New Portuguese Law-Decree on water reuse

Lisbon
22nd May 2019

Anabela Rebelo, PhD
anabela.rebelo@apambiente.pt
WATER USE: NEW VISION

Water resources replenishment
Support ecosystems

Surface water
Groundwater

Water treatment (according uses and needs)

Recreational uses

Wastewater treatment

Water Reuse
“Use of treated wastewater for beneficial use”

Urban use
Agriculture
Industry
other

Wastewater

Aquifer Recharge:
Not allowed under the Portuguese Regulation for Water Resources Use, therefore not covered under the new PT Law Decree under development

Água para Reutilização
Water for Reuse
### WATER REUSE IN PT (NEW STRATEGY UNDER DEVELOPMENT)

#### Sources (TWW)
- Urban
- Domestic
- Industrial
- Other (e.g. irrigation runoff)

#### System types
- **Centralized** (production systems from UWW)
- **Decentralized** (non UWW) / Own uses / Symbiosis between industries
- **Runoff Symbiosis** (Symbioses between different crop production)

#### Uses/Requirements
- **Multiple non potable uses** (irrigation, industrial uses, ecosystem support...)
- **Defined on fit-for-purpose base supported on the results of the risk assessment**

#### Project/Risk Assessment
- **Project complexity/dimension + “sensitivity/vulnerability” of the end-use and risk receptors**
- **Risk assessment**: Heath + Environment
- **Health authority (all projects)**
- **Agriculture auth.: Agriculture/Forest irrigation**
• Literature Base:
  • Agriculture: Proposal for the EU Regulation and JRC Report on Minimum Quality Requirements

• Other:
  • ISO Standards on irrigation, urban uses, risk assessment and vocabulary (all standards published from 2015 to 2018)
  • WHO guidelines
  • Examples of Best Practices (E.g. IMPEL Project “Integrated Water Approach & Urban Reuse)
  • Research projects on water reuse, Contaminants of Concern in UWW, Treatment technologies
  • Plan of Action for Circular Economy
WATER REUSE: APPROACH TO ENSURE SAFETY

- **Fit-for-Purpose**: Water quality that meets the needs of the intended end-users and the surrounding environment.
- **Support**: Risk assessment.
- **Multi-barrier**: Control and minimize risks.
PERMITS

• Centralized Systems

- Permit to produce
- Permit to use

Formal opinion by Health and Agriculture authorities (agriculture uses)

• Decentralized Systems

- Permit to produce and use

Symbiosis between projects, processes and industries are allowed: Wastewater from one site can be used to produce water for reuse on other site
### RISK ASSESSMENT APPROACH UNDER DEVELOPMENT (PT)

#### Risk assessment
- Semi-quantitative Approach based on importance scales
- Health and Environment
- Needed for the permit application

#### Risks
- Microbiological content
- Chemicals (assessed through the use of the Combined Approach from WFD applicable to all WWTP)

#### Who is responsible
- Reclaimed Water producer (from production to the point of delivery)
- End user (from point of delivery to point of use)
- Promoters need to involve competent authorities to collect and assess information

#### Permit
- Validation of risk assessment and risk management
- Conditions: Definition of the measures for risk management
HEALTH RISK (SEMI-QUANTITATIVE MODEL)

\[ V_{\text{Recetor}} = \frac{\sum (f_i \text{ Via exp} \times f_i \text{ Cen exp})}{f_{\text{normalização}}} \]

\[ f_{\text{normalização}} = f_{i \text{ max}} \times \sum (f_i \text{ Via exp} \times n.\text{ cen exp}) \]

WORST-CASE SCENARIO

**Exposure / Scenarios**

**Use of Importance Scales**

\[ Dano = \frac{\sum (f_i \times n)}{f_{\text{normalização}}} \]

\[ f_{\text{normalização}} = f_{i \text{ max}} \times n \]

\[ R_{\text{Recetor}} = \text{Perigo} \times V_{\text{Recetor}} \times Dano \]

\[ R_{\text{Global}} = \frac{\sum R_{\text{Recetor}}}{N_{\text{Recetores}}} \]

**Vulnerability of receptors**

**Damage/Barrier failure**

<table>
<thead>
<tr>
<th>Insignificante</th>
<th>Fraco</th>
<th>Moderado</th>
<th>Forte</th>
<th>Severo</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>5</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>7</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>8</td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

Probabilidade de falha na barreira
UWW treatment plant → Reclamation water production

Reclaimed water → Irrigated area

Irrigated area → Local environment (water, soil, plants, ecosystems)

Health risk

EU internal market

Consumer

Agricultural products

Workers and other public exposed

Health risk

Environmental risk

Agriculture: EU Regulation under Development
Thank you for your attention!