



Fact Sheet #1

Policy framework for water reuse

Introduction

The growing pressure on water sources and the perspective of diminishing availability are pushing the agenda for the quest of alternatives. New technological advances and legal instruments are improving the availability of treated urban wastewater for crop irrigation. Reclamo project aims to investigate how to optimize the process of water reuse for irrigation to achieve an efficient and sustainable management of water resources. This factsheet is part of 3 factsheets that describe the current state of water reuse in Spain.

European and Spanish legislation

The current legislation on water reuse fits in the context of previously existing legislation on water and wastewater management.

On the one hand, the European Water Framework Directive WFD (2000/60/EC) and Spanish Water Law (RD 1/2001) set the general rules for water management, in particular the objective of achieving the good status of all water bodies in a particular time frame.

On the other hand, European Directive 91/271/EEC and Spanish RDL 11/1995 concerning urban wastewater treatment set the quality standards of treated wastewaters that are discharged to the environment. These limits are described in terms of physico-chemical contaminants (Biological Oxygen Demand of organic matter, nitrogenous and phosphorous concentrations when applicable) at wastewater treatment plant effluent, plus the requirement that receiving waters respect the limits set by the WFD.

Wastewater treatment directive is currently undergoing a revision process in order to increase harmonization with WFD and to widen the list of restricted contaminants, with a particular focus on emerging pollutants.

The particular focus on agriculture was set to protect the health of consumers and remove potential barriers on trade through the definition of a common standard. The Regulation defines four classes of reclaimed water depending on the agricultural use and the irrigation method:

- A. All food crops consumed raw where the edible part is in direct contact with reclaimed water and root crops consumed raw, watered with all irrigation methods.
- B. Food crops consumed raw where the edible part is produced above ground and is not in direct contact with reclaimed water, processed food crops and non-food crops including crops used to feed milk- or meat-producing animals, watered with all irrigation methods.
- C. Food crops consumed raw where the edible part is produced above ground and is not in direct contact with reclaimed water, processed food crops and non-food crops including crops used to feed milk- or meat-producing animals watered with drip irrigation or other irrigation method that avoids direct contact with the edible part of the crop
- D. Industrial, energy and seeded crops, watered with all irrigation methods

Each class must respect a particular set of requirements which are more demanding as the risk for the population increases, class A being the most restrictive. The requirements are naturally focused on waterborne pathogens (virus, bacteria, protozoa and helminths).

The legislation prescribes that the users of recycled water require a permit from the Water Authorities, that should integrate this resource in their global planification.

All new water reuse projects must comply with a validation process that certifies their capacity to reduce the concentration of waterborne pathogens or indicators of their presence. Once validated, the Regulation describes the minimum monitoring program during operation, setting the periodicity of tests for each pathogen or indicator type and for each reuse class.

The Regulation also prescribes the distribution of responsibilities across the actors, and the definition of a Point of Compliance of water quality that separates the responsibility of water reuse plant operators and water distributors.

An important and novel aspect of the Regulation 741/2020 is the explicit requirement of a Risk Management Plan (RMP) for each water reuse project. The RMP should:

- Identify all hazardous agents with the potential to harm people or the environment
- Enumerate all dangerous events that may introduce a hazardous agent in the system
- Describe all the human groups that may be exposed to a particular hazardous agent
- Calculate the probability of each event, and the severity of the consequences
- Identify the actions to optimize the management of these risks

The European Commission Joint Research Centre is currently working on the definition of the information that must be included in the RMPs for their approval.

Reused water quality requirements

The Regulation 2020/741 demands the following quality requirements for each of the reclaimed water quality classes:

Reclaimed water quality class	Indicative technology target	Quality requirements			
		<i>E. coli</i> (number/100 ml)	BOD ₅ (mg/l)	TSS (mg/l)	Turbidity (NTU)
A	Secondary treatment, filtration, and disinfection	≤ 10	≤ 10	≤ 10	≤ 5
B	Secondary treatment, and disinfection	≤ 100	In accordance with Directive 91/271/EEC (Annex I, Table 1)	In accordance with Directive 91/271/EEC (Annex I, Table 1)	-
C	Secondary treatment, and disinfection	≤ 1 000			-
D	Secondary treatment, and disinfection	≤ 10 000			-

Additionally, when there is a risk of aerosolization, the concentration of *Legionella* spp. must be kept below 1 000 cfu/l regardless of the quality class. And in the case of irrigation of pastures or forage, the concentration of intestinal nematodes (helminth eggs) can not exceed 1 egg/l.

Apart from the quality requirements to be fulfilled and monitored during operation, reuse infrastructure for Class A (the most restrictive) also requires an initial validation where the reduction of concentration of the following indicator microorganisms is certified:

Reclaimed water quality class	Indicator microorganisms (*)	Performance targets for the treatment chain (log ₁₀ reduction)
A	<i>E. coli</i>	≥ 5,0
	Total coliphages/F-specific coliphages/somatic coliphages/coliphages (**)	≥ 6,0
	<i>Clostridium perfringens</i> spores/spore-forming sulfate-reducing bacteria (***)	≥ 4,0 (in case of <i>Clostridium perfringens</i> spores) ≥ 5,0 (in case of spore-forming sulfate-reducing bacteria)

The regulation proposes the use of indicator microorganisms (E. coli, coliphages virus, clostridium p. spores) for the validation, but also allows for the direct use of reference pathogens (required log10 reduction between brackets): Campylobacter ($\geq 5,0$), Rotavirus ($\geq 6,0$) and Cryptosporidium ($\geq 5,0$).

In normal operation, the water quality requirements must be monitored regularly. The minimum monitoring frequencies are described in the following table:

Reclaimed water quality class	E. coli	BOD ₅	TSS	Turbidity
A	Once a week	Once a week	Once a week	Continuous
B	Once a week	In accordance with Directive 91/271/EEC (Annex I, Section D)	In accordance with Directive 91/271/EEC (Annex I, Section D)	-
C	Twice a month			-
D	Twice a month			-

When applicable, legionella spp. tests should be performed twice a month; intestinal nematodes tests should be performed twice a month or as determined by the reclamation facility operator according to the number of eggs in wastewater entering the reclamation facility.

Water reuse policy in Spain

The European Union and the Spanish Ministry of the Environment (MITERD) promote the reuse of urban wastewater as a means of reducing the pressure on water bodies and developing coping mechanisms against droughts and water scarcity. The goal is to increase the volumen of recycled wastewater in the short term, in particular in areas of water resources overexploitation.

The MITERD is developing a National Plan for Wastewater Treatment, Sanitation, Efficiency, Saving and Reuse (Plan DSEAR), with the purpose of setting new mechanisms to prioritize projects and facilitate the implementation of the required measures to comply with the existing legislation.

The promotion of water reuse is also in line with the Spanish Strategy of Circular Economy (since wastewater is no longer a "waste" but rather a resource to be exploited) and with the National Plan of Adaptation to Climate Change, since it helps reduce the vulnerability to water scarcity.

Currently Spain is an European leader in terms of reused water volumen (approximately 400 hm³ per year), although the new infrastructure implementation has lagged behind expectations in the last years highlighting the need of administrative changes to facilitate financing and eliminate barriers.

Water Authorities in Spain are also working on an adaptation of the legislation of reuse permits, in order to clear legal obstacles like the financing of new projects and facilitate the issue of new authorizations.

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