Portugal Drinking Water Quality Regulatory Model

By Luís Simas (The Water and Waste Services Regulation Authority of Portugal)

Abstract

Twenty years ago the Portuguese legal framework for drinking water quality could only guarantee 50% of safe water, with the remaining supply being beyond authorities' control or in violation of national standards. Between the years 1993 and 2004, the coverage of safe water for drinking increased to 84%. However, this was still far from excellent drinking water quality as defined by international standards (99% of safe water coverage).

To pursue this goal, a new regulatory model for drinking water quality was established based on the European Drinking Water Directive 98/83/CE. Ten years after its implementation, safe water coverage in Portugal has reached 98% and new tools –like water safety plans– are being implemented to achieve 99% coverage.

Context

Before the Drinking Water Directive 98/83/EC (DWD) was integrated into national legislation, drinking water regulations in Portugal were part of a law that included the whole urban water cycle (water sources, drinking water and wastewater) as well as other water uses (drinking water, bathing waters and water for agriculture and fish production).

The legal framework in Portugal distributed the responsibility of assuring safe drinking water among several public entities, including the Environment and Health Ministries. Consequently, independent monitoring and inter-ministerial coordination proved difficult.

The implementation of the DWD provided an opportunity to modify the Portuguese drinking water regulatory model to obtain a good level of efficacy and efficiency in regulation compliance. One of the first changes was to ensure that the responsibility for coordination and surveillance of the new framework were under one institution: The Water and Waste Services Regulation Authority (ERSAR).

It was also decided that drinking water suppliers were responsible for official drinking water quality control, besides usual operational monitoring. ERSAR, as the national drinking water authority, had to create and implement the mechanisms and tools to ensure all suppliers complied with the new regulations. This was achieved by requiring all drinking water suppliers to prepare a Drinking Water Quality Control Plan (DWQCP) to assure all legal requirements were fulfilled on an annual basis.

ERSAR was also responsible for ensuring legal compliance with drinking water quality regulations. The authority created a team of inspectors to verify the on-site implementation of the DWQCPs. In addition, ERSAR was enabled to control and check the technical capability of laboratories to analyse drinking water.

The role of health authorities also needed to be defined, as the mandate given to ERSAR only focused on the environment. The new legislation provided health authorities to undertake sanitary surveillance, complementing drinking water operator monitoring and official quality control. The health authorities are now also in charge of the risk analysis of any non-compliance. This means determining occurrences of human

health risks and the procedures to minimize or eliminate them.

The implementation of this new legal framework with effective sanctions and improved technical knowledge has been the path to securing improved drinking water quality and, as a result, better protection of human health in Portugal.
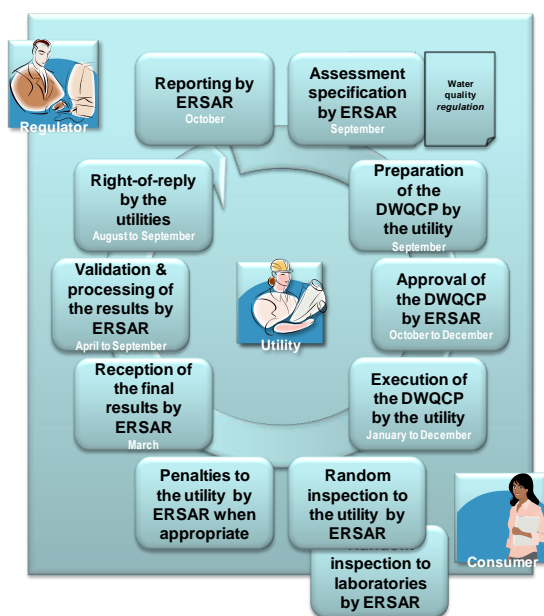
Analysis

Several measures were implemented to achieve safe drinking water while complying with regulations. After ERSAR became the national drinking water authority, a specialized team with different professional backgrounds (laboratories, water treatment and drinking water companies) was created to develop and implement the new drinking water quality regulatory cycle.

The Drinking Water Quality Regulatory Cycle

Figure 1 shows the detailed steps of the Portuguese Drinking Water Quality Regulatory Cycle

Figure 1 The Portuguese Drinking Water Quality

supported by an approved DWQCP that must be implemented by drinking water operators.

The implementation of the DWQCP is verified by the drinking water team in ERSAR and the final results of the drinking water quality control are submitted to ERSAR for the annual report. Inspections are completed on a routine basis.

Verification of the DWQCP implementation is supported by two main elements:
First, the Portuguese legislation allows ERSAR to penalise drinking water operators not implementing the approved DWQCP. This means if the operator is not in compliance with the regulations, there are means to enforce compliances to guarantee human health is protected.

Secondly, during the inspection, besides confirmation of the legal requirements, the inspectors routinely visit the supply system (water sources, water treatment plants, reservoirs, pumping stations, etc.). After these visits, technical recommendations are sent to the drinking water operator to enable the improvement of supply system performance. Inspections are undertaken on a routine basis.

Each step of the Portuguese Drinking Water Quality Regulatory Cycle requiring the exchange of information between ERSAR and the drinking water operators (submission and approval of the DWQCP, reception, validation and right of reply of drinking water quality control results and reporting) is completed through a web information management system (ERSAR Portal).

The new drinking water quality regulation model defined and implemented by the authority was made available to the relevant stakeholders in order to facilitate communication and exchange of information. To make these regulations clearly understood by all, the following measures were taken:

- Training sessions throughout the country on the national legislation and the web management system.
- Creation of a forum in the ERSAR Portal to discuss all issues related to the regulation of drinking water quality, daily technical problems, or the application of tools available in the ERSAR Portal.

Each inspector has a defined group of drinking water suppliers for which he/she is responsible. The inspector has the obligation to provide clarifications and answer questions. These clarifications can be made by phone, email or an official letter.

Communication of drinking water quality non-compliances

Another important tool of the Portuguese Drinking Water Quality Control Regulatory Cycle is the web based communication system to record non-compliance. According to Portuguese law, every drinking water supplier has 24 hours to communicate any non-compliance. The warning is sent through the ERSAR Portal tool, which enables immediate evaluation by ERSAR and health authorities. Additionally, the drinking water supplier must report causes, remedial actions and their results (to evaluate their efficacy).

The Drinking Water Quality Control Laboratories

Reliability of drinking water quality control is essential to guarantee the correct decisions when data is analysed. Consequently, ERSAR also implemented a technical evaluation system for laboratories as a transitional step to the ISO 17025 accreditation enforcement.

During this transition period, a list of recognised laboratories was published on the official website. Laboratories included in this list are the only ones allowed to perform quality control analyses for the verification of compliance with drinking water quality requirements. As of January 1st 2010, the ISO 17025 accreditation is mandatory in Portugal, meaning that this list only contains laboratories in compliance with this requirement.

The identification of key problems in drinking water quality

To establish a strategy to improve drinking water quality and make regulations work, it was also essential to identify key problems. Only familiarity with the sector allows the correct identification of corrective measures. This aspect is of particular importance when defining priorities.

ERSAR started the analysis of all available data in order to determine which parameters were in a critical status at a national level. The next step was to identify the causes for this (natural contamination of water source, lack of treatment, inefficiency of treatment, lack of human knowledge, etc.). The latter was achieved by visiting drinking water suppliers to understand if they were aware of the problems, how to address them, and if any action was being taken.

It was then possible to develop technical documents to support capacity building of the water operators, including:

- Technical recommendations for disinfection: microbiological non-compliances were a major problem because of the absence or inefficiency of disinfection.
- Technical recommendations for correcting pH: pH non-compliances made up about 40% of all Portuguese non-compliance incidents, which meant it was important to correct this problem. This was not only for health reasons, but to guarantee that drinking water does not affect the supply system materials.
- Technical recommendations for iron, manganese and arsenic treatment: these chemical parameters are critical in certain areas of Portugal and are related to soil geological characteristics.
- Technical recommendations for sampling procedure: sampling drinking water is a critical step when comparing results, so procedures have been standardized.
- Technical guide on operational monitoring: this guide promoted preventive control of drinking water as a first approach to Water Safety Plans.
- Technical guide on drinking water quality control: this guide provided a review of several aspects related to drinking water quality control, clarifying what are the legal enforcements, how to build a DWQCP, how to deal with laboratories

(selection, sampling procedure,...), how to react to non-compliance incidents, good practices in operational monitoring or reservoir maintenance, the definition of a Water Safety Plan and how to deal with consumers' complaints.

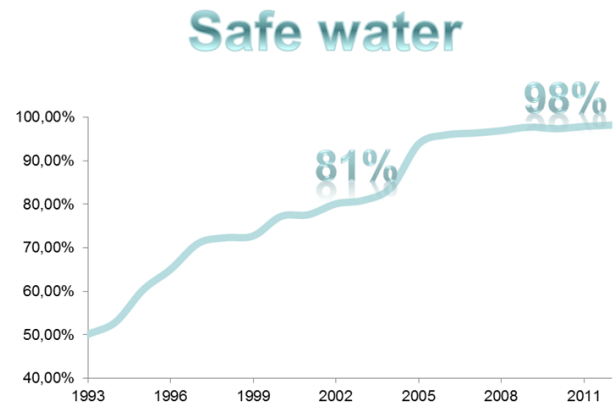## Cooperation with other entities

The implementation of the Drinking Water Quality Regulatory Cycle always requires the definition of cooperation mechanisms with other entities in the sector. The Portuguese case emphasised the need for cooperation with health authorities, drinking water suppliers and their associations, municipalities and their associations, the accreditation body, and the laboratories and their associations. It was also important to establish cooperation mechanisms with agriculture authorities (pesticides, for instance) or food safety authorities (for water used in the food industry).

International networking

Participation in international meetings, namely those which provided a platform to discuss common problems (for example, RegNet, END-WARE or Protocol for Water and Health) has been fundamental in learning from experiences of the most developed countries as well as establishing a network of contacts.

For Portugal, these international contacts were essential for the development of Water Safety Plans and a National Approval Scheme for Products in contact with Drinking Water projects.

Figure 2 The evolution of safe drinking water in Portugal
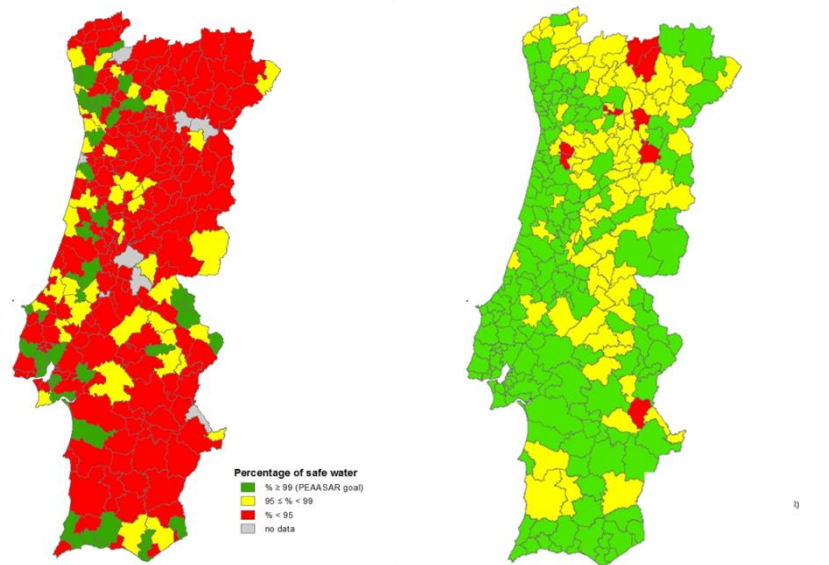

Lessons Learned

The implementation of the measures and procedures described above led Portugal to significantly improve their drinking water quality, as shown in Figure 2.

Currently, two percent of drinking water does not comply with quality requirements, and even in these cases, non-compliances underwent risk analysis by health authorities and ERSAR.

The regulatory model described has been responsible for results since 2004, showing efficacy in improving drinking water quality.

A **high level of stakeholder engagement** was essential to implement drinking water regulations. This engagement was only made possible in Portugal because all relevant stakeholders participated in the implementation of the new drinking water quality regulatory model. For example, drinking water suppliers are essential stakeholders for the elaboration of technical guidance since they have the practical expertise.

4

Conclusion

The maps in Figure 3 illustrate the results of the national strategy for improving drinking water quality in the last ten years. This is the result of collaboration and dedication amongst stakeholders to comply with a regulatory model developed through independent regulation and implementation, clear guidance and commitment to protect human health.

The near future of ensuring drinking water quality in Portugal is through the national implementation of the water safety planning approach and the application of a certification scheme for all products in contact with drinking water.