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WATER AND SANITATION
FOR HEALTH PROJECT

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

Operated by
CDM and Associates

Sponsored by the U.S. Agency
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WASH FIELD REPORT NO. 202

JANUARY 1987

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

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

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

by

Daniel B. Edwards

January 1987

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EXECUTIVE SUMMARY

At the request of USAID/Bolivia, Water and Sanitation for Health (WASH) Project consultants conducted a two-week training-of-trainers' workshop in operations and maintenance (O&M) in Cochabamba, Bolivia, from November 24 to December 5, 1986. This workshop was the third installment in a four-part technical assistance package provided by WASH consultants to the Department of Environmental Sanitation (Departamento de Saniamiento Ambiental - DSA) of the Ministry of Social Services and Public Health. In addition to the acquisition of skills and knowledge relating to training, the workshop produced a trainer's manual and a plan for using it to train community operators in how to operate and maintain their systems.

The participants consisted of 14 technicos who were graduates of the previous two O&M courses. The basic objective of this course was to develop skills in how to be a trainer using a set of structured learning designs. At the end of the course, the participants were to be able to conduct training for community operators. A pilot course for approximately 25 community operators is scheduled following this course.

The course was well received by the participants and was given high ratings in the evaluations. It was clear by the end of the course that, in fact, most of the participants had good training delivery skills as well as the skills to determine training needs and design training events in the future, particularly in O&M.

If the results of this course and the series of courses which have been conducted by WASH are to have any long-lasting effect, DSA and USAID Bolivia must be prepared to carry out and support the development of plans and programs for the transition from construction of systems to operating and maintaining them. These WASH courses represent only a beginning in what will need to be a much larger effort. Suggestions for the future include:

- o A refresher course within six months
- o The development of a long-range O&M plan for DSA
- o Special attention during the last nine months of the USAID project for O&M
- o Use of the O&M training manuals developed by WASH to carry forward more O&M training by the DSA staff who have been trained by WASH as instructors
- o Consideration of a follow-on institutional strengthening effort and O&M USAID project either with DSA or some other entity
- o Provision of incentives and a pay restructuring for the technicos who have participated in the WASH courses as one way of protecting the valuable investment in this human resource.

Chapter 1

INTRODUCTION

1.1 Scope of Work

In December 1985, USAID/Bolivia requested WASH assistance in strengthening the operations and maintenance capability of the rural sanitation department of the Ministry of Health (DSA). Specifically, the USAID mission asked for assistance in providing training to 25 technicos (paraprofessional technicians) who supervise rural water systems in approximately 150 communities. In most local systems, one person in the community is designated community operator or system caretaker. Under Activities 228 and 260, WASH designed and delivered three courses for technicos: the first in general operations and maintenance systems, the second in operating and maintaining pumps, and the third (and the subject of this report) in training of trainers for O&M.

In January 1987, the final installment in the WASH four-part series will take place with a pilot test of a course to train community operators and community council members in how to operate and maintain their rural water systems. Two WASH consultants will assist the DSA technicos as they try out their training skills and the training materials which were developed during the current WASH activity by participants of the workshop. Upon completing the pilot course, the technicos will incorporate the materials and skills developed over the past year into a continuing program of operations and maintenance in the two pilot areas of Chuquisaca and Cochabamba.

During each phase of WASH technical assistance, an instructor's manual was produced to allow DSA to duplicate the training activity at some future date. WASH consultants have developed instructors' manuals in basic operations and maintenance, O&M of pumps, and training for community operators.

This report describes the activities related to designing and conducting a workshop in training of trainers and to developing an instructor's manual for training community operators and community councils in the operations and maintenance of rural water systems.

1.2 Overview of Major Activities

The WASH consultants arrived in Bolivia one week prior to the initiation of the workshop. Briefings were conducted in La Paz with the AID project officer and the project manager and with officials of the Environmental Sanitation Department of the Ministry of Social Services and Public Health (Departamento de Saniamiento Ambiental [DSA] del Ministerio de Prevision Social y Salud Publica). The WASH team then proceeded to Cochabamba for workshop planning and delivery. Over a five-day period, members of the team established specific goals of the workshop, prepared a day-by-day schedule, designed individual sessions, prepared handouts, and drafted an outline of subject matter for a seven-day community operator course. Logistical arrangements were completed for the workshop and final participant selection was arranged.

Subsequently, a two-week workshop was conducted using the combined staff resources of WASH, DSA/Cochabamba, and USAID. Following the workshop, debriefings were conducted in La Paz with the Minister of Social Services and Public Health, the Deputy Director of the USAID Mission, the National Director of Operations and Maintenance and the National Office Director of DSA, the USAID Health and Human Service Project Officer, and the project officer for the DSA/AID project.

1.3 Training Staff

A team of four instructors conducted the training. Ing. Raul Bascon (USAID project advisor) coordinated the logistical arrangements. Ing. Javier Pino, Operations and Maintenance Chief for Cochabamba, assisted in the technical content relating to O&M. Lic. Fernando Diaz Romero (USAID Education and Community Promotions advisor) assisted in monitoring content related to community involvement. Ing. Oscar Larrea (WASH consultant) provided the technical content relating to appropriate technology and curriculum design for the community operator's training manual. Daniel Edwards was project team leader and provided the training-of-trainers' methodology inputs and the training design advice for the community operator's training manual.

1.4 Participants

The participants were the same 14 technicos (of 22 original participants) who have attended the two previous courses: seven from Cochabamba; four from Chuquisaca; one each from La Paz, Oruro, and Potosi. A complete listing of participants appears in Appendix A.

Chapter 2

COURSE DESIGN

2.1 Learning Strategy

The course was presented in a workshop format. Given that a requirement of the course was to produce a training manual for community operators, participants wrote and designed training sessions daily. This experience was used as the basis for developing training design and presentation skills. Participants were to design the sessions for the course, prepare critiques and review them, and then obtain feedback from other members of the group. The instructors first demonstrated everything the participants would be required to learn or be able to do. This instruction was followed by participant practice and feedback. The learning sequence can be described as follows:

- Stage I: **Establish a framework of theory and skills needed to be a trainer at the level required.**
- Subjects: Principles of Adult Education
 Communication Skills Trainers Need
 How to Determine Training Needs
 How to Write Training Goals and Objectives
 How to Select the Appropriate Training Method
 How to Plan Training Events
 How to Sequence Learning Activities
 How to Design a Training Session Using
 Experiential Methodology (the Learning Cycle)
 Basic Presentational Skills
- Stage II: **Provide an initial application in writing and designing training sessions and materials for community operators.**
- Activities: Training Design Clinic. Divide into design teams and produce training materials and training modules. Review and prepare critiques of the training design using the criteria established in Stage I. Rewrite the training design.
- Stage II: **Provide an initial pilot test of the training design and use training skills by practicing sessions from the community operator course.**
- Activities: Conduct microtraining simulations of each training session. Prepare critiques of each simulation using the basis of theory and skills established during Stage I. Develop a skills improvement profile for each participant based upon performance.
- Stage III: **Provide further training design skills by writing and designing another training session.**

Activities: Training Design Clinic II. Divide into new design teams and produce training materials and training modules for the community operator course. Review and prepare critiques of the training design using skills acquired in stages I and II.

Stage IV: Reinforce training delivery skills by simulating the second training design; improve training design skills by pilot testing the training design.

Activities: Conduct Round II of microtraining of each session. Prepare critiques of each simulation using the skills learned in stages I, II, and III.

Stage V: Improve the training designs.

Activities: Conduct final review of each training design and prepare final written product. Apply skills and knowledge of training design learned during previous stages.

Stage VI: Plan for future application.

Activity: Develop a work plan for the use of the training modules and their pilot testing. Assign follow-up duties. Apply skills and knowledge presented in Stage I.

2.2 Goals

The goals in support of the sequence presented above were to:

- o Learn the basic concepts of adult education.
- o Develop the following trainer skills: communications, session design, and facilitation skills.
- o Learn how to develop training materials and designs appropriate for use in training community operators in the operations and maintenance of rural water systems.
- o Develop a work and application plan for the future use of the training materials developed in the course.

2.3 Content and Schedule

Day 1 Workshop opening: goals, climate setting, expectations, workshop norms, and opening ceremony

Introduction to principles of adult education

- Communication skills: paraphrasing, active listening, and summarizing
- Day 2 Principles of training design: assessing training needs, writing training goals, and writing training objectives
- Day 3 Training design clinic: selection of appropriate training method, experiential learning cycle, step-by-step training design, and design practice
- Day 4 Microtraining and training delivery clinic: simulation with the following training designs: components of a water system and disinfection of a water system
- Day 5 Microtraining continued: simulation with operating water systems and chlorination
- Day 6 Microtraining continued: simulation with maintenance of water systems
- Day 7 Training design clinic, Round II
- Day 8 Microtraining Round II: simulation: basic concepts of masonry and plumbing
- Day 9 Microtraining continued: simulation involved duties of the water council in O&M and community use of water
- Day 10 Microtraining continued: simulation involved basics of latrine construction. Revision of training designs
- Day 11 Development of a work plan for the next phase, workshop evaluation, and closing ceremony.

Chapter 3

OUTCOMES AND RECOMMENDATIONS

3.1 Trainer Observations Concerning Participant Learning

At the beginning of the training-of-trainers' course, the participants seemed doubtful that any O&M program would ever be supported within DSA. Consequently, they were unsure whether it was worth their effort to participate at the level demanded in the course. By the end of the first day, enthusiasm began to grow. Each day, it seemed, the participants became more involved, took more risks in developing skills, and became more enthusiastic. By the end of the course, it was evident that most of the participants were committed to using effective training techniques and were able to use the community operator course materials which they had developed during the workshop.

The WASH consultants were favorably impressed with the level of skill, interest, and enjoyment which the DSA technicos demonstrated and learned during a demanding course. It is difficult to stand up in front of a group of peers and be a trainer, even for simulations. One participant was almost unable to speak in front of the group the first time he tried. By the end of the course, however, he was conducting the lecture part of the training session and was obviously proud of himself. The level of risk-taking and the degree of openness to feedback (and criticism) were rare in this group, in comparison with others.

3.2 Evaluation

The end-of-course evaluations indicated that all goals of the course were achieved. All responses were rated with a mean score of 4.0 or above on a 1 to 5 point scale. During the mid-course evaluation, the following results were written by the participants in a group evaluation exercise:

I feel the following are the most important skills I have learned so far in the course:

- o How to write learning objectives clearly
- o How to present ideas in front of groups (motivate participants)
- o How to paraphrase
- o How to maintain the interest of participants
- o How to design training sessions
- o How to conduct an ice breaker
- o How to use interactive presentation techniques

- o How to feel comfortable in front of a group
- o How to use a flipchart
- o How to address the appropriate experience level of a group
- o How to ask open-ended questions
- o How to follow the sequence of the experiential learning cycle
- o How to clearly give a group task instruction.

I feel the following concepts are important in training:

- o To know where you are going in training by having goals
- o To use criteria for determining if learning objectives are measurable/observable, state the minimum acceptable performance, and state the conditions for learning.
- o To always open sessions and close sessions using appropriate climate settings and linkages
- o Training is not simple
- o To know the appropriate training method to use for the learning goals
- o It is important to listen to the group and use their experiences as part of the learning.

I feel I need to learn more about the following:

- o How to write learning objectives using the appropriate criteria
- o How to design a session following the proper sequence
- o How to design and conduct a field training experience
- o I simply need a lot more experience doing training to be good
- o How to ask questions using open-ended techniques
- o How to use visuals
- o I need to practice using paraphrasing.

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

Table 1

Evaluation Results

<u>GOALS</u>	<u>Score</u>
To learn basic concepts of adult education	4.53
To learn training facilitation and communication skills	4.15
To learn training design skills	4.58
To learn how to plan training programs	4.23

<u>SESSIONS</u>	<u>Score</u>
1. Principles of adult education	4.4
2. Communication skills	4.2
3. Writing goals and objectives	4.3
4. Use of appropriate methods	4.7
5. Design practice	4.3
6. Microtraining simulations	4.1
7. Latrine construction	4.5
8. Future planning	4.2

OPEN-ENDED QUESTIONS

How practical and useful was this workshop to you?

COMMENTS: Maximum assimilation, breaking the chain of fear to train in front of others, very applicable. It was presented in such a way that we could readily assimilate the material, very understandable, flexible and practical; we produced our own designs and tried them out, this was highly practical; 90 percent practical and highly participative.

What are the most important things you have learned?

COMMENTS: To design a session (six respondents); how to set the learning climate; how to give feedback; how to conduct an interactive talk; how to paraphrase; how to select the right method; how to write goals and objectives (four respondents); how to sequence a session using the experiential learning cycle; how to evaluate learning objectives; to be able to use communication skills.

Comments on the conduct of the workshop?

COMMENTS: Flawless presentation; we need to apply what we have learned; highly skilled instructors (five respondents); there was an obvious lack of support from the local office in copying handouts on time; feedback to us was very constructive; close collaboration between participants and instructors.

3.3 Recommendations

At the conclusion of the two previous WASH courses in June and July of 1986, both WASH consultant teams observed that the participants were highly enthusiastic and motivated to begin work establishing a pilot operations and maintenance system in their respective geographic areas of work. At that time, equipment and materials (vehicles, tools, and so forth) had been scheduled for arrival in September. Both consultant teams had recommended that DSA and AID ensure that application of learning take place by coming through with the support needed to launch the O&M program (which was the primary rationale for conducting a series of O&M courses).

Because of a number of administrative failures and problems both within AID and DSA, the promised equipment did not arrive as scheduled. As a result, it has been rescheduled for January 1987. Planned allotments for warehousing of O&M equipment under the AID project were transferred in December 1986 (now several months late). The WASH consultants were also informed by DSA O&M staff that no budgetary allotment has yet been made for O&M within DSA, aside from staff salaries (a ministerial-level supplementary budget request was being considered during the time of this workshop).

Because of the lack of budgetary support within DSA for O&M, it is difficult to obtain even rudimentary supplies, such as writing paper within the O&M sections. Most of the budget is directed toward supporting the construction of new systems and meeting the construction goals of the USAID project before it ends in September of 1987.

During the time period between the last WASH course and the present, internal strife (strikes and turnover of key staff, including the director of DSA) reportedly has resulted in low morale among course participants. This attitude has been (perhaps temporarily) turned around. The technicos are now ready to carry out operations and maintenance, given the proper support and incentives.

DSA and AID/Bolivia now have a well-trained and valuable human resource in the technicos who have completed all three courses. They are capable of designing and conducting training at a reasonably high level of skill (for non-professional trainers); they have a thorough understanding of how to ensure that community systems are operated and maintained properly; the supervisory personnel in O&M from the national director down to the regional levels are completely versed and skilled in O&M and have been trained to train their own staff. The investment in this resource has been considerable over the past year.

It is essential that DSA support this resource by ensuring that this core of skilled staff in using what they have learned in the development of an O&M system. To this end, the following recommendations are made:

- o DSA should raise the basic pay of O&M staff to retain this resource; compensation levels are so low that technicos are forced to leave in order to maintain their families; supervisory staff are especially vulnerable to better offers outside DSA.

- o USAID should continue to support the development of O&M systems during the final phases of the water supply project and assist DSA in making the transition from construction to O&M. The USAID advisers on the scene should help DSA develop a transition plan from construction to O&M in all of its work areas (not limited only to Cochabamba and Chuquisaca).
- o A follow-up, refresher course in O&M and training should be conducted within six months after the pilot course for community operators (slated for January 1987).
- o DSA should use the instructor's manuals developed by WASH to extend O&M capability with a series of workshops conducted in regions which have not yet been exposed to O&M concepts. It is quite possible that the future of DSA will be in operating and maintaining systems in the years following the USAID project.
- o DSA should develop a long-range plan for O&M. Possibly WASH technical assistance could be useful.
- o USAID should conduct an assessment to determine whether a follow-on O&M and institutional strengthening project is warranted with DSA or some other entity in Bolivia in order to ensure that currently constructed systems are cared for and used properly.

3.4 Conclusions

The next-to-last installment of WASH technical assistance for the DSA technicos and USAID Bolivia has been a great success, according to comments of the participants, DSA, and USAID project staff, and in the opinion of the WASH team. The basic elements of skills and knowledge for developing and managing an O&M system are in place. If USAID Bolivia and DSA can sustain and support these beginning elements by carrying forward an O&M program within the next nine months, a valuable contribution will have been made for continuity into the post-project period.

APPENDIX A
Participant List

PARTICIPANTS

Cochabamba

Jesus Siles
Freddy Gamboa
Victor Hugo Ustariz
Avelino Salinas
Lucio Jimenez
Jose Diaz
Simon Nogales

Chuquisaca (Sucre)

Raul Moore
Nestor Perez
Fernando Cuellar
Napoleon Flores

La Paz

Roberto Luna

Oruro

Juvenal Maidana

Potosi

Humberto Zambrana

Instructors

Javier Pino, DSA Cochabamba, Chief O&M
Fernando Diaz Romero, USAID Education/Community consultant
Oscar Larrea, WASH
Daniel Edwards, WASH

APPENDIX B

Training theory Handouts
(Spanish)

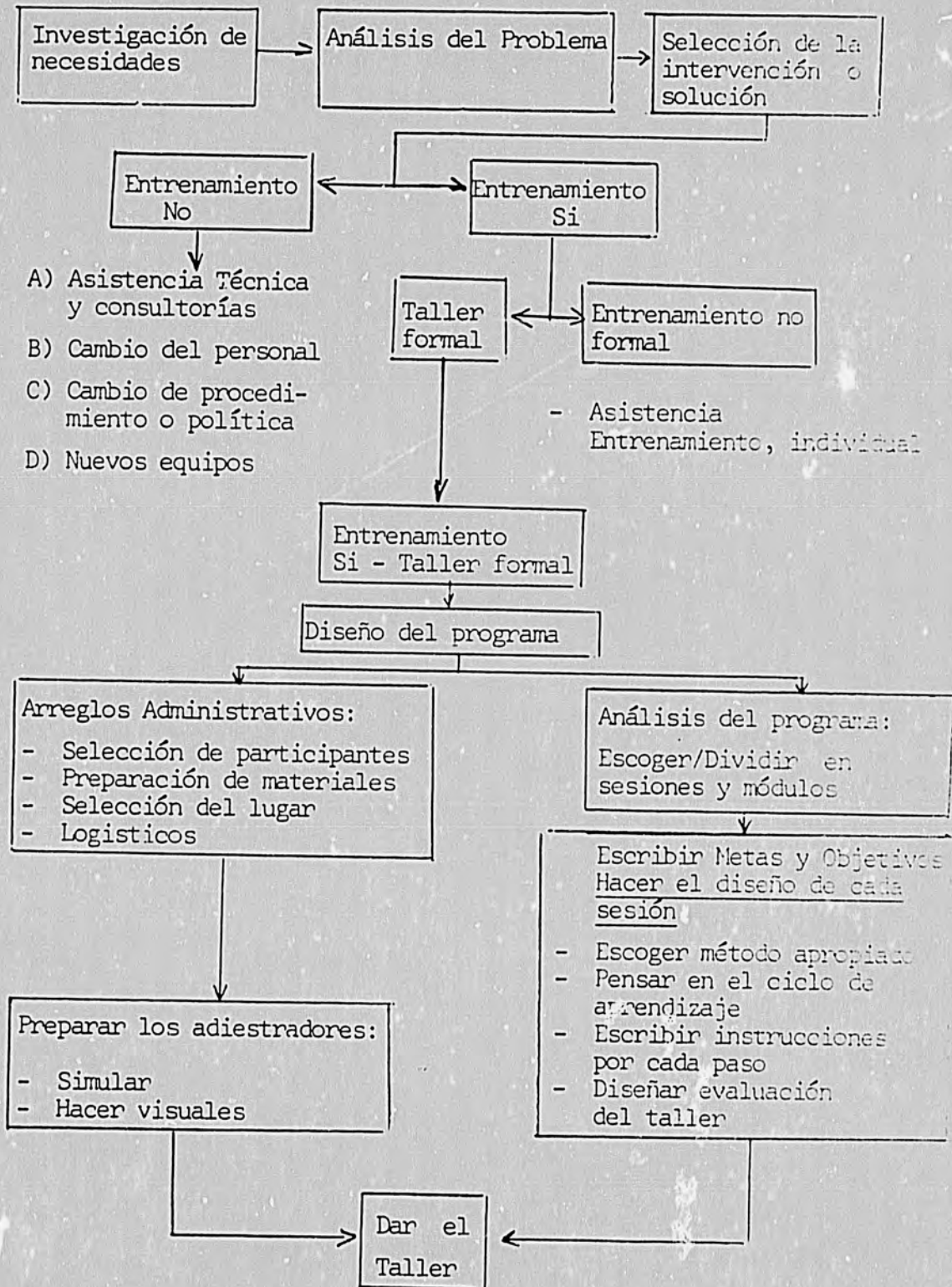
ADiestRAMIENTO DE ADiestRADORES

METAS GLOBALES DEL TALLER

- 1.- Aprender conceptos básicos de educación de adultos.
- 2.- Aprender destrezas del entrenador: Comunicación, diseño de sesiones y módulos y aplicación de entrenamiento con destrezas de facilitación de grupo.
- 3.- Diseñar una serie de módulos de adiestramiento dirigidos a temas apropiados para Operaciones y Mantenimiento de Sistemas de Agua Potable Rural.
- 4.- Planear un programa de trabajo para el uso final de los módulos de adiestramiento diseñados en el curso.

BOLETIN: Sesión - PRINCIPIOS DEL DISEÑO DE ADIESTRAMIENTO

EL PROCESO DE DISEÑO DE ADIESTRAMIENTO



METAS Y OBJETIVOS

1. META GLOBAL DEL APRENDIZAJE

Definición: Es el resultado final que se espera alcanzar del aprendizaje, al nivel más alto. La meta global se aplica a un curso entero o a un módulo de sesiones.

Ejemplo: Al final del curso los participantes habrán aprendido los usos y funciones de bombas hidráulicas.

Ejemplo: Al final del curso los ingenieros habrán aprendido a seleccionar la bomba más apropiada para los sistemas de agua rural.

Ejemplo: Al final del módulo los miembros de la Junta Administradora habrán aprendido sus responsabilidades y funciones en la Administración de Operaciones y Mantenimiento de su sistema de agua potable.

2. META GENERAL DEL APRENDIZAJE

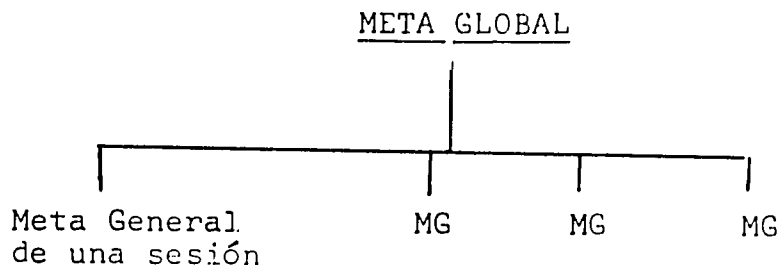
Definición: El fin o resultado que se espera realizar durante una sesión de entrenamiento.

Ejemplo: Familiarizar a los participantes con las acciones de mantenimiento que se deben realizar para que los sistemas funcionen de acuerdo al diseño.

Ejemplo: Capacitar a los participantes en el manejo gerencial eficiente de las actividades de Operación y Mantenimiento para los sistemas rurales de agua potable.

Se distingue entre la meta global y la meta general, solamente en la amplitud de intención. Una meta global se compone de varias metas generales.

Ejemplo:



3. OBJETIVOS

Definición: Un objetivo es una intención específica y concreta de aprender. Cada objetivo está escrito con tres criterios importantes:

Mensurable: Se pueden medir u observar que el objetivo se alcanzó.

Desempeño Aceptable: El objetivo expresa el desempeño mínimo aceptable que hay que alcanzar para satisfacer un criterio específico.

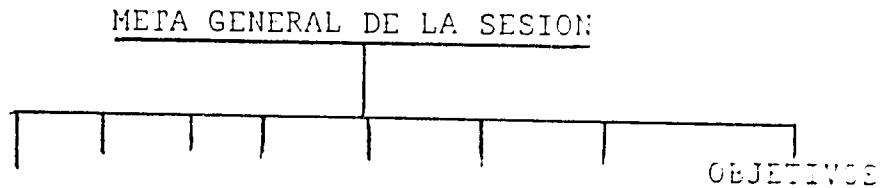
Condiciones de desempeño: Las condiciones que rodean el acto de desempeño están especificados en el objetivo. Eso se expresa normalmente en términos de criterios o condiciones.

Ejemplo: Al final de la sesión, los participantes estarán capacitados para:

- Identificar y describir verbalmente y con claridad por lo menos tres de los principales niveles de acción, administrativa en la operación y mantenimiento de los sistemas de agua potable rural.
- Listar sin equivocarse cinco elementos necesarios para el buen funcionamiento de los sistemas.
- Roscar y conectar correctamente dos tubos de a una pulgada en un tiempo de 40 minutos.

- Describir verbalmente todas las funciones y responsabilidades del Secretario/Tesorero de la Junta Administradora según el reglamento de las mismas
- Identificar y describir, sin referencia a notas funcionales de una bomba eléctrica cuando le pregunte el instructor.

Los objetivos de una sesión son los componentes del aprendizaje que se usan para diseñar las sesiones. Cuando todos los objetivos de la sesión se han alcanzado, la meta general de aprender esta cumplida.



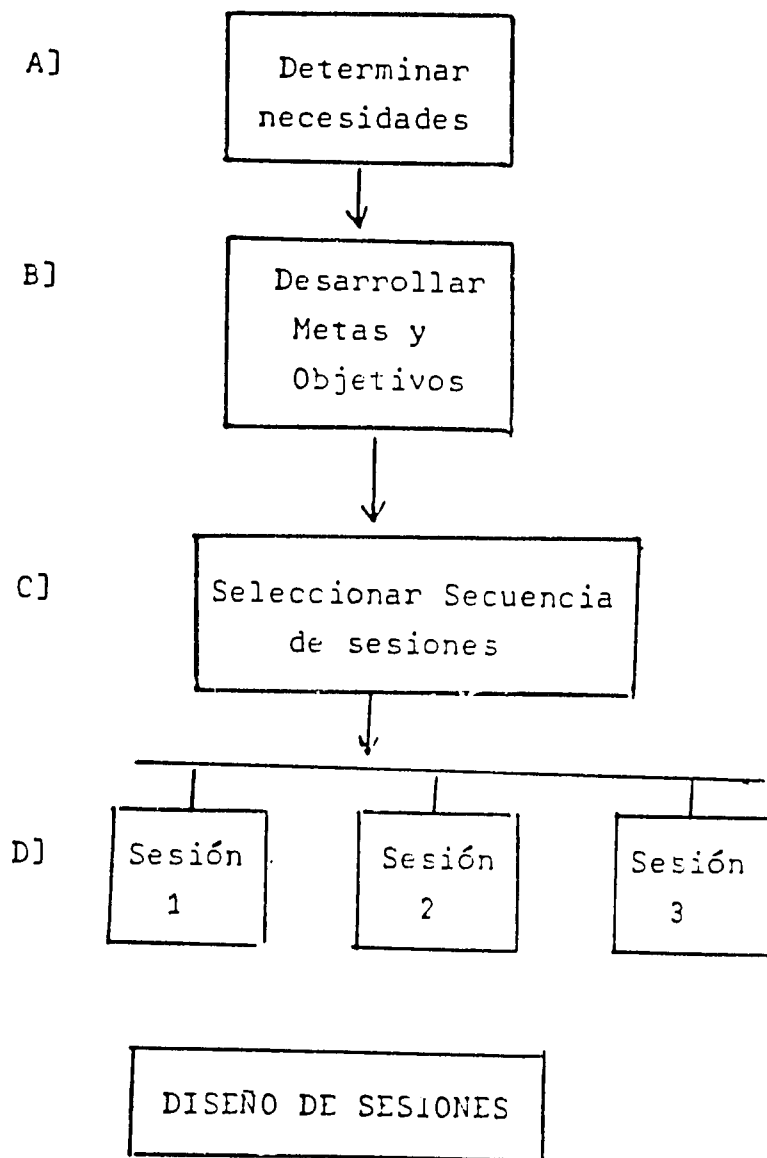
METODOS DE ENTRENAMIENTO

<u>METODO</u>	<u>USO APROPIADO</u>
1. Charla informal	- Compartir información informalmente.
2. Charla, exposición interactiva con visuales (Rotafolio, Láminas, slides)	- Compartir y recibir información en una dinámica de intercambio de ideas (comunicación de dos vías).
3. Lectura formal	- Presentar información en una dinámica de comunicación de una vía.
4. Demostración	- Presentar y practicar destrezas.
5. Práctica de campo	- Practicar y corregir destrezas sobre el terreno de implementación.
6. Aprendizaje	- Practicar y corregir destrezas en una situación de largo plazo con la ayuda de un instructor o supervisor.
7. Dramatización (Rol plei)	- Practicar y corregir destrezas de indole mental y verbal en una situación simulada
8. Simulación	- Practicar una combinación de destrezas (mental, informacional, verbales, físicos) en una situación que aproxima lo real

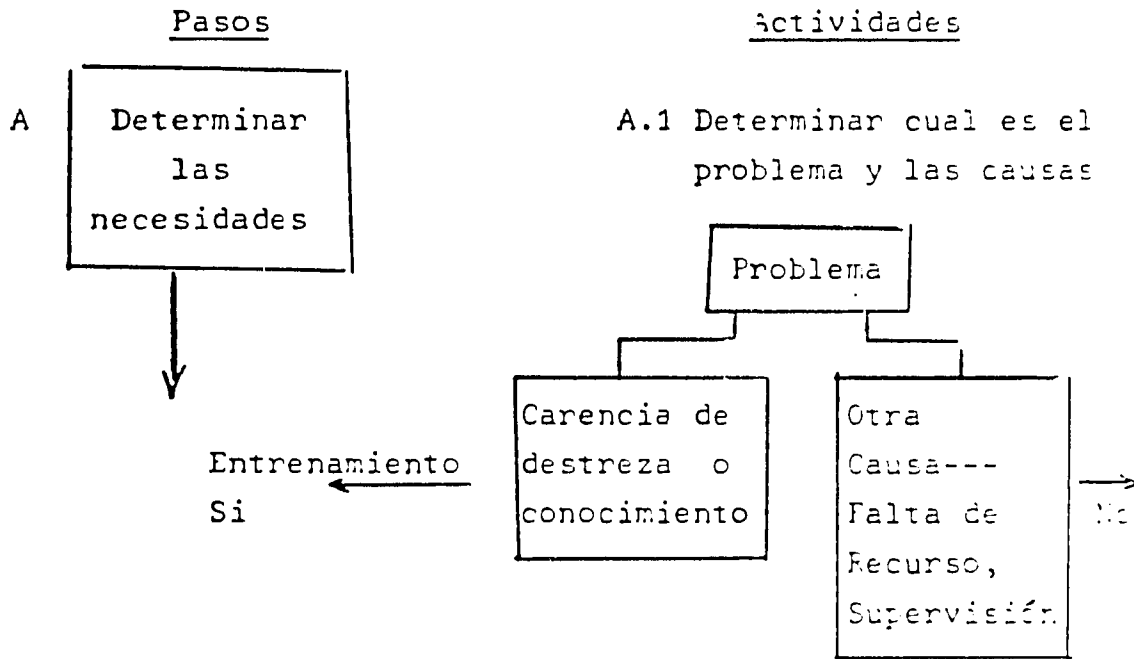
- aunque en menos tiempo que se toma en el mundo real.
9. Estudio de caso
 - Practicar destrezas de análisis de información en una situación presentada por escrito o transmitido verbalmente.
 10. Tarea de grupo (grupos de dos, tres, etc)
 - Analizar información e ideas utilizando los recursos humanos de un grupo de personas.
 11. Películas y otros Audio-visuales
 - Presentar información o demostrar destrezas en una forma visual y auditiva. El medio de comunicación es de una vía.
 12. Ejercicios con Lápiz y papel
 - Practicar la aplicación de conocimientos y destrezas de índole informacional y mental.
 13. Instrumentos Proyectivos: dibujos y murales que se hace un grupo o individual; cuentos, dramas y canciones que se hace espontáneamente; fantasías guiadas
 - Sacar el impulso ó idea creativa que está dentro o implícito en una persona o grupo. Averiguar las presunciones o ideas escondidas de las personas.
 14. Escalas de presunción
 - Examinar ideas y presunciones de las personas por medio de frases escritas en forma de escalas.

15. Juegos
- Levantar interés y envolver las personas en actividades de diversión o competición, mientras se aprende o practica destrezas.
16. Discusión de grupo
- Intercambiar ideas e información utilizando los recursos del grupo.
17. Tarea de descubrimiento
- Dar una tarea o experiencia en que el participante aprenda por medio de descubrir.
Normalmente se comete errores y se aprende por prueba y error.
18. Repetición y práctica
- Reforzar y profundizar destrezas o conocimientos.
Normalmente se usa con destrezas psicomotoras.
(ejemplo: aprender a montar a caballo, bicicleta, escribir, hablar lenguas, etc.)

PASOS EN EL DISEÑO DE ADIESTRAMIENTO [Rotafolio



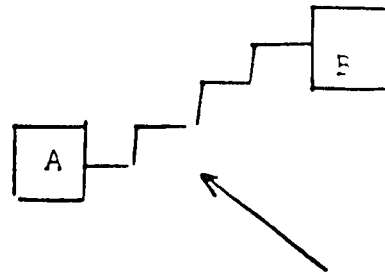
El Proceso de Diseño de Adiestramiento:



A.2 Determinar lo que saben/no saben y su nivel de experiencia

A.3 Determinar lo que deben saber o poder hacer para resolver el problema.

A.4 Averiguar la discrepancia entre lo que deben saber o hacer y lo que se están haciendo



Actividades

B.

Desarrollar
Metas y
objetivos

B.1 Examinar las necesidades y pensar en la pregunta: "que harían de diferente, si pudieran hacer lo que deberían?"

B.2 Escribir Meta general para cada descripción

B.3 Escribir Objetivos mensurables para cada Meta.

C.

Seleccionar
Secuencia de
sesiones

C.1 Agrupar Metas y Objetivos en sesión.

C.2 Seleccionar secuencia lógica de/proceso de aprendizaje con la -- pregunta: "que deben conocer/hacer/saber primero y segundo, etc.

Criterios

D.

Diseñar las
sesiones de
Adiestramiento

El diseño de adiestramiento debe:

1. Ser elaborado de acuerdo con los objetivos.

BOLETIN VI - 1

1. Experiencia

La salida

La entrada

4. Aplicar

2. Procesar/
Reflexión

3. Generalizar

El ciclo de aprendizaje experiencial

Pasos normales en una sesión

<u>Paso</u>	<u>Propósito</u>	<u>Actividades</u>
La entrada	Establecer el ambiente de aprendizaje	Cuento Chiste Pregunta Vínculo Racionalización
	Orientar a los participantes sobre el propósito y la dirección de la sesión	Metas Objetivos Horario
	Despertar el interés	Preguntas
1. La Experiencia	Hacer/ el participante Experimentar/ palpar Un acto de aprendizaje	. Estudio de caso . Charla Interactiva . Exposición de tema

2.

- para establecer una base de destreza o información
- . Dramatización
- . Tarea de grupo
- . Demostración y tarea
- . Ejercicio
- . Película
- . Slide
- . Tarea de campo
- . Etc.

2. Procesar/Reflexión

Examinar la experiencia y analizar lo que se ha hecho; refinar/corregir la experiencia; profundizar el aprendizaje.

- . Preguntas y respuestas
- . Presentación de grupo y crítica
- . Tareas
- . Discusiones
- . Análisis con rotafolio

3. Generalizar

Sacar lo más importante de lo que se ha aprendido y concretar el aprendizaje

Preguntas-
Reflexión y
contestación

3.

- . Hacer acuerdos
- . Relacionas lo aprendido con otros casos

4. Aplicar Pensar ó ensayar
 la futura aplicación
 y uso de lo aprendido
 reforzar el aprendiza_je

- . Planear
- . Reflexionar
- . Ensayar
- . Practicar

"La Salida"

Cerar la sesión
y asegurar que se
ha cumplido el compromiso
hecho (lo que se prometió)

- . Víncular con la próxima sesión
- . Resumir
- . Referirse a las metas
- . Evaluar

Métodos apropiados

Cuales serían los métodos de enseñanza más apropiados y de uso más frecuentes con operadores... con Juntas?

- . Demostración
- . Participación: introactiva
- . Práctica

- . Preguntas-comm.; doblavía

- Conceptos/Acuertos
- Charlas
- Rotafolio
- Película

Como Escribir en Rotafolio

Principios

- . Usar letras mayúsculas
- . Colores oscuros para letras
- . Colores brillantes - subrayar
- . Letras de tamaño apropiado
- . Usar marcas especiales para indicar importancia
- . Siempre ponga un marco en cada hoja.

Componentes de un Diseño

- . Título
 - . Meta
 - . Objetivos
 - . Resumen
 - . Actividades
-
- Instrucciones
 - Datos y puntos importantes
 - Preguntas
 - Tiempo de cada paso
 - Observación de cada paso en el ciclo de aprendizaje

¿Cual es la destreza mas importante que el entrenador debe conocer?

Locución

Mantener el interés

Mantener la secuencia del diseño

Sentirse cómodo

Familiarizarse con el ambiente

¿Cual es la cosa más difícil en adiestramiento?

- Diseño
- Ponerse en el lugar del participante (éi que no sabe)

¿Cual es la cosa mas importante que se han aprendido?

- * Es difícil entrenar - bien
- * Romper el hielo
- * Saber donde uno se va en el entrenamiento
- * Aplicar lo aprendido

TALLER DE ADIESTRAMIENTO DE ADIESTRADORES
DESARROLLO DE MODULOS DE ADIESTRAMIENTO PARA
LA COMUNIDAD

MODULO 1.- COMPONENTES DE UN SISTEMA DE ABASTECIMIENTO

Sesión 1.1.- Elementos de un Sistema

- 1.1.1.- Fuentes de abastecimiento
- 1.1.2.- Conducción
- 1.1.3.- Almacenamiento
- 1.1.4.- Distribución
- 1.1.5.- Potabilización
- 1.1.6.- Tratamiento

MODULO 2.- DESINFECCION

Sesión 2.1.- Cloración y Desinfección

- 2.1.1.- Cloración
- 2.1.2.- Dosificación (práctica)
- 2.1.3.- Desinfección de nuevos elementos

MODULO 3.- OPERACION DE LOS ELEMENTOS DE UN SISTEMA

Sesión 3.1.- Estructura Orgánica

Sesión 3.2.- Plan de Operación

- 3.2.1.- Obras de toma
- 3.2.2.- Equipo de bombeo
- 3.2.3.- Conducción e impulsión
- 3.2.4.- Almacenamiento
- 3.2.5.- Desinfección
- 3.2.6.- Distribución

Sesión 3.3.- Operación de Unidades de Potabilización

- 3.3.1.- Desarenadores
- 3.3.2.- Sedimentadores
- 3.3.3.- Filtros

MODULO 4.- MANTENIMIENTO DE LOS ELEMENTOS DEL SISTEMA

Sesión 4.1.- Plan de Mantenimiento

- 4.1.1.- Obra de toma
- 4.1.2.- Equipo de bombeo
- 4.1.3.- Conducción e impulsión
- 4.1.4.- Almacenamiento
- 4.1.5.- Desinfección
- 4.1.6.- Distribución

Sesión 4.2.- Mantenimiento de las Unidades de Potabilización

- 4.2.1.- Desarenadores
- 4.2.2.- Sedimentadores
- 4.2.3.- Filtros

MODULO 5.- CONCEPTOS BASICOS SOBRE CONSTRUCCION

Sesión 5.1.- Albañilería

- 5.1.1.- Excavación de zanjas
- 5.1.2.- Instalación de tuberías
- 5.1.3.- Instalación de válvulas y accesorios
- 5.1.4.- Relleno de zanjas
- 5.1.5.- Mampostería de piedra
- 5.1.6.- Mampostería de ladrillo
- 5.1.7.- Obras de concreto
- 5.1.8.- Revoque
- 5.1.9.- Pintura

Sesión 5.2.- Plomería

- 5.2.1.- Equipo básico de trabajo
- 5.2.2.- Corte y roscado de tubería
- 5.2.3.- Tipos de uniones
- 5.2.4.- Accesorios
- 5.2.5.- Acometidas domiciliarias
- 5.2.6.- Lectura de planos

MODULO 6.- CONSTRUCCION DE LETRINAS

Sesión 6.1.- Tecnología Apropriada

- 6.1.1.- Letrina de hoyo seco
- 6.1.2.- Letrina ventilada
- 6.1.3.- Letrina de sello hidráulico
(inodoro campesino)

Sesión 6.2.- Estructuras para Letrinas

- 6.2.1.- Losa
- 6.2.2.- Caseta

MODULO 7.- JUNTA ADMINISTRADORA

Sesión 7.1.- Organización y Funciones

- 7.1.1.- Registros contables y administrativos
- 7.1.2.- Tarifas y cobranza
- 7.1.3.- Cortes de servicio y reconexiones

Sesión 7.2.- Supervisión

- 7.2.1.- Operador
- 7.2.2.- Sistema

MODULO 8.- COMUNIDAD

Sesión 8.1.- Motivación de la Participación de la Comunidad para:

8.1.1.- Conservación del sistema

8.1.2.- Usos del agua

- * Consumo humano
- * Otros usos
- * Higiene personal

APPENDIX C

Administrative and Technical Plan
for the Pilot Community Operator Course
(Spanish)

PLAN ADMINISTRATIVO Y TECNICO

CURSO PILOTO DE ADIESTRAMIENTO A

OPERADORES Y JUNTAS ADMINISTRADORAS EN

OPERACION Y MANTENIMIENTO

5, DICIEMBRE, 1986

PLAN ADMINISTRATIVO - CURSO - PILOTO

A.- Arreglos Administrativos

1.- <u>Participantes</u>	(Primera semana) 5 días	21 Operadores
2.- <u>Participantes</u>	(Segunda semana) 3 días	30 Miembros
Total Participantes 51		(8 días)

3.- Criterios Para Seleccionar

- * Ser miembro de la comunidad y radicar en forma permanente en esta.
- * Mayor de edad.
- * Saber leer, escribir, y realizar las 4 operaciones principales

4.- Lugar

Comunidad Rural

- * Paracaya (Punata) Centro de entrenamiento de Paracaya se elige para reunir mejores ventajas para el curso, como ser:

- Aulas
- Salón de actos (película)
- Comedor, dormitorio, baños

Accesibilidad adecuada 40 kms. de Cochabamba-Paracaya camino a Santa Cruz.

5.- Materiales Requeridos

- Rotafolios 4 pzas. (21 personas)
- Pliegos papel sábana 400 pzas.
- Marcadores colores: Rojo 10 pzas.
azul 10 pzas.
negro 10 pzas.
verde 10 pzas.

Total 40 pzas.

- 1 Máquina fotocopidora
- 1 Elevador de corriente

7.- Apoyo Logístico

- Vehículos (2) camionetas equipadas
- Carpas (2) para camionetas
- Combustible 500 lts.

8.- Personal de Apoyo

- Secretaria (1) tiempo completo
(deberá ser contratada una semana antes del curso y durante el desarrollo de este)
- Chofer (1) tiempo completo (para desplazamientos en el lugar)
- Chofer (1) medio tiempo a requerimiento para posibles emergencias.

9.- Adiestradores

Tiempo: 3 días antes del inicio del curso

Actividades:

- 1er. día Revisión y ajuste, final diseño de sesiones de acuerdo a grupos responsables.
- 2do. día Simulación de sesiones por grupos (ensayo)
- 3er. día Sigue simulación y preparación material didáctico, láminas y audiovisuales.

B.- Presupuesto

Partidas

1.- Remuneración Instructores

incluye

Por persona día durante:

día\$b. total 7.840

2.- Alojamiento

Incluyendo personas

Adiestradores , instructores y cursillistas

por persona: 40 cama 5.000 \$b. 2.130.000.210

<u>3.- Alimentación</u>			
Como anterior a	10.000 \$b.	1ra.	2.420.000
Por Per./día		2da.	<u>2.450.000.</u> 2.420
			4.870.000
<u>4.- Refrigerio</u>			
Igual a	10.000		1.210.000
por dia persona			<u>245.000</u> 1.210
			1.455.000
<u>5.- Apoyo Logístico</u>			
Secretaria/Chofer			
Combustible			700.000. 700
<u>6.- Material Didáctico</u>			
Marcadores, archivadores,			
fotocopias, certificados			
papelería , etc. \$b.			1.000.000
<u>7.- Alquiler Local</u>			
Aulas ,sala de sesiones,			
para proyección película			350.000
	Sub total	\$b.	18.282.000
	Imprevistos10%		182.000
	Total	\$b.	18.464.820
	Equivalente a \$us. 9.250		

PLANILLA

Tarea	Responsable	Fecha Conducción
1. Asumir selección de participantes	Téc. Victor Hugo Ustariz	.15-I-87
2. Preparación de material (comp)	Téc. Lucio Jimenez	12-I-87
3. Lugar y Local	Téc. Victor Hugo Ustariz " Fredy Gambo	20-I-87
4. Apoyo logístico (Secretaria)	Ing. Javier Pino Lic. F. Díaz Romero	22-I-87
5. Ensayo Adiestradores	Ing. Javier Pino Lic. Díaz Romero	16-I-87
6. Verificación de factores en la comunidad	Ing. Javier Pino	14-I-87

T E M A S

I

- 1.- Elementos de un Sistema
- 2.- Organización de la DOMAR
- 3.- Operación de Obtas de Toma
- 4.- Operación de Tanques y Red.
- 5.- Operación de Equipos de Bombeo
- 6.- Plan de Mantenimiento
- 7.- Desinfección y Cloración
- 8.- Obras civiles (Albañilería)
- 9.- Plomería
- 10.- Tipos de Uniones y Accesorios
- 11.- Acometidas y Planos
- 12.- Responsabilidad de la Comunidad
- 13.- Organizaciones de Juntas Administradoras
- 14.- Registros Contables
- 15.- Tarifas y Cortes
- 16.- Motivación de la participación de la Comunidad SAPR
- 17.- Letrinas

II

Selección de Instructores

- 1.- Cochabamba
 - 1.- Jesús Siles
 - 2.- Freddy Gamboa
 - 3.- V. Hugo Ustariz
 - 4.- Avelino Salinas Cochabamba
 - 5.- Lucio Jimenez
 - 6.- José Díaz
 - 7.- Simón Nogales
-
- 1.- Raul Moore
 - 2.- Nestor Pérez
 - 3.- Fernando Cuellar Sucre
 - 4.- Napoleón Flores

- 1.- Roberto Luna - La Paz
- 1.- Juvenal Maidana Oruro
- 1.- Humberto Zambrana-Potosí

III Preparación Módulos y Responsabilidades

Sesión	Responsabile
1.- Elementos de un Sistema	V. Hugo Ustariz
2.- Elementos de un Sistema	Simón Nogales Nestor Pérez
3.- Organización DOMAR	José Díaz Napoleón Flores
4.- Operación de Obras de Abastecimiento	Lucio Jimenez Roberto Luna
5.- Operación de Tanques y	Juvenal Maidana José Díaz
6.- Operación y Equipo de Bombeo	Simón Nogales Humberto Zambrana
7.- Plan de Mantenimiento	Nestor Pérez Jesús Siles
8.- Desinfección	Freddy Gamboa Fernando Cuella
9.- Cloración	Raúl Moore V. Hugo Ustariz
10.- Albañilería	Raúl Moore Lucio Jimenez
11.- Plomería	Simón Nogales Fernando Cuellar
12.- Tipos de Uniones y Accesorios	Napoleón Flores Avelino Salinas
13.- Acometidas y Planos	Roberto Luna Juvenal Maidana
14.- Responsabilidad de la Comunidad	Humberto Zambrana Avelino Salinas

- | | |
|---------------------------------|--|
| 16.- Tarifas | Raúl Moore |
| 17.- Motivación de la Comunidad | V. Hugo Ustariz
Humberto Zambrana |
| 18.- Letrinas | José Díaz
Jesús Siles
Fernando Cuellar |

Requerimiento

- | | |
|--------------------------------------|---|
| 1.- Visuales (Dibujos) | |
| 2.- Boletines | |
| 3.- Slides | |
| 4.- Xerigrafias | |
| 5.- Tableros (Rotafolio) | |
| 6.- Proyectoras (películas y slides) | |
| 7.- Generador de luz | |
| 8.- Papel sábana (resma) | |
| 9.- Juegos de marcadores | |
| 10.- Hipocloradores | |
| 12.- Herramientas de albañilería | 1. Vadilejo
2. Combo
3. Frotacho
4. Pala
5. Picota |
| 13.- Herramientas Plomería | Prensa tripode
Juego tarrajas 2", 1 1/2"
1", 3/3" y 1/2"
- Marco de Sierra
- Llaves stailson # 18,
24, 36
- Limpiador
- Pegamento
- Hojas de Sierra
- Sepillo de acero
- Lima plana |

- | | |
|---------------------------------|---|
| 14.- Materiales de Construcción | <ul style="list-style-type: none"> - Cemento - Arena - Grava |
| 15.- Material Eléctrico | <ul style="list-style-type: none"> 2 Alicates eléctricos de c. aislado 1 Cinta autobulcanizante 4 Rollos cinta aislante 1 Juego destornilladores 1 Juego llaves cressent 1 Juego llaves fijas |
| 16.- Accesorios y Uniones | <ul style="list-style-type: none"> Tees, 1 a 2 1/2" Codos 1 a 2 1/2" Uniones universales Cruces 1 a 2 1/2" Neplos corridos 1/2 Válvulas de retención Válvulas de paso |
| 17.- Planos | |
| 18.- Otros | Material de limpieza |

PLAN PILOTO

HORARIO DEL TALLER DE ADIESTRAMIENTO DE OPEFADORES DE S.A.P.R.

HORA	LUNES	MAERTES	MIÉRCOLES	JUEVES	VIERNES	SABADO
8:00	Apertura y bienvenida Presentación del programa del curso plan piloto Receso Elementos de un Sistema	Operación de tanques y red Receso Continuación	Operación de equi de bombeo Receso	continuación Receso Desinfección	Receso Plomeria	Acometidas y planos Resumen
A L M U E R Z O						
	Operación	Continuación	Mantenimiento	Cloración	Uniones y accesorios	Evaluación Clausura
	Receso	Receso	Receso	Receso	Receso	Receso
	Continuación	Continuación	Continuación	Resumen	Continuación	
JUNTAS ADMINISTRADORAS						
	LUNES	MAERTES	MIÉRCOLES	JUEVES	VIERNES	SABADO
	Apertura	Tarifas y cortes				
	Receso	Receso				
	Organicacion de la DOMAR	Motivación de la Participación de la Comunidad				
A L M U E R Z O						
	Responsabilidades de la comunidad	Letrinas				
	Receso	Receso				
	Registros contables	Evaluación y Clausura				