World Health Organization

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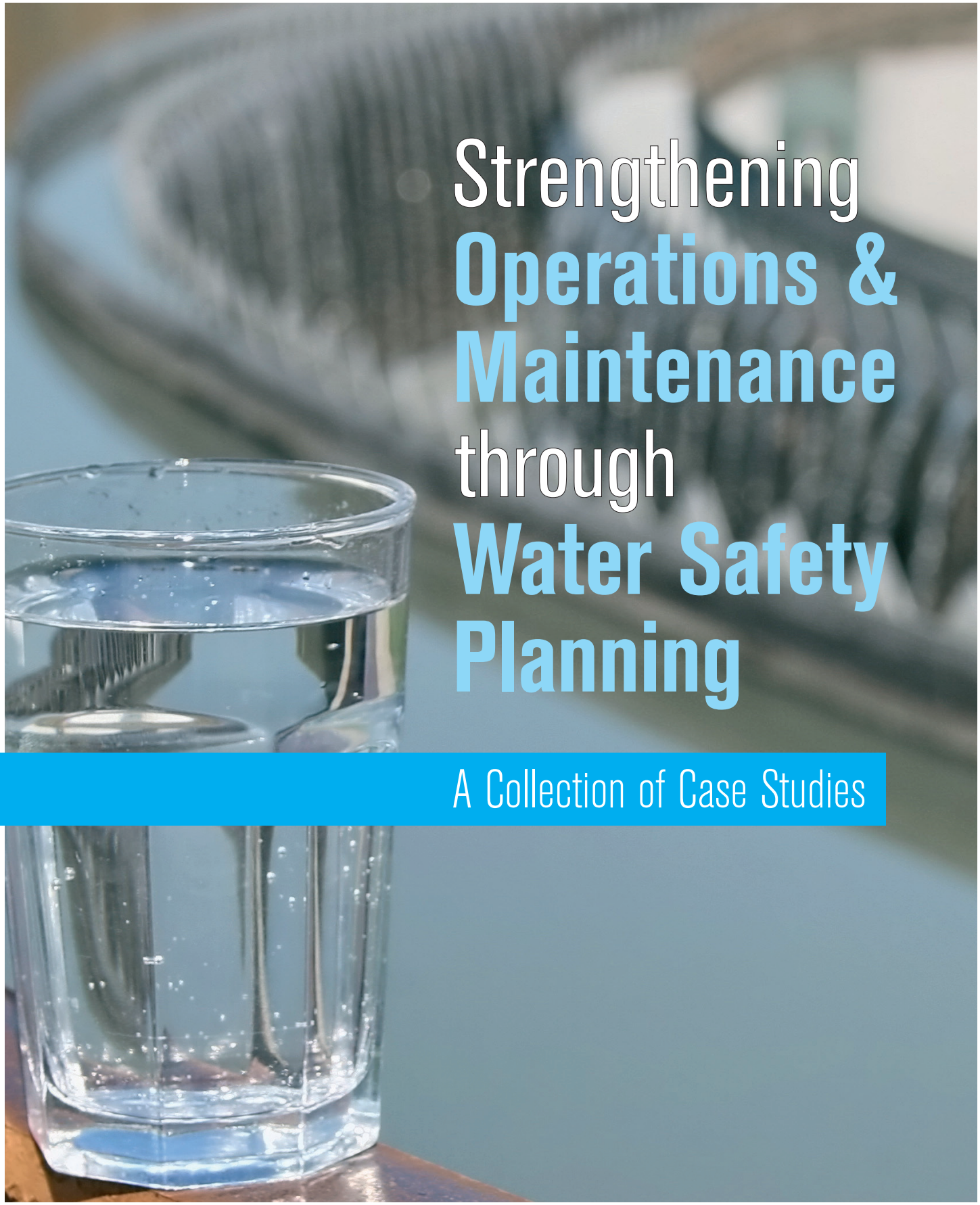

Strengthening Operations & Maintenance through Water Safety Planning

A Collection of Case Studies

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The International Water Association (IWA) is a global knowledge hub for water professionals and anyone concerned about the future of water. It has a seventy-year heritage connecting water professionals worldwide to find solutions to the world's water challenges as part of a broader sustainability agenda. As a non-profit organisation with members in more than 130 countries, the IWA connects scientists to practitioners and communities so that pioneering research delivers sustainable solutions. It further fosters technological innovation and drives best practice through international frameworks and standards.

The International Water Association (IWA) is a nongovernmental organisation (NGO) in Official Relations with WHO. WHO's network of NGOs in Official Relations contributes to promote the policies, strategies and programmes derived from the decisions of the Organisation's governing bodies. IWA's role as an NGO in Official Relations with WHO focuses on supporting countries to implement intersectoral policies and interventions for protecting health from immediate and longer term environmental threats. A long history of cooperation exits, built on previous joint activities between WHO and IWA's predecessors, the International Water Supply Association and the International Water Quality Association. A key area of cooperation is drinking-water safety.

IWA's *Bonn Charter for Safe Drinking Water* promotes the application of water safety plans (WSPs) as expressed in the WHO *Guidelines for Drinking-water Quality*. (Revisions to the WHO Guidelines will be taken as revisions to the Bonn Charter in as much as the Bonn Charter refers to the Guidelines.) IWA promotes WSPs with WHO through collaboration agreements, and through its membership of water utilities, research institutes, industry, and individual professionals. IWA is a registered charity in England (Company registered in England No. 3597005 Registered Charity (England) No. 1076690).

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Introduction

Strong operations and maintenance (O&M) programmes underpin the effectiveness and sustainability of any drinking-water supply system. Failure to adequately address O&M can bring serious consequences, including operational and/or infrastructural failures, contamination events and economic losses. Despite the critical role of O&M in the provision of safe and adequate drinking-water supplies, basic O&M functions are often under-resourced – marked by undertrained staff and/or inadequate funding. In a recent global survey, half of the 75 responding countries indicated that tariffs were insufficient[1] to recover O&M costs (UN-Water & WHO, 2017).

Increased attention to and investment in O&M are needed to ensure that water safety and service delivery targets are consistently met and that public health is protected. With the ambition to achieve universal and equitable access to safe drinking-water by 2030, as articulated in the Sustainable Development Goals, the role of effective O&M is critical to sustain improvements made in the Millennium Development Goal era and ensure progress in the longer term.

[1] Defined as less than 80% of O&M costs

Water safety plans (WSPs) contribute to improved O&M by supporting the systematic assessment, prioritization and management of risks from catchment to consumer, including those related to inadequate O&M. Introduced in 2004 in the third edition of the *Guidelines for drinking-water quality* (WHO, 2004) and the *Bonn charter for safe drinking water* (IWA, 2004), the WSP approach is considered the most effective means of consistently ensuring the safety of a drinking-water supply. WSPs have been implemented in at least 93 countries, with 69 countries reporting to have policies or regulations in place or under development that promote or require WSPs (WHO & IWA, 2017).

The *Water safety plan manual* (WHO & IWA, 2009) describes the core elements of a WSP, many of which highlight the critical role of effective O&M. (See text box for an overview of the linkage between WSPs and O&M.) WSPs are therefore a valuable tool to strengthen O&M programmes. Indeed, WSP implementation has resulted in a wide range of O&M improvements across systems of various types, sizes and resource levels globally.

This document presents seven case studies[2] from six countries around the world that highlight O&M benefits resulting from WSP implementation. Figure 1 summarizes the wide range of benefits realised, which include catchments, treatment plants and distribution systems. These case studies contribute to a growing body of information on the outcomes of water safety planning and may be useful in building support for WSPs among water sector senior managers, operational staff and other stakeholders. In addition, the experiences offer insights into the particular WSP focus areas that are most likely to yield O&M benefits.

Defining O&M

Operations refers to the day-to-day "running" of a water supply system under normal or emergency conditions.

Maintenance involves (a) scheduled or planned activities under normal operating conditions to maintain operational systems, equipment and assets essential to supplying safe water to consumers (including the catchment, raw water storage, abstraction, treatment, distribution and customer interface); and (b) unscheduled activities during unforeseen or emergency situations to bring the water supply system back to normal operating conditions. Most maintenance activities require engagement of operational personnel.

The relationship between WSPs and O&M

O&M are central to successful implementation of WSPs. Identifying O&M-related hazards, determining and validating associated control measures, monitoring those control measures, preparing standard operating procedures (SOPs) for O&M activities and ensuring sufficient training for O&M staff are essential components of a WSP. The full benefits of a WSP cannot be realised without these key O&M processes.

WSPs drive O&M improvements. The risk assessment process that underpins WSPs is a mechanism to identify any gaps in a water supply system's O&M practices and the control measures required to manage risk to water quality and service delivery. This gap analysis becomes the platform to drive O&M process improvements.