (Circle One):

(Field) (Classroom)

Instructors: Sherer

3. Materials Needed:

various training materials & instruments

4. Learning Objectives:

To develope technical skills which are identified as deficiencies by the trainees through work in their team projects.

5. Order of Activities

Develope individual and small group training for technical subjects identified by the trainees. Sessions held evenings weekends, during breaks

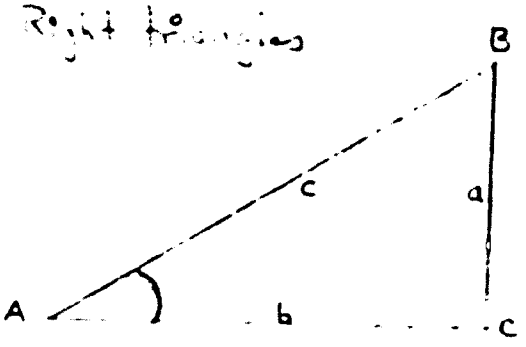
6. Evaluation of Session:

Ongoing throughout the technical training

Subjects included surveying, trig., using tables & charts in handouts given in stateside training

Trig functions

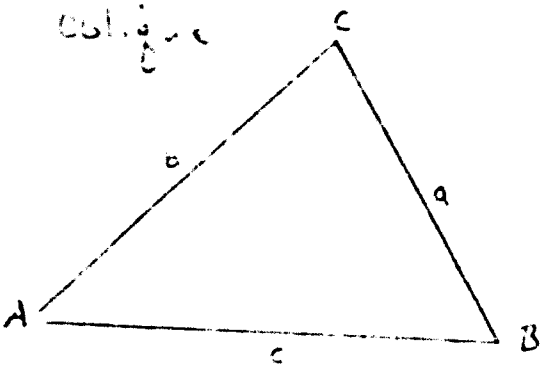
Right triangles



Sine $\theta = \frac{a}{c}$ Cosine $= \frac{b}{c}$ Tangent $= a/b$

Cotangent $= b/a$ Secant $= c/b$ Cosecant $= c/a$

Oblique



Law of sines

$\frac{1}{\text{Sine}} = \frac{\text{[illegible]}}{\text{Sine } B} = \frac{c}{\text{[illegible]}}$

Law of cosines

$a^2 = b^2 + c^2 - 2bc$ [illegible] $= \frac{b^2 + c^2 - a^2}{2bc}$

$b^2 = a^2 + c^2 - 2ac$ [illegible] $\cos B = \frac{a^2 + c^2 - b^2}{2ac}$

$c^2 = a^2 + b^2 - 2ab \cos C$ [illegible] $\cos C = \frac{a^2 + b^2 - c^2}{2ab}$

Horse power

$$\text{Power} = \frac{\text{work}}{\text{time}} = \frac{\text{Force (pounds) x distance (ft)}}{\text{time (minutes)}}$$

James Watt — horse [illegible], 33[illegible] lb [illegible] gal/min

$$\therefore \quad 1\ HP = \frac{33[illegible]\ \text{lbs} \times [illegible]}{1\ \text{min}} = 3[illegible]$$

$$\text{[illegible] HP} = \frac{F \times D}{\text{time} \times 33{,}000}$$

$$\text{horse power} = \frac{[illegible]}{3000}$$

SESSION SUMMARY SHEET

1. Session Title: Design small pump systems Date: several times

2. Session Type (Circle One): Time: 1-2 hrs each

Field (Classroom)

Instructors: Sherer

3. Materials Needed:

Design format 'Pump Engineering' manual

blackboard

example

4. Learning Objectives:

teach how to size pump & pipe

5. Order of Activities:

Present form

go through example

help with individual projects

6. Evaluation of Session:

well recieved

Designing a Small Water Pumping System

Estimated water usage - present

	Number of:		Unit use:		
Population:	persons _____	x	_____	=	_____
School	Students _____	x	_____	=	_____
Church	Attendees _____	x	_____	=	_____
Commercial	_____	x	_____	=	_____
Large animals	_____	x	_____	=	_____
Small animals	_____	x	_____	=	_____
Public watering places	_____	x	_____	=	_____
	Total		_____		liters / day

Estimated water usage - future

Use 20 years design life. If no better information is available use a population increase of 2x present and use an animal increase of 1.25 x present.

In addition, use a rate of use increase of 2x per person

6) Population - present use _____ x 2 = _____

Schools, Church, commercial, and public watering places use present use

_____ x 2 = _____

Animals, use present use _____ x 1.25 = _____

Thus total future use (Step 7) = [_____ liters / day]

Storage reservoir

Use future demand and convert to cubic meters:

Reservoir = $\frac{\text{_____}}{1000}$ liters = cubic meters = [_____ M^3]

Water source and Pump capability

Capability of existing source _____ l/sec as found by existing records ( ) or by test pump ( ). Determine pump rate using a 10 hour pumping

$$\frac{Q \text{ liters}}{10 \text{ hr.} \times 3600 \text{ sec / hour}} = \frac{Q \text{ liters}}{36{,}000} = \text{liters / sec} = \boxed{_____ \text{ l/s}}$$

Compare water available _____ l/s to needed _____ l/s

If water available is less than needed, extend pumping time to 12 hours or identify additional source capacity.

Pipe from pump to storage

$$\text{Pipe Diameter} = 1.5 \sqrt{Q \text{ m}^3 / \text{sec}}$$

$$= 1.5 \sqrt{10^{-3} \text{ l / sec}}$$

$$= 1.5 \sqrt{0.00__ \text{ l / sec}} = _____ \text{ meters}$$

_____ meters x 1000 = _____ round to nearest pipe size = [_____ mm]

Motor sizing:

Identify the total head in meters on pump

Friction head

Equivalent length due to fittings: _____

Length of _____ mm pipe _____

Friction head loss: _____ meters x head loss / m _____

= _____ meters

Static head

Static head on pipe = _____ elevation at pump - _____ elevation at storage

= _____ meters

H = total system head = _____ m head loss + _____ m static =

H = _____ m

$$\text{Horsepower required} = HP = \frac{Q \times H}{76\ E}$$

Q = flow in l/sec
H = system head in meters
76 = constant
E = pump efficiency

$$HP = \frac{\text{l/sec} \times _____ \text{ m}}{76 \times \text{efficiency}} = _____ \text{ HP}$$

Closest available motor = [_____ HP]

SESSION SUMMARY SHEET

1. Session Title: Petters diesel Date: 2/2-3

2. Session Type (Circle One): Time: 5-4 hour sessions

Field Classroom

Instructors: Petters man. representatives

3. Materials Needed:
Petters engine, Petters manuals, slide projector

4. Learning Objectives:
How to operate and repair a Petters diesel

5. Order of Activities:
discuss models
go through step by step operating and repair routine

6. Evaluation of Session:
was good presentation and kept interest of group

HAWKER SIDDELEY

PETTER DIESELS

PETTERS LIMITED STAINES MIDDLESEX TW18 1AR ENGLAND Telephone Staines 51333 Telex 23611 Cables Diesel Staines

0784

Your Ref

Our Ref BEB/jb

23rd December, 1981

Miss Stephanie Sweet,
Training Coordinator,
Corps De La Paix Des Etats Unis D'Amerique,
1, Rue Benzerte,
Rabat,
Morocco.

Dear Miss Sweet,

I thought you would appreciate confirmation of the proposed visit by our Service Supervisor, David Priestly, to Morocco from 1st to approximately 12th February 1982. It is intended that he spends 2nd/3rd February with your mechanics and the remainder of the time he will be available to assist our licencee, and its distributors.

I will write to you again after Christmas once I have received definite confirmation about the date of his departure and travel in Morocco.

Yours sincerely,
PETTERS LIMITED.

B E Balcombe

B. E. BALCOMBE,
Sales Manager - Overseas Projects.

SESSION SUMMARY SHEET

1. Session Title: Planning in Morocco Date: 2/4

2. Session Type (Circle One): Time: 1 hour

Field Classroom

Instructors: Davis

3. Materials Needed:

Handout - le Plan dAmenagement & Le Plan du developpment

4. Learning Objectives:

types of formal master planning in Morocco and its relationship to water supply

5. Order of Activities:

6. Evaluation of Session:

Would have been improved with use of actual maps and typical plan as example

Le Plan d'Amenagement:

The explanation of the word:

Literally "un plan d'amenagement" is a plan of arrangement. It can be better understood, however, if one considers it a general master plan for any given city, town, etc....denoting (in a graphic two-dimensional way) what the future land-use will be. It is a graphic legal document that in theiry, is fixed by law and can only be changed with prior approval of the national government.

Facts of the plan d'amenagement: Though a general document, land masses are usually well designated on the plan with some of the following land-uses and details noted: housing differentiations, roads, various limits, special functions such as mosques, markets, etc...., existing elements, natural features. Scales used with the "plan d'amenagement": Again, there are variances depending on the scope of the plan. In most instances the limits will be defined by the "perimetre" of the city or community. In particular cases it might be defined by a "quartier" or even a smaller geographical area such as a "place" or a lire, a street. In the latter cases the terminology is the same but symbols and principles change. The plan will certainly include all of the following:

les elements existants : all existing features including roads, buildings, rivers, etc.

les elements proposes : all features actually being proposed by the plan -- or can the only elements actually laid out and dimensioned.

les elements futur : all those features to be proposed as alternate or future elements; also those elements to be included in an extension.

The plan should respect present systems, habits, and traditions by trying to ameliorate them and directing their growth. At the same time, the plan should try to correct any faults while directing this growth (in theory based on reality) and also be flexible enough when and if a major change must be made. A need for change might be instigated by a new dam, an industry, or an change in social structure in the area in question.

Uses of the "plan d'amenagement"

As stated before, "le plan d'amenagement" is used as the basis [illegible]

the said geographic area (it is not necessarily limited to a political area). It therefore dictates the growth and physical organization of the area. It also provides the 'perimetres' for various 'lotissements: and special use parcels, such as a mosque or a PTT. These will eventually become individual projects. It is the first reference when authorising any private or public construction and the primary source for major circulation systems. In most instances a plan is valid for five to ten years though, in principles, it could be the master plan that leads to total and final growth of the area.

Le plan de developpement

An explanation of the word:

It literally means a development plan, though its best explanation is a study plan. It is usually drawn at a scale of 1/2000 and uses the same symbols as found on the "plan deamenagement". This kind of plan serves two purposes. Firstly, it can be a study of a part of a 'plan d'amenagement" showing a proposal that is both functional and respects the plan. It is a more detailed plan than the 'plan d'amenagement' though always more vague than a "plan de lotissement" or a 'plan d'execution'.

Secondly, the 'plan de developpement' is used in many cases to replace the 'plan d'amenagement' when planning very small towns, rural settlements, and large scale tourist projects. In this way, changes can be made without the problems encountered with that other legal document. For rural centers the 'plan de developpement' is meant to be done rather quickly so that it can be implemented without stopping construction for a long period of time in the middle. The document itself is very simple, consisting of the plan and the reglements (M), or regualtions, on the same page. These regulations cover all of the specific rules for zoning, widths of streets and footpaths, sizes of lots allowable, and information on the public services which are existing or planned for the center. It is meant to be easily understood and easily distributed, thus the emphasis on having a single sheet for both the plan and the regulations. The plan is valid for a period of ten years and can be changed after five years if necessary because of the rapid growth of the town or because some particular zoning does not really fit the current needs of the inhabitants of the town.

SESSION SUMMARY SHEET

1. Session Title: Vertical axis turbines Date: 2/8-12

2. Session Type (Circle One): Time: 8 hrs. 4x during week

(Field) (Classroom)

Instructors: Sherer/Wally/Rob

3. Materials Needed:

Pump installer, transportation, equipment for pump & tools -

Handout for vertical axis turbines

4. Learning Objectives:

How a line shaft (vert. axis) pump is installed, and operates

5. Order of Activities:

Line up field trips for groups of 5 with a local pump installer. Go to site(s) with installer and install pump. 4 days, about 6 hours per day

6. Evaluation of Session:

Have to have alot of flexability as the installation is dependant on parts delivery et al - this should have been set up earlier in the training as more different installations viewed.

SESSION SUMMARY SHEET

1. Session Title: Operation & Maintenance Date: 2/8
   Time: 2 hrs

2. Session Type (Circle One):

   (Field) (Classroom)

   Instructors: Sherer

3. Materials Needed:

   IHS O&M module 1, the need for Operation and Maintenance

4. Learning Objectives:

   What a preventive maint. system consists of. How its implemented and what are the basic elements & responsibilities. This follows on to the field exercise

5. Order of Activities:

   Gain a perspective of the problem through working on the water project. Present methodology in class for implementing a program of preventive maintenance by having each team address either diesel, windmills, hand pumps or distribution of electric pumps as home work, reprt back to group and develope concensus report

6. Evaluation of Session:

   Started slow but group is keenly aware of the need for O&M and Friday was set as a report day

Operation and Maintenance:

Nov. 1980 Special meeting to launch the International Drinking Water Supply and Sanitation Decade Director General of WHO. Our new approach depends above all on people, on how they ensure and use safe water and sanitation.

Water is an essential element in our lives, it is critical that we have it. How we obtain it is another matter and perception plays a key element on Maslows theory of needs, safe, food, water, shelter, heat, sex - et al - essential, necessary, nice, luxury

Part Repair/Replace brush fire operation
Maint Management using a system approach
Includes - Maint. Policies
- Work Programs
- Scheduling Procedures
- Performance standards
- Reporting procedures

Types of maintenance
Corrective - repair/replace
Emergency - above but cant wait
Preventive-

What is enough Maintenance:
Proper maintenance consists of Inspecting, Lubricating and fixing things in accordance with Manufacturer Recommendations, and cleaning, Repairing or replacing items when they fail.

When this is done the design life of a part will be realized, if not, early failure can be expected and in fact is assured.

A good maintenance system pays for itself not only in replacement money saved but in assuring that the origional purpose intended by the provision of the system is not jeoporidized.

Maintenance Policy: It is 'essential' that a committment be made by the organization responsible. This is best done by establishing a written policy which addresses writted objectives and goals and general methodologies for reaching those goals & objectives

Preserve facilities

Provide adequate potable water

ensure proper util of resources

by work planning, budgeting, scheduling & perform standards

define workload

Identify responsibilities

determine time in man hours per task

specialties needed

vehicles needed, distances time schedule

Equipment

Parts

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SESSION SUMMARY SHEET

1. Session Title: Water project & UNICEF Date: 2/9

Time: 1 hr.

2. Session Type (Circle One):

(Field) (Classroom)

Instructors: Gilbert (UNICEF)

3. Materials Needed:

none

4. Learning Objectives:

How the Peace Corps will relate to UNICEF

5. Order of Activities:

essentially Q & A

6. Evaluation of Session:

good session

PROJECT DATES

March 1,1982---Start work at the province.

May, 1982---Projects for 1983 must be planned by this date;

---Equipment for Azilal and El Kelaa should arrive.

July, 1982 ---Equipment for Beni-Mellal, Settat, and Essaouira should begin to arrive.

Check all order made

Summer, 1982---Begin setting up a maintenance program, going out and repairing existing facilities.

---For those concerned, building projects.

Fall, 1982 ---Continue with maintenance program, study and submit projects for 1983 and 1984.

Jan., 1983 ---Funds for maintenance team, mechanic, workers trucks, etc. become available. Work with team setting up schedules, procedures, etc.

April, 1983 ---Arrival of materials ordered.

May, 1983 ---Deadline for submission of projects for ~~second~~ first half of 1984.

October, 1983--Arrival of the new volunteers.

Dec., 1983 ---Completion of service.

PRACTICAL PROCEDURES

Actions to do	Concerned Organizations	Principal Elements to Take into Account
A. Choice of installation studied	--Authorities local and provincial --Technical services --Health services --U.N.I.C.E.F. expert	--Sanitary and social [illegible] --Technical and financial elements
B. Definition of projects	--Provincial technical services --U.N.I.C.E.F. expert	--Filling out a technical form --Specialization of equipment --Evaluation of building and and operating costs
C. Choice of other projects	--Provincial authorities --Ministry of the Interior --U.N.I.C.E.F. expert	--Definitive equipment specifications --Establishment of forecasted budget of building and operating costs
D. Ordering material	--U.N.I.C.E.F.	--Delay of delivery of 4 - 5 weeks
E. Bringing the material to the site, taking care of taxes and transport	--Ministry of the Interior	--Material delivered to the port of Casablanca
F. Preparation of works	--Provincial authorities --Provincial technical services	--Calls for bids and letting contracts --Planning works
G. Realization of works	--Provincial authorities --Technical and financial services --Specialized companies	--Coordination and control of works
H. Choice of maintenance structure	--Local provincial authorities --Maintenance structures	--Establishing an operating contract

SESSION SUMMARY SHEET

1. Session Title: Hydraulic rams Date: 2/10

2. Session Type (Circle One): Time: 1 1/2-2 hours

Field Classroom

Instructors: Marc Andreini, Sherer

3. Materials Needed:

Manual on hydraulic rams - blackboard

4. Learning Objectives:

how to build and size a hydraulic ram, how to locate materials

5. Order of Activities:

check local businesses for availability of parts & cost. Present course on design

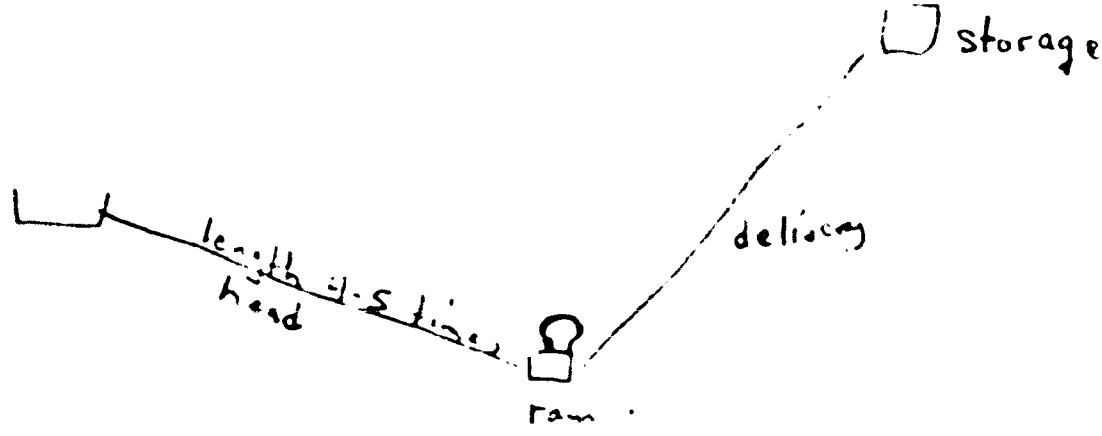
6. Evaluation of Session:

good follow-up would be to buy the parts and build the ram, Marc did a good job of presenting

Wed

Hydraulic rams

Source/supply – 5 to 12 [illegible] /min. minimum
Drive pipe – L/D [illegible] 1000 [illegible] L/D = 500 or smaller
must be submerged
ram – make or buy – very level installed
delivery pipe – any material pressure/friction
Storage – max any



$$Q_s = \frac{q_d \times H_s}{h_d} \times E$$

Q_s = Supply - L/min
q_d = delivery - L/min
H_s = Supply Head in meters
h_d = delivery head in meters
E = efficiency

Use in battery / w/m system or direct
Can use one source to pump another source

SESSION SUMMARY SHEET

1. Session Title: Test Pumping a Well Date: 2/11

2. Session Type (Circle One): Time: 1 hr

Field Classroom

Instructors: Sherer

3. Materials Needed:

Blackboard

4. Learning Objectives:

basic methods and necessary equipment to test pump a well and how to use the information - Necessity for having accurate information before building a system

5. Order of Activities:

Types of ground water

data use

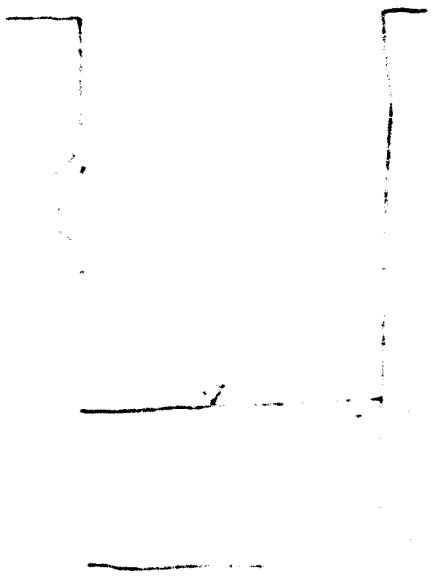
equipment needed

6. Evaluation of Session:

A lot of interest - should be forrlwed up with actual test pumping a well

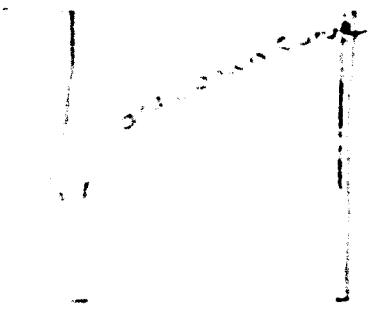
Test pumping

Purpose to determine safe yield of well
Test to pump at [illegible] to regulate
[illegible] water table or artesian conditions



Use well rarely completely
Dewater the aquifer

Procedure - gpm [illegible]
16 [illegible] [illegible]
[illegible] for 100 gpm
assuming homogeneous aquifer



Equipment

Water level recorder
watch
bailer
[illegible]
flow measuring device
tape measure
mirror

Essential that flow rate be known, measurements taken and time kept - long term pumping times desired (24 to 48 hours) to define aquifer. Test wells valuable. Water level surveys of more than 1 well.

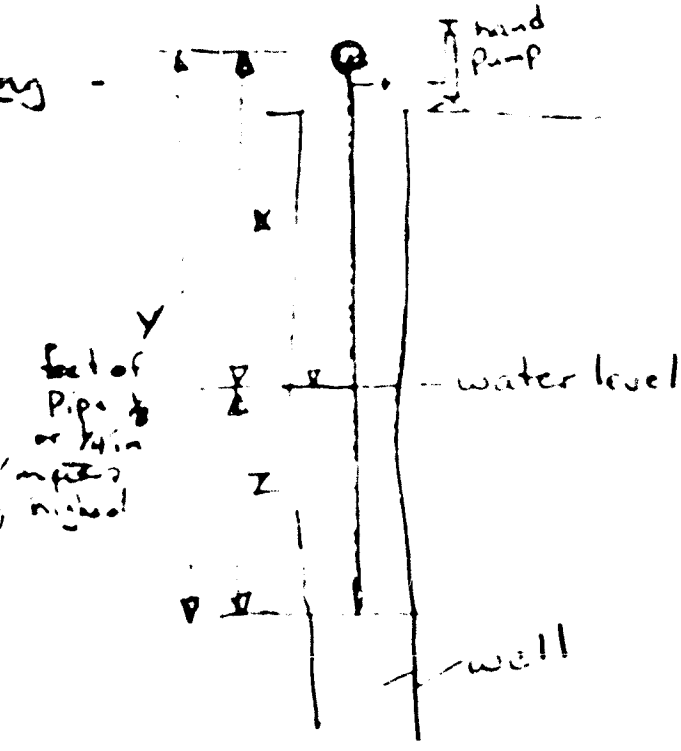
Cascade - different zones of water, poor quality developing [illegible]

Water level recording -

electrical -

Cord & float

air line



$X = Y - Z$

all units same and in ft/meters

if gauge reads lbs multiply indicated reading by 2.31

1 psi = 2.31 ft of H_2O

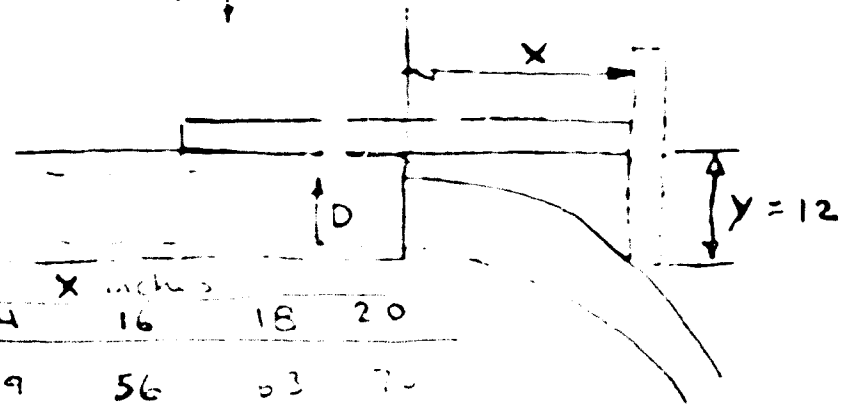
1 Kg sq m = 1 cm of H_2O

Flow measurement

water meter

container of known capacity w/stop watch

measure water drop



D	X inches 12	14	16	18	20
2"	42	49	56	63	70
2½	60	70	80	90	100
3	93	108	123	139	154

Flow in GPM

SESSION SUMMARY SHEET

1. Session Title: Windmill sizing Date: 2/13

2. Session Type (Circle One): Time: 1 hour

Field Classroom

Instructors: Sherer

3. Materials Needed:

Blackboard

windmill manual (Aermotor)

4. Learning Objectives:

Circumstances which favor windmills

how to size them

Application

5. Order of Activities:

Work through typical windmill design using a local Douar as an example

6. Evaluation of Session:

SESSION SUMMARY SHEET

1. Session Title: Operation & Maint. of windmills, Elec. pumps & motors, Diesel motors Date: 2/13

2. Session Type (Circle One): Time: 3 hr

Field Classroom

Instructors: Sherer

3. Materials Needed:

Blackboard, recorder

4. Learning Objectives:

Elements of an O&M program for windmills & other elements of water systems

Making presentation of a program to a group & obtaining interactions

5. Order of Activities:

Work groups present O&M program they developed over past week get group input consensus to be typed and given to each group

6. Evaluation of Session:

O&M

Windmills - Steve Littlear

use book - covers very well

also address packing, pump rod & cylinders

- Parts
- tools
- equipment included

Handpumps - Jack Stowell (Debbie)

- lack of training & tools
- transportation
- maint. not highly rewarding
- [illegible] of pump

~~[illegible]~~ daily - look unlock clean area

weekly - clean up

- check for rust
- oil
- record comments from villagers

Monthly - Adjust stuffing box

- check nuts & bolts for tightness

make of thumb to strokes, man should also

water otherwise leaths

Yearly - paint, repair concrete, check replace leaves

- packing, plunger valve

Strategies: - village level

Diesels — Kurt

* mid tension — Excellent source is Lister Diesel handbook - everyone has

SESSION SUMMARY SHEET

1. Session Title: Technical Project Presentation Date: 2/16/82

Time: 6 hours

2. Session Type (Circle One):

(Field) (Classroom)

Instructor: Sherer/Davis

3. Materials Needed:

Project proposal

Roles prepared for each committee member

Outline of committee and its function

4. Learning Objectives:

How to present a project to loxal gov't. officials

How local committees are formed and likely interactions

5. Order of Activities:

Have instructors as committee & PVT's assigned to Settat.

Have one group of trainees present their concept of how the project should be developed. Others observe interactions. Balance of PCT present w/out role play afterwards.

6. Evaluation of Session:

Role play worked well, participation good

MEETING OF THE COMMISSION ON THE RURAL WATER SYSTEM OF DOUAR

Ministry of Interior Meeting Room

February 16, 1982

Douar	Time	
Zaouia	3:30-4:00	Jack, Debbie, Steve, Ned
Ouled Messnaouia	3:00-3:30	Marc, Dan, Jim
Loudel ssyne	4:00-4:30	Lewis, Scott
Souaka	4:30-5:00	Tim, Janet, Arni, Jim
Lahouza	5:00-5:30	Gomar, Loni, Robi
	Feb 17	
Ecole Khemisset	2:30-3:00	Will, Mike

Scenario of the Meeting of the Commission to Study the Water Supply System of Duar_____.

There was a commission appointed to study the rural water question of this duar. The members of this commission are:

The Caid
The President of the commission
The Medecin Chef
The Chef of equipement Rural
The Chef of Travaux Public
The Chef of Division Technique.

Your boss, the Chef of the Division Technique of the province, informed you that as you are the water experts, it was decided that you should do the technical study and present it to the commission. This is a meeting of that commission to decide what steps to take to solve this water problem.

There is always a report of meetings of this nature. It is called a procès-verbale. Normally it is a written report given to all participants as well as the Governor and Secretary General. Prior to the presentation of this procès-verbale, with decisions included, to the Secretary General verbally on Wednesday.

Caid:

Education: Traditional University of Fes

Occupation: Caid for 20 years, mainly in the Province of Settat

Concerns: 1) wants an appropriate allocation of resources

2) recognizes problem and wants quick solution

3) is very fond of Americans and expects great expertise.

Comment: "You Americans are the most developed people in the world. You can do anything."

Adjoint Technique - Travaux Publics

Education: One year stage in 1970 with Ministry of Public Works

Occupation: Minor functionary in T. P.

Concerns: 1) is outwardly devout Muslim and is very suspicious of foreigners coming into Morocco

2) is defferential towards superiors, arrogant towards those he perceives as socially inferior to himself

3) likes to shuffle papers and is not anxious for a quick solution to problem

President of the Commune

Education: very little

Occupation: Farmer

Concerns: 1) wants problem rectified as quickly as possible

2) it's a poor commune and he wants the central government to pay for project

3) would like as much as possible

4) is suspicious of foreigners

Chef du Service - Division Technique (Division de programation et equipment)

Education: Application Engineer from Mohammedia School of Engineers - Rabat (1960)

Occupation: has been boss of division technique for 6 months

Concerns: 1) wants project presented in the best light possible

2) does not want to make waves

3) may feel threatened by having a foreign technicien (i.e. volunteer) in his office

4) wants to demonstrate his control of the situation

Chef du Service Equipment rural - Ministry of Agriculture

Education: graduate engineer from University of Paris (1964)

Occupation: Engineer

Concerns: 1) is unsure of volunteer's technical ability and wants good project

2) is a little annoyed that this project is being done by Ministry of the Interior and not by Agriculture and will exploit opportunities to get it back under his control

3) is very competant technically and would resent it if his prejorgatives were stepped on

Chef du Bureau - Travaux Publics

Education: graduate engineer from Belgium School des Beaux Arts

Occupation: Chef du T. P. since 1.7d. Engineer before then

Concerns: 1) never really heard of this douar and not really interested

2) technically very qualified but is more interested in roads than in water supplies

3) wants to talk to President about another matter

Medicin Chef - Ministry of Public Health

Education: Medical Doctor from University of Barcelona

Occupation: Medical Doctor

Concerns: 1) is very interested in preventative medicine

2) wants to see what's going on

3) is thinking of incorporating a program of hygiene and sanitation in his program if feasible

SESSION SUMMARY SHEET

1. Session Title: Final Technical Training Evaluation Date: 2/15/82

   Time: 2 hrs

2. Session Type (Circle One):

   (Field) (Classroom)

   Instructors: Sherer

3. Materials Needed:

   Needs assessment results

   training objectives

4. Instructional Objectives:

   Provide training staff & PC with feedback on training program

5. Procedure:

   Give PCT the list of training needs they had identified earlier on as well as the training objectives

   Have them fill out and hand in the ETE

6. Evaluation of Session:

   Not all PCT's filled out form completely but generally speaking the evaluation was positive

FINAL TRAINING EVALUATION

PEACE CORPS / W.A.S.H. PROGRAM

TECHNICAL RURAL WATER SUPPLY AND TRAINING PROGRAM

FOR

MOROCCO

SETTAT, MOROCCO

JANUARY 25 - FEBRUARY 19, 1982

1. The degree to which the objectives of this technical rural water supply training program have been achieved:

1	2	3	4	5
A great deal	Quite a bit	Some	Little	None
	46%	54%		

2. The degree to which my personal needs were met:

1	2	3	4	5
A great deal	Quite a bit	Some	Little	None
	38%	54%		

3. The degree to which I am satisfied with my own behavior / performance:

1	2	3	4	5
A great deal	Quite a bit	Some	Little	None
16%	46%	23%	15%	

4. The degree to which I am satisfied with my own learning:

1	2	3	4	5
A great deal	Quite a bit	Some	Little	None
8%	23%	69%		

5. The degree to which I felt listened to and valued:

1	2	3	4	5
A great deal	Quite a bit	Some	Little	None
	46%	54%		

6. The training staff's ability to present material and/or facilitate learning has been:

1	2	3	4	5
A great deal	Quite a bit	Some	Little	None
16%	54%	30%		

7. Accessibility of the training staff:

1	2	3	4	5
A great deal	Quite a bit	Some	Little	None
23%	62%	8%	7%	

8. Staff response to feedback:

1	2	3	4	5
A great deal	Quite a bit	Some	Little	None

9. Pace of the training program:

1	2	3	4	5
Too slow	Slow	Well paced	Fast	Too fast
8%	16%	46%	22%	8%

10. Integration of technical material and community development material:

1	2	3	4	5
Excellent	Very good	Good	Average/fair	Poor
	8%	38%	46%	8%

Open-ended questions: When responding to the following questions, please be as candid and as specific as possible.

11. Things I have found <u>most helpful / useful</u> during the training program:

Field visit - on site eval. - (9)

Surveying

Arabic technical training

Chald Talks and field visits

Petter diesel

Pump installation

Instructor's knowledge and assessability

12. Things I have found least helpful / useful during the program:

more time to do projects (2)

What our real job will be (Not Knowing)

This section should have been over the whole program in country

too rushed and condensed

Excessive moving arould of the Stage

Constant subject scheduling changes

13. Some things I need more help on:

Specific pump problems How to establish maint. systems

satisfied

formulas

Pipe, pump sizing (2)

cost estimation

surveying

planning electricity (2)

14. Assessment of the use of a project site to learn protocol, language needs, practice technical skills, evaluate technical needs, etc.:

somewhat

great, excellent (2)

very poor

exercise quite helpful, very good idea, should be expanded upon

very important

15. Specific recommendations for future water and sanitation training programs, e.g., statewide vs. in-country training, use of short-term instructors, length of training, mix of theory and practical sessions, etc.:

Language before any tech.

All tech. in Morocco (2)

Good mixture of lectures and little projects and presentation

More time for projects (2)

Pratical training in country key element

Integrate language, cross cultural & basic technical early in training later use project site to put to use

more water system design

In the best of your ability please rate how well you feel the following topic areas were covered during both lecture and practical training sessions. Please comment when possible:

1 - Not covered 2 - Inadequately covered 3 - Sufficiently covered

4 - Covered in good detail 5 - Comprehensively covered

1. Diesel repair:

	1	2	3	4	5
		8%	50%	34%	8%

Comments:

Would like more hands on for future courses

2. Pump and motor sizing:

	1	2	3	4	5
		25%	58%	17%	

Comments:

Field project & lecture

3. Pipe sizing:

	1	2	3	4	5
		17%	58%	25%	

Comments:

Field project and lecture

4. Pump repair / installation:

	1	2	3	4	5
		34%	58%	8%	

Comments:

Needs hands-on

More actual work w/different pumps

5. Water quantity estimation:

	1	2	3	4	5
Comments:		16%	42%	42%	

6. Pumps / Ram:

	1	2	3	4	5
Comments:			50%	50%	

7. Windmills:

	1	2	3	4	5
Comments:		[illegible]	58%	34%	

8. Operation and maintenance programs:

	1	2	3	4	5
Comments:		8%	50%	42%	

Needs to be covered in depth in future

9. Maintenance organization

	1	2	3	4	5
Comments:	16%	24%	58%		

10. Project planning:

	1	2	3	4	5
Comments:	8%	16%	42%	34%	

Good

11. Material and cost estimation:

	1	2	3	4	5
Comments:					

not Covered

12. Surveying:	1	2	3	4	5
Comments:		8%	58%	34%	

13. Mapping:	1	2	3	4	5
Comments:	16%	16%	50%	18%	

14. Privies:	1	2	3	4	5
Comments:					

Not Covered

15. Engineering drawings and estimating materials:

1 2 3 4 5

Comments:

Not Covered

16. Treatment / water sampling:

1 2 3 4 5

Comments:

Not Covered

17. Dug wells: 1 2 3 4 5

Comments:

Not Covered-stateside

18. Drilled wells: 1 2 3 4 5

Comments:

didnt cover much/Not covered

19. Construction: 1 2 3 4 5

Comments:

Not covered/Covered stateside

20. Water system design:

	1	2	3	4	5
Comments:	9%	18%	45%	28%	

Not enough time

21. Ground water / hydrology:

1	2	3	4	5
	20%	60%		20%

Comments:

very good

22. Final comments:

In-service Training Needs Survey

This survey is to identify areas of technical training which would be helpful to you in accomplishing your assignment. This might include refresher training as well as the introduction of new subject matter. The following questions are being asked to help in the preparation of future training. It will be appriciated if you will fill this form out fully.

1. How would you describe your duties.

Activity	Percent of Time Present	Future
Project construction ----------		
Project developement ----------		
Community surveys ----------		
Developing O&M Organizations -----		
Other (describe) ----------		

2. What technical subjects would you like additional training in considering your job needs?

3. When do you feel this training would be most beneficial. 6 mo (Sept), 9 mo , 1 year (circle one)

4. Should the training be preceeded by a field visit to your Province by the technical trainor? yes / no

5. Are there specific technical problems within your Province that require the assistance of a technical consultant? yes/no--Describe

6. Are there specific technical manuals which you need? Specify.

7. Comments.