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## **Taking Care of Your Water Supply**

**A manual for community-based operation and  
maintenance of piped water systems**

**IRC International Water and Sanitation Centre  
The Hague, The Netherlands**

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## **PREFACE**

A main constraint in the long term sustainability of piped water supplies in developing countries is the lack of adequate provision for operation and maintenance. The involvement of users in the operation and maintenance of their own supply is becoming accepted as feasible and necessary to overcome this problem. The approach entails a partnership between community, government departments and external support agencies in which there is a clear understanding and agreement between the partners of their different roles and responsibilities.

The Netherlands Directorate-General for International Co-operation (DGIS) supported IRC in the development of approaches to community-based public standpost supplies in four developing countries: Malawi, Zambia, Indonesia and Sri Lanka. The Public Standpost Water Supplies demonstration project (1983-1986) encouraged community involvement in all stages of project development, including operation and maintenance. A follow-up project in Malawi and Zambia, Piped Supplies for Small Communities (1988-1992), developed and applied the approach further. This manual draws on the experience of the two projects.

The manual provides guidelines on the essential issues to consider for the effective involvement of users in operation and maintenance activities. It is intended as an aid to personnel at district and similar level, who are responsible for piped supplies for small communities. Each of the 4 chapters starts with a short introduction and a summary of the key message and its effects. At the end, a glossary of words and terms used is provided.

Michael Seager of IRC initiated the development of this publication. Contributions to this manual have been provided by Sue Laver, Lizette Burgers, Peter Heeres, Jo Smet and Jan Davis. The illustrations were made by Kors de Waard and Chung-Hsi Han. The draft was reviewed by Mary Boesveld, François Brikké and Han Heijnen. The lay out was done by Chung-Hsi Han while the desktopping of the final draft was done by Lauren Wolvers.

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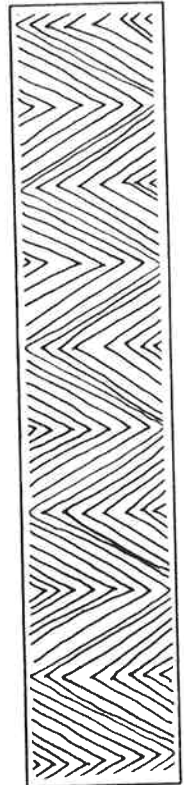
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# 1 INTRODUCTION

There is no point in constructing a new piped water supply if it cannot be properly operated and maintained. This may seem obvious, yet many piped water supplies have been constructed in the past with little or no attention to the needs of long term operation and maintenance. The result has been the breakdown of many piped supply systems. This should be avoided in future.

External support agencies can fund the construction of new supplies but they cannot provide long-term support to run them. Water agencies are often unable to provide the service required to keep supplies in good working order due to a lack of money and resources. A way to overcome these problems is to involve the community, as a partner to the water agency, to share the responsibility for operation and maintenance.

The IRC-supported Piped Supplies for Small Communities (PSSC) Project has built on the experience of earlier projects to develop a community-based approach to piped water supplies. The results indicate that active community involvement can be effective, and is necessary, if supplies are to continue working long after the end of construction. This manual considers the issues involved and provides guidelines for the involvement of users in the operation and maintenance of their own piped supplies. The manual is primarily meant for district water department staff involved in community-based water supply systems.



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## **COMMUNITY-BASED APPROACH**

- Early involvement of community in planning of new supplies.
- Sharing responsibility for quality and maintenance.

## **EFFECTS**

- Supplies continue to function a long time.
  - Improved water use.
  - More convenience and time-saving.
  - Health and financial benefits.
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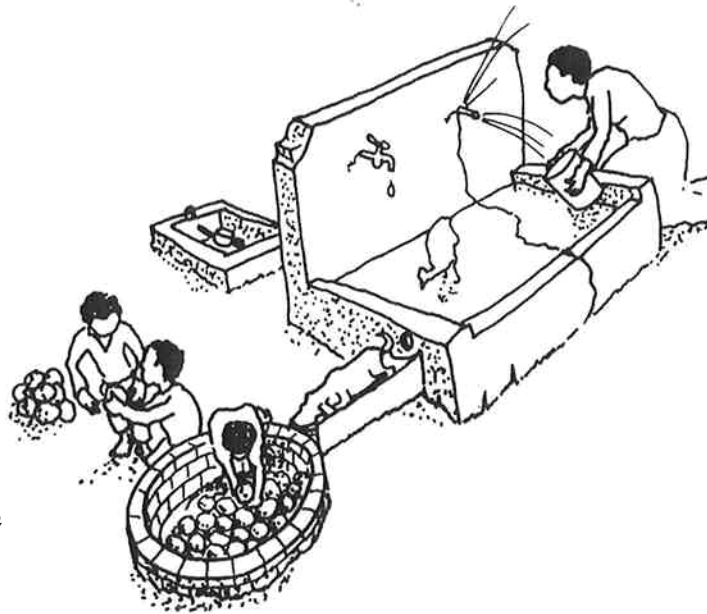
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## 1.1 An operation and maintenance problem

A community standpost which has not been properly looked after will be taken as an example to illustrate the problems which can arise from poor and inadequate operation and maintenance.

### **Technical problems:**

- The tap is broken and in need of repair.
- One tap has been stolen.
- The standpost is cracked and in danger of breaking up.
- The drainage channel is blocked.
- The soakaway needs repair and stones have been taken away.
- The meter box lock is broken and the cover has been moved.
- No effort has been made to keep the surroundings clean.



### **Managerial problems:**

- Nobody has taken responsibility for the standpost.
- There is a lack of motivation to look after the standpost.
- The users lack basic skills for maintenance and repairs.
- The children are undisciplined and play around the supply.
- Animals are allowed around the standpost.

### **Community problems:**

- No one looking after the supply.
- No cement for repair.
- No tools or spare parts for repair.
- No report that the meter box lock was broken.
- No key for the meter box.
- Parents allow their children to vandalise the supply.
- No arrangement for the users to contact the water agency.
- No monthly water contribution for the cost of repairs.
- Bad taste of water, so no collection from tap.
- Bad sited standpost so no looking after by villagers.



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***Who is to blame?***

The water agency probably does not have enough staff to look after all the standposts in their district and, anyway, they do not have adequate transport, fuel and spares to do the job properly. Perhaps the water agency staff assumed the community would look after the standpost. Even if the users did want to repair the standpost, they probably did not have the skills or receive the training required for such a job. Users and water agency staff often do not see the same problem in the same way.

***No one in particular is to blame, so:***

Community-based operation and maintenance aims for a closer collaboration between users and the water agency to overcome these misunderstandings and difficulties.



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## 1.2 The partnership concept

- **Sharing responsibility**

The concept of community-based operation and maintenance implies that the users of a supply take a far greater share of the responsibility for operation and maintenance than has been usual in the past. The limitation on how much responsibility users can take depends on the organizational, financial and technical capabilities of the communities.

- **Technology level suiting local skills**

The water supply technology and form of organization required must suit the existing locally available skills, or skills which could be acquired by community members. Therefore, community education and training in operation and maintenance tasks and responsibilities should be a part of the overall development of piped water supply projects.

- **Additional Training**

The need for additional technical and managerial skills training should be realistically assessed after exploring the range of operation and



maintenance problems which commonly occur in a piped water supply system. This process should be a collaboration between the community and the water agency. It should not be imposed on a community from outside.

- **Increasing responsibility for community**

At the beginning of a partnership a community may only be responsible for minor tasks but could develop skills and confidence to take on more responsibility in the future. The water agency will need to provide continuous support in several areas including: major repairs, training, and monitoring of the continuing functioning and use of systems. This continuing support, through water agency maintenance and extension staff, will be crucial to the success of the partnership.

- **Involving private sector**

Another potential partner is the private sector. There are several opportunities for private individuals and small businesses to be involved in activities that the water agency may have carried out in the past. These include: operating equipment; servicing and repairs; revenue collection; and as suppliers of equipment and spare parts to both the community and the water agency.

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## 1.3 The benefits

Why should users be involved in operation and maintenance activities? A look at the benefits to both the community and water agency will make this clear.

### **Community benefits:**

- **Reduced breakdowns**  
Users can reduce the number of interruptions of a supply by carrying out preventive maintenance.
- **Reduced breakdown time**  
Users can respond quickly to minor breakdowns when they do occur leading to a more reliable supply.
- **Time saving**  
Major problems can be reported quickly and the community can assist the water agency to speed up major repairs.
- **Reduced water charges**  
Community members will recognise the cost of water resulting from their involvement in maintenance work. They may therefore be more ready to save water, look after the system, and be prepared to pay for a reliable supply. In turn, a reliable supply is cheaper to run and so charges to the users should be less.  
Proper operation and maintenance by the community eases the task, and therefore reduces the operational costs, of the water agency. This, again, should reduce charges to the users.
- **Improved health**  
During breakdown of their safe water supply, users would collect water from their old water sources but a more reliable piped water supply will avoid the need to use these unhealthy sources.
- **Women's involvement**  
User participation may create the opportunity for women to be involved in decision making and management activities.
- **Less dependency**  
Communities will be less dependent on outside assistance for the repair of their supply and they will develop local skills and resources which can be used in other community development activities.
- **Better security**  
Responsibility for their own supply will help to develop a sense of community ownership which may reduce theft of equipment and vandalism of the supply facilities.

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### ***Water agency benefits:***

- ***Reduced pressure on agency staff***  
Less time required by water agency staff to attend to minor repairs allowing them to provide a better major repair service.
- ***Better revenue collection***  
A reliable water supply will encourage users to pay for their supply and therefore give the agency the funds to carry out their responsibilities.

The overall benefit to everyone is more reliable and sustainable piped water supplies.

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## **2 PIPED WATER SUPPLIES FOR SMALL COMMUNITIES**

To have an idea what the partnership concept is in practice, one must have some knowledge of the technical aspects of piped water supply. If one is aware of the functioning of each component and its inter-relation, one can easily analyze what kind of operation and maintenance is required daily, weekly or in case of damage or in case no water arrives at standpost.

In this chapter, the piped water supply scheme, its principal components and alternatives are described without going too much into detail.

Special attention is paid to elements the community is directly involved in i.e. service level and standposts. Several possibilities of service levels as well as for construction of standposts are described. Ways and timing to involve the community in these possibilities are discussed.



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### **UPGRADE KNOWLEDGE OF PIPED WATER SUPPLY**

- Inform community of water supply scheme and its components.
- Inform community where they can be involved.

### **EFFECTS**

- Functioning of water supply system is understood.
  - Construction becomes part of community.
  - Damage can be prevented or reported or repaired by community.
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## 2.1 Piped water supply scheme

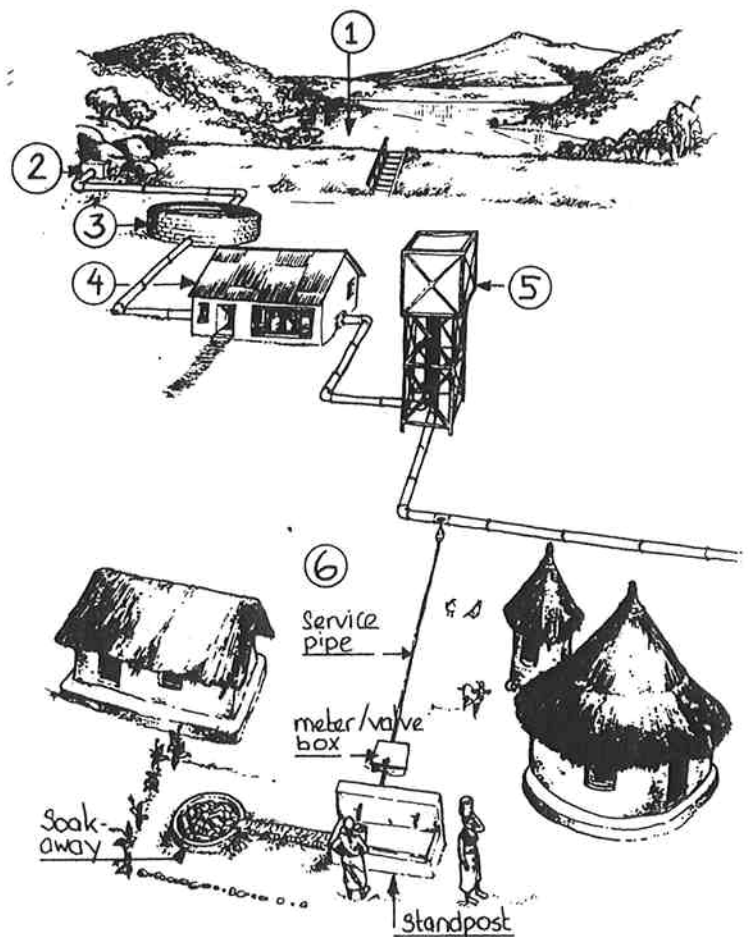
Before considering the components, a general pumped piped water supply scheme is described. In this scheme the interrelation between the components is illustrated. The water is transported through pumping from the intake to the treatment (if required) and then to the water storage tower. From there the water is distributed via the distribution system to the supply points.

One scheme might supply a village, numerous neighbourhoods or several villages, depending on their size and the distance between them.

The scheme shown is just an example. Treatment can be avoided when the water source is groundwater or a spring instead of surface water. The pumping station can be avoided when the level of the source is high above the village level so water flows by gravity force. In such a case, a break pressure tank will be required to reduce pressure in pipes (see scheme appendix A.1).

### Major components

1. Water source
2. Intake
3. Treatment (if required)
4. Pumping station
5. Water storage tower or tank
6. Distribution system with mains, service pipes and standposts



Note: pipe routes are shown but all pipes should be buried and covered.