

THE CONSERVATION OF DRINKING-WATER SUPPLIES: TECHNIQUES FOR LOW-INCOME SETTLEMENTS

United Nations Centre for Human Settlements (Habitat)

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FOREWORD

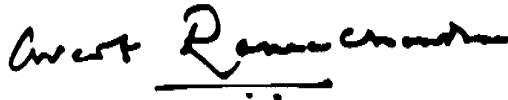
Globally, much progress has been made in increasing both access to and levels of water-supply service since the launching of the International Drinking Water Supply and Sanitation Decade (1981-1990). Much of this increased and improved service coverage has, however, only notably affected statistics in rural areas, and despite efforts in urban areas, service coverage has only managed to keep pace with increases in population in these centres. One of the reasons for this often is that the water available in urban areas is inequitably distributed, with middle- income and upper-income areas consuming much more water than is needed either for health reasons or for user convenience. Leakage losses from distribution systems are often very high. If high consumption can be reduced by the use of water-saving devices and if leakages can be reduced through leak-detection programmes, an increased proportion of existing water supplies can be made available to new areas, especially low-income settlements which house the unserved majority of populations in developing countries.

Interventions designed to redress the water-supply deficit during the Decade have focused on the commissioning of new facilities, and little, if any, effort has been made to identify and promote ways in which existing facilities might be used to provide improved service. The research efforts of the United Nations Centre for Human Settlements (Habitat) indicate that water conservation, through a number of measures, can contribute both to expanding and upgrading existing water-supply services. This document describes methods that are available for water conservation, with emphasis on simple and reliable techniques that are readily applicable in developing countries.

The report is the first of its kind addressing some of the issues of operation and maintenance of infrastructural facilities, and, as such, it is designed to draw attention to the long-neglected area of water conservation and to increase awareness of the role of conservation amongst decision-makers, engineers and planners. UNCHS (Habitat) expects to continue to provide detailed information on operating and maintenance issues in subsequent research publications and

additional reports produced under the joint World Bank/UNCHS (Habitat)/UNDP project (INT/86/006) - Support Programme For Urban Management - initiated in June 1987.

I hope the principles of water conservation defined herein will lead governments to pay attention to conserving water resources, as a fundamental strategy for improving urban supplies. I gratefully acknowledge the contribution of Professor Duncan Mara, University of Leeds (United Kingdom), to the preparation of this publication.

A handwritten signature in black ink, reading "Arcot Ramachandran". The signature is written in a cursive style. Below the signature, there is a horizontal line with two small dots centered underneath it.

Dr. Arcot Ramachandran
Under-Secretary-General
Executive Director

INTRODUCTION

A. Background

The cost of providing water supplies to urban centres has steadily increased over the years and will continue to increase, as nearby sources are exploited and it becomes essential to transport water from far afield or extract it from great depths. Despite concerted efforts to increase urban supplies over the past decade, most developing countries have only managed, at best, to keep pace with population increase. The majority of governmental responses to the problem of increasing urban water- supply coverage over this period has concentrated on the construction of new facilities.

The proportion of national budgets allocated to drinking- water supply amounts to between 1 and 6 per cent and has remained stable over the past decade, but, in the face of poor revenue generation and continually deteriorating facilities, increasing proportions of these funds are used to maintain and operate existing facilities. Consequently, funds for capital investments in the sector have primarily come from external sources which, in many countries, exceed 80 per cent of the total investment in new facilities. With their burden of debt, most governments are finding it increasingly difficult to justify and sustain current levels of borrowing, and radical shifts in policy are required to improve the efficiency and performance of the water sector.

Amongst the range of options available for maximizing returns from investment in water-supply facilities, one option, which has received little attention but, nonetheless, has great potential for improving and extending existing services, is the application of water-conservation techniques. Water supplies conserved through rational use and appropriate leak detection and repair programmes can increase substantially the quantity of water available for distribution and consumption. Although no quantitative assessment has been made of the benefits of water conservation, they are likely to be very significant indeed, as they can, in some cases, save as much as half the total quantity of water currently distributed.

Decision-makers and professionals concerned with supplying water to urban centres are often unaware of the role water conservation can play in extending and improving the use of existing facilities and optimizing future investments in water- supply and complementary sanitation facilities. Information regarding water-saving techniques has not been readily available, and, until recently, little effort was directed to initiating projects and programmes designed to promote conservation. However, there is a wide range of measures which can be implemented to conserve water supplies, and an overview of these measures is presented in this report.

B. The relevance of water conservation to low-income settlements

In December 1986, the World Health Organization¹ estimated that, despite the considerable progress achieved during the first five years of the International Drinking Water Supply and Sanitation Decade (1981-1990), some 1.2 billion people were still without adequate water supplies and sanitation, and a further 500 million without adequate sanitation. Programmes for the conservation of drinking-water supplies might, at first, appear to be of little relevance to communities with inadequate or scarcely adequate water supplies. They are, however, very relevant, since conserved water can be used to improve the overall supply situation. This can be done, for example, by:

- (a) Reducing the amount of water lost through leakage in the distribution system, which may often be as high as 50 per cent of the water put into it;
- (b) Reducing the often excessively high level of water consumption in middle-income and upper-income communities, which can be readily achieved without sacrificing the high levels of user convenience favoured by these communities.

The achievement of these reductions has several benefits to the national economy, viz.:

- (a) Existing water supplies can be used to serve more people than before, especially those in low-income settlements, or to provide additional hours of service each day;
- (b) The requirement for large capital investments to exploit new and expensive water-supply sources can be deferred until some future date, thereby delaying the need to increase water tariffs;
- (c) On-site wastewater-disposal systems become feasible in a large number of middle-income and upper-income communities, thus obviating the need for expensive conventional sewerage systems.

The conservation of existing drinking-water supplies is, thus, not only relevant to the needs of low-income settlements, whose water supplies can thereby be improved, but also relevant to needs of middle-income and upper-income communities, since they will not have to pay for unnecessary capital works to expand the water-supply system and might also be able to avoid expensive sewerage charges.

C. Purpose and scope of the report

This report is intended to increase awareness of the role water conservation can play in eking out existing water resources to meet the needs of unserved communities and improve current levels of urban service. However, fundamental adjustments to investment policies and programmes are essential if the benefits of water conservation are to be realized and the underlying concepts integrally addressed in all water-development efforts. Therefore, the report addresses senior decision-makers, engineers and planners engaged in the planning and provision of water supplies in