



Output 3.5

Testing of DMST in drinking water obtained from surface/river bank filtration water resources in Danube Region

Drafted by University of Ljubljana, Slovenia
with input provided by all project partners

This project is supported by the Interreg Danube Region Programme co-funded by the European Union.

Project MicroDrink

Lead Partner: Croatian Geological Survey

Specific objective: 3. Capacity building for management of microplastics in drinking water facilities (from source to tap)

Objective Leader: University of Ljubljana

Output: 3.5 Testing of DMST in drinking water obtained from surface/river bank filtration water resources in Danube region

Version: 01

Availability: Public

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1. Introduction

Project MicroDrink “Capacity building for management and governance of MICROplastics in DRINKing water resources of the Danube Region”, was approved under the 1st call of the Interreg Danube Region Programme, beginning in January 2024 and ending in June 2026. Within Specific Objective 3 “Capacity building for management of microplastics in drinking water facilities (from source to tap)” led by the University of Ljubljana, which focuses on strengthening capacities for microplastics management in drinking water facilities, the project developed methodological approaches to support operators, authorities, and policymakers in addressing microplastics challenges across the region.

Building on the transnational knowledge generated under Specific Objective 1 “Developing transnational knowledge base on microplastics in Danube region drinking water resources” and Specific Objective 2 “Occurrence of microplastics in the water environment used for drinking water supply”, and informed by stakeholder consultations held in 8 Danube Region countries (AT, BA, CZ, DE, HU, HR, SI, RS), the MicroDrink Board created the Decision Making Support Tool (DMST) as Output 3.2. The DMST is a practical, scenario-based tool designed to guide users through assessing MP-related vulnerabilities, identifying relevant pathways, and selecting appropriate mitigation and management measures. Its development and refinement relied on close collaboration with Associated Strategic Partners and testing at nine pilot sites representing key drinking water resource types across the Danube River Basin, karst, intergranular and surface/river bank filtration. The DMST provides stakeholders across the drinking water sector with a structured, evidence-based framework for understanding and managing microplastics risks. Its value lies in translating complex scientific knowledge and diverse operational experience into practical, actionable guidance tailored to real-world water supply conditions.

This output summarises the findings and outcomes of testing the Decision-Making Support Tool (DMST) in pilot actions carried out by the University of Ljubljana, T. G. Masaryk Water Research Institute and University of Belgrade, Faculty of Mining and Geology representing surface/river bank filtration drinking water resources of the Danube River Basin. The tool was tested in close collaboration with Associated Strategic Partners, ensuring that practical experience and real-world operational knowledge were incorporated into the evaluation. Feedback from water practitioners provides essential insights into how well the DMST performs in various water-supply scenarios and how effectively it supports decision-making for microplastics management.

This evaluation of the DMST is based on a questionnaire (Figure 1, Annex I.) consisting of nine questions designed to capture user experience, clarity, usefulness, and practical value. Seven questions apply to all water resource types included in the pilot testing, while two questions specifically address the assessment of microplastics-related risks in surface/river bank filtration drinking water resources. The collected feedback provides an important real-world perspective

that supports the refinement and practical viability of the tool across diverse water-supply scenarios.

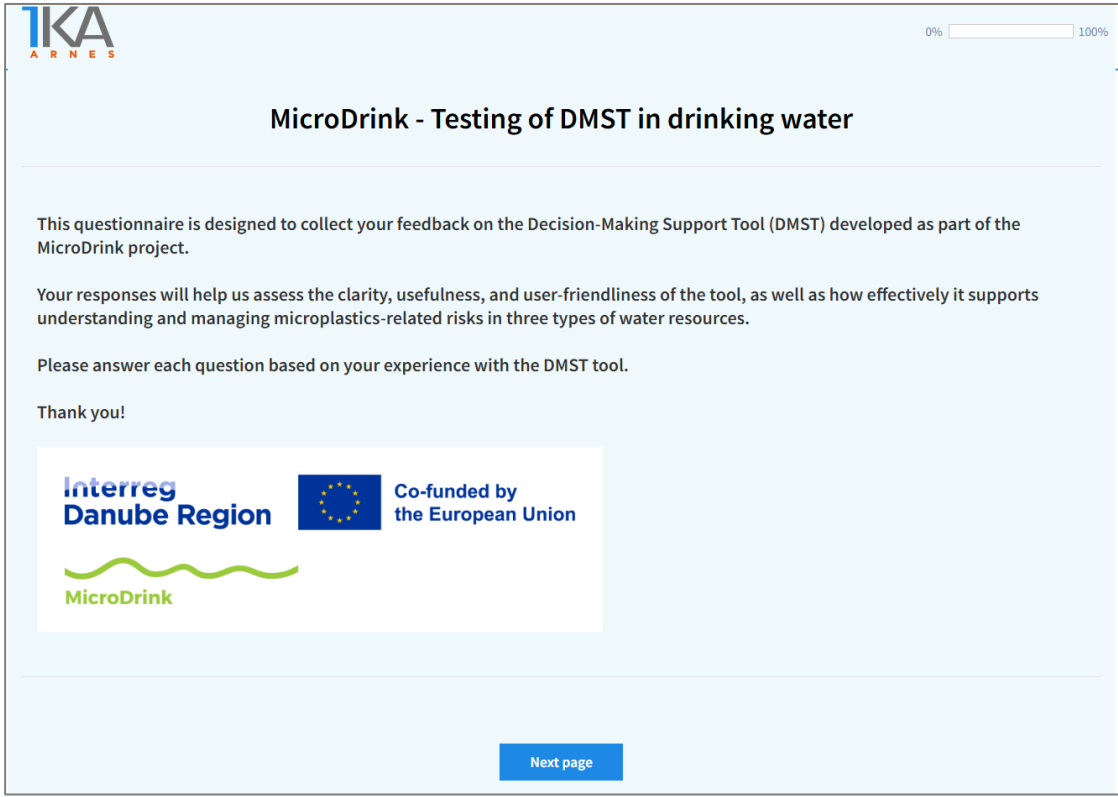


Figure 1: Questionnaire introductory page

2. Testing of DMST in surface/river bank filtration water resources

Overall, 11 complete responses to the DMST survey were provided, of which 3 responses were recorded for the surface/river bank filtration water resources (Figure 2).

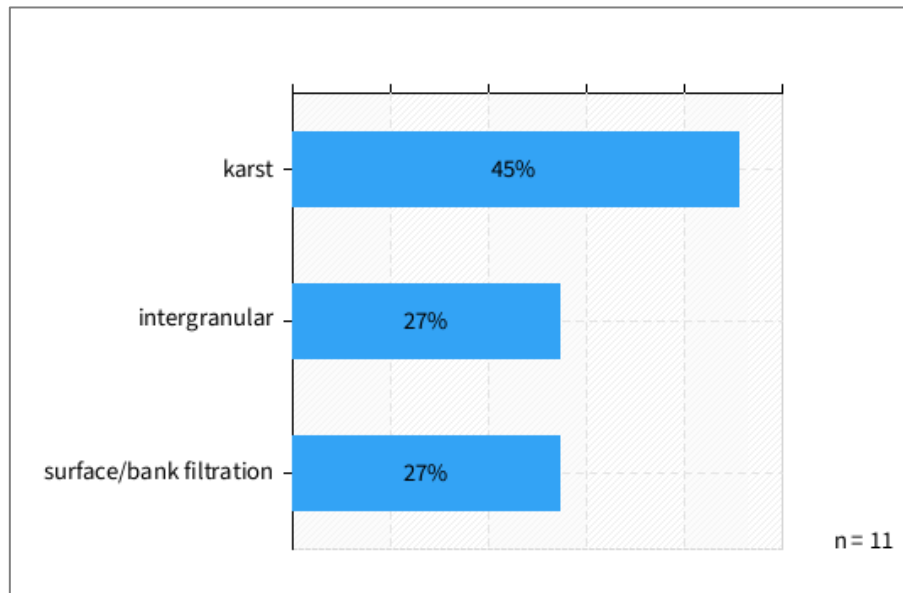


Figure 2: Complete responses for all three water resources

2.1. Overall impression of the tool

The results (Figure 3) show a strongly positive overall impression of the tool across all three water source types. Most respondents rated the tool as “useful” (64%), followed by “very useful” (27%). Only a small proportion selected “neutral” (9%), and no negative ratings were given. With a mean score of 4.2, the results indicate that users across karst, intergranular and surface/river bank filtration found the tool consistently helpful and well designed.

For surface/river bank filtration water resources, the results (Figure 4) show a consistently positive overall impression of the tool. All respondents rated the tool as “useful” (100%), with no neutral or negative responses. With a mean score of 4.0, the results indicate that users working with surface/bank filtration water resources consistently found the tool helpful, well designed, and supportive for their decision-making needs.

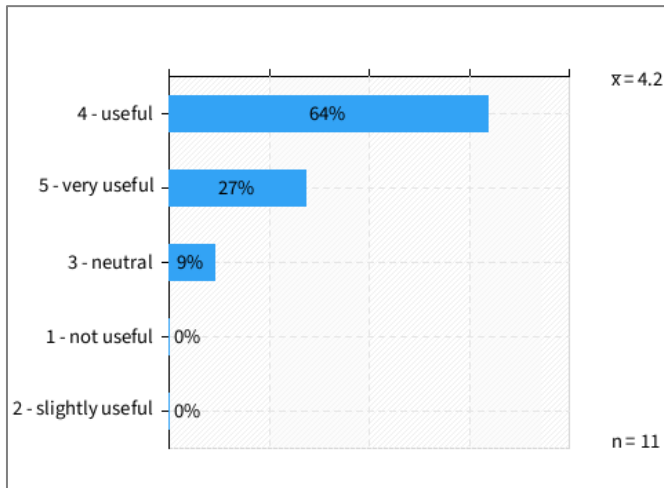


Figure 3: Overall impression of the tool from responses from all three water resources

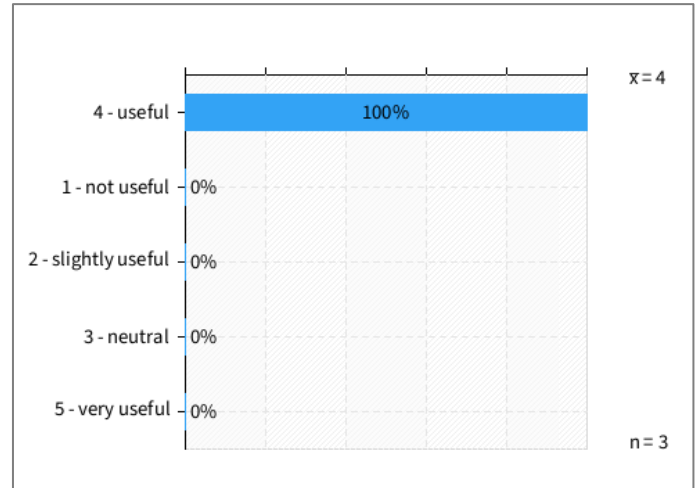


Figure 4: Overall impression of the tool from responses with surface/river bank filtration water resources

2.2. Ease of navigating the tool and building scenarios

For all water resources, the results (**Error! Reference source not found.**) show that respondents generally found the tool easy to navigate when building scenarios, with most selecting “very easy” or “easy”, and no one reporting difficulties. The mean score of 4.2 indicates that users across karst, intergranular and surface/river bank filtration found the tool intuitive and straightforward to use.

For surface/river bank filtration water resources, the results (Figure 6) show that respondents found the tool very easy to navigate when building scenarios. Most selected “very easy” (67%), while the remaining respondent chose “easy” (33%). No one reported difficulties or a neutral experience. With a high mean score of 4.7, the results indicate that users found the tool intuitive, straightforward, and efficient to use, supporting smooth scenario development across different decision pathways.

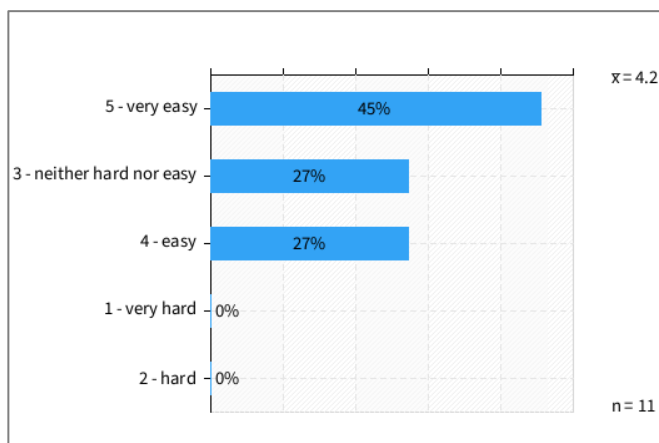


Figure 5: Ease of navigating the tool and building the scenarios for all water resources

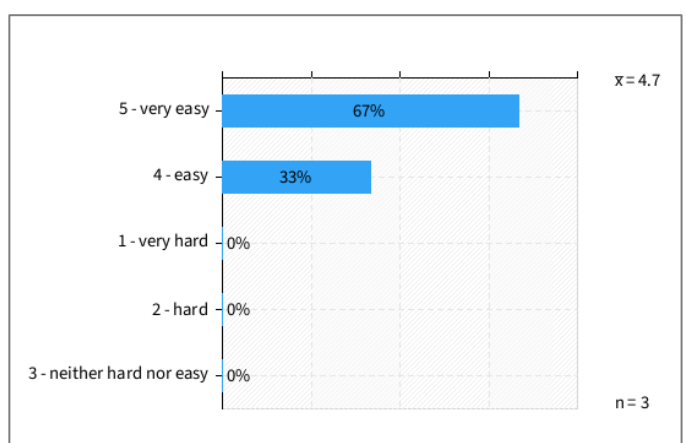


Figure 6: Ease of navigating the tool and building the scenarios for surface/river bank filtration water resources

2.3. Clarity of content presentation in individual parts of the tool

For all water resources, the results (Figure 7) show that respondents generally found the content of individual parts of the tool clearly presented. Most selected “clearly” or “very clearly”, while a smaller proportion chose the middle option, and no one rated the content as unclear. With a mean score of 4.1, the results indicate that users across all three water resources understood the tool’s content well.

For surface and river-bank filtration water resources, the results (Figure 8) show that respondents found the content in individual parts of the tool very clearly presented. Most selected “very clearly” (67%), while the remaining respondents chose “clearly” (33%). No one rated the content as unclear or neutral. With a high mean score of 4.7, the results indicate that users found the structure, explanations, and information flow highly comprehensible and well organised, supporting smooth understanding across all sections of the tool.

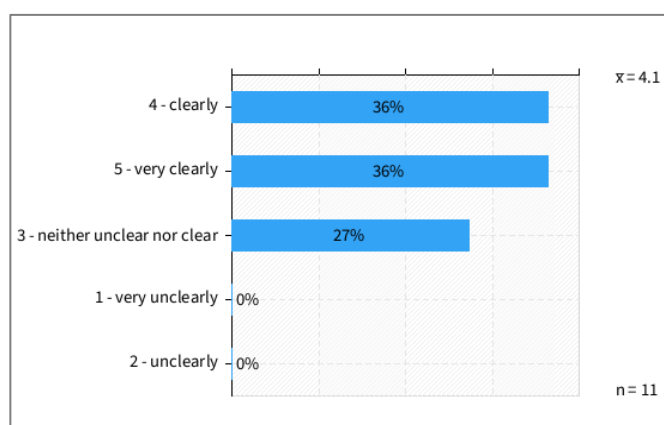


Figure 7: Clarity of content presentation for all water resources

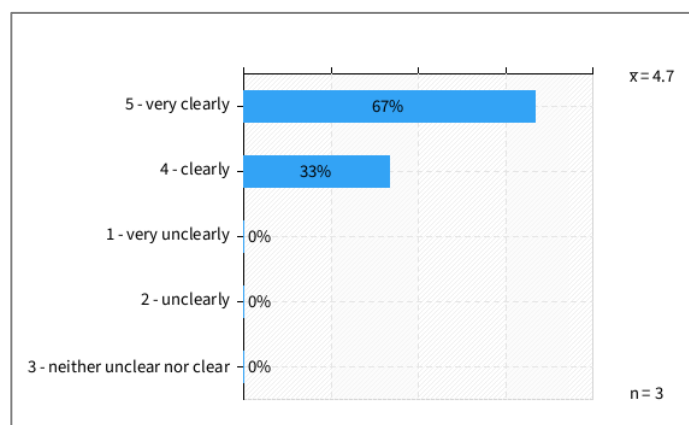


Figure 8: Clarity of content presentation for surface/river bank filtration water resources

2.4. Clarity and logic of the decision-tree structure

For all water resources, the results (Figure 9) show that respondents generally perceived the decision-tree structure as clear and logical. Most ratings were in the “clear” and “very clear” categories, while a smaller proportion selected the middle option, and no one rated the structure as unclear. With a mean score of 3.9, the results indicate that users across all three water resources were able to follow the decision-making steps without difficulty.

For surface/river bank filtration water resources, the results (Figure 10) show that respondents unanimously perceived the decision-tree structure as clear. All participants selected “clear” (100%),

with no ratings in the unclear, very unclear, or very clear categories. With a mean score of 4.0, the results indicate that users found the sequence of steps logical and easy to follow, suggesting that the decision-tree effectively supports structured progression through the tool without confusion.

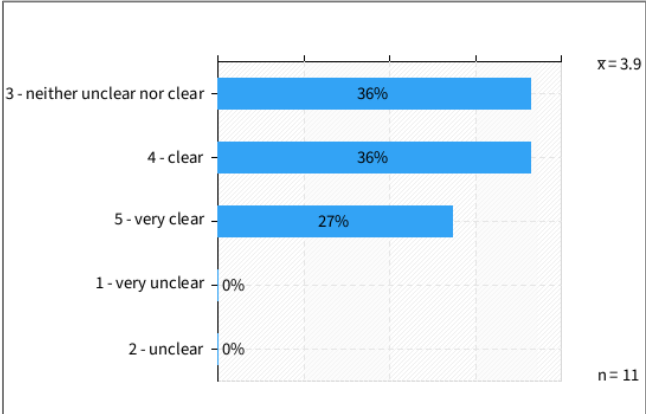


Figure 9: Clarity and logic of the decision-tree structure for all water resources

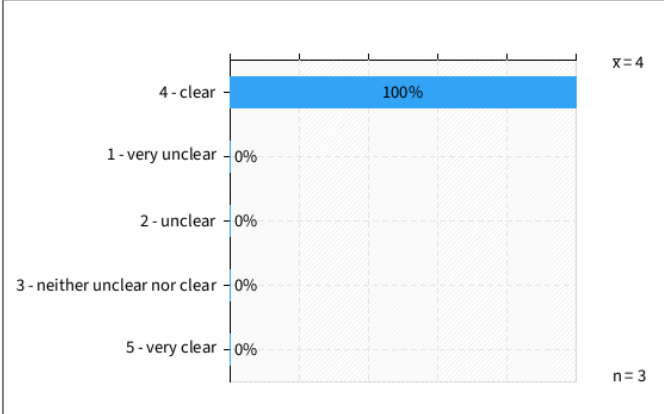


Figure 10: Clarity and logic of the decision-tree structure for surface/river bank filtration water resources

2.5. New knowledge gained through the tool

For all water resources, the results (Figure 11) show that respondents generally felt they gained a meaningful amount of new knowledge from the tool. Most selected “a moderate amount” or “a large amount”, with a smaller proportion choosing “a very large amount”, and no one reporting little or no new knowledge. With a mean score of 3.5, the results indicate that the tool effectively supported learning across all three water resources.

For surface/river bank filtration water resources, the results (Figure 12) show that respondents gained a moderate to large amount of new knowledge from the tool. Most selected “a moderate amount” (67%), while the remaining respondent chose “a large amount” (33%). No one reported gaining little or no new knowledge. With a mean score of 3.3, the results indicate that the tool effectively supported learning and helped users strengthen their understanding of microplastics-related issues relevant to surface/bank filtration water resources.

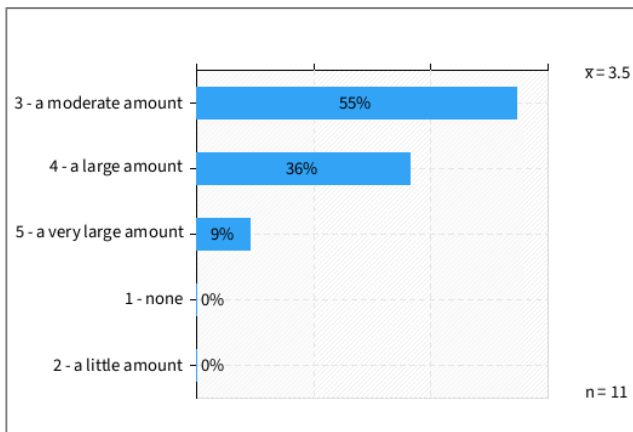


Figure 11: New knowledge gained for all water resources

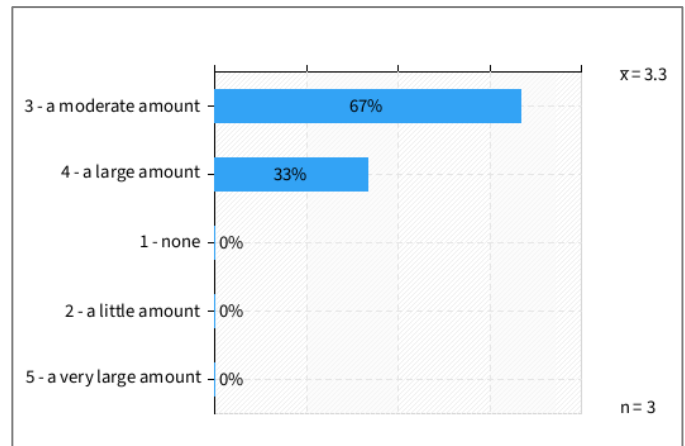


Figure 12: New knowledge gained for surface/river bank filtration water resources

2.6. Adequacy and helpfulness of the tool for assessing microplastic risks in surface/river bank filtration water resources

For surface/river bank filtration water resources, the results (Figure 13) show that respondents generally considered the tool adequate and helpful for assessing microplastic risks. Most selected “agree” (67%), while the remaining respondent chose the neutral option (33%). No one disagreed or strongly agreed. With a mean score of 3.7, the results indicate that users found the tool supportive for evaluating microplastic risks in these water-resource type.

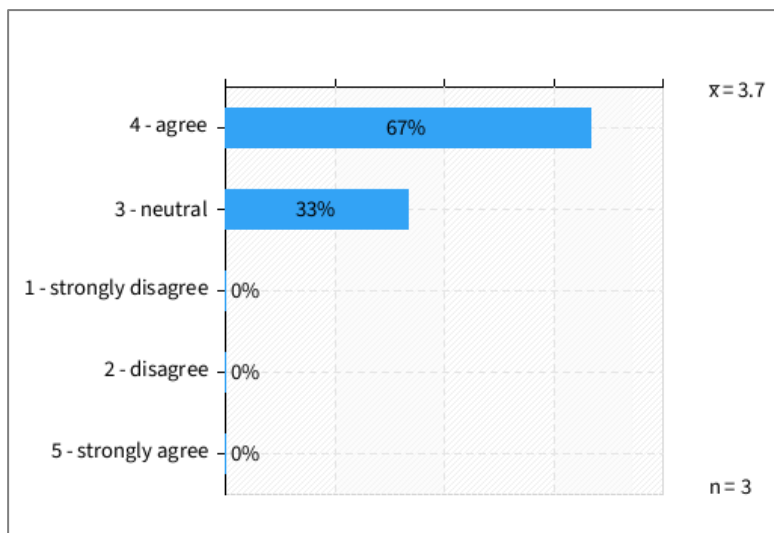


Figure 13: Adequacy and helpfulness of the tool for assessing microplastic risks in surface/river bank filtration water resources

2.7. How the tool supports understanding of microplastic vulnerability in surface/river bank filtration water resources

For surface/river bank filtration water resources, the results (Figure 14) show a strongly positive perception of how well the tool supports understanding of microplastic vulnerability. Most respondents selected “strongly agree” (67%), while the remaining respondent chose the neutral option (33%). No one disagreed with the statement. With a mean score of 4.3, the results indicate that the tool is highly effective in helping users understand the specific vulnerability of surface/river bank filtration water resources to microplastics, providing clear explanations and structured guidance that enhance users’ overall understanding.

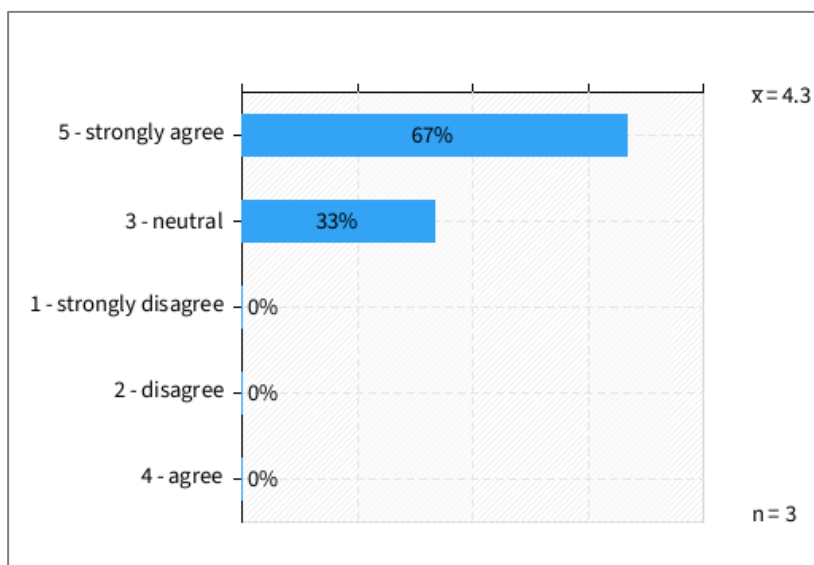


Figure 14: Respondents' assessment of how the tool supports understanding of microplastic vulnerability in surface/river bank filtration water resources

2.8. Information in the DMST users found most useful

For all water resources, the results (Figure 15) show that users found a broad range of DMST content useful, with the highest interest in microplastics hotspots, followed by several equally valued topics such as the microplastics cycle, laboratory information, sampling systems, risk assessment, and best practice requirements. Lower but still notable interest was expressed in definitions, monitoring strategies, source mapping, and hotspot analysis, while only a few respondents selected measures to reduce microplastics input or interpretation-related topics. Overall, the results indicate that users most appreciated content directly supporting practical assessment and scenario development.

For surface/river bank filtration water resources, the graph (Figure 16) shows that users identified several elements of the DMST as particularly useful, with three topics standing out: microplastics hotspots, risk assessment for microplastic pollution and microplastics source mapping (each selected by 67%). These reflect users' strong interest in content that directly supports understanding spatial vulnerability, evaluating risks, and identifying potential sources.

A second group of topics, definitions and classification, the microplastics cycle, EU Act, laboratory information, the MicroDrink sampling system, monitoring strategies, best-practice requirements, variability and uncertainties, and hotspot analysis, were each selected by 33% of respondents. These results indicate that users also valued methodological, regulatory, and conceptual information, though with slightly less emphasis. Overall, the results suggests that surface/river bank filtration operators primarily appreciated content that strengthens risk assessment and supports practical understanding of microplastic dynamics in their systems.

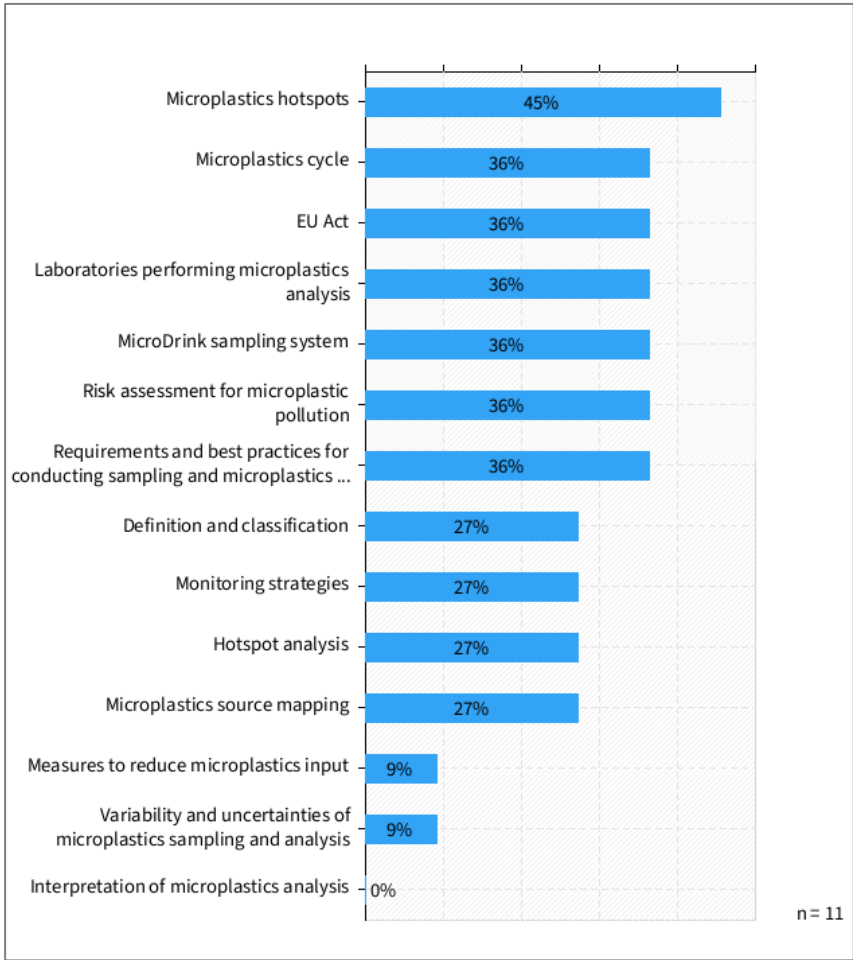


Figure 15: Most useful information provided by the DMST across all water resources, as identified by users

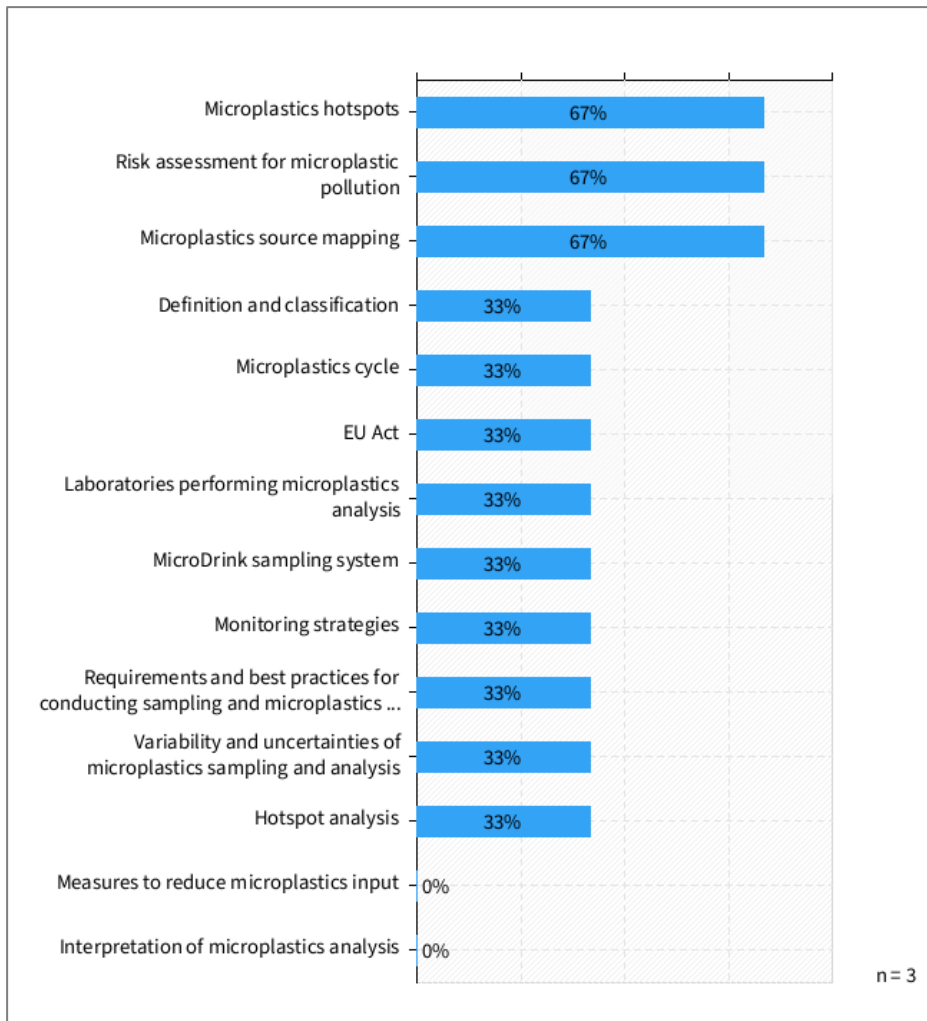


Figure 16: Most useful information provided by the DMST for surface/river bank filtration water resources, as identified by users

2.9. Ability to define next steps for microplastics management after using the tool

For all water resources, the results (Figure 17) show that respondents generally felt confident in defining their next steps for microplastics management after using the tool. Most selected “agree” (70%) or “strongly agree” (20%), with only one neutral response and no disagreement. With a mean score of 4.1, the results indicate that the tool effectively supports users in translating its outputs into clear, actionable follow-up measures.

For surface/river bank filtration water resources, the results (Figure 18) show agreement that the tool supports users in defining their next steps for microplastics management. All respondents selected “agree” (100%), with no neutral, negative, or strongly positive responses. With a mean

score of 4.0, the results indicate that the tool provides clear and actionable guidance, helping users translate its outputs into concrete follow-up measures for managing microplastics in surface/river bank filtration water resources.

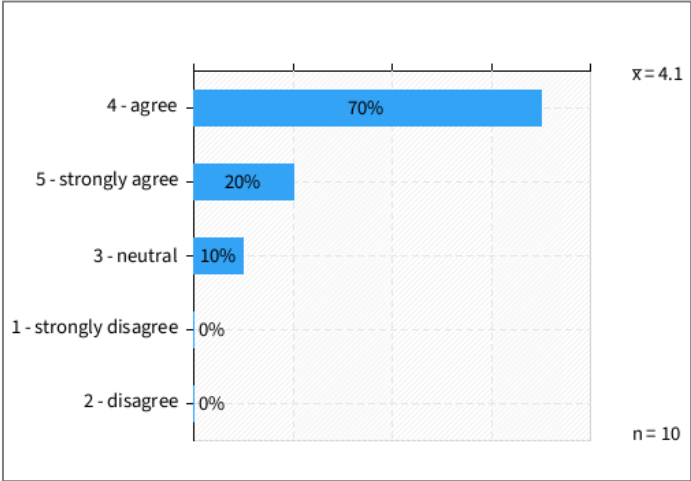


Figure 17: Ability to define next steps for microplastics management after using the tool for all water resources

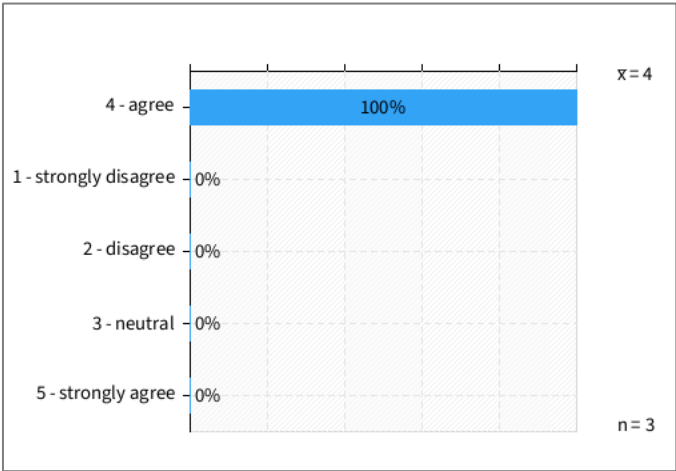


Figure 18: Ability to define next steps for microplastics management after using the tool for surface/river bank filtration water resources

3. Conclusion

The evaluation of the DMST for surface/river bank filtration water resources shows a consistently positive user experience across all questions. Respondents expressed a uniformly favourable overall impression of the tool and found it very easy to navigate. Content presentation was also rated as very clear and the decision-tree structure was unanimously perceived as clear and logically organised.

The tool effectively supported learning: users reported gaining a moderate to substantial amount of new knowledge, particularly regarding microplastic vulnerability, where the tool received strong positive feedback. Its adequacy and helpfulness for assessing microplastic risks were also confirmed indicating that the tool provides meaningful support for evaluating vulnerabilities and risk pathways in surface/river bank filtration water sources.

Users highlighted several information areas as especially useful, most notably microplastics hotspots, risk assessment, and source mapping, reflecting a strong interest in content that directly supports operational understanding and risk-based decision-making. All respondents agreed that the tool helps them define next steps for microplastics management, demonstrating its practical value for translating insights into actionable measures.

Overall, the results indicate that the DMST is a clear, well-structured, and practically relevant decision-support tool for surface/river bank filtration water resources, offering strong guidance for understanding vulnerabilities, assessing risks, and planning follow-up actions. With an overall score of 4.1, the evaluation reflects a solid and consistently positive user experience across key individual parts of the tool.

Annex I.

Questionnaire

Surface/river bank filtration water resources:

1. What is your overall impression of the tool?
Rate your answer from 1 (not useful) 2 (slightly useful) 3 (neutral) 4 (useful) 5 (very useful)
2. How easy is it to navigate the tool and build different scenarios?
Rate your answer from 1 (very hard) 2 (hard) 3 (neither hard nor easy) 4 (easy) 5 (very easy)
3. How clearly is the content of individual parts of the tool presented?
Rate your answer from 1 (very unclearly) 2 (unclearly) 3 (neither unclearly nor clearly) 4 (clearly) 5 (very clearly)
4. Is the decision-tree structure clear and logical in guiding you through the different steps?
Rate your answer from 1 (very unclear) 2 (unclear) 3 (neither unclear nor clear) 4 (clear) 5 (very clear)
5. How much new knowledge did the tool help you acquire?
Rate your answer from 1 (none) 2 (a little amount) 3 (a moderate amount) 4 (a large amount) 5 (a very large amount)
Explain which new knowledge you gained.
6. I believe this tool provides an adequate and helpful assessment of the risks posed by microplastics in surface/bank water resources.
Rate from 1 (strongly disagree) 2 (disagree) 3 (neutral) 4 (agree) 5 (strongly agree)
7. I believe this tool helps to understand vulnerability of surface/bank filtration water resources to microplastics pollution.
Rate from 1 (strongly disagree) 2 (disagree) 3 (neutral) 4 (agree) 5 (strongly agree)
8. Which of the following information included in the DMST did you find most useful? Choose up to three:

- *Definition and classification*
- *Microplastic cycle*
- *EU Act*
- *Laboratories performing microplastics analysis*
- *MicroDrink sampling system*
- *Microplastics hotspots*
- *MicroDrink sampling results*
- *risk assessment for microplastics pollution*
- *monitoring strategies*
- *measures to reduce microplastics input*
- *interpretation of microplastics analysis*
- *requirements and best practices for conducting sampling and microplastics analysis*
- *variability and uncertainties of microplastics sampling and analysis*
- *hotspot analysis*
- *microplastics source mapping*

9. After using the tool, I can define my next steps in decision-making for microplastics management.

Rate from 1 (strongly disagree) 2 (disagree) 3 (neutral) 4 (agree) 5 (strongly agree)