Water Quality Reader

United Nations Office to Support the International Decade for Action 'Water for Life' 2005-2015 / UN-Water Decade Programme on Advocacy and Communication (UNW-DPAC)

Produced by the UN-Water Decade Programme on Advocacy and Communication (UNW-DPAC), this reader is intended for all those interested in getting familiar with water quality issues. The reader provides basic references for easy reading and some of the latest and most relevant UN publications on water quality. It also contains references for specific audiences such as water suppliers, educators, farmers or policy-makers.

World Water Day
2010
Clean Water for a Healthy World

United Nations
Department of Economic and Social Affairs
(UNDESA)

WATER FOR LIFE
2005-2015

United Nations Office to Support the International Decade for Action "WATER FOR LIFE" 2005-2015

UN WATER
UN-Water Decade Programme on Advocacy and Communication

Water Quality: An Overview

Sick Water. The central role of wastewater management in sustainable development. A rapid response assessment

United Nations Environment Programme (UNEP), UN-Habitat. 2010

www.grida.no/_res/site/file/publications/sickwater/SickWater_screen.pdf

This report identifies the main threats to human and ecological health and the consequences of poor wastewater management and degrading sewage systems. It also presents opportunities, where appropriate policy and management responses over the short and longer term can trigger employment, support livelihoods, boost public and ecosystem health and contribute to more intelligent water management.

Clearing the Waters: A focus on Water Quality Solutions

United Nations Environment Programme (UNEP). 2010

www.unep.org/PDF/Clearing_the_Waters.pdf

This publication addresses the urgency of controlling pollution and preserving water quality around the world. Water quality impacts human health, water quantity, livelihood, economic activity, and climate change. Emerging contaminants, population growth and urbanization present additional stresses to water quality. This publication quantifies these water-quality related issues and uses case studies to illustrate both problems and solutions.

Water Quality for Ecosystems and Human Health. 2nd edition.

United Nations Environment Programme (UNEP), European Regional Centre for Ecohydrology (ERC), United Nations Educational, Scientific and Cultural Organization (UNESCO). 2008

www.gemswater.org/publications/pdfs/water_quality_human_health.pdf

Drawing on examples from around the world, this publication presents assessments of current water quality status and trends. It also provides an introduction to a diverse range of global water quality issues, including approaches to their identification, analysis and resolution.

UNICEF Handbook on Water Quality.

United Nations Children's Fund (UNICEF). 2008

www.unicef.org/wash/files/WQ_Handbook_final_signed_16_April_2008.pdf

This handbook provides an introduction to all aspects of water quality, with a particular focus on the areas most relevant to professionals working in developing countries. It covers the effects of poor water quality, quality monitoring, the protection of water supplies, methods for improving water quality, and building awareness and capacity related to water quality. Finally, the handbook provides an extensive set of links to key water quality references and resources.

Water Quality Outlook.

United Nations Environment Programme (UNEP), GEMS/Water, World Water Assessment Programme (WWAP). 2007

www.gemswater.org/common/pdfs/water_quality_outlook.pdf

This report presents a snapshot of global water quality issues as they relate to achieving the internationally agreed goals on water, sanitation and biodiversity. Evidence suggests that there have been improvements in the quality of water in some parts of the world. However, there are serious problems that must be addressed for health and prosperity to be reached universally.

Emerging issues in Water and Infectious Disease.

World Health Organization (WHO). 2003

www.who.int/water_sanitation_health/emerging/emergingissues/en/index.html

This publications aims at broadening awareness of emerging issues in water and infectious disease and at guiding readers to sources of information that deal with these issues in greater depth.

Water Quality Standards and Guidelines

- **WHO Guidelines for drinking-water quality.**

  World Health Organization (WHO).

  www.who.int/water_sanitation_health/dwq/guidelines/en/

  The World Health Organization produces international norms on water quality and human health in the form of guidelines that are used as the basis for regulation and standard setting, in developing and developed countries worldwide.

- **Water quality - Guidelines, standards and health: Assessment of risk and risk management for water-related infectious disease.**

  World Health Organization (WHO). 2001

  www.who.int/water_sanitation_health/dwq/whoiwa/en/

  To date, the various WHO guidelines relating to water have been developed in isolation from one another. The potential to increase consistency in approaches to assessment and management of water related microbial hazards was discussed by an international group of experts between 1999 and 2001. These discussions led to the development of a harmonised framework, which was intended to inform the process of development of guidelines and standards. Subsequently, a series of reviews was progressively developed and refined, which addressed the principal issues of concern linking water and health to the establishment and implementation of effective, affordable and efficient guidelines and standards. This book is based on these reviews, together with the discussions of the harmonised framework and the issues surrounding it.

Assessing and Monitoring Water Quality

- **Water quality assessments. A guide to the use of biota, sediments and water in environmental monitoring. 2nd edition.**

  World Health Organization (WHO). 1996

  www.who.int/water_sanitation_health/resourcesquality/wqa/en/

  This guide gives comprehensive and practical advice on designing and setting up monitoring programmes to obtain valid data for water quality assessment in all types of freshwater bodies. It provides key information for all agencies and individuals responsible for water quality and it is an aid for anyone involved in setting up a water quality assessment programme. The publication also addresses the key recommendations of Agenda 21.

- **Water quality monitoring: A practical guide to the design and implementation of freshwater quality studies and monitoring programmes.**

  World Health Organization (WHO), United Nations Environment Programme (UNEP). 1996

  www.who.int/water_sanitation_health/resourcesquality/wqmonitor/en/

  This book covers the entire monitoring process providing detailed guidance for implementing a monitoring network with step-by-step descriptions of field and laboratory methods. It brings together information on proven methods and will

be useful for anyone concerned with water quality monitoring with a scientific, managerial or engineering background, including field staff. An overview of the principles underlying hydrological, chemical, biological and sediment measurements together with their importance and relevance to water quality monitoring is also included.

- **Monitoring bathing waters: A practical guide to the design and implementation of assessments and monitoring programmes.**

  World Health Organization (WHO). 2000

  www.who.int/water_sanitation_health/bathing/bathing3/en/

  This book provides comprehensive guidance for the design, planning and implementation of assessments and monitoring programmes for water bodies used for recreation. It addresses the wide range of hazards that may be encountered and emphasizes the importance of linking monitoring programmes to effective and feasible management actions to protect human health. It also provides details of sampling and analytical methods.

- **Groundwater Contamination Inventory. A Methodological Guide.**

  United Nations Educational, Scientific and Cultural Organization (UNESCO). 2002

  unesdoc.unesco.org/images/0013/001325/132503e.pdf

  The broad objective of this document is to present a methodology for the inventory of groundwater contamination and to provide a guideline for planning, conducting, evaluating, and presenting the inventory. The guideline is aimed at professionals – as a manual or reference material for hydrogeologists or other specialists responsible for organizing and conducting groundwater contamination inventories, particularly in developing countries.

Information materials for specific audiences

Water Suppliers

- **Water Safety Plan Manual: Step-by-step risk management for drinking-water suppliers.**

  World Health Organization (WHO). 2009

  www.who.int/water_sanitation_health/publication_9789241562638/en/

  In 2004, the WHO Guidelines for Drinking Water Quality recommended that water suppliers develop and implement “Water Safety Plans” (WSPs) in order to systematically assess and manage risks. Since this time, governments and regulators, water suppliers and practitioners have increasingly embraced this approach, but they have also requested further guidance. This workbook answers this call by describing how to develop and implement a WSP in clear and practical terms. Stepwise advice is provided through 11 learning modules, each representing a key step in the WSP development and implementation process.

- **Protecting Groundwater for Health. Managing the quality of drinking-water sources.**

  World Health Organization (WHO). 2006

  www.who.int/water_sanitation_health/publications/protecting_groundwater/en/

  This publication provides a structured approach to analysing hazards to groundwater quality, assessing the risk they may cause for a specific supply, setting priorities in addressing these, and developing management strategies for their control. For health professionals, it thus is a tool for access to environmental information needed for such a process, and for professionals from other sectors it gives a point of entry for understanding health aspects of groundwater management.

- **Heterotrophic plate counts and drinking water safety. The significance of HPCs for water quality and the human health.**

  World Health Organization (WHO). 2003

  www.who.int/water_sanitation_health/dwq/hpc/en/index.html

  This book provides a critical assessment of the role of HPC measurement in drinking water quality management. The HPC test (or Standard Plate Count), applied in many variants, is widely used to measure the heterotrophic microorganism population in drinking-water and other media. Heterotrophs are organisms, including bacteria, yeasts and moulds that require an external source of organic carbon for growth. This book provides valuable information on the utility and the limitations of HPC data in the management and operation of piped water systems as well as other means of providing drinking water to the public. It is of particular value to piped public water suppliers and bottled water suppliers, manufacturers and users of water treatment and transmission equipment and in-line treatment devices, water engineers, sanitary and clinical microbiologists, and national and local public health officials and regulators of drinking water quality.

- **Toxic cyanobacteria in water: A guide to their public health consequences, monitoring and management.**

  World Health Organization (WHO). 1999

  www.who.int/water_sanitation_health/resourcesquality/toxicyanbact/en/index.html

  This book examines the need to protect drinking water, recreational waters and other water supplies from contamination by toxic cyanobacteria and to control their impact on health. It discusses the nature, diversity and global occurrence of toxic cyanobacteria, their consequences for public health, and methods for the assessment, management, investigation and treatment of contaminated water supplies. Programmes for monitoring the causes and occurrence of cyanobacteria in water and techniques for the analysis of water samples are also described.

Educators

- **Introduction to Sandwatch. An Educational Tool for Sustainable Development.** Chapter 8 “Water quality”.

  United Nations Educational, Scientific and Cultural Organization (UNESCO). 2005

  unesdoc.unesco.org/images/0014/001427/142786e.pdf

  Sandwatch seeks to change the lifestyle and habits of youth and adults on a community-wide basis, and to develop awareness of the fragile nature of the marine and coastal environment –in particular, the beach environment– and the need to use it wisely. Sandwatch provides the framework for school students, with the help of their teachers and local communities, to work together to critically evaluate the problems and conflicts facing their beach environments and to develop sustainable approaches to address these issues. Chapter 8 focus on water quality issues and propose an activity to learn measuring and monitoring water quality.

Farmers

- **Control of water pollution from agriculture. FAO irrigation and drainage paper 55**

  Food and Agriculture Organization (FAO). 1996

  www.fao.org/docrep/w2598e/w2598e00.HTM

  The objective of this document is to delineate the nature and consequences of agricultural impacts on water quality, and to provide a framework for practical measures to be undertaken by relevant professionals and decision-makers to control water pollution.

Policy-makers

Safer Water, Better Health- Costs, benefits and sustainability of interventions to protect and promote health.

World Health Organization (WHO). 2008

www.who.int/quantifying_ehimpacts/publications/saferwater/en/index.html

This document summarizes the evidence and information related to water and health in a broad sense- encompassing drinking-water supply, sanitation, hygiene, and the development and management of water resources. The report collects the ingredients that support policy decisions, namely the disease burden at stake, the effectiveness of interventions, their costs and impacts, and implications for financing. It presents an overview of current knowledge on the health impacts by country and by disease, and of what has worked to reduce that burden.

Water pollution control: A guide to the use of water quality management principles.

United Nations Environment Programme (UNEP), World Health Organization (WHO), Water Supply and Sanitation Collaborative Council (WSCC). 1997

www.who.int/water_sanitation_health/resourcesquality/watpolcontrol.pdf

This handbook addresses specific aspects of water resources management and water pollution control. A series of case studies from various regions is also included, highlighting successful models of wastewater management and pollution control from different parts of the world. This is a handbook for policy makers and environmental managers in water authorities and engineering companies engaged in water quality programmes, especially in developing countries. It is also suitable for use as a textbook or as training material for water quality management course.

Water Quality issues around the world

Asia

Implications of groundwater rehabilitation on water resources protection and conservation: artificial recharge and water quality improvement in the ESCWA region.

United Nations Economic and Social Commission for Western Asia (UNESCWA). 2001

www.escwa.un.org/information/publications/edit/upload/enr-01-12-e.pdf

The main objective of this study is to review the status of groundwater pollution and present the techniques for groundwater rehabilitation being applied in different parts of the world, including the Arab world and the ESCWA region. The study highlights existing groundwater quantity and quality with regard to its use by different consuming sectors, pollution sources and pollutants, groundwater remediation techniques and protection measures.

Africa

Evaluation of Urban Pollution of Surficial and Groundwater Aquifers in Africa.

United Nations Environment Programme (UNEP), United Nations Educational, Scientific and Cultural Organization (UNESCO). 2002

www.unep.org/DEWA/water/groundwater/africa/English/reports/Urban%20&%20Surficial%20GW%20Final%20Report.pdf

The Urban Pollution of Surficial and Groundwater Aquifers in Africa is a joint UNEP and UNESCO project that addresses the issue of aquifer vulnerability and the need to protect the quality of the continent's groundwater resources. This report presents the findings of this project evaluation.

Europe

Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes.

United Nations Economic Commission for Europe (UNECE). 1999

www.unece.org/env/water/text/text_protocol.htm

The main aim of the Protocol is to protect human health and well being by better water management, including the protection of water ecosystems, and by preventing, controlling and reducing water-related diseases. The Protocol is the first international agreement of its kind adopted specifically to attain an adequate supply of safe drinking water and adequate sanitation for everyone, and effectively protect water used as a source of drinking water.

Recommendations to ECE Governments on water quality criteria and objectives.

United Nations Economic Commission for Europe (UNECE). 1993

www.unece.org/env/water/documents/Reco_Water-Quality%20Criteria&Obj..pdf

This document provides further guidance in the elaboration of water-quality criteria and the formulation and setting-up of water-quality objectives for inland surface waters with a view to strengthening international cooperation.

International Decade for Action 'Water for Life' 2005-2015

A Decade for Water, a Decade for Life

Towards the primary goal of the Water for Life Decade, Spain has agreed to provide resources to the United Nations to establish an Office to support the International Decade for Action. Located in Zaragoza, Spain, and led by the United Nations Department of Economic and Social Affairs (UNDESA), the Office implements the UN-Water Programme on Advocacy and Communication (UNW-DPAC) aiming at sustaining the global attention and political momentum in favour of the water and sanitation agenda at all levels during the Decade.

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'Water for Life' 2005-2015

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