

Linking technology choice with operation and maintenance in the context of community water supply and sanitation

**A REFERENCE DOCUMENT
FOR PLANNERS AND PROJECT STAFF**

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Contents

Preface	v
Acknowledgements	vi
1. Introduction	1
1.1 The importance of operation and maintenance for water-supply and sanitation technologies	1
1.2 Defining sustainability	2
1.3 Organization of the document – Fact Sheets	5
2. The technology selection process	6
2.1 Introduction	6
2.2 Factors that influence the selection of community water-supply technology	6
2.3 The selection process for community water-supply technology	8
2.4 Factors that influence the selection of community sanitation technology	10
2.5 The selection process for community sanitation technology	10
2.6 Assessing O&M needs	12
3. Water sources and intakes	20
3.1 Introduction	20
3.2 Rooftop rainwater harvesting	21
3.3 Catchment and storage dams	23
3.4 Springwater collection	26
3.5 Dug well	29
3.6 Drilled wells	32
3.7 Subsurface harvesting systems	34
3.8 Protected side intake	36
3.9 River-bottom intake	38
3.10 Floating intake	39
3.11 Sump intake	41
4. Water-lifting devices	43
4.1 Introduction	43
4.2 Rope and bucket	43
4.3 Bucket pump	45
4.4 Rope pump	47
4.5 Suction plunger handpump	49
4.6 Direct action handpump	51
4.7 Deep-well diaphragm pump	53
4.8 Deep-well piston handpump	55
4.9 Centrifugal pump	58
4.10 Submersible pump	60
4.11 Hydraulic ram pump	62
5. Power systems	64
5.1 Introduction	64
5.2 Windmills	64
5.3 Solar power system	66
5.4 Diesel generator	68

6. Water treatment	71
6.1 Introduction	71
6.2 Boiling	75
6.3 Household slow sand filter	77
6.4 Water chlorination at household level	79
6.5 Storage and sedimentation	81
6.6 Upflow roughing filter	82
6.7 Slow sand filtration	84
6.8 Chlorination in piped systems	
7. Storage and distribution	90
7.1 Introduction	90
7.2 Concrete-lined earthen reservoir	91
7.3 Reinforced concrete reservoir	93
7.4 Elevated steel reservoir	94
7.5 Ferrocement tank	96
7.6 Public standpost	98
7.7 Domestic connection	100
7.8 Domestic water meter	
8. Sanitation	103
8.1 Introduction	103
8.2 Improved traditional pit latrine	105
8.3 Ventilated improved pit latrine	108
8.4 Double-vault compost latrine	111
8.5 Bored-hole latrine	113
8.6 Pour-flush latrine	114
8.7 Septic tank and aqua privy	117
8.8 Vacuum tanker	119
8.9 Manual pit emptying technology (MAPET)	122
8.10 Soakaway	124
8.11 Drainage field	125
8.12 Small-bore sewerage system	126
9. Bibliography	129

Preface

The *Global Water Supply and Sanitation Assessment 2000*, a report prepared jointly by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), indicated that nearly 1.1 billion (1100 million) people have no access to improved water sources and that about 2.4 billion have no access to any form of improved sanitation facilities, with the vast majority of these people living in developing countries. To achieve the international development target of halving the percentage of people without access to improved water supply or sanitation by the year 2015, an additional 1.6 billion people will require access to water supply and about 2.2 billion will require access to sanitation facilities by 2015, given the projected population increases. The task is huge and involves a considerable increase in the level of investments made so far.

A major concern for expanding water-supply and sanitation services is to select technologies and institutional options that users would be willing to pay for, and that would also ensure good public health and sustainable environmental conditions. As suggested by its title, the present document aims to help decision-makers identify the most appropriate technology for their situation, taking into account the conditions in the project area. The document focuses on developing countries, and provides essential information on the types of water-supply and sanitation technologies available, including descriptions of the operation and maintenance requirements of the technologies, the actors involved and the skills they must have or must acquire. It also addresses potential problems, including those that have been identified in prior water-supply and sanitation projects.

It is hoped that this contribution to sector development will be useful to bilateral, multilateral and governmental agencies that are involved in choosing the water-supply and sanitation technologies to be used in specific situations. The current document is a revision of a previous version that was based on the results of several years of field-testing different technologies and was prepared by the Operation and Maintenance Working Group of the Water Supply and Sanitation Collaborative Council (c/o WHO).

José Hueb

World Health Organization

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1. Introduction

1.1 The importance of operation and maintenance for water-supply and sanitation technologies

In many developing countries, operation and maintenance (O&M) of small, community water-supply and sanitation systems has been neglected. Sanitation, in particular, is given much less attention in practice, even though “water-supply and sanitation improvements” are often mentioned together in project documents. This has led to some alarming statistics, with an estimated 30%–60% of existing rural water-supply systems inoperative at any given time, and more than 2 billion people worldwide lacking access to any type of improved sanitation. The lack of such services is degrading for the affected people and has a serious impact on their health and well-being.

Increasingly, however, governments, external support agencies and local communities are recognizing the importance of integrating O&M components in all development phases of water-supply and sanitation projects, including the planning, implementation, management, and monitoring phases. National government plays a vital role in creating an “enabling environment” within which an O&M policy framework can be developed, one of the key elements of sustainability. Government can foster such an environment in a number of ways, including through legal provisions, regulations, education initiatives and training programmes, and by communicating information. If supportive O&M policy is not forthcoming from the central government, then support for O&M at the local level will be hindered. An important role of local government is to promote an awareness of national policies and to support community water-user committees. Both the project staff and the recipient communities should be made aware of the O&M implications, as the communities themselves have responsibilities in the management and O&M of their water-supply and sanitation systems. However, many local government departments have insufficient resources and are unable to provide effective support. Support by the local government may also be influenced by local politics.

The roles and responsibilities of the actors involved in O&M need to be well defined, especially where governments are shifting from their traditional role as a services provider to that of a facilitator of service provision. There has been a tendency to decentralize O&M activities and to encourage the private sector to get involved in both the construction and upkeep of water-supply and sanitation facilities. Although this trend could increase the flexibility of O&M activities and reduce costs, private sector involvement may be limited by the low profit margins, particularly in areas where rural communities are scattered. Private-sector accountability is also a concern when there are no controls or regulations. Communities that contract services from the private sector need to ensure that the job is well done at a fair price. To some extent, the communities themselves can monitor the quality of the work, even though they may initially require assistance from the central government (e.g. from the national water agency). Nevertheless, informal community-based monitoring is no substitute for developing government guidelines to ensure there are minimum-quality standards for the work, and that interventions are cost-effective. It is also important that the guidelines be conveyed to the communities, since they have increasing responsibilities, not only in the O&M of their

water-supply systems, but also in their financial management. Regulation, control and monitoring require extensive efforts and commitment by governments, and considerable human and financial resources.

Sector professionals use a number of terms to describe affordable, simple technologies that can be adapted to local conditions and be maintained by the communities themselves. Such terms include: appropriate technology, progressive technology, alternative technology, village-level operation and maintenance management (VLOM) technology, intermediate technology, village technology, low-cost technology, self-help technology, technology with a human face. In this document, we propose to use the term “sustainable technology at community level”, since this encompasses precisely the aims of this publication. Water-supply and sanitation projects should not be viewed as an end in themselves, but as the initiators of benefits that continue long after the projects have been handed over to the community. However, to ensure that long-term benefits do, in fact, accrue, the projects must be sustainable, which means appropriate technologies must be selected, and O&M should be integrated into project development from the beginning. Although, community-based projects may take longer to develop than short-term, agency-managed projects, the longer development time can be used to identify factors that would influence service sustainability. Often, critical aspects of O&M development have been neglected in short-term, agency-managed projects. Effective O&M brings about important health benefits by sustaining accessible water supplies in adequate quantity and quality; by reducing the time and effort spent on water collection; by allowing better sanitation facilities to be provided; and by providing income-generating activities.

This document focuses exclusively on community water supply and sanitation in developing countries (i.e. services that can be managed by communities in rural or low-income urban areas). It is designed to help planners and project staff select water-supply and sanitation technologies that can be maintained over the long term in rural and low-income urban areas. As has been repeatedly demonstrated worldwide, the selection of a particular technology can have far-reaching consequences for the sustainability of the services. For many years, technical criteria and initial investments were emphasized when choosing such technologies. Although these aspects are important, the roles of financial, institutional, social and environmental factors are also germane for ensuring the sustainability of services. In this manual, it is proposed that an O&M component be added to the selection process. With new actors, such as formal or informal private entrepreneurs, becoming increasingly involved, O&M is no longer simply a technical issue. It is now seen as encompassing social, gender, economic, cultural, institutional, political, managerial and environmental aspects, and is viewed as a key factor for sustainability.

1.2 Defining sustainability

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