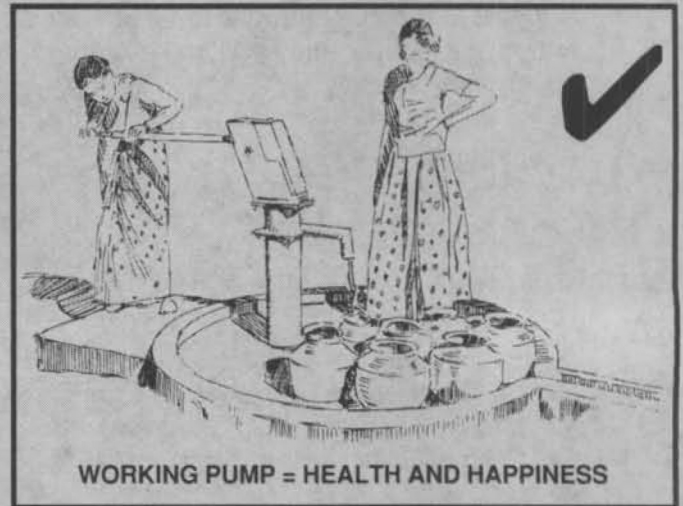
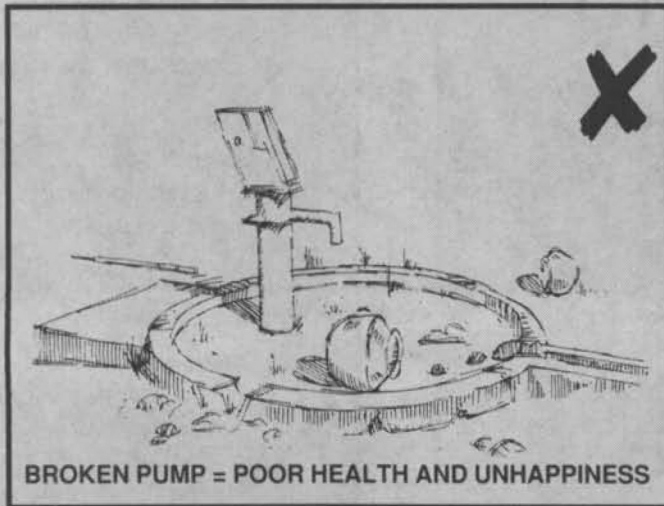


## Technical Brief No.33/Maintaining handpumps

Handpumps can provide a permanent source of unpolluted water which is vital for a healthy developing community. A significant proportion of installations are not in optimum working order, however, and some are broken and inoperable for long periods. One of the major factors contributing to this waste of resources is inadequate or non-existent maintenance.



### What is maintenance?

- ✗ It is *not* carrying out repairs when a pump finally breaks down.
- ✓ It *is* periodically inspecting an installation and replacing parts that are worn or show other signs of deterioration. Its aim is to prolong the life of the pump and avoid unexpected breakdowns.

Planned preventative maintenance is an organized system of inspections on a daily, weekly, monthly, and yearly basis, which should maximize the time for which a pump can deliver good drinking water.

A typical schedule is given below but will vary for different pump types.

<p><b>Daily</b></p> <ul style="list-style-type: none"> <li>● Pump operation</li> <li>● Pump and base cleanliness</li> <li>● Wastewater drainage</li> <li>● Comments of users</li> </ul>	<p><b>Weekly</b></p> <ul style="list-style-type: none"> <li>● Lubricate moving parts</li> <li>● Check tightness of nuts and bolts</li> <li>● Check security of pump on base</li> </ul>
<p><b>Monthly</b></p> <ul style="list-style-type: none"> <li>● Check output rate</li> <li>● Check for condition of concrete base</li> </ul>	<p><b>Yearly</b></p> <ul style="list-style-type: none"> <li>● Remove downhole assembly</li> <li>● Inspect and replace parts where necessary</li> </ul>

Whenever remedial actions are required these are to be carried out and records kept at all stages.

*This system of work requires proper scheduling, and experience has shown that the organization is just as important as the physical work.*

# Technical Brief No.33/Maintaining handpumps

The handpump is installed for the benefit of the community and it is reasonable to expect some contribution to its installation, as they will want to look after their investment. In the past maintenance has been organized in three ways:

## A. Community management

All inspections, repairs, renovations and replacements are carried out by members of the community or under the community's direction.

Support to the community can be provided by private enterprise (spares and services) or purchased from a government agency.

### Advantages

- ✓ Fast response to problems
- ✓ In control of own affairs
- ✓ Develop pride in own abilities and achievements

### Disadvantages

- ✗ Needs motivated people with appropriate level of skill
- ✗ May require engineering facilities
- ✗ Need to hold expensive stock of spares

## B. Centrally managed with community involvement (tiered system)

Simple routine inspections and minor repairs are done by people using the pump, but major repairs are done by a central team looking after many handpumps. This system involves regular inspections, overhauls, and replacements.

### Advantages

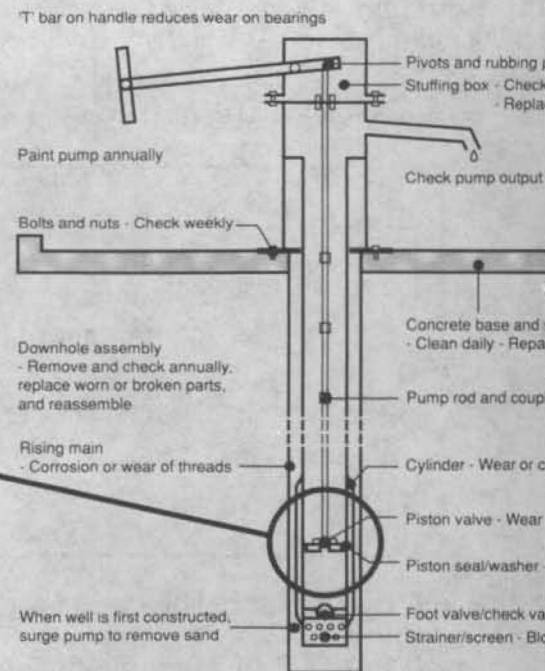
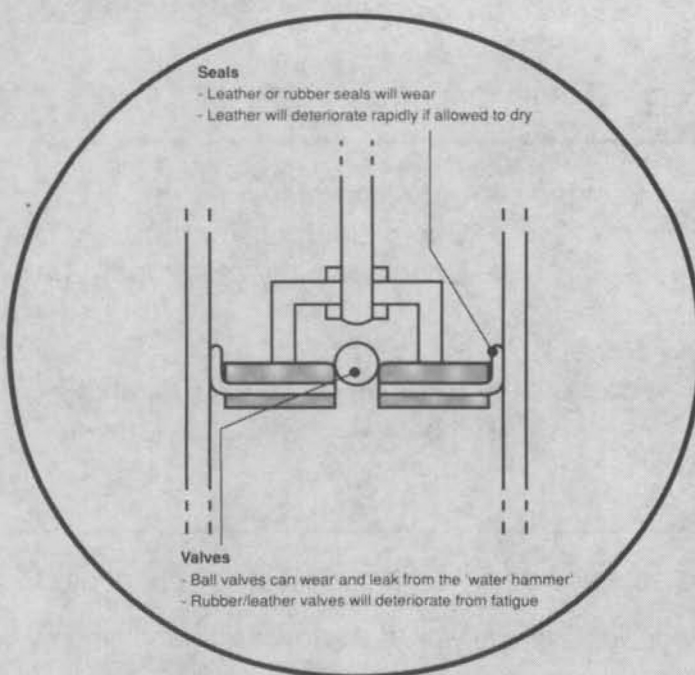
- ✓ Community retains reasonable responsibility
- ✓ Back up for major problems
- ✓ Pride in maintaining pump

### Disadvantages

- ✗ Community dependent in the long term
- ✗ Delays awaiting actions on major problems
- ✗ Skilled team needs to be available
- ✗ Expensive vehicles required

- While the centrally managed system (C) would seem the easiest to set up, it is the least effective in the long term.
- The compromise option (B) with both central and community involvement is perhaps the most common choice.
- Totally self-sufficient communities (A) are not widespread, but with the increasing availability of Village Level Committees, they are becoming more common.
- Increasingly private enterprise is being seen as the channel for the purchase of spares and expertise.

## Typical maintenance points



tion to its continued use by the community. This is especially so if the community has initiated the pump in one of three ways:

**community (em)**

nd repairs are carried out by the a centralized specialist group ps will visit periodically for major repairs.

able measure of control and

s beyond local resources is developed

part on another organization central group properly resourced to be effective d

**C. Centrally managed**

All work is carried out by a central agency.

**Advantages**

- ✓ Smaller stock of spares required per pump
- ✓ Concentration of skills and resources

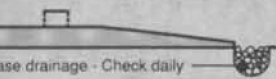
**Disadvantages**

- ✗ Slow response to remedy breakdowns
- ✗ High cost and possibly poor service
- ✗ Routine inspections may not be carried out
- ✗ No involvement or commitment by the community

but it has not always been sustainable.

Operation and Maintenance (VLOM) - designed pumps, this option is becoming more feasible.

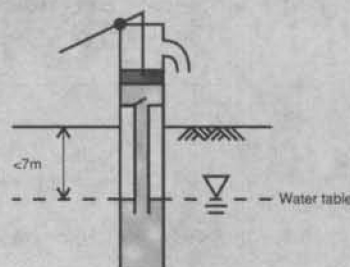
- parts - Lubricate weekly
- monthly
- annually
- monthly
- base drainage - Check daily
- surplus water drain when needed
- g - Tightness and wear
- rosion
- deterioration
- Wear or deterioration
- g - Wear or deterioration
- gases



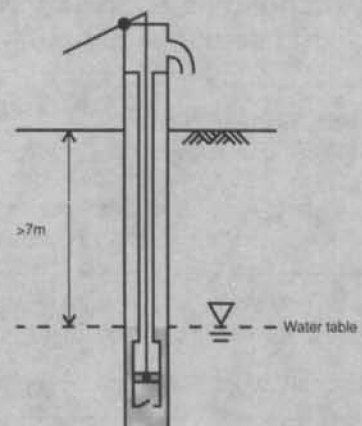
**The significance of maintenance**

When handpumps are to be installed a lot of time is spent considering the type of pump and the installation details, but ease of maintenance is of vital importance as it will influence the effectiveness and life of the pump.

**Ease of maintenance should influence choice as much as hydrogeology.**



Shallow water table - Suction pump  
Easy maintenance as all parts are above ground



Deep water table - Lift pump  
Complex maintenance as some operative parts are below ground

# Technical Brief No.33/Maintaining handpumps

## Community involvement

No matter what system of management is adopted, user involvement is vital for the long-term effectiveness of the handpump. The best way to achieve this is by the appointment of a *pump caretaker* who, after proper training and the supply of a tool kit, will carry out the following duties:

### The pump caretaker's duties:

- To carry out inspections daily, weekly, monthly
- To keep records of all checks and work
- To monitor pump output rate
- To keep pump and base clean and clear of refuse
- To train people how to use the pump properly
- To make simple repairs or replacements
- To request help for major problems
- To keep a supply of spare parts
- To ensure surplus water is drained away
- To give guidance in health care

### The pump caretaker should:

- Be female (if culturally or socially acceptable)
- Be aged 18-35
- Live close to the pump
- Be physically fit and active
- Be acceptable to the community
- Be a pump user
- Have own means of support as the pump caretaker's job is only part-time
- Be self-motivated

*In order to emphasize their responsibility, pump caretakers should receive payment.*

## Physical maintenance

There are so many types of handpump that it is not within the scope of this article to detail specific maintenance points, but it should be noted that whenever parts rub or rotate wear will take place. Lubrication will minimize the wear, but routine inspections will confirm the rate of deterioration and decide when a replacement is required.

All nuts and bolts should be kept tight, as excessive play encourages wear.

Each type of pump will require a different level of maintenance, and one reason for keeping records is to review procedures to check if they are appropriate.

**Every handpump should be available for work 100 per cent of the time, but this cannot be achieved by only responding to breakdowns. A strategy of Planned Preventative Maintenance will keep the non-working time to a minimum.**

### For further information:

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UNICEF, *India Mark-II handpump installation and maintenance manual*.

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