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WATER AND SANITATION FOR HEALTH PROJECT

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TRAINING OF COMMUNITY OPERATORS IN OPERATIONS AND MAINTENANCE FOR RURAL POTABLE WATER SYSTEMS IN BOLIVIA

WASH FIELD REPORT NO. 204

FEBRUARY 1987

The WASH Project is managed by Camp Dresser & McKee International Inc. Principal cooperating institutions and subcontractors are: Associates in Rural Development, Inc.; International Science and Technology Institute, Inc.; Research Triangle Institute; Training Resources Group; University of North Carolina At Chapel Hill.

Prepared for
the USAID Mission to Bolivia
WASH Activity No. 260

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TRAINING OF COMMUNITY OPERATORS IN OPERATIONS AND MAINTENANCE FOR RURAL POTABLE WATER SYSTEMS IN BOLIVIA

Prepared for the USAID Mission to Bolivia
under WASH Activity No. 260

by

Amy A. Titus

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EXECUTIVE SUMMARY

At the request of USAID/Bolivia, an eight-day course on training community operators and community council members in operations and maintenance (O&M) was conducted in Paracaya, Bolivia, from January 26 to February 3, 1987. This course was the fourth and last installment of a four-part technical assistance package for the Department of Environmental Sanitation (DSA) carried out by the WASH Project. This phase consisted of piloting the manual developed by the tecnicos (paraprofessional technicians) in November 1986, during the third installment: training-of-trainers' workshop.

The course instructors were the 14 tecnicos who had participated in the training-of-trainers' workshop. Course participants consisted of 20 community operators and 30 community council members. The objectives of the course were to:

- Train the operators and council members regarding their O&M responsibilities.
- Test the course design and modify it, as needed.
- Develop and further improve the training skills of the tecnicos.

The pilot course was considered a success on the basis of the skills and knowledge demonstrated by the operators and community council members as well as by their positive oral and written comments. The course design was shown to be adequate. It was also clear by the end of the pilot course that the tecnicos were able to conduct training using the principles and practices of adult education, to develop effective training materials, and to apply and transmit their technical knowledge and skills to others.

The four phases of WASH assistance consisted of courses in general operations and maintenance, O&M of pumps, training of trainers, and pilot testing of an O&M training course. If the results of these courses conducted by WASH are to have any long-lasting effect, DSA and USAID/Bolivia must carry out and support the development of O&M plans and their implementation as well as make the transition from constructing systems to operating and maintaining them.

The four WASH courses represent only a beginning of what will need to be a much larger effort. These additional actions, therefore, need to be undertaken:

- Provide the support necessary to implement O&M, including materials, equipment, and the salary and incentives required to maintain and motivate O&M staff.

- Develop an O&M procedures manual and an O&M manual for community operators.

- Develop and implement a pilot O&M plan in selected areas in Bolivia.

- Develop and strengthen DSA as an institution and clarify the position of operators and maintenance within the institution.

- Develop a training plan that uses the WASH instructor guides and reinforces and extends O&M activities. It should include a refresher course for community operators in O&M before the end of the project.

- Focus special attention on the O&M component during the last seven months of the USAID project.

- Consider a follow-up USAID project with DSA in the area of institutional strengthening and O&M.

Chapter 1

INTRODUCTION

1.1 Scope of Work

In December 1985, USAID/Bolivia requested WASH assistance in strengthening the operations and maintenance (O&M) of the Ministry of Health. Specifically, the USAID Mission asked for assistance in providing training to 25 tecnicos (para-professional technicians) who supervise rural water systems in approximately 150 communities. In most rural water systems, one community member is designated the community operator or system caretaker.

This WASH assistance was developed and carried out in four parts. During the first three components (Activities No. 228 and 260), WASH designed and delivered three courses for tecnicos: the first in general aspects of operations and maintenance systems, the second in O&M of pumps, and the third in training of trainers. In January and February 1987, this final installment in the WASH four-part series took place. It consisted of pilot testing a course composed of two components: a six-day course to train community operators in operations and maintenance of their water systems and a two-day course for community council members to learn to operate and maintain their systems. This assignment was carried out by two WASH consultants, Amy Titus, a training specialist, and Oscar Larrea, an environmental engineer. They assisted the DSA tecnicos in trying out the training skills and materials that were developed during phase three of the project -- the training-of-trainers' course.

During each phase of WASH technical assistance, an instructor's manual was produced by the participants in order for DSA to be able to replicate the training activity at some future date. These manuals on Basic O&M, O&M of Pumps and Related Equipment, and Training for Community Operators and Council Members in Operations and Maintenance, have been reproduced and distributed locally.

This report describes the activities conducted during the final installment of the WASH four-part series: assisting the tecnicos in delivering and evaluating a pilot course for (1) community operators in operations and maintenance, and (2) community council members in O&M, and to complete the instructor's manual for both course components.

1.2 Overview of Major Activities

The WASH consultants arrived in Bolivia four days prior to the pilot course. Briefings were conducted in La Paz with the AID project officer and the project manager as well as with the director and officials of the Department of Environmental Sanitation (DSA) of the Ministry of Social Services and Public Health (Departamento de Saneamiento Ambiental del Ministerio de Prevision Social y Salud Publica). The WASH team then proceeded to Cochabamba, the regional capital, to assist the tecnicos and national coordinators in preparing for the pilot test during a one-day session prior to beginning the course.

Subsequently, in Paracaya, at a residential training center, the pilot test was conducted. A six-day component for operations and a two-day component for community council members were delivered. Following the pilot course, a final wrap-up meeting was held with the national coordinators (see Section 1.3) in Cochabamba. Debriefings were then conducted in La Paz with the Minister of Social Services and Public Health, the National Director of DSA, USAID Health and Human Services Project Officer, and the project officer of the DSA/USAID project.

1.3 Pilot Coordinators and Instructors

A team of five coordinators monitored the pilot course. Ing. Javier Pino (O&M Chief for Cochabamba) assisted in monitoring technical context and managed logistical requirements. Lic. Fernando Diaz Romero (USAID Education and Community Promotions Advisor) assisted in monitoring the training methodology and content related to community involvement, and Ing. Jorge Henrich (National Director of O&M) participated as national course coordinator. The two WASH consultants served as the additional coordinators: Ing. Oscar Larrea monitored the technical content and coordinated technical requirements of the course, and Amy Titus, the WASH team leader, monitored the training activities and provided guidance for the tecnicos.

The 14 tecnicos who participated in the training-of-trainers' course conducted the training during the pilot course. For a listing of tecnicos and the activities carried out by each one, see Appendix A. Appendix B lists the names of additional persons involved in coordinating, monitoring, and delivering the course.

1.4 Participants

As noted, the pilot course contained two components. In the Community Operations component, 18 operators and one assistant participated (see Appendix C for a list of community operators). In the Community Council component, 28 community council members attended, either the Council President or the Treasurer.

Chapter 2

COURSE DESIGN

2.1 Goals

There were three overall goals for the pilot course.

1. The first goal of the pilot course was to:

   a. Train community operators to carry out the necessary, rudimentary O&M activities required by their systems.

   b. Orient the community council members to the requirements of O&M as well as to the tasks and functions necessary to manage a successful system.

2. The second goal of the pilot course was to further develop and improve the training skills of the tecnicos delivering the pilot.

3. The third goal was to test and modify the design of the pilot course and leave DSA with a tested and proven course design. The design could be used in the pilot project areas as well as throughout Bolivia to train community operators in their O&M duties.

2.2 Content and Schedule

The pilot course contained two components. The first component was for operators, and the second component was for community council members. The first section for operators lasted six days (Monday, January 26 through Saturday, January 31, 1987). The second component lasted two days (February 3 through February 4, 1987).

The course was divided into modules, and each module into sections. Overall there were eight modules, six for the operators' course and two for the community council course with one optional module on latrines.

A brief description of the course content is provided below. See Tables 1 and 2 for more detailed schedules.

Section 1: Community Operators

Introduction

The pilot course opened with an inauguration attended by both national and regional DSA representatives. Introductions were given and followed by an icebreaker, identification of expectations, discussion of the pilot course content and schedule, and finally a presentation on course methodology and norms.

Module 1: Elements of a System

1.1 Elements of a System

Module 2: Organization of O&M in Cochabamba

2.1 Organization of DOMAR (Division of O&M for Rural Water Systems)

Module 3: Operations

3.1 Operation of Water Intake and the Water Line

3.2 Operation of Storage Tanks and Distribution Network

3.3 Operation of Pumps and the Line of Impulsion

Each session included a field trip where the participants practiced operating a local system.

Module 4: Maintenance

4.1 Maintenance of the Water Intake and Water Line

4.2 Maintenance of the Storage Tank and Distribution Network

4.3 Maintenance of Pumps and the Line of Impulsion

Each session contained a field trip where the participants practiced maintaining a local system.

Table 1

Course Schedule for Community Operators

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
7:30	Inauguration	3.1 Operation of Water Intakes	3.3 Operation of Pumps and the Line of Impulsion	4.2 Maintenance of Tanks and Distribution Networks	5.1 Chlorination 5.2 Disinfection	(Continuation of Module 6)
10:30	Opening and Welcome	Field Trip	Field Trip	Field Trip	Field Trip	
12:00	L	U	N	C	H	
1:30	1.1 Elements of a System	3.2 Operation of Tanks and Distribution Networks	4.1 Maintenance of Water Intakes	4.3 Maintenance of Pumps and the Line of Impulsion	6.1 Plumbing and Accessories 6.2 Carpentry, Designs, and Plans	Review Evaluation Closure
16:30	2.1 Organization of DOMAR	Field Trip	Field Trip	Field Trip		
17:30						

E V E N I N G A C T I V I T I E S

Table 2

Schedule

Short Course for Community Councils
in Operations and Maintenance

Time	Monday	Tuesday
07:30	Inauguration	Responsibilities of the Community
	Opening and Welcome	o Good conservation of the system
	Responsibilities of the Community Council	o Water use
		o Water loss
12:00	1. Promotion of O&M 2. Audit Reports	
13:30	3. Tariffs	Latrines
		o Types of latrines
		o Maintenance
		o Construction
17:00	4. Supervison	Closure

Module 5: Chlorination and Disinfection

5.1 Chlorination

5.2 Disinfection

Each session included practice in the field chlorinating and disinfecting a system.

Module 6: Basic Elements of Construction

6.1 Plumbing

6.2 Unions and Accessories

6.3 Carpentry

6.4 Designs and Plans

Closure

A review of the six modules was provided, and a written evaluation form was distributed. A closing luncheon was then held.

Prior to the second component, the new manual for community councils was distributed to the t{cnicos and a discussion was conducted by Lic. F. D. Romero. The major changes were that community councils had become entities recognized and guided by law. The manual was then distributed to the community council participants and used as a resource during the course.

Section 2: Community Councils

Introduction

The pilot community council component opened with an inauguration. Introductions were given and then followed by an icebreaker, discussion of the pilot course content and schedule, and a presentation of methodology and norms.

Module 7: Responsibilities of the Community Council in Supporting Operations and Maintenance Activities

7.1 Responsibilities of the Community Council in Supporting O&M Activities

7.2 Auditing Reports

7.3 Tariffs

7.4 Supervision

Module 8: Responsibilities of the Community

8.1 Participation of the Community in Supporting O&M Activities

Optional: Latrines

Closure

A review and discussion of the two modules and latrines were conducted, and a written evaluation form was distributed.

2.3 Strategy

To pilot the course, it was important to define clearly the roles and responsibilities during the course for both the tecnicos and coordinators. The coordinators also developed a continuing formative evaluation system that culminated in a summative evaluation of the overall pilot course.

2.3.1 Roles and Responsibilities of the Tecnicos

The roles and responsibilities of the tecnicos during the course included:

1. Responsibilities while delivering instruction
2. Responsibilities during the periods between course delivery
3. Responsibilities during the evening (because the participants remained on site in the evenings, evening activities had to be organized and managed).

To facilitate the management of the workshop, a list of workshop norms were developed by Ing. Pino and discussed and agreed upon by the tecnicos during preparation of the course. A tecnico coordinator was also named who was responsible for monitoring materials, coordinating assistance required during sessions, selecting observers for the daily classroom evaluation activities (see Section 2.3.3), and attending daily evaluation sessions.

The tecnicos agreed that during course sessions they were not involved in, they would either watch quietly and unobtrusively or work on preparing their sessions.

Every evening the tecnicos, with assistance from two coordinators who stayed on site, showed films or conducted musical events and were responsible for overall supervision. The time was used to further clarify and support O&M concepts with participants.

2.3.2 Roles and Responsibilities of the Coordinators

The coordinators discussed and agreed upon a set of roles and responsibilities both in the classroom and in the field. The roles carried out were those of observer, evaluator, and consultant. Responsibilities included checking to determine whether the session corresponded to the objectives, the rapport between the instructor and the participant, and the performance of the tecnicos. The coordinators also responded to requests for assistance in preventing possible problems. They also helped the tecnicos prepare their materials and reviewed them before delivery. The coordinators would not interrupt the instruction unless requested by the instructors to intervene.

2.3.3 Evaluation Sessions

At the end of each day, feedback sessions were held to review the day, evaluate the performance of the instructors, and prepare for the next day's sessions. To prepare for the feedback sessions, two observers were chosen from the tecnicos by the tecnico coordinator. These two persons, using a checklist (see Appendix D), observed each session in the classroom and the field and took notes. The coordinators also observed using the same checklist.

The feedback sessions began with self-evaluation reports from the instructors, reports from the observers, and comments from the coordinators. The instructors for the next day listened so that they would learn from the feedback sessions. The tecnico coordinator was queried regarding any comments he wanted to contribute. At the end of the discussion for each session, the instructors were asked how they would apply what they had learned from the feedback. The instructors for the next day then gave a status report and presented any outstanding issues.

Chapter 3

OUTCOMES AND RECOMMENDATIONS

3.1 Trainer Observations

3.1.1 Instructor Learning

During the course planning sessions, the instructors were hesitant about their training abilities and the quality of their sessions. Thus, one-on-one coaching and review of materials were conducted. Enthusiasm, however, was high, and all of the participants looked forward to the course.

Each day of the course was better than the previous one, as the tecnicos learned from each other and, after delivering one session, were able to improve upon their performance for the next day. All demonstrated the ability to use adult learning techniques and clearly showed their technical abilities in O&M. Several of the more timid instructors gave excellent presentations after a great deal of preparation. Many times these same tecnicos were the hardest on themselves during self-evaluation.

The tecnicos worked hard preparing their sessions. Outstanding graphics on flipchart paper were prepared. In addition, one instructor-tecnico took photographs of accessories, had the film developed, and used the slides during his session.

As in the training-of-trainers' course (Phase III of this technical assistance), the level of risk-taking and the degree of openness to feedback (and criticism) was high. Overall, feedback provided was positive.

For many of the tecnicos, this experience was a maturing one. They had responsibilities and people to manage, and were carrying out important roles. The growth demonstrated by many of the tecnicos in terms of confidence, ability to express ideas, take initiatives, and be responsible for their own behavior was impressive.

3.2 Participant Learning

During both components of the course, the objectives were met. The operators started the first component of the course by being quiet and polite. By the second day, they were actively participating and asking questions. By the end of the course, the operators had accomplished the course objectives of identifying O&M tasks and carrying out simple tasks.

The community council members were a lively group, easily relating course content to their problems. Thus, much discussion centered around analyzing community problems and applying course content. For this component of the course, participants were able to identify why and how they would support O&M activities.

3.2 Evaluation Results

3.2.1 Course Evaluation

The oral comments of the end-of-course evaluations rated all course goals as having been achieved.

Component 1: Community Operator Training

During the review of the course, the participants responded to the following questions:

What have you learned in this course?

- Importance of O&M of a rural water system
- To have responsibility in the community concerning the system and provide better service
- The correct maintenance of a system
- Principal elements of carpentry
- How to use tools
- About different types of pumps
- About the O&M structure of DSA
- Elements of a system
- Different types of water intakes

How will you apply what you learned?

- Keep the handouts and refer to them
- Put into practice what I learned
- Meet with the community

General feedback regarding content, timing, and the amount of practice was favorable. Several participants mentioned that they wanted more practice.

During the final day of instruction, an evaluation questionnaire was administered to all of the participants. They were asked to rank goal achievement for the course goals and each session using a 1 (low) to 5 (high) scale. Open-ended questions were also asked. The results are summarized in Table 3 on the following page.

Table 3

Evaluation Results: Community Operators

A. Goals	Score
Overall Course Purpose: Gain O&M Skills	4.7
Session 1.1: Elements of a System	4.4
Session 2.1: The Organization of O&M	4.5
Session 3.1: Operation of Water Intake	4.4
Session 3.2: Operation of Tanks	4.4
Session 3.3: Operation of Pumps	4.7
Session 4.1: Maintenance of Water Intakes	4.4
Session 4.2: Maintenance of Tanks	4.0
Session 4.3: Maintenance of Pumps	3.9
Session 5.1: Chlorination	4.4
Session 5.2: Disinfection	4.4
Session 6.1: Plumbing	4.2
Session 6.2: Unions and Accessories	4.1
Session 6.3: Carpentry	4.4
Session 6.4: Plans and Designs	3.6

The average score of the sessions was 4.3

B. Open-ended Questions

1. How practical and useful was this workshop to you?

   Comments: very useful, useful in order to maintain my system, do plumbing, chlorination, disinfection, use tools, clean tanks, understand O&M in DSA.

2. What were the most important things you learned?

   Comments: plumbing, tank maintenance, chlorination, disinfection, maintenance of the water intake, O&M of a system, different types of systems, how to run my system, pump maintenance, tank operation, how to contact DSA when there are O&M problems, carpentry.

3. Comments, recommendations:

   I learned about preventive maintenance, how communities do not take care of their systems, more time for the course, no problems with the course.

Component 2: Community Council Member Training

During the review of the course, the participants responded to the following questions:

What have you learned in this course?

- The importance of O&M
- We need to be tough about tariffs
- The organization of O&M in DSA

How will you apply what you learned?

- Meet with the community
- Meet with the council
- Put into practice what I learned

After the review, an evaluation questionnaire containing four open-ended questions was administered. The results are summarized in Table 4.

3.2.2 Coordinator Evaluation

Prior to the course, the coordinators identified five goals they wanted to achieve. The goals and outcomes are outlined in Table 5 on the following page.

3.3 Recommendations

The four-part series of WASH courses has been completed. DSA now has a core of 14 trained and highly motivated tecnicos who are capable of providing O&M services as well as designing and conducting training in these areas. Despite this investment in human resources to carry out O&M activities, other critical aspects of a functional system within DSA have not been completed. Such constraints include the lack of budgetary support, the delayed delivery of equipment and materials, and the lack of O&M procedures and programs. Action at the national and regional levels has been lacking.

Operations and maintenance is ready to start, and DSA must take immediate actions to support its human resources as well as to develop an O&M system. To this end, the following recommendations are provided for DSA and USAID:

DSA

1. The national office should ensure and promote the prompt delivery of materials and equipment required for O&M to the pilot areas (Cochabamba and Chuquisaca).

Table 4

Evaluation Results: Community Council Members

1. Was the course goal achieved?

   Comment: yes

2. What was useful and practical about the course?

   Comment: the course was very useful. (This comment does not answer this question.)

3. What was the most important thing you learned?

   Comment: tariffs, accounting records, latrines, maintenance of a system, supervision of system members, responsibilities of the council to aid O&M, and responsibilities of the community in system O&M.

4. Comments, suggestions:

   Have most courses at least twice a year, we need to transfer our learning to our communities, more time in the course (3 to 5 days), per diem for participants, and more practice with the accounting records.

2. The DSA should explain how to provide incentives to O&M staff and raise their basic rate of pay in order to maintain these vital, trained staff within DSA. These people, because of their training, are more attractive as employees, and due to their low pay, are especially vulnerable to better offers outside DSA.

3. DSA should develop an O&M procedures' manual that describes O&M responsibilities and when and who should be carrying out these tasks. Necessary basic O&M forms, such as for inventory control, should be included.

4. DSA should develop an operator's manual using the materials from the four courses. It should be a simple document containing two parts: (1) basic O&M activities and (2) the relationship and responsibilities to the community council.

5. DSA should develop a pilot plan in O&M, using what was learned in the four courses.

6. DSA should concentrate efforts on strengthening itself as an institution, ensuring that the necessary goals and frameworks are established in order to support and facilitate O&M. The new director of DSA has shown interest and capability in this area and ministry support has been stated; these positive features should be built upon.

7. DSA should develop a training plan and continue its training efforts in the pilot areas. DSA should also use the instructor's manuals developed during the WASH courses to extend O&M capability through a series of workshops held in other regions which have not yet been introduced to O&M concepts. In all of these efforts, the attempt should be made to coordinate training plans with O&M plans.

USAID

1. USAID should continue to support the development of O&M systems during the final phases of the project and to assist DSA in making the transition from construction to O&M. The local USAID consultants should help DSA in this process by jointly developing a transition plan from construction to operations and maintenance in all of its work areas (not only limited to the two pilot areas of Cochabamba and Chuquisaca).

2. USAID should conduct an assessment to determine whether a follow-up of O&M and institutional strengthening project with DSA is warranted in order

Table 5

Coordinator Evaluation

Goals	Outcomes
1. The tecnicos apply the principles of adult education.	Yes, but more practice is necessary.
2. The tecnicos apply the technical content.	Yes, they know it and can apply and transmit it.
3. The design of the course is adequate in terms of level, sequence, pacing, and content.	Yes, and the design allows for modifications to be made to meet participant needs and interests.
4. The tecnicos carry out logistic responsibility.	Yes, they do.
5. The operators and council members achieve course goals and objectives.	Yes, but more courses are required.

to ensure that currently constructed systems are properly operated and maintained. WASH assistance could be useful in this endeavor.

3.4 Conclusions

The final installment of WASH technical assistance for the DSA tecnicos and USAID/Bolivia has been successful according to comments of the tecnicos, DSA, USAID project staff, and the WASH team. It has been a highly satisfying and enriching activity for all parties involved. A group of talented and committed tecnicos has been developed through participating in the cycle of DSA/WASH courses. The basic elements of skills and knowledge for developing and managing an O&M system are in place. DSA is ready to undertake O&M activities. If USAID/Bolivia and DSA can sustain this momentum and carry out the necessary actions required to implement an O&M program during the next seven months, continuity of operations and maintenance activities into the post-project period is highly probable.

APPENDIX A

List of Instructors and Sessions

APPENDIX A

LISTA DE INSTRUCTORES Y DE SESIONES - 4to.CURSO WASH

Simon Nogales	a.- Elementos de un sistema b.- Operación de los equipos de bombeo c.- Plomería d.-Supervision de las Juntas
Jesus Siles	a.- Mant. de obras de toma y conducción b.- Letrinas c.-Supervision
José Diaz	a.- Operación de tanques y red de distribución b.- Organización de la DOMAR c.- Motivación de la participación de la comunidad
Freddy Gamboa	a.- Mant. del tanque de alm. y red de dist. b.- Desinfección c.- Registros contables
Avelino Salinas	a.- Tipos de uniones y accesorios b.- Responsabilidad de la comunidad c.- Mantenimiento de equipos de bombeo
V.H. Ustariz	a.- Apertura/bienvenida - curso operadores b.- Cloración c.- Tarifas y cortes
Lucio Jimenez	a.- Operación de obras de toma y conducción b.- Albañilería c.-Letrinas
Nestor Perez	a.- Elementos de un sistema b.- Mantenimiento de obras de toma y conducción c.- Tarifas y cortes
Raúl Moore	a.- Cloración b.- Albañilería c.- Registros contables
Fernando Cuellar	a.- Desinfección b.- Plomería c.- Letrinas
Napoleón Flores	a.- Tipos de uniones y accesorios b.- Organización de la Domar c.- Apertura/bienvenida - curso Juntas
Roberto Luna	a.- Operación de obras de toma y conducción b.- Acometidas y lectura de planos c.- Mantenimiento de equipos de bombeo
Humberto Zambrana	a.- Operación de equipos de bombeo b.- Responsabilidad de la comunidad c.- Motivación de participación de la comunidad
Juvenal Maidana	a.- Operación de tanques y red de distribución b.- Acometidas y lectura de planos c.- Mantenimiento de tanques y red de distrib.

APPENDIX B

List of Course Coordinators and Instructors

APPENDIX B

CURSO DE ADIESTRAMIENTO EN OPERACION Y MANTENIMIENTO PARA OPERADORES Y JUNTAS ADMINISTRADORAS

(Del 26 de enero al 3 de febrero 1987)

NOMINA DE COORDINADORES E INSTRUCTORES DEL CURSO

NOMBRE	CARGO
1.- Lic. Amy Titus	ASESOR WASH
2.- Ing. Oscar Larrea	ASESOR WASH
3.- Ing. Jorge Henrich	JEFE NACIONAL DE OPERACION Y MANTENIMIENTO
4.- Lic. Fernando Díaz Romero	ASESOR USAID, EN PROMOCION Y EDUCACION COMUNAL
5.- Ing. Javier Pino	JEFE REGIONAL DE OPERACION Y MANTENIMIENTO-COCHABAMBA
6.- Nestor Pérez	JEFE REGIONAL DE OPERACION Y MANTENIMIENTO-SUCRE
7.- Victor Hugo Ustáriz	JEFE DE LA DIVISION DE PROMOCION Y EDUCACION-CBBA.
8.- Napoleón Flores	JEFE DE LA DIVISION DE PROMOCION Y EDUCACION-SUCRE
9.- José Díaz	Téc. en Op. y Mant. - Cbba.
10.- Jesús Siles	Téc. en Op. y Mant. - Cbba.
11.- Simón Nogales	Téc. en Op. y Mant. - Cbba.
12.- Freddy Gamboa	Téc. en Op. y Mant. - Cbba.
13.- Lucio Jiménez	Téc. en Prom. y Educ.-Cbba.
14.- Avelino Salinas	Téc. en Prom. y Educ.-Cbba.
15.- Raúl Moore	Téc. en Op. y Mant.- Sucre
16.- Fernando Cuellar	Téc. en Op. y Mant.- Sucre
17.- Roberto Luna	Téc. en Op. y Mant. - LPZ
18.- Juvenal Maidana	Téc. en Op. y Mant. -Oruro
19.- Humberto Zambrana	Téc. en Op y Mant. -Potosí

Paracaya, 3 de febrero de 1987

APPENDIX C

List of Participants

APPENDIX C

CURSO SOBRE ADIESTRAMIENTO PARA OPERADORES DE SISTEMAS DE AGUA POTABLE RURAL - DSA-USAID/WASH

(Del 26 al 31 de enero, 1987)

NOMINA DE PARTICIPANTES

Nº	NOMBRE DEL OPERADOR	TIPO DE SIST.	COMUNIDAD
1.-	Albarado Nicanor	G	Khoari
2.-	Caballero Mario	B	Chilligchi
3.-	Claros Octavio	B	Pabellón
4.-	Colque Margarita	B	Paracaya (oyente)
5.-	Chavez Luciano	G	Chinguri
6.-	Gamboa Daniel	G	Flores Rancho
7.-	Gutierrez Felix	B	Barrio Nuevo
8.-	Jiménez Policarpio	B	Pampamanata
9.-	Laime Daniel	B	Silota
10.-	Muñoz Andrés	G	Copapugyo
11.-	Nogales Mario	G	Hudyñacota
12.-	Ortuño Moises	B	Cruz Pata
13.-	Paniagua Victor Hugo	B	Aranjuez
14.-	Ponce Bernardo	B	Banda Arriba
15.-	Rojas Macario	G	Carcaje
16.-	Serna Vitaliano	B	Paracaya
17.-	Tordoya Wilfredo	B	Villa el Carmen
18.-	Torrico Luciano	G	Cañadas
19.-	Uriona Nelson	G	San Lorenzo
20.-	Vallejos Orlando	B	Ayoma

Paracaya, enero de 1987

APPENDIX D

Observation Checklist

APPENDIX D

"CHECKLIST DE OBSERVACION"

Se usa este checklist para hacer la observacion y dar la retroalimentacion en una manera objetiva y profesional. Por cada sesion -- marque con un "X" cuando la muestra el desempeño y por abajo escriba sus comentarios.

PASO	DESCRIPCION	SESIONES					
La Entrada							
	Establecer el ambiente de aprendizaje.						
	Orientar a los participantes sobre el propósito y la dirección de la sesión.						
	Despertar el interés.						
La Experiencia							
	Hacer el participante experimentar/palpar un acto de aprendizaje.						
	Establecer una base de destreza o información.						
	Organizar y explicar bien las actividades.						
	Poner disponible los materiales necesarios.						
Procesar/Reflexión							
	Examinar la experiencia.						
	Analizar lo que se ha hecho.						
	Refinar y corregir la experiencia.						
	Profundizar el aprendizaje.						
	Usar preguntas abiertas.						
	Permitir una variedad de opiniones.						
Generalizar							
	Sacar lo más importante de lo que se ha aprendido.						
	Concretar el aprendizaje relacionar lo aprendido con otros casos.						
	Usar metodos participatorios.						

PASO	DESCRIPCION	SESIONES					
Aplicar							
	Guiar a pensar o ensayar la futura aplicación y uso de lo aprendido.						
La Salida							
	Resumir la sesión.						
	Referirse a los objectivos.						
	Vincular con la proxima sesión.						
	Evaluar la sesión.						
Otros Puntos							
Tratar los participantes como adultos.							
Mantener el interes.							
Mantener la secuencia del diseño.							
Ayudar a los participantes más timidos a participar.							

Comentarios