Various WHO Guidelines on Water Quality

Guidelines for Drinking-water Quality

Water Safety Plan Manual

Sanitation Safety Plan Manual

UNDER DEVELOPMENT 2012/13

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Background

- Wastewater use is extensive worldwide, and increasing
- 10% of the world’s population is thought to consume wastewater irrigated foods.
- 20 million hectares in 50 countries are irrigated with raw or partially treated wastewater.
- The use of excreta (faeces, urine) is important worldwide, but the extent has not been quantified.
- The use of greywater is growing in both developed and less-developed countries – it is culturally more acceptable in some societies
- Wastewater can be an excellent resource…. if it is managed safely.
Scenarios where untreated wastewater is being used by city farmers

Source: IWMI, 2007
Health concerns

Direct Health Effects

- Disease outbreaks (in developing and developed countries).
- Contribution to background disease (e.g., intestinal helminth infections).

Indirect Health Effects

- Adverse impacts on the safety of drinking water, food and recreational water.
- Positive impacts on household food security and nutrition.

3 GROUPS TO CONSIDER:
- workers
- community
- consumers
Some lessons so far

- Overly strict standards borrowed from other countries often fail.
- Guidelines are not just numbers; they are made up of good practice + microbial water quality standards.
- Low-cost effective treatment technologies needed.
- Risk reduction strategies necessary (and possible) where wastes receive no or inadequate treatment.
Objective:
Maximize the **protection of human health** and the **beneficial use** of important resources.

Target Audience:
• Policy makers
• People who develop and enforce standards and regulations
• Environmental and public health scientists
• Educators
• Researchers and engineers
What's new in the 3rd edition?

Guidelines provide an *integrated preventive management framework* for maximizing public health and environmental benefits of waste use.

Health components:
- Define a level of health protection as health-based targets.
- Identify health protection measures to achieve the health-based target.

Implementation components:
- Establish monitoring and system assessment procedures.
- Define institutional and oversight responsibilities.

Requires:
- System documentation; and confirmation by independent surveillance.
The Guidelines cover:

- Intentional use. But they may also be relevant to some unintentional uses (e.g., irrigation or aquaculture with sewage contaminated surface waters);

- Municipal or domestic wastes without substantial industrial inputs;

- Faecal sludges derived from on-site sanitation facilities but not sludge produced from the treatment of wastewater;

- Detailed information only on matters related to health protection.
Four volumes to better reach different target audiences

Volume 1: Policy and regulatory aspects

Volume 2: Wastewater use in agriculture

Volume 3: Wastewater and excreta use in aquaculture

Volume 4: Excreta and greywater use in agriculture
Vol I: Policy and Regulatory Aspects

International Policy framework:

- MDG Goal 1
  Eradicate extreme poverty and hunger

- MDG Goal 7
  Ensure environmental sustainability

National Policy aspects:

- poverty reduction
- food security
- protection of public health
- protection of the environment
- consumer protection
- integrated water resources management
- energy reliance
Where is it most needed?

Further water resources development in is increasingly limited by rising difficulties to mobilise more water (RED) or economic difficulties (Yellow). IMWI, 2000
How to start?

**Harmonization:**
- Situation analysis and needs assessment
- Establish a mechanism for policy dialogue
- Obtain political endorsement
- Engage in an adequately resourced policy dialogue
- Ensure policy changes are legitimized through Parliament and/or decreed by the Prime Minister’s Office

**Institutional Arrangements:**
- Agreed mechanisms for coordination and resource sharing between sectors
- Identification of roles and responsibilities
- Incentive: partial inputs lead to credit for 100% outcome
- through specific Memoranda of Understanding between sectors
- by operating at lower levels of governance
Planning assessment and management

Prepare Risk Management Plans

1. Assemble the team to prepare the risk management plan
2. Document and describe the system
3. Undertake a hazard assessment and risk characterization to identify and understand how hazards can be managed in the system
4. Assess the existing proposed system (including a description of the system and a flow diagram)
5. Identify control measures — the means by which risks can be controlled
6. Define monitoring of control measures — what limits define acceptable performance and how these are monitored
7. Establish procedures to verify that the risk management plan is working effectively and will meet the health-based targets
8. Develop supporting programmes (e.g. training, hygienic practices, standard operating procedures, upgrade and improvement, research and development, etc.)
9. Prepare management procedures (including corrective actions) for normal and incident conditions
10. Establish documentation and communication procedures
Assessment of Health Risk

A health risk exists if:
- an infective dose of a pathogen reaches a crop or a pathogen that reaches a crop multiplies to an infective dose, and
- the infective dose reaches a human host (directly or indirectly through a vector).

What is a tolerable health risk?
- Based on local public health conditions
- Health priorities (hazards, types of diseases and relative importance)
- Capabilities (institutional, economic, social)
- Can be expressed in DALY's
The purpose is to standardize the acceptable risk caused by different agents in different norms. (Drinking water a risk of $10^{-5}$ for cancer while in irrigation a risk of $10^{-3}$ for diarrhoeas)

One DALY = One year of healthy life lost, as a measure of community health. The burden of disease, expressed in DALYs, represents the gap between a real community health status and an ideal situation where everyone lives into old age free of disease and disability.

**What is a DALY?**

Disability Adjusted Life Years - DALYs

- Life without any disease
- Disease
- Recuperation
- Premature death

100% LEVEL OF HEALTH

0% 0 20 40 60 80 AGE (YEARS)

World Health Organization
WHO recommendation: ≤ 10-6 DALYs lost

- Compatible with other public health safety standards
- It is below the actual global incidence of diarrhoeal disease which is estimated at 0.7, i.e. $10^{-1}$
- On a per person basis it is equal to losing 31.5 seconds of healthy life in a year.
- At the community level it signifies a collective loss of one year of healthy life per million people
Health protection measures: the multiple barrier approach

The level of protection to achieve the target can be reached through a combination of management options such as:

- Wastewater treatment
- Crop restriction
- The method of irrigation
- Food preparation
  - Washing
  - Disinfection
  - Peeling
  - Cooking
- Hygiene practices at the marketplace
- Vaccines and other health sector preventive measures

"Control Measures" that may be identified in the Risk Management Plan
Example of excreta systems

<table>
<thead>
<tr>
<th>Exposure</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning of blocked pipes</td>
<td>Ingestion of pathogens</td>
</tr>
<tr>
<td>Accidental ingestion when handling unstored urine</td>
<td>Ingestion of pathogens</td>
</tr>
<tr>
<td>Accidental ingestion when handling stored urine</td>
<td>Ingestion of pathogens</td>
</tr>
<tr>
<td>Inhalation of aerosols created when applying urine</td>
<td>Inhalation of pathogens</td>
</tr>
<tr>
<td>Consumption of crops fertilised with urine</td>
<td>Ingestion of pathogens</td>
</tr>
</tbody>
</table>
Greywater: same principles – the faecal input is crucial to assess risks
Thank you for your kind attention.

More information:

www.who.int/water_sanitation_health