Interreg Danube Region

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MicroDrink

Roadmap Towards MP Strategy in Drinking Water

Project MicroDrink

Drafted by University of Ljubljana, supported by Croatian Geological Survey, with input from all project partners.

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1. Introduction

Microplastics (MP) have become an increasing concern for water quality and public health worldwide. Although scientific understanding of their impacts is still evolving, the presence of microplastics in drinking water sources highlights the need for proactive strategies. International frameworks, such as the EU Drinking Water Directive and its delegated acts, are beginning to establish methodologies for monitoring; however, effective implementation requires coordinated action at national and local levels.

This roadmap (Figure 1) provides a structured approach for countries to progress from knowledge gathering to the full integration of microplastic monitoring and management in drinking water systems. It outlines five key stages: starting points, monitoring and research, risk assessment and regulation, communication, awareness and education, and implementation and assigns responsibilities to essential actors at each step. These stages are designed to guide policymakers, regulators, water suppliers, laboratories, researchers, public health authorities, educators and news media in developing resilient and transparent strategies.

This roadmap has been prepared within the framework of the MicroDrink project (2024 – 2026), implemented under the Interreg Danube Region Programme. The consortium of the MicroDrink, comprised of 11 institutions from 8 Danube Region countries (Austria, Bosnia and Herzegovina, Croatia, Czech Republic, Germany, Hungary, Slovenia and Serbia), jointly prepared this Roadmap under the project's Specific Objective 3, which focuses on building capacity for the management of MP in drinking water facilities from sources to taps.. The Roadmap reflects the objectives of the MicroDrink project by promoting coordinated and knowledge-based approaches to managing microplastics in drinking water systems across the Danube Region.

This document builds on the analytical work presented in Deliverable D.3.3.1 Compilation report on microplastic governance strategies for water facilities operators and complements the operational framework developed in Deliverable D.3.3.2 Compilation report on the legislation solutions for microplastics. While D.3.3.1 summarised national governance approaches and identified common challenges, and D.3.3.2 introduced supportive decision-making mechanisms, this roadmap consolidates those findings into a structured pathway to guide gradual and practical implementation.

2. Roadmap

2.1 Starting Points: Establishing the Knowledge Base

The first step in developing a microplastics (MP) strategy for drinking water is to map existing information, beginning with reviewing scientific literature, previous studies, and ongoing projects to understand the occurrence and behaviour of microplastics in water systems. At the same time, a legislative review identifies current obligations, regulatory gaps, and opportunities for alignment with international standards. In addition to these

desk-based reviews, surveys, questionnaires, and national stakeholder exercises serve as practical tools for mapping existing knowledge, practices, and gaps across institutions and regions. This stage ensures that strategies are evidence-based and legally coherent, providing a solid foundation for subsequent monitoring and risk management.

In the Starting Points stage, the main actors are policymakers, regulators, and researchers. Policymakers set the strategic direction and initiate coordinated reviews, while regulators analyse existing legislation to identify regulatory gaps and alignment needs. Researchers synthesise available scientific evidence and define the knowledge gaps that must be addressed before monitoring can begin.

2.2 Monitoring and Research: Building the System

Monitoring and research on microplastics should prioritise the standardisation of sampling and analysis methods, in line with the harmonised methodology set out in Commission Delegated Decision (EU) 2024/1441, to ensure consistent and reliable results. This requires close cooperation with laboratories, including providing equipment and training to build technical capacity. A comprehensive monitoring system should be established to assess MP presence in raw water, treated water, and at the tap, enabling a complete picture of contamination across the supply chain. In parallel, identifying the main sources of pollution is essential to guide mitigation strategies. Finally, creating a centralised database on MP in water will provide a valuable resource for tracking trends, supporting research, and informing policy decisions.

During the Monitoring and Research stage, responsibilities shift mainly to regulators, water suppliers, laboratories, and researchers. Regulators establish standardised sampling and analytical methods and define reporting requirements, while water suppliers implement monitoring programmes for raw, treated, and tap water. Laboratories conduct analyses using validated methods and ensure quality assurance, while researchers continue to refine methods and investigate the sources and behaviour of microplastics in water systems.

2.3 Risk Assessment and Regulation: Protecting Public Health

Once sufficient data on microplastics (MP) in drinking water resources are available, countries can conduct risk assessments to evaluate human exposure and potential health impacts. These assessments provide the basis for developing risk management tools, which may include upgrading filtration technologies, replacing or modifying materials used in water systems, or avoiding contaminated sources. Over time, regulatory frameworks can evolve to incorporate guidance values or establish limit thresholds, once scientific consensus provides a reliable foundation. This process ensures that monitoring and research efforts lead to protective action, safeguarding public health and strengthening water safety management.

In the Risk Assessment and Regulation stage, regulators, public health authorities, researchers, and water suppliers play central roles. Regulators coordinate risk assessments and translate findings into regulatory and technical requirements, while public health authorities interpret potential health risks and provide recommendations to protect public health. Researchers provide scientific evidence on exposure and toxicity, and water suppliers assess system-specific risks and implement mitigation measures based on assessment outcomes.

Figure 1: Roadmap graphic Towards MP Strategy in Drinking Water

2.4 Communication, Awareness, and Education: Engaging Stakeholders

Communication, awareness, and education are essential components of effective microplastic (MP) management. Engaging stakeholders begins with public information and education initiatives that raise awareness about plastic management, identify the main sources of MP, and promote actions to limit these sources. Targeted education for water facility managers ensures that operational practices follow best standards for reducing MP contamination. To support these efforts, workshops, campaigns, manuals, and social media posts should be developed, providing accessible tools and platforms for knowledge sharing. Together, these activities foster a culture of responsibility and empower both professionals and the public to help reduce MP pollution.

In the Communication, Awareness, and Education stage, responsibilities are shared mainly among policymakers, regulators, water suppliers, and public health authorities, with significant contributions from the education sector and news media. Policymakers lead national awareness initiatives and promote stakeholder engagement, while regulators prepare technical guidance and communicate regulatory expectations. Water suppliers inform consumers about monitoring results and train operational staff, and public health authorities provide clear health-related messages and support risk communication. The education sector reinforces long-term behavioural change by integrating topics related to plastic management and environmental protection into curricula and training programmes, while news reporters play a key role in translating complex information into accessible stories that raise public awareness and encourage responsible practices.

2.5 Implementation: Embedding into Water Management

Finally, implementing microplastic (MP) management involves preparing for the future integration of MP parameters into routine drinking water monitoring programmes, even though this is not yet required under the Drinking Water Directive (EU) 2020/2184, which instead foresees a watch-list mechanism for water intended for human consumption. Monitoring results should be reviewed systematically and at regular intervals to identify trends, evaluate the effectiveness of interventions, and adjust strategies as necessary. To support decision-making, a structured reporting and assessment system must be established to enable authorities to translate monitoring data into actionable measures, complementing the risk-based approach required under the Drinking Water Directive (EU) 2020/2184.

In the Implementation stage, regulators, water suppliers, and laboratories have the primary responsibilities. Regulators enforce compliance, review monitoring results, and update regulatory frameworks as new evidence emerges. Water suppliers incorporate microplastics into routine monitoring and maintain transparent reporting to authorities and consumers, while laboratories provide ongoing analytical support and ensure consistent application of validated methods.

The implementation phase should also be supported by practical instruments and guidance material, such as the MicroDrink Knowledge Base, Video guidelines for sampling, and the Decision-Making Support Tool (DMST) developed under project MicroDrink. The DMST provides a practical solution tailored to drinking water operators, authorities, and other relevant target groups, developed through national consultation processes. It offers scenarios, best practices, and guidance, enabling informed decision-making to mitigate and address microplastic challenges at different levels.

3. Conclusions

Microplastics in drinking water present a complex and emerging challenge that requires coordinated, science-based responses across institutions. Although scientific understanding is still developing, the roadmap outlined here provides a structured pathway for countries to progress from initial knowledge gathering to the full integration of microplastic monitoring and management in water resources intended for drinking water and in drinking water systems. In the early stages, policymakers, regulators, and researchers play a central role by establishing the knowledge base, reviewing existing evidence, and identifying legislative and scientific gaps. As countries move into monitoring and research, responsibilities shift to regulators, water suppliers, laboratories, and researchers, who work together to standardise methods, strengthen analytical capacity, and generate reliable data on microplastic occurrence and sources.

Once sufficient evidence is available, risk assessment and regulatory development rely primarily on regulators, public health authorities, researchers, and water suppliers, who jointly evaluate exposure, interpret potential health impacts, and implement system-specific mitigation measures. Effective communication and awareness-raising require the engagement of policymakers, regulators, water suppliers, and public health authorities, supported by educators and news media, who help translate technical findings into accessible messages and promote behavioural change among professionals and the general public. In the final implementation stage, regulators, water suppliers, and laboratories take the lead in embedding microplastic monitoring into routine water management, ensuring compliance, maintaining analytical quality, and providing transparent reporting.

This roadmap is not only about protecting public health today but also about preparing for future risks, fostering innovation, and strengthening long-term resilience in water management systems. The roadmap offers a flexible framework that can be adapted to national contexts while maintaining alignment with international standards, ensuring that all countries are equipped to address microplastics in drinking water effectively and sustainably. Ultimately, it transforms knowledge into measurable practice, ensuring that monitoring leads to protective action and that public confidence in drinking water is maintained for generations to come.