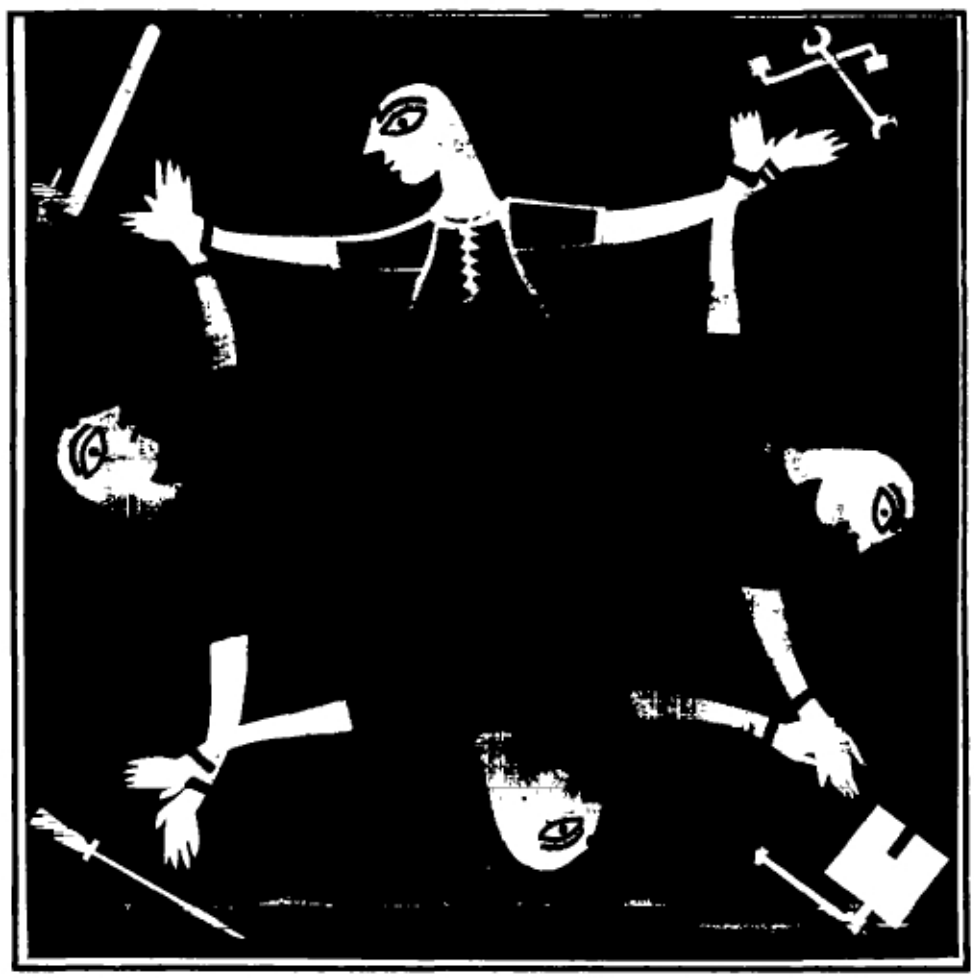
TRAINER'S GUIDE



COMMUNITY BASED HANDPUMP MAINTENANCE
INDIA MARK II & INDIA MARK III (VLOM)
HANDPUMP MECHANICS TRAINING

VILLAGE HANDPUMP MECHANICS TRAINING
TRAINERS GUIDE

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About this Manual

The water supply programme has achieved significant progress in terms of accessibility and reach of the handpumps to the rural populations in the past few years through installation of handpumps. The focus now is gradually shifting from coverage to sustainability of the system. This changing scenario is leading to a change in the roles and perceptions of the users as well as the implementing agencies especially with regard to women's involvement in repair and maintenance of installed handpumps. This manual has been developed keeping in view these aspects.

The manual has been developed as a guide to standardize the training of village handpump mechanics for community based maintenance the India Mark III (VLOM) handpumps. It can be used by the trainers as a reference to conduct the training of the handpump mechanics. This guide contains all the information necessary for organizing and conducting the training and highlights certain key factors that must be kept in mind during the sessions.

The trainers guide can be used effectively along with other materials available for training of women handpump mechanics ie.

Training film, manual and slide set on dismantling and repair of the India Mark III (VLOM) handpump; Posters and flipchart-cum-calendar on women's role in repair of handpumps.

Introduction

Rural Water Supply Programme

India implements possibly the largest rural drinking water supply programme in the world. Provision of drinking water supply is the core of its development plan. However, the magnitude of the task of providing safe potable water to the 6.5 million rural people and the enormous cost involved make the possibility of any piped water supply or centralized maintenance systems such as those that exist in urban areas difficult.

Consequently, during the early 1960's, piston type hand pumps were introduced to pump water from deep bore/tubewells in the rural areas. However, these pumps failed too frequently and were considered unreliable to use as a source of providing drinking water to the rural populations. In the 1970's, the Government of India (GOI) initiated action in cooperation with the State Governments, World Health Organization (WHO), United Nations Children's Fund (UNICEF), Mechanical Engineering Research & Development organization (MERADO) and Richardson & Cruddas (1972) Ltd., (a GOI Undertaking), for the development of a dependable deepwell handpump. A very reliable and sturdy deepwell hand pump was developed in the late 1970s and is now known all over the world as India Mark II deepwell handpump. By the early 1980's, the India Mark II hand pump had become a household name in the villages in India, and this proved a reliable source of water supply to millions of people in rural and semi-urban areas. By 1993, over 2.2 million India Mark II/III hand pumps were in operation in India alone.

The development of India Mark II was a major breakthrough in reliability and ease of operation. There was a dramatic increase in the number of pumps operating at any point of time from a dismal 25% to an impressive 85%.

Although, sturdy and reliable in design, the pump requires preventive and curative maintenance. The repair needs envisage special skills, manpower and tools to make replacements. These may not always be available/feasible at the village level.

In addition, studies conducted so far indicate that the present maintenance systems have high overhead cost. Further, the community is not adequately involved during planning, execution and maintenance of the handpump based water supply system.

In order to improve the IM-II handpumps, to enhance maintainability at village level and increase meantime before failure (MTBF) further efforts during the period 1983-87 led to the development of a village level operation and maintenance (VLOM) version of India Mark II known as India Mark III handpump. This VLOM concept promotes maintenance of a handpump by the users themselves with minimal outside support.

Handpump Maintenance Systems

Handpumps are the most widely accepted technological option for community water supply. While the India Mark II/III handpumps are reliable, robust and efficient pumps, like any other machine, they require a certain level of maintenance to function without breakdown. The different handpump maintenance systems prevailing in India are-

Three Tier Maintenance System

This maintenance system is organized with 3 levels or tiers of functionaries. It was the first institutionalized attempt at involving the users in the maintenance of hand pumps. Essentially, the system proposes the following three tiers :

1. A village level voluntary caretaker identified by the implementing agency from among the nearby users of the pump. This caretaker is trained for conducting preventive maintenance, keeping the handpump surroundings clean and motivating the users to handle the pump properly. She also reports any event of breakdown to the higher level of the system through a pre-printed post card.

2. At the second tier is the Block Mechanic who looks after all the pumps in the block. His duty is to visit all pumps regularly and to undertake minor repairs of the above ground components. In case a major repair of the below-ground assembly becomes necessary, he too reports such repair needs to the next higher level.

3. At the district level, the Mobile Maintenance Team constitutes the third tier and is expected to look after all the handpumps in the district. Being equipped with a vehicle and 5 workers, the mobile maintenance team undertakes all major repairs as and when necessary.

The operation of this system hinged on a crucial functionary, the village level handpump caretaker. The assumption that the voluntary Caretakers could be easily recruited and motivated to carry out simple preventive maintenance and communicate the need for repairs to the next higher level turned out to be wrong in most cases.

It was felt that the Three Tier system was a top-heavy and centralized system in which the Caretaker depended on the Block Mechanic, who in turn depended upon the Mobile Team. A failure in any one of the links would result in a collapse of the system as a whole.

Independent evaluations of the functioning of the 3-tier system have invariably identified absence and shortage of Caretakers as one of the main reasons why the Three Tier System has not functioned effectively. High workload on Block Mechanics and the Mobile Team and improper work programming have often resulted in unusually high down-time, once a pump had broken down.

Two Tier Maintenance System

In many States, this maintenance system went under the name of the Two Tier System and took different forms in different places. Most Two Tier Systems attempted to eliminate the need for Caretaker by increasing the numbers of Mechanics and Mobile Maintenance teams and decentralizing them. These actions eliminated the need for the facing the difficult, unfamiliar (and more importantly, non-technical and non-engineering) task of recruiting and motivating Caretakers. Many a time, these modified versions of the Three Tier system completely did away with any semblance of community involvement sometimes.

One tier Maintenance system

This alternative system emerged from the visible drawbacks of the three tier system and a growing belief that rural people could be empowered and enabled to maintain their own handpumps. The first attempt, based upon the conviction that people who are users of handpumps are capable of maintaining them, was made by the Social Work and Research Centre (SWRC), a voluntary organization based at Tilonia, Rajasthan.

If illiterate villagers could repair electric and diesel pumps, tractors and other agricultural implements which were much more sophisticated machinery than a hand pump, the actual repair task could be demystified and no skills needed to be imported from the district level to keep the pumps going. A village based Handpump mistry - HPM could replace all the 3 tiers. The idea of a Handpump Mistry was based on the premise that unemployed rural youth from economically poor families could be identified based on their mechanical aptitude and their skills upgraded by training so that they would undertake most common repairs necessary for a handpump.

This system had many advantages in terms of the ready availability of the handpump mistry to the community and use of local skills in maintenance & repair. However, in the process of large scale implementation, it had its own problems including the identification of the right person as the handpump mistry; and bottlenecks in the provision of spare & tools to the handpump mistry.

The village based artisans such as blacksmiths, carpenters and cycle mechanics etc., after receiving training, necessary tools and spare parts, could take care of essential preventive maintenance and regular repair needs of about 20 to 25 pumps. They would need to be backed up and monitored by a second tier consisting of a Junior Engineer and his maintenance crew at the block level.

Community Based Handpump Maintenance System

Need

As the number of installed handpumps increase in a district, the efficiency of a maintenance system through a centralized mechanism deteriorates. Besides, studies conducted so far indicate that maintenance through centralized mechanisms have high overhead costs. Thus high priority needs to be given to the development of sustainable village based and community managed maintenance systems which adapt to the local needs and requirements.

Moreover, the involvement of community is essential during planning, execution and maintenance of the handpumps installed in the community. Complete community involvement would result in a sense of ownership of the handpump installed. A water supply system like the handpump can be preserved only if the community understands and appreciates its role in management of the system. The community should be able and willing to take responsibility for its management & maintenance.

Definition

The Community Based Handpump Maintenance System, is a strategy for ensuring sustenance of the water supply through the handpump at the village level. Under this system of maintenance, the user groups select representatives to form a Water and Sanitation (WATSAN) committee. The WATSAN committee undertakes the responsibility of management, preventive, maintenance as well as repair of the handpumps installed. It collects contributions from the users and uses the money to buy spares required for repair & maintenance.

One user representative per handpump is selected by the WATSAN committee to undertake preventive maintenance of the handpumps. One handpump mechanic per panchayat is selected & trained to undertake repair of the handpump. The caretakers and mechanics work under the overall responsibility of the WATSAN committee. The skills necessary for maintenance & repair are transferred to the community representatives (caretakers & mechanics) through training.

The accountability for operation and maintenance lies with the WATSAN committee. Self-sustainability in terms of procurement of spares and servicing cost is ensured through contributions from user groups.

Traditionally, water is a woman's domain. Women collect, transport, store, and allocate water within the household. As women are responsible for water by virtue of their domestic functions, they should play a major role in the functioning of the WATSAN committee. Women also have the potential to operate, maintain and repair any malfunctioning in the handpumps and thus should be empowered to ensure sustained water supply to the community.

COMMUNITY BASED HANDPUMP MAINTENANCE

ORGANISATION PROCESS

Meetings with officials and community leaders

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Village contact drive and orientation of community.

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Formation of WATSAN committee

|

Registeration of committee

|

Orientation & training of WATSAN committee members

|

Collection of funds from community.

|

Selection and training of caretakers & mechanics

|

Installation of handpump

|

Public handing over of handpump

|

Community operates and maintenance handpump

|

Monitoring and evaluation

STRUCTURE

PANCHAYAT

Handpump caretaker (one/handpump)

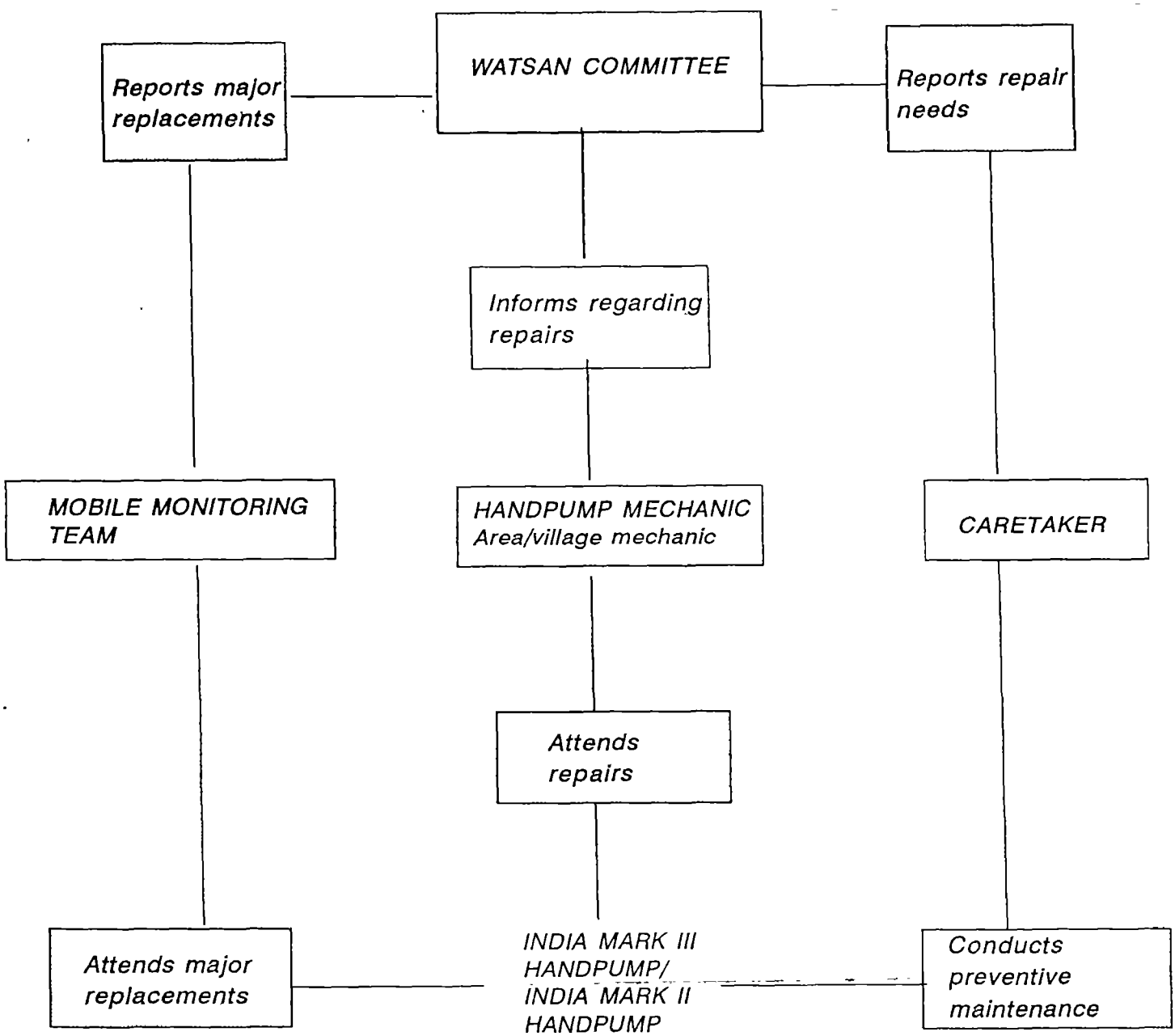
Handpump mechanic

Village WATSAN committee

BLOCK/DISTRICT

Back-up monitoring and maintenance team

FUNCTIONING



Village handpump mechanic

Village handpump mechanics

In areas where the India Mark III (VLOM) handpump is installed, one handpump mechanic is selected for each handpump in the panchayat. The government implementing department and the NGO functionaries jointly with the WATSAN committee members select the handpump mechanics . The criteria for selection of the village handpump mechanic are given below.

The village handpump mechanic should

preferably be a woman from the user community,
be a permanent resident of the village,
preferably be literate and motivated to undertake the activity.

It is crucial to focus on women as handpump mechanics for better utilization and functioning of the handpumps as it is women who face extreme hardship wherever there is a problem of non availability of clean drinking water due to breakdown of handpumps. Women, as they are most concerned with water, would deliver better as handpump mechanics.

Role of village handpump mechanics

On receiving information of a handpump breakdown, collect the tools and spares required for the repair from the village WATSAN committee.

Carry out handpump repairs with help from the caretaker, WATSAN committee members and the community.

Account to the WATSAN committee for the spares used and time spent on the repair.

Receive payment for the services from the WATSAN committee on a monthly basis.

Maintain a record of the handpump repair with the help of the WATSAN committee.

Act as a motivator to promote health and hygiene practices, proper use of the handpump, cleanliness around the handpump and sanitation in the village.

Training of village handpump mechanics

Objective

To develop the skills of the handpump mechanics for undertaking repair of the handpumps fcr effective execution of the community based handpump maintenance system.

Duration

The village handpump mechanics are given a two weeks practical training.

Organization

The Public Health Engineering Department in consultation with the district and block authorities, local Non-Governmental Organizations and WATSAN committee members organize the training programme.

The training is held at the district/block headquarters. Practical training on handpump repair is given in the field. The trainees are involved in the conversion of the India Mark II handpump to the India Mark III (VLOM) handpump in their respective villages.

The trainers team comprises of functionaries from the Public Health Engineering Department/Water Boards/Rural development departments and representatives from Non- Governmental Organization involved in the programme.

Training methodology

Lecture-cum-discussion sessions are held for the theoretical sessions. Group work /discussion sessions are held on the roles and responsibilities of the village handpump mechanics in the community based handpump maintenance system. Handpump repair is demonstrated using handpump models.

Practical "hands-on" training is given on the different aspects of handpump repair in the villages. The handpump mechanics are specially trained in the conversion of handpumps, which they undertake for their own village as a part of the training programme.

Tentative Training schedule

The following training schedule is suggested for the training of handpump mechanics. A framework has been given regarding the session subject content. However, depending on the availability of time and local needs some of the other topics may be covered during the training like linkages between water and diarrhoeal diseases, role of the mechanic in promoting nutrition education etc.

Day 1

9.00 - 9.30 a.m.	*Registration*
9.30 - 10.00 a.m.	*Introduction*
10.00 - 10.30 a.m.	*Inaugural*
10.30 - 11.30 a.m.	*Importance of Safe Water*
11.30 - 12.00 p.m.	*Handpump based water supply system*
12.00 - 1.00 p.m.	*Anatomy of the handpump*
1.00 - 2.00 p.m.	*Lunch*
2.00 - 2.30 p.m.	*Community based handpump maintenance system*
2.30 - 3.00 p.m.	*Role of WATSAN committee, handpump caretakers*
3.00 - 3.30 p.m.	*Role of handpump mechanics*
3.30 - 4.30 p.m.	*Tools and spare parts needed for repair*
4.30 - 5.30 p.m.	*Planning for the field work sessions*

Day 2 - Day 11

9.00 - 10.00 a.m.	*Review of previous day's sessions*
10.00 - 5.00 p.m.	*Practical demonstration and training on handpump repair.*
5.00 - 5.30 p.m.	*Planning for next day's sessions*

Day 12

9.00 - 10.00 a.m.	*Review of the training programme*
10.00 - 11.30 p.m.	*Monitoring & record keeping.*
11.30 - 1.00 p.m	*Village & home sanitation.*
1.00 - 2.00 p.m.	*Lunch*
2.00 - 3.30 p.m	*Game on recognizing the pump components, spare parts and tools for carrying out maintenance.*
3.30 - 4.30 p.m.	*Evaluation of the training. Post knowledge test.*
4.30 - 5.30 p.m.	*Closing ceremony and distribution of materials and tools.*

Session-wise subject content and methodology

Day 1 :

Session	***Registration and Introduction***
Objective	*To know the background of the trainees and maintain a record for follow-up of the training.* *To welcome the participants and initiate the process of cohesive group formation.*
Methodology	*Refer to the format for registration and the attendance register for trainees. Fill up the background information forms.* *Informally introduce & welcome the participants to the training programme.* *Sub-divide participants into groups on the basis.of a game. Allow time for discussions & familiarization among the trainees. Ask one trainee to introduce her group mate to the entire group.* *Name, occupation, qualifications, village, workplan, family background etc. of the participants narrated by different participants.*
Session	***Inaugural***
Objective	*To inaugurate the training programme and briefly outline the objectives of the training.*
Subject content	*Status of the handpump installation under the Rural Water supply programme. Problems of the centralized maintenance system. Need for community based handpump maintenance. Scope/objectives of the training programme.*

Methodology	*Presentation/address by the training programme coordinator on the objectives of the training.*
Session	***Importance of safe water and hygiene practices.***
Objective	*To highlight the importance of safe drinking water, hazards of unsafe water and inform about the sources of safe drinking water. To emphasize the importance of proper sanitation and hygienic practices.*
Subject content	*Water borne diseases.* *Link between unsafe water and diseases.* *Relationship between sanitation & diseases.* *Importance of a safe source of drinking water.*
Methodology	*Discussion using the visual Modified Photodisplay set on sanitation and Flipcharts to illustrating the disease transmission cycle.* *Films like "Prescription for health" or Story of drinking water" (Pani Ki Kahani) may also be used. Visual-aid calendar, modified photodisplay on sanitation and flipbook on safe water and sanitation "Saf pani aur safai" may also be used. Set of posters on the role of women as handpump mechanics may be put up at the training venue.*
Session	***Handpump based water supply system***
Objective	*To create an understanding of the functioning of the India Mark III handpumps to lift groundwater.*
Subject content	*Importance of ground water as a resource for safe water supply.* *Basic aspects of construction of a tubewell to lift ground water.* *Operating principles and functioning of a lever action handpump.*
Methodology	*Film show / slide presentation and discussions on the community based handpump maintenance system.*
Session	***Anatomy of the handpump***
Objective	*To teach the trainees about the different parts of the handpump, its functioning mechanism, the VLOM aspects and its maintainability at village level.*
Subject content	*Mechanism of the handpump and how it ensures protected water supply.* *VLOM aspects of the handpump - simple design and maintainability.* *Anatomy of the handpump - Above-ground components, Below-ground components. Operating principles.*

Methodology	*Discussions using posters, model of the handpump, wall charts on the anatomy of the handpump and film on installation of the India Mark III handpmp.*
Session	***Community based handpump maintenance system***
Objective	*To create an understanding about the need, structure and functioning of the community based handpump maintenance system.*
Subject content	*Centralized maintenance of handpumps and need for the community to take responsibility and accountability for handpump maintenance. Key aspects of community based handpump maintenance system.*
Methodology	*Discussions.*
Session	***Role of the WATSAN committee and handpump caretakers***
Objective	*To inform about the various responsibilities of the WATSAN committee and the recommended tasks of the handpump caretakers.*
Subject content	*Role & responsibilities of the village WATSAN committee and handpump caretaker in the community based maintenance system.*
Methodology	*Discussions.*
Session	***Role of the handpump mechanics***
Objective	*To inform about the various responsibilities of the handpump mechanics.*
Subject content	*Role & responsibilities of the village handpump mechanic in the community based maintenance system.*
Methodology	*Discussions*
Session	***Tools and spares needed for repair.***
Objective	*To teach the trainees about how to identify defects for repair and create an understanding of the different spares and tools needed for repair of the handpumps.*
Subject content	*Different between preventive maintenance and repair.* *Identification of the tools and spares for repair of the handpump.* *Steps in identification of the defects through observations, investigation, and curative actions to be taken for the different problems.*

Methodology	*Discussions using wall charts, models and film on repair and dismantling of the handpump.*

Day 2 - Day 11 :

Session	***Practical demonstration and training on handpump repair.***
Objective	*To train on the steps involved in dismantling and reassembling of the handpump.*
Subject content	*Steps in dismantling and reassembling of the handpump. Steps in the repair and dismantling of the cylinder assembly - foot valve and plunger.*
Methodology	*Demonstration and practical "hands-on" training in the field. The trainees may also be involved in the conversion of India Mark II to India Mark III handpumps in their villages.*

Day 12 :

Session	***Monitoring pump performance***
Objective	*To inform the trainees about the monitoring system and emphasize the need for record keeping. To teach the trainee how to maintain records/monitoring formats.*
Subject content	*Record keeping & its importance.* *Types of formats for monitoring pump performance.*
Methodology	*Discussion. Actual practice in filling records.*
Session	***Village and home sanitation***
Objective	*Inform the trainees about the importance of village & home sanitation. Identify/specify the role of the trainees in maintaining village sanitation.*
Subject content	*Village sanitation.* *Alternative delivery systems.* *Sanitation in the home.* *Sanitary latrines.* *Personal hygiene.* *Handling of drinking water.* *Garbage disposal.*
Methodology	*Discussion using available films and printed materials on sanitation.*

Session	***Identification of pump components,tools and spares through games.***
Objective	*To help the trainees identify the pump components, spares and tools, and refresh the memory of the trainees on the functions; positions of pump components; spares and tools; causes of malfunction and repair requirements of the handpump through games.*
Subject content	*Identifying all components of the pump, tools & spares through a game.*
Methodology	*Write names of the pump components & tools/spares on slips of paper & put them in a box. Draw lots and ask each trainee to pick a paper & then identify the pump components spares and tools. Discussions.*
Session	***Distribution of materials and winding up of training programme***
Objective	*To evaluate the training programme, close the training programme formally and distribute materials that the trainees will need during their work.*
Methodology	*Use question answer technique to evaluate the training programme regarding the organization, session subject content, materials used and methodology used.* *State the results of the evaluation and give a few words of encouragement to all the trainees.* *Distribute the certificates to the trainees along with the participant kits.* *Say good bye to trainee and close the training programme.*

Recommended list of materials in the mechanic's kit

1. *Bag, notebook and pen.*
2. *Poster roll containing posters on India Mark III handpump - Stree shakti posters (3) and handpump posters (8).(In regional language)*
3. *Flipbook on safe water and sanitation (developed as a part of the NDWM package) in the regional language.*
4. *Set of six pamphlets on sanitation in regional language.*
5. *Manual on dismantling and repair of the India Mark III handpump in regional language.*
6. *Flipbook calendar as a part of the Stree Shakti package in regional language.*