



Output T.4.6

**SYNTHESIS REPORT OF THE INTERNATIONAL WORKSHOP
“Policy Guidance on Managing Hazardous Substances Pollution in the Danube River Basin”**

December 2022

PROJECT TITLE: Tackling hazardous substances pollution in the Danube River Basin by Measuring, Modelling-based Management and Capacity building

ACRONYM: Danube Hazard m³c

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Introduction

The Danube Hazard m³c (DH m³c) project aims to achieve a durable and effective transnational control of hazardous substances (HS) water pollution, by collecting, integrating and harmonizing available existing data of HS concentration levels, by modelling emissions at catchment scale in pilot regions and in the entire Danube River Basin (DRB) and by providing policy advice and technical recommendations on managing HS pollution.

This project also addresses the substantial knowledge gaps and lack of process understanding and institutional capacity regarding HS emissions pathways and effective management options/approaches by comprehensive capacity-building activities. A harmonized transnational water management approach is considered essential to reach the goals of the EU Water Framework Directive.

One of the most important outputs of the project is the “Policy Guidance on Managing Hazardous Substances Pollution in the Danube River Basin”, focusing on the management of HS pollution. The draft content of the policy guidance was presented and discussed at the Final International Workshop of the project on 30 November 2022 in Vienna. The workshop was held back-to-back with the final conference of the project and it was embedded within the 25th International River Symposium in order to exploit the synergies among the events.

The goal of the Workshop was to make a broad group of stakeholders directly familiar with the content of the guidance already within the timeline of the project and thus on the one hand to increase the chances of its real use in practice afterward, and on the other hand to collect their input and to incorporate it subsequently into the final version of the document.

Target Groups/stakeholders

The relevant target groups have been strongly involved in the project activities along the project duration, being an integral part of the project. The Project Partners identified relevant stakeholders and invited them to participate in the Workshop.

Experts have been selected considering their interest, expertise and involvement in the issues addressed. The group encompassed decision-makers and technical experts from authorities and sectoral agencies responsible for water management at the national and Danube Basin scale, including representatives from ICPDR and its expert groups, interest groups from planners, operators, technology suppliers, laboratory experts, industry, agriculture and associations for wastewater treatment, environmental non-governmental organizations (NGOs) associated to ICPDR as observers, and representatives from higher education and research institutions within the DRB. In total, about 40 participants attended the Workshop, representing 12 countries, mostly European countries and India.

The following institutions and countries were represented:

Organisation	Type of organisation	Country	No of participants
Budapest University of Technology and Economics (BME)	Research and higher education	Hungary	2
Bulgarian Water Association	National authority	Bulgaria	3
Centre for Ecotoxicological Research CETI	Research institute	Montenegro	4
Czech Ministry of Environment	National authority	Czech Republic	1
Deltares	Consultancy	The Netherlands	1
Deutsche Gesellschaft für Internationale Zusammenarbeit GIZ-India	International organisation	India	3
Environment Agency Austria	National authority	Austria	2
EUSDR Water Quality	International organisation	International	2
Federal Ministry of Agriculture, Forestry, Regions and Water Management Div I 2	National authority	Austria	2
ICPDR	International organisation	International	2
IHE Delft Institute for Water Education	Research and higher education	The Netherlands	1
National Administration Romanian Waters	National authority	Romania	4
Serbian Ministry of Environmental Protection	National authority	Serbia	1
TU Wien	Research and higher education	Austria	4
Ukrainian Hydrometeorological Institute	National authority	Ukraine	1
University of Architecture, Civil Engineering and Geodesy	Research and higher education	Bulgaria	1
University of Public Service, Water Diplomacy	Research and higher education	Hungary	1
University of Zagreb, Faculty of Chemical Engineering and Technology	Research and higher education	Croatia	2
Water Research Institute	Research institute	Slovakia	1
WESSLING Hungary Ltd	Laboratory	Hungary	1

Workshop programme

After the joint introductory presentations, the workshop participants were split into three groups for more in detail discussions. The detailed programme of the workshop and single topics discussed are shown below.

Time (Vienna)	Presentations and group discussions		
1:20 – 1:25 pm	Welcome and introduction to workshop <i>Ottavia Zoboli (TU Wien)</i>		
1:25 – 1:35 pm	Setting the scene – scope and context of the policy guidance <i>Ottavia Zoboli (TU Wien)</i>		
1:35 – 1:50 pm	Hazardous substance pollution in the Danube River Basin – What we do and do not know <i>Matthias Zessner (TU Wien)</i>		
1:50 – 4:25 pm	Three parallel group discussion. This block is conceived as rotating activity, so that all participants have the chance to participate to the discussion in all three topics.		
1:50 – 2:35 pm	<p style="text-align: center;">Topic 1</p> <p style="text-align: center;">Policy recommendations for the DRB countries</p> <p style="text-align: center;"><i>Impulse talk and moderation (A. Kovacs, ICPDR)</i></p> <p style="text-align: center;"><i>Rapporteur (G. Dimova, BWA)</i></p>	<p style="text-align: center;">Topic 2</p> <p style="text-align: center;">Recommendations on sustainable measures in the DRB</p> <p style="text-align: center;"><i>Impulse talk and moderation (J. van Gils, Deltares, tbc)</i></p> <p style="text-align: center;"><i>Rapporteur (Z. Jolankai, BME)</i></p>	<p style="text-align: center;">Topic 3</p> <p style="text-align: center;">Need and prioritization of follow-up activities</p> <p style="text-align: center;"><i>Impulse talk and moderation (M. Broer, UBA)</i></p> <p style="text-align: center;"><i>Rapporteur (C. Boscornea, NARW)</i></p>
2:35 – 3:40 pm			
Coffee break 2:55 – 3:15 pm			
3:40 – 4:25 pm			
4:25 – 4:45 pm	Reporting of outcomes of group discussion and final synthesis <i>Moderation – Matthias Zessner (TU Wien)</i>		

Summary of the discussions

As mentioned above, three parallel group discussions were organized, each of them having a specific topic to be discussed:

- Topic 1 - Policy recommendations for the DRB countries;
- Topic 2 - Recommendations on sustainable measures in the DRB;
- Topic 3 - Need and prioritization of follow-up activities.

At the beginning of the workshop the project team gave three short impulse talks for all participants align, with the aim of aligning the baseline knowledge and to provide clear context and outlines for each topic. The participants were divided into three well-mixed groups to ensure an active discussion within smaller groups. The workshop was designed in a way, that each group and thus each participant had the chance to discuss every topic.

The synthesis of these group discussions is described below.



Topic 1: Policy recommendations for the DRB countries

Impulse talk and moderation: A. Kovacs (ICPDR), rapporteur: G. Dimova (BWA)

Summary

The main subjects of the discussion were:

- Implementation of source control measures to prevent HS pollution at source;
- Establishing an enabling regulatory framework to effectively control HS emissions.

The results of the group discussion can be summarized in the following table:

Highlighted critical issues concerning emission and immission of hazardous substances	Proposed regulatory measures
<p>1. Better/stricter control of industrial polluters</p>	<ul style="list-style-type: none"> • Strengthening the inspection mechanism over the production chain. • Better harmonization (at EU level) of permit mechanism for certain industrial branches, as well as harmonization of the application of the “polluter pay principle” at international level. • Ban of certain chemicals to be used for industrial production or authorization for using them in only very specific situations (e.g. in case of population health protection) only by the state authorities. • Financial stimulus for companies replacing certain hazardous substances with other non- or less hazardous alternatives in their production chain, e.g. applying the extended producer responsibility approach or providing financial support for innovation.
<p>2. Inefficient and insufficient control of plant protection products (PPPs) application and soil pollution, including:</p> <ul style="list-style-type: none"> • grey market of pesticides • no sound regulations on content of pesticides in soils 	<ul style="list-style-type: none"> • Strengthening the inspection mechanism over the PPPs application. • Establishment of sound national (or EU level) regulation for the content of pesticides in different type of soils and also depending on the agricultural activities. • Grey market/application of pesticides to be criminalized.
<p>3. The final disposal of pharmaceuticals by population is not well regulated in many countries</p>	<ul style="list-style-type: none"> • To establish designated places where the population can easily get rid of pharmaceuticals with expired deadline or out of use. • To promote the sale of a “tailor-made” amount of drugs, so that after the prescribed treatment there are no or minimal amount of residual (unused) amounts. • To raise the social awareness on the negative effect of pharmaceuticals on the environment.
<p>4. Monitoring of hazardous substances in water bodies needs optimization, because:</p> <ul style="list-style-type: none"> • the list of priority substances in water is ever growing • frequent sampling and laboratory analyses are quite expensive • often the quality monitoring is not synchronized with quantity monitoring, thus the evaluation of pollution load is difficult 	<ul style="list-style-type: none"> • Broader utilization of modelling for evaluation and prediction of hazardous substances in order to optimize the frequency of on-site monitoring. • Full monitoring could be limited only for the validation of the model at a certain river basin scale. • Wider application of risk assessment at river basin scale to optimize the monitoring process; the risk assessment methodology should be unified at EU level. • Wider application of methods for general assessment of the impact of a group of hazardous substances on water bodies and ecosystems - for example, use of “toxicity fish” indicator for initial assessment of ecological status.

Besides the highlighted critical issues and possible regulatory measures, some **emerging problems** have also been identified, e.g.:

- The ban of one chemical or certain group of chemicals most often leads to utilization of other “new” chemicals, whose potential negative effect has not been yet sufficiently investigated, but which trigger the need of development of new methods for their detection and measurement.
- The stringent quality standards, which in most of the cases are in terms of “micrograms/l” or “nanograms/l” make measurement challenging and require often development of more sophisticated laboratory equipment and new analytical methods.
- Awareness raising and education have critical role to achieve behavioral change in the society towards more responsible and reasonable use of chemicals in daily life.



Topic 2: Recommendations on sustainable measures in the DRB

Impulse talk and moderation: J. van Gils (Deltares), rapporteur: M. Kardos (BME)

Summary

The discussions focused around the urban water problems, the points/pathways where HS pollution can/should be caught (like wastewater treatment plants, combined sewer overflows, and the soil erosion process), and the possible synergies or conflicts between suggested measures for water quality protection and flood/drought mitigation measures as well as climate change (CC) mitigation measures.

The results of the group discussion are summarized in the followings.

Improved (quaternary) wastewater treatment should be regarded as a possible, probably in most of the cases the most cost-efficient intervention option. However, its efficiency might be different across a wide range of chemicals.

Green urban infrastructures like green roofs and rain gardens should be regarded as measures that reduce peak HS loads, thus HS pressure on wastewater treatment plants (WWTPs). They also reduce HS emissions through combined sewer overflows (CSOs). Leaching of certain HS from green roofs, however, should be investigated before wide use. Similarly, rain gardens and infiltration trenches should be constructed so that they will not release the settled contaminated particles even in cases of later heavy rain events. On the other hand, such infrastructures have additional positive effects, like reducing the risk of urban flash floods and acting against the formation of urban heat islands. These infrastructures might act as a source of irrigation water in dry periods or even automatically lower the potential of the formation of droughts by introducing water into the ground. Positive synergies with other issues should foster the financing of such measures.

Agricultural measures learned a few decades ago when coping with the nutrient problem should also be considered. Examples of soil erosion control measures:

- Constructional measures:
 - construction of stabilization structures,
 - vegetated waterways,
 - establishment of buffer strips,
 - construction of small water reservoirs.
- Modification of the agricultural practice:
 - strip cropping,
 - terracing,
 - contour farming.

Other ideas: Some more philosophical ideas arose, the detailed discussion of which would have exceeded the actual limits of the workshop. A few examples of these are:

- Why not ban everything that is persistent and hazardous?
- Include (part of) the constructional/operational cost of wastewater treatment in the price of certain products that lead to the release of hazardous substances in the environment and thus to the need of advanced wastewater treatment (e.g. pharmaceuticals, personal care products) – would we pay more for the polluting product?
- Print special labels on the packaging of products that burden the (aquatic) environment – would we, by intention, skip buying those products?
- Who bears the responsibility: should politicians or everyday people act first? The problem is probably a system-level one, meaning that simultaneous intervention in many points is needed to achieve changes.

As a conclusion: many measures are listed – and nothing new has been invented. A tailored combination of already-known measures should be applied in a tailored manner at each problematic location.



Topic 3: Need and prioritization of follow up activities

Impulse talk and moderation: M. Broer (UBA), rapporteur: C. Boscornea (NARW)

Summary

The discussions mainly focussed on future challenges and needs of monitoring, modelling and capacity building aspects, these being the major pillars of the Policy Guidance that need stakeholders' opinion.

The results of the group discussion can be summarized in the followings.

Monitoring

It is necessary to implement **a common harmonized monitoring vision** by harmonization of the HS analytical methods. Based on a reliable transnational monitoring network the assessment of water status of the Danube River will be improved. Also, it is recommended to focus on countries with a low availability of monitoring data and analytical methods, especially the non-EU countries.

Online monitoring of the hydrological and chemical parameters, improved methods for sampling and measurements are important activities that need further reflection and consideration.

An important need is **to identify the list of relevant HS at the basin wide level**, keeping in mind that it is necessary to identify specific monitoring sites for establishing the selection of relevant HS (screening). Alternatives for identification of the list of relevant HS at the basin wide level could be the comparison of the relevant HS lists from each country and selection of the common HS at basin wide level. In addition, extending the Danube Transnational Monitoring Network (TNMN) by adding relevant HS as parameters to be monitored (look to the sediment analyses too) and making use of

the inventory database for specific pollutants created by the Solutions project and the Danube Hazard m³c project could help identify and prioritize HS of basin wide importance. Risk assessment needs to be taken into consideration when designing the monitoring network (e.g. locations, specific parameters, etc.). Also, the accidental pollution hot spots should be considered when designing the monitoring network.

On the other hand, the participants highlighted **the main gaps in specific activities**, such as lack of specific capacity and knowledge to improve and optimize the monitoring system, lack of clear legal assignment of responsibilities, too low financial resources for HS monitoring and shortage of skilled staff to perform the monitoring. Without addressing these weaknesses, the decision makers cannot rely on sound monitoring results and system understanding to select and implement the most effective measures.

Also, the establishment of **a common monitoring database and an operative transnational inventory tool** (perhaps through the DanubeGIS system of the ICPDR) would be very useful for surveying the water quality at basin wide level, but also at the national level.

Modelling

As an important activity for water management, the participants agreed that it is necessary to implement and maintain **a common assessment model at the basin wide level**, inspired by the results of the Danube Hazard m³c project. The selected model needs to be adapted to different sources and pathways and a common methodology for validation and calibration should be ensured.

The modelling tool needs a **very good input data base**. Setting up an appropriate IT platform for collecting and reporting the monitoring and statistical data can very well support the modelling process. Other ideas to consider were that modelling should be the basis of starting a risk assessment and planning the measures and the water status assessment could be supported by statistical data to optimize the monitoring network.

Capacity building

The main ways of developing capacity building activities to improve staff skills on monitoring and modelling are:

- transferring existing knowledge, especially to the non- EU countries on how to implement monitoring systems (e.g. involving universities, research sector and NGOs, establishing task forces for voluntary people to collect samples, etc.);
- organizing training courses for human resources to implement the modelling tool and to make it sustainable;
- organizing workshops to share the best practices and successful stories.



Summary of the key points

The contribution of the participants to the three topics as potential inputs to the “Policy Guidance on Managing Hazardous Substances Pollution in the Danube River Basin” was very much appreciated, reflecting the main issues but also practical experiences of HS pollution management.

The highlighted critical issues concerning the policy recommendations for the DRB countries mainly address proposed regulatory measures for better/stricter control of industrial polluters, improving the control of plant protection products, regulation of the final disposal of chemicals such as pharmaceuticals by population and optimization of the HS monitoring in water bodies.

As recommendations on sustainable measures in the DRB, it was highlighted that a combination of already-known measures should be applied (quaternary wastewater treatment, green urban infrastructures, measures for agriculture to reduce soil erosion and surface runoff, etc.) depending on specific local conditions.

Managing hazardous substances pollution needs further activities on common harmonized monitoring methods, identification of the list of relevant HS at the basin wide level, setting up and maintaining a common monitoring database and an operative transnational inventory tool and applying a common assessment basin wide model. Also, additional capacity building activities (knowledge exchange workshops, trainings sessions) can contribute to improve the HS pollution management in the DRB.