

WASTEWATER REUSE FOR AGRICULTURE
20-25 October 2025

PROGRAMME

- 0. Opening session and programme presentation (1 hour)**
- 1. Water reuse in perspective (4 hours)**
 - 1.1. Role of wastewater resources in water-scarce conditions (FAO)
 - 1.1.1. Historical review of the treated wastewater reuse in the agricultural sector
 - 1.1.2. Opportunities and challenges associated with the use of reclaimed water
 - 1.2. The water reuse concept
 - 1.2.1. Wastewater sources
 - 1.2.2. Wastewater fate: direct and indirect use of wastewater and wastewater lost
 - 1.2.3. Integration of wastewater resources in an IWRM scheme (FAO)
 - 1.2.4. Treated, partially treated and untreated wastewater
 - 1.3. Wastewater and circular economy (sludge, biogas, phosphorus, etc.) (FAO)
 - 1.4. Debate: experiences in participants' countries (2 h) (D. Isidoro)
- 2. Quality requirements for water reuse and water reclamation treatments (3 hours) (P. Simón)**
 - 2.1. Quality parameters and potential hazards for water reuse: pathogens, organic compounds, heavy metals, nutrients, salts, emergent contaminants ...
 - 2.2. Water reclamation treatments
 - 2.2.1. Wastewater collection, treatment, storage and distribution
 - 2.2.2. Low-cost treatments. Decentralised and extensive reuse technologies
 - 2.2.3. Primary, secondary and tertiary wastewater treatments
 - 2.2.4. Advanced treatments
- 3. Risk assessment (3 hours) (A. Allende)**
 - 3.1. One health risk assessment (human, animal and environment)
 - 3.2. Quantitative and Qualitative Risk Assessment Methods
 - 3.2.1. WHO's Sanitation Safety Planning approach
 - 3.2.2. EC guidelines
 - 3.2.3. HACCP (Hazard Analysis and Critical Control Points) adapted for wastewater reuse
 - 3.3. Application of Risk-Based Approaches in Wastewater Management
 - 3.3.1. Identifying critical control points in wastewater treatment and irrigation
 - 3.3.2. Case studies of risk-based decision-making in agriculture
 - 3.4. Practical exercise on Water Reuse Risk Management for Agricultural Irrigation Schemes
- 4. Implementation of treatment technologies (2 hours) (P. Simón)**
 - 4.1. Operation and maintenance of water reclamation systems
 - 4.2. Continuous production vs seasonal uses
 - 4.3. Costs and technological efficiency
- 5. Field implementations to manage crop production system sustainability in arid and semi-arid zones (4 hours) (J.J. Alarcón and FAO)**
 - 5.1. Quality of the effluent and choice of the irrigation system and devices (1 h) (J.J. Alarcón)
 - 5.2. Effects in the short and long term on crops, soil and land sustainability (2 h) (J.J. Alarcón)
 - 5.2.1. Salinity effects
 - 5.2.2. Nutrient management
 - 5.2.3. Crop yield and quality
 - 5.2.4. Emergent contaminants
 - 5.3. Innovative approaches and advanced tools to manage wastewater at Irrigation district level: case in semiarid region (1 h) (FAO)

6. Institutional framework and socioeconomic aspects (7 hours)

- 6.1. Social and economic analysis (2 h) (A. Battilani)
 - 6.1.1. Cost-benefit analysis to assess the economic feasibility
 - 6.1.2. Stakeholder and consumer acceptance (markets)
 - 6.1.3. Strategies to promote irrigation with treated wastewater in Europe and throughout the Mediterranean region
- 6.2. Institutional framework (1 h) (ICARDA/ FAO)
 - 6.2.1. Inter-sectoral coordination requirements and policy coherence
 - 6.2.2. Development of scenarios for institutional set up/establishment of wastewater reuse management
- 6.3. Policy Instruments (1 h) (IWMI) (A. Battilani)
 - 6.3.1. Public/private partnership
 - 6.3.2. Economic incentives (tariffs, subsidies etc.)
 - 6.3.3. Innovative financing and cost recovery
- 6.4. Regulations and standards at national and international level: differences between the Arab and Mediterranean countries (M. Al-Hamdi) (1 h)
- 6.5. **Practical exercise on good agricultural practices reusing wastewater in different** socioeconomic contexts (F. Pedrero) (2 h)

7. Experiences in reclaimed water use (7.5 hours)

- 7.1. Real case studies
 - 7.1.1. Murcia region (Spain): (F. Pedrero)
 - 7.1.2. Morocco and other Mediterranean countries (F. Pedrero)
 - 7.1.3. Italy region (F. Pedrero)
 - 7.1.4. ReWater-MENA project (0.5 h) (J. Mateo-Sagasta)
 - 7.1.5. Artificial Intelligence to detect WWTP to support reuse planning (Lebanon project) (0.5 h) (J. Mateo-Sagasta)
 - 7.1.6. Reuse of agriculture drainage in Egypt (1 h) (FAO)
- 7.2. Practical exercise. Play to learn exercise: participatory processes for wastewater reuse projects (3.5 h) (B. Nouri)

8. Conclusions and take home messages (0.5 hours)

- 9. **Technical visit** to wastewater treatment plants and an irrigation area using wastewater. Possibility to have a debate with stakeholders on the use of treated wastewater, safety and socioeconomic aspects