

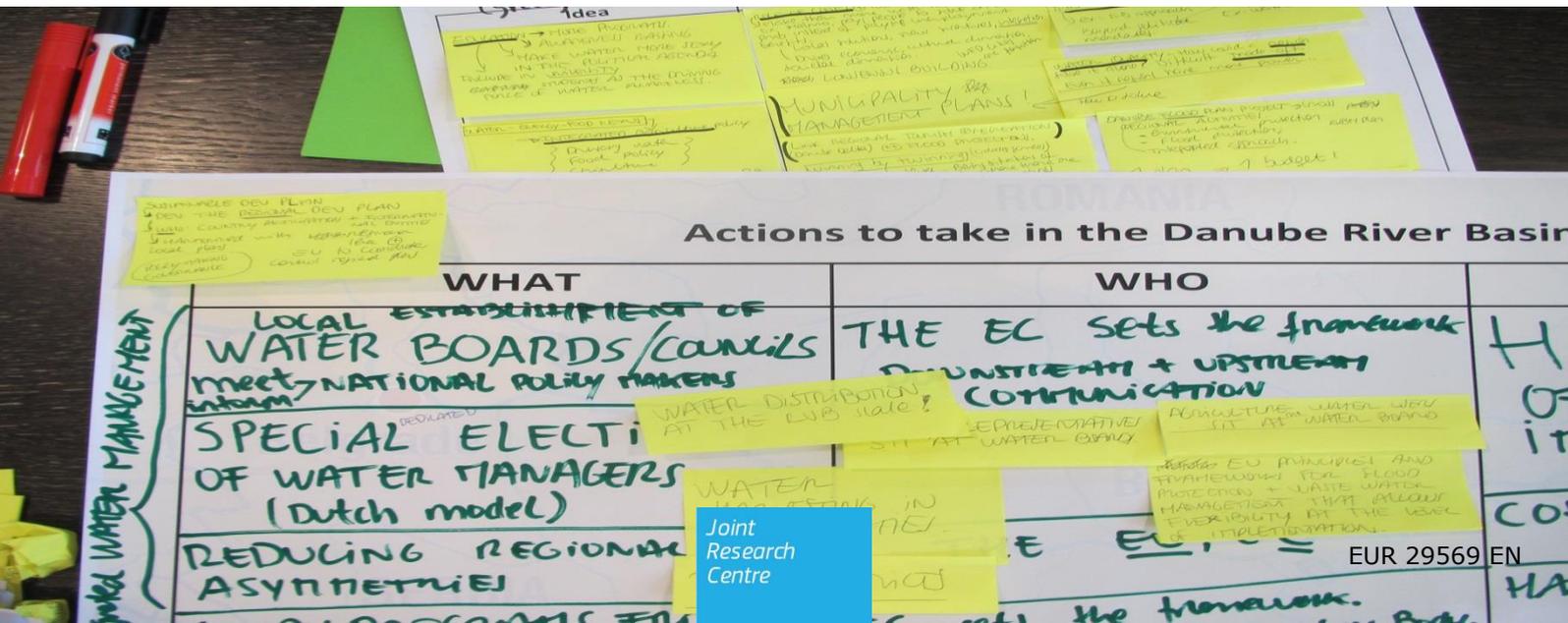
JRC CONFERENCE AND WORKSHOP REPORTS

Key water management issues for the sustainable development of the Danube River Basin

Future challenges and policy preparedness

Laurent Bontoux
Sara Rafael Almeida
Alberto Pistocchi

2018



This publication is a Conference and Workshop report by the Joint Research Centre (JRC), the European Commission's science and knowledge service. It aims to provide evidence-based scientific support to the European policymaking process. The scientific output expressed does not imply a policy position of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of this publication.

Contact information

Name: Laurent Bontoux

Email: Laurent.Bontoux@ec.europa.eu

EU Science Hub

<https://ec.europa.eu/jrc>

JRC 114803

EUR 29569 EN

| | | | |
|-------|------------------------|----------------|--------------------|
| PDF | ISBN 978-92-79-98389-4 | ISSN 1831-9424 | doi:10.2760/919407 |
| Print | ISBN 978-92-79-98388-7 | ISSN 1018-5593 | doi:10.2760/069 |

Luxembourg: Publications Office of the European Union, 2018

© European Union, 2018

The reuse policy of the European Commission is implemented by Commission Decision 2011/833/EU of 12 December 2011 on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39). Reuse is authorised, provided the source of the document is acknowledged and its original meaning or message is not distorted. The European Commission shall not be liable for any consequence stemming from the reuse. For any use or reproduction of photos or other material that is not owned by the EU, permission must be sought directly from the copyright holders.

All content © European Union, 2018

How to cite this report: Bontoux, L., Rafael Almeida, S., Pistocchi A., *Key water management issues for the sustainable development of the Danube River Basin*, EUR 29569 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-98389-4, doi:10.2760/919407, JRC 114803.

Contents

Acknowledgements2

1 Introduction3

2 Context and aims of the project4

3 Workshop: purpose, participants and agenda6

4 Workshop sessions7

 4.1 Icebreaker7

 4.2 Modelling7

 4.3 Introducing the scenarios8

 4.4 Discovering opportunities and challenges9

 4.5 Creating win-win opportunities 10

 4.6 Identifying actions to take in the DRB 10

 4.7 Conclusion and next steps 10

5 Feedback from participants 11

 5.1 General results 11

6 Information on participants 13

Acknowledgements

The authors would like to thank the various external and European Commission experts who dedicated their time and effort to contribute significantly to this workshop and project.

A special thank you goes to Augustin Gallot-Lavallée who initially developed the scenarios used in this workshop in the context of his master thesis entitled *The use of scenarios in water futures planning applied to the Danube River Basin*, at the Centre for Environmental Policy, Faculty of Natural Sciences, Imperial College London (2016).

The authors are grateful for the support that was provided by the various JRC colleagues based in Ispra and in Brussels in the preparation of the workshop. A warm thank you goes also to the colleagues at the Representation of the European Union in Budapest for hosting the workshop in their premises.

1 Introduction

This report documents the process that was implemented in a workshop held in October 27-28, 2016 at the Representation of the European Commission, in Budapest, with a group of policy-makers, academics and business representatives from the Danube region.

The workshop built on both a qualitative and a quantitative description of possible futures of the region in the broader context of European and global trends, making use of complementary tools deployed by the JRC - hydrological and water quality models enabling the simulation of water resources in the region (Unit D.2 - Water and Marine Resources), and participatory methods for foresight, behavioural insights and design to develop novel approaches for policy-making (Unit I.2 - Foresight, Behavioural Insights & Design for Policy). From quantitative information originated from modelling and qualitative narratives of broad socioeconomic and political scenarios, the workshop aimed at identifying the key water management issues and possible actions for the sustainable development of the Danube River Basin (DRB).

The workshop addressed challenges in the Danube River Basin in an integrated and cross-cutting perspective, taking into account the interdependencies between various policy priorities, and making use of a set of extreme, broad socioeconomic and political scenarios.

The content generated during the workshop will support the project team at the Joint Research Centre in taking stock and paving the way for the remainder of the study.

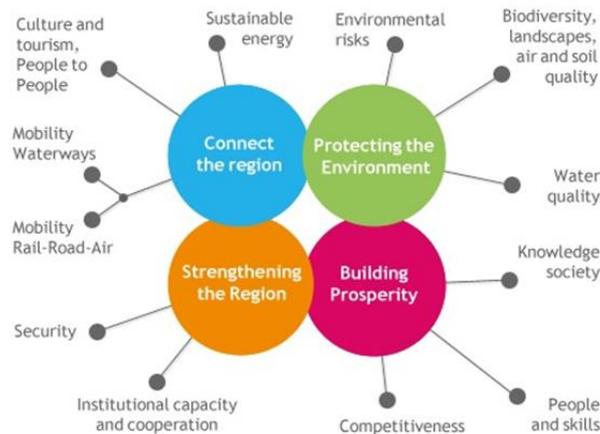
The first section provides information about the project, its context and team. The second and third sections present the workshop's agenda, purpose and process. Finally, the fourth section describes the feedback received from participants.

This document does not describe all the insights captured during the workshop, nor presents the full set of outcomes. This content will be further developed and ultimately shared in the form of a Joint Research Centre Science for Policy report.

2 Context and aims of the project

As the European Commission's in-house science service and the only Directorate-General executing direct research to provide science advice to EU policymaking, the Joint Research Centre provides independent, evidence-based scientific and technical support to EU policies with throughout the policy cycle.

The **European Union Strategy for the Danube Region (EUSDR)**¹ is one of the EU macro-regional strategies and builds on 4 pillars – 'connecting the region', 'protecting the environment', 'strengthening the region', and 'building prosperity' - for which 12 priority areas of action are organized.



The Danube River Basin is considered a very representative complex system which includes many dimensions (e.g. societal, environmental, economic, geopolitical, and technological) affecting, and affected by, water management. For its characteristics, it can be regarded as a pilot for other macro-regional strategies in Europe. Understanding and managing such a complex system requires an integrated and holistic approach.

The **Danube Water Nexus (DWN) flagship cluster**² covers various water-related issues such as water availability, water quality, water-related risks and the preservation and restoration of ecosystems and biodiversity. It also analyses the interdependencies of between different water-intensive economic sectors such as agriculture and energy. The aim of this cluster is to provide input to decision-makers and managers in the region about sustainable futures of water resources use, also by putting water in the agenda of development in the Region in a pervasive way. One of the expected outcomes of the Danube Water Nexus activities is an "analysis of scenarios of socio-economic impacts of alternative water allocation measures across competing water-using sectors (agriculture, energy, industry, human consumption, environment, transport) for the years 2030-2050".

This workshop was carried out as part of the JRC scientific support to the Danube strategy³. In this perspective, the workshop addressed the challenges faced by the Danube Region from an integrated and cross-cutting perspective, taking into account the interdependencies between various policy priorities, and making use of a set of extreme scenarios.

The workshop built on both a qualitative and a quantitative description of possible futures of the region in the broader context of European and global trends, making use of complementary tools deployed by the JRC: hydrological and water quality models enabling the simulation of water resources in the region (JRC Unit D.2 - Water and

¹ https://ec.europa.eu/regional_policy/en/policy/cooperation/macro-regional-strategies/danube/

² <https://ec.europa.eu/jrc/sites/jrcsh/files/jrc-scientific-support-danube-strategy-concept-paper.pdf>

³ <https://ec.europa.eu/jrc/en/research/crosscutting-activities/danube-strategy>

Marine Resources), and participatory methods for foresight, behavioural insights and design to develop novel approaches for policy-making (JRC Unit I.2 - Foresight, Behavioural Insights & Design for Policy). From quantitative information originated from modelling and qualitative narratives of broad socioeconomic and political scenarios, the workshop aimed at identifying the key water management issues and possible actions for the sustainable development of the Danube River Basin (DRB).

The workshop had two main **aims**:

- 1) Identify the key issues of water management in the DRB in a perspective of sustainable development; and
- 2) Put forward a set of key actions for different stakeholders to tackle those issues, beyond general policy recommendations.

Other objectives included:

- Identification of opportunities and threats for water quality, aquatic ecosystems, human water security and the economy under different scenarios;
- Discussion of trade-offs between economic development and environmental resources protection; and
- Drawing of recommendations for win-win development options in the Danube region, ensuring a high level of water protection and security while stimulating the economy.

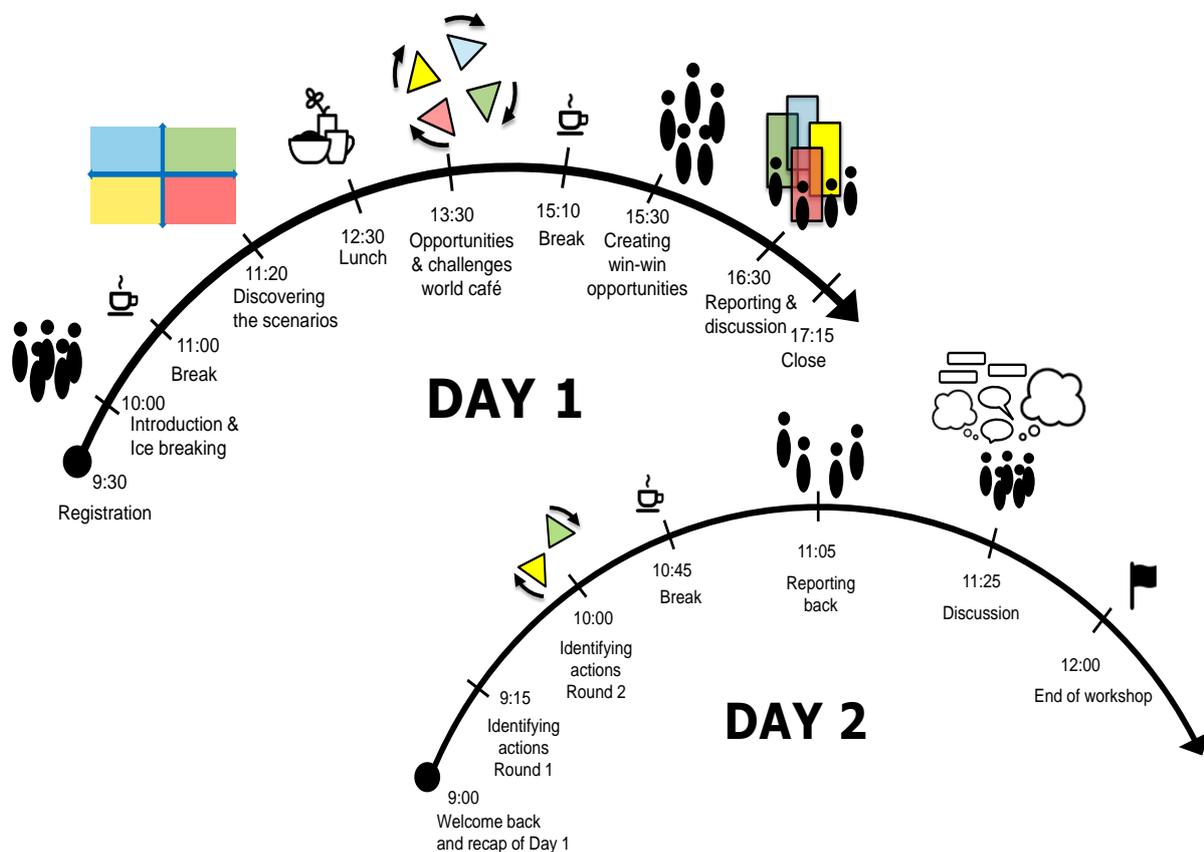
3 Workshop: purpose, participants and agenda

The workshop was held at the Representation of the European Union in Budapest, Hungary, on 27-28 October 2016.

The **purpose** of the workshop was to identify actions to be taken by all relevant stakeholders for win-win development options in the Danube region, ensuring a high level of water protection and security while stimulating the economy. In order to achieve the stated objectives, the JRC team developed extreme future scenarios, prepared illustrative modelling outputs, defined a meaningful range of expertise, ensured a diversity of perspectives and a good geographic coverage of the Danube River Basin.

The JRC team identified and invited **experts** in several fields - such as, flood protection, hydrological modelling, renewable energy resources, environmental law, civil and chemical engineering, agriculture and forestry, economics, etc. - to participate in the workshop. In total, 31 experts from 10 countries and 4 international organizations working in the Danube region and 5 JRC experts participated in the workshop.

The workshop lasted 1,5 days and the **agenda** was structured as follows. On the **first day**, Laurent Bontoux opened the workshop with an introduction of the JRC's mission, the project team and of the foresight methodology. Then, he reflected on the purpose of the workshop and its role in the wider project before opening an ice-breaking session. Afterwards, the project team presented the four scenarios to the audience and made scenario specific considerations on opportunities and challenges for water management in the DRB. The workshop was closed by discussions on win-win and no-regret options that could be acted upon in each scenario, to ensure the long-term sustainable development of the Danube basin. The **second day** started with a recollection of what was achieved the previous day. The subsequent discussions focussed on the identification of actions that the various stakeholders could take to make the future of the Danube River sustainable in each scenario. It closed with a general discussion over what had been achieved over the two days.



4 Workshop sessions

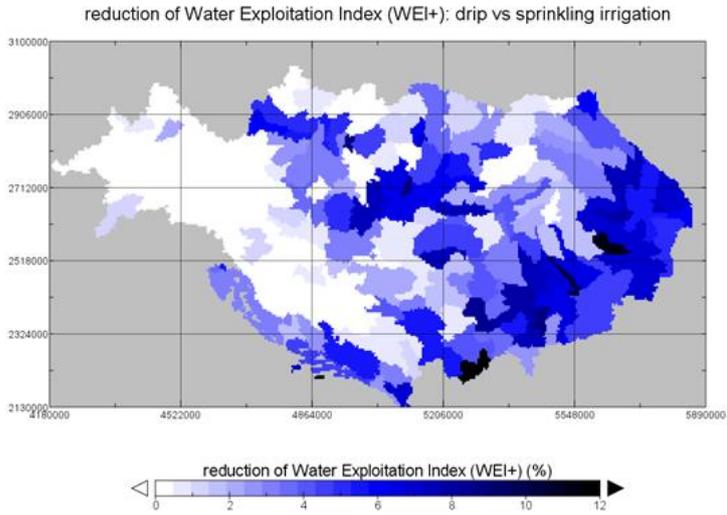
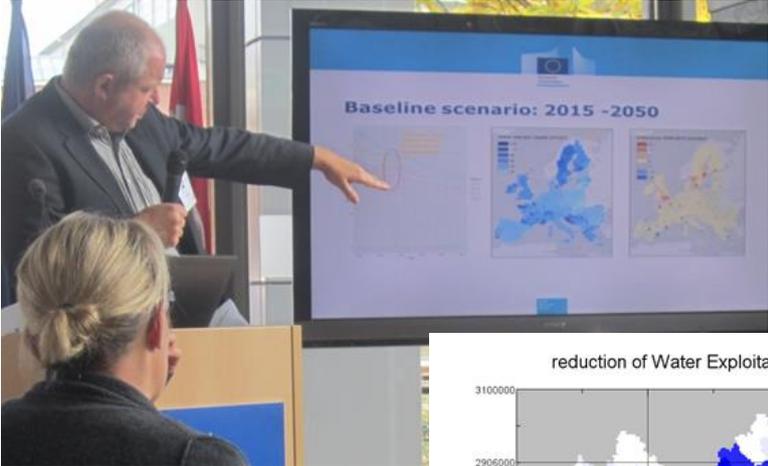
4.1 Icebreaker

As most participants had not met previously, an icebreaker exercise gave the opportunity for participants to get to know each other in quick and informal way. The participants gathered in pairs and spent 5 minutes getting to know each other. Once the 5 minutes elapsed, each participant introduced their partner to the whole group. This exercise created a good ambiance. It was interesting to hear many people talk about the personal interests of whom they were presenting.



4.2 Modelling

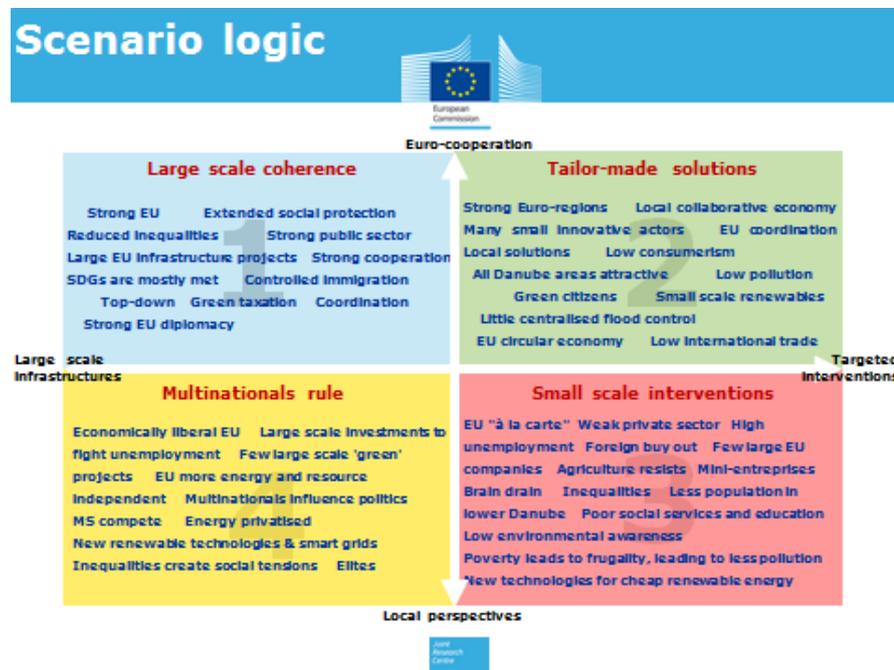
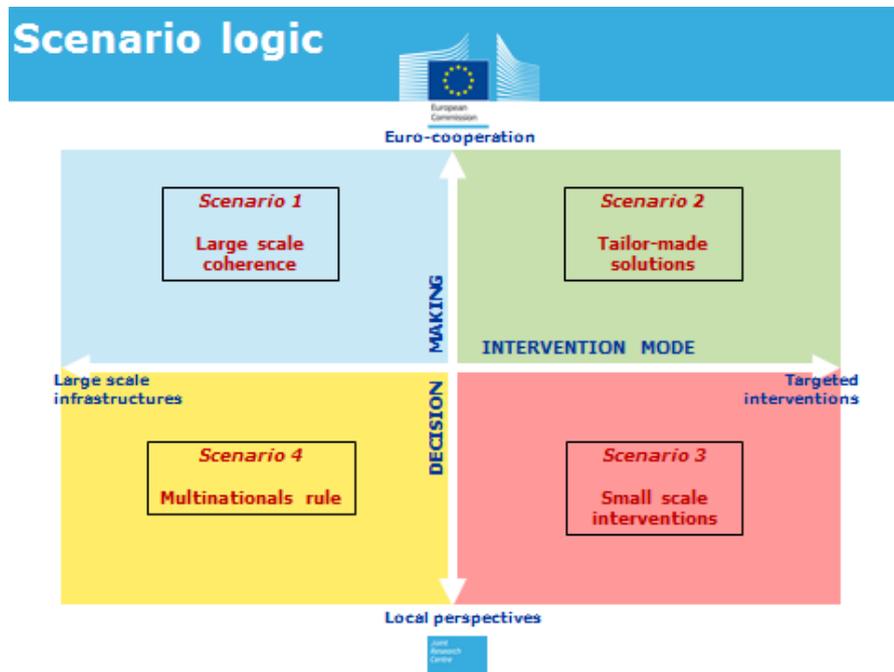
After the ice breaker exercise, Ad de Roo (JRC), made a presentation on how the JRC's work on water modelling for the Danube river basin can be used to illustrate outcomes for diverse parameters under various possible scenarios.



4.3 Introducing the scenarios

Augustin Gallot-Lavallée, Sara Rafael Almeida, Alberto Pistocchi and Peter de Smedt presented the 4 scenarios that had been prepared ahead of workshop.⁴

The scenarios were developed around two structural axes: governance level (Euro-cooperation vs local perspectives) and scale of preferred investment (large scale infrastructures vs targeted interventions):



⁴ The scenarios were initially developed in the context of the MSc thesis of Augustin Gallot-Lavallée, *The use of scenarios in water futures planning applied to the Danube River Basin*, Centre for Environmental Policy, Faculty of Natural Sciences, Imperial College London, 2016.

The presentations described how, under each scenario, the STEEP dimensions – Social, Technological, Economic, Environmental and Political - were affecting the agriculture, industry, energy and water sectors. Participants had the opportunity to ask questions on all scenarios and the session was concluded by a general discussion to come to grips with the details and overall coherence of all scenarios. A few adjustments were made. The scenario summaries and structural dimensions are presented below.

4.4 Discovering opportunities and challenges

After lunch, participants worked in four groups to identify the opportunities and challenges created by each scenario for water management in the Danube River Basin. After 50 minutes, the groups moved to the opposite scenario, along the diagonals of the scenario matrix. This way, each group explored two extreme scenarios. The conversations were harvested on a template and the second round added on to the output collected at the first round.



The output was structured according to the opportunities and challenges in each sector relative to the economy, society or the environment. This session was followed by a reporting in plenary to bring everyone to speed on all four scenarios.

Scenario 4 T&U
Identifying Issues for Water Management in the Danube River Basin (S1)

| SECTOR | ENVIRONMENT | SOCIETY | ECONOMY |
|---|---|--|---|
| <ul style="list-style-type: none"> MOBILITY PRIVATISED AGRICULTURE MONOPOLISED NO LAND AGRICULTURE SOIL/LAND USE UNSUSTAINABLE LAND GRABBING TOURISM/ TRANSNATIONAL NAVIGATION ON DANUBE GROWING NATURE TOURISM POLITICS | <ul style="list-style-type: none"> EFFICIENCY GAINS BUT REBOUND EFFECT CLIMATE CHANGE DRIVING FORCE FOR AMPLIFICATION DEFORESTATION FOR HIGH PRODUCTIVE FORESTRY MONOCULTURAL FORESTRY STRONG - TO SUPPORT MODERNISING OF GOV LEVEL OF ENV. PROTECTION MORE PLANNABILITY IN HAND OF PM | <ul style="list-style-type: none"> URBANISATION SMART MOBILITY UNEQUAL INFRASTRUCTURE INVESTMENT SEARCHABLE EMPLOYMENT PEOPLE, LOCAL COMMUNITIES LESS INFLUENTIAL POORER THE SAME TASTE - LOCAL FINE NICHES INCREASED LOCAL EMPLOYMENT FAMILY FARM - SELF SUFFICIENT NO PROFIT / JOBS FOR LOCAL COMMUNITIES STRONG REGULATIONS TO PROTECT SOCIAL IMPACTS WEAKENING OF CIV. SOCIETY POORER | <ul style="list-style-type: none"> COMPETITION / INEQUAL DISPARITIES GROW PROFIT ORIENTATION INCREASED COMPETITION FOR WATER BETWEEN PRIVATE USERS + COMPANIES SENTED IN NEW TYPES OF WATER PRODUCTION - SCALE COMPETITION BETWEEN MS TO CREATE BETTER CONDITION - DUMPING EQUIVOCAL / NATURE BUILDING PLOTS: INVESTING IN DIRECTS ON DANUBE NEARLY OF GOV. DISAPPEAR SOUTH - ASBESTOS (MULTIPLY IN NORTH) TIP/CETA |

GLOBAL POLITICS
- CHINA, INDIA, USA → INDG / CETA - TIP / CETA

ENV. → NO WATER TREATMENT IN SOME COUNTRIES
- LOWER STANDARDS

4.5 Creating win-win opportunities

The day was closed with another group session which built on the opportunities and challenges identified to delve into the identification of what various stakeholders could do to seize the opportunities created by each scenario for building a more sustainable future for the Danube River Basin. This time, the four groups reflected on one scenario, without rotating. The output was collected in the form of ideas and their rationale. The results were put on posters for all to see and comment.

MULTI-MULTI-UMS-VELOW
Towards Sustainability in 2040 (S2) CIRC

| Idea | Rationale |
|-----------------------------|---|
| P.P.P. Gov- Multi (win-win) | - Using existing funds for WWT plants - Create market incentives (energy, raw mat.) - Create jobs in multi-not/beer channels/pharma/food/healthcare |
| Large p plants w-? | or less harm on environment or do we need large power plants? |
| Beer fact (INNOVATION) | - More new tech for production rain → beer |

LARGE SCALE COHERENCE (BLUE)
Towards Sustainability in 2040 (S2)

| Idea | Rationale |
|---|--|
| Create more coherence across policies | Improvement of strategic planning → sustainability Financial facilities to support reorganisation of small projects + simplified procedures + communication |
| Increase the level of standards | Consultation between the levels Better cooperation Develop pilot projects, especially for the less developed areas |
| Reduce the capacity gap + capacity building | |
| Stronger economy | |
| Platform for technology transfer: good practice | |
| Increased security | |
| Ensure local and global interests are balanced (i.e.: local consultation) | |
| Distribution of resources | |
| Remove excessive regulations | |

After such an intense day of work and a short final discussion, everyone deserved a good night rest.

4.6 Identifying actions to take in the DRB

After a quick recall of what had happened on Day 1, Day 2 started with a reflection on the actions that could be taken in each scenario to make the Danube River Basin more sustainable.

To make the suggestions as concrete as possible, the participants were asked to identify also who should take the actions and how these actions should be implemented (e.g. what instruments can be used to make these actions happen). This session was run in four groups and each group visited two contrasting scenarios, as in the first group session of Day 1. Large templates covering 'What', 'Who' and 'How' were used to guide the discussions and harvest the results in a structured way.

This session delivered a large amount of constructive and concrete output on which it is possible to build scenario specific recommendations. These results will be analysed and the outcomes from all scenarios compared to identify whether some suggestions would be applicable to all the possible futures that were explored. This would be an indication that some actions should be taken regardless of any uncertainty we might have on the future.

4.7 Conclusion and next steps

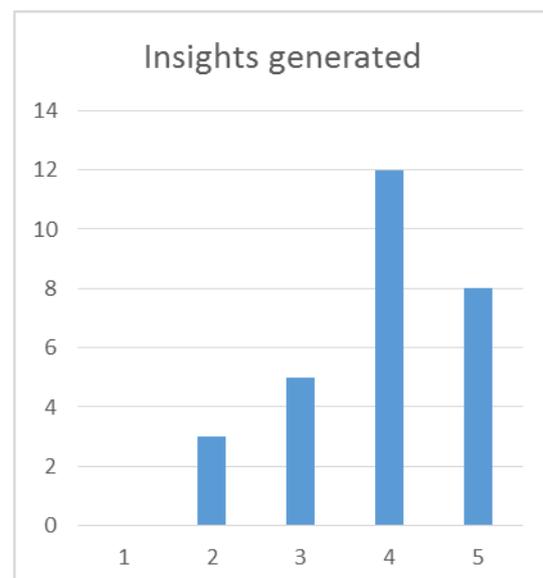
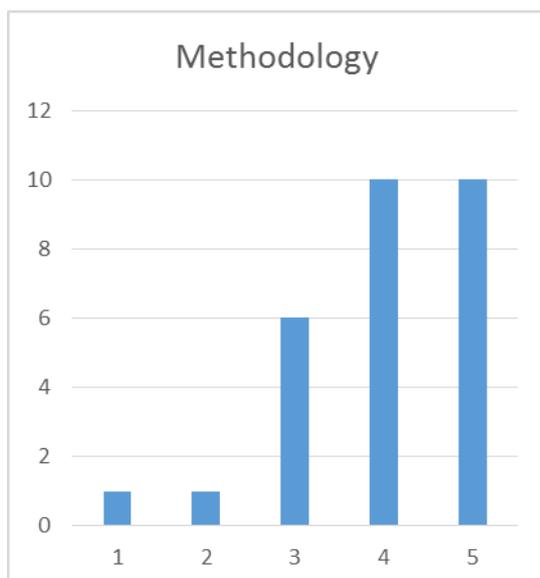
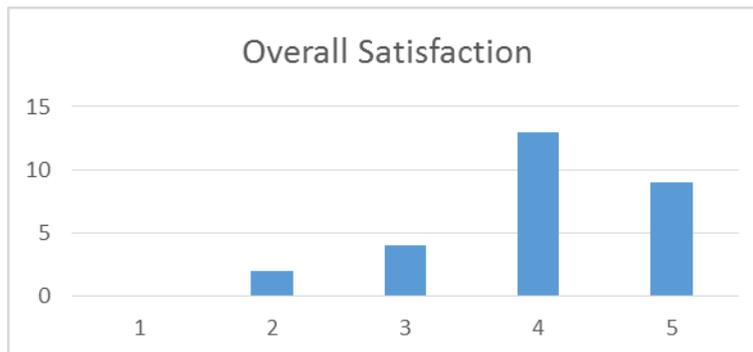
At the end of the previous session, the JRC team distributed a feedback survey to all participants for completion before their departure. The results of the feedback from participants are presented in the following section.

The workshop ended with a general discussion during which all participants had an opportunity to share any remark about workshop process and content with the group. The general tone of the discussion reflected well the overall constructive attitude that prevailed throughout the workshop.

5 Feedback from participants

Most of the workshop participants (28/31) filled in a feedback form and delivered it to the JRC team. The feedback form included single answer questions (placed on a scale from 1 "very dissatisfied" to 5 "very satisfied") and open ended questions. The responses are summarised here. This section also responds to some of the questions and queries that were raised through these forms.

5.1 General results



Q1: Did you learn anything new at the workshop? If yes, what?

The overwhelming majority of participants responded positively to this question. As most had never been dealing with foresight previously, many participants reported they learnt about what foresight is and how extreme scenarios can be used to stimulate systemic thinking about the future and to enable the generation of tangible suggestions for action. For many, the methodology was new. Several also mentioned that they learned about the diversity of the Danube region from a variety of perspectives. Others mentioned that the exercise gave them interesting new insights on the Danube region and on the issues at hand. The participants also appreciated meeting people from different horizons that brought stimulating views to the table. The trans-disciplinary cooperation from different sectors was appreciated and its potential to provide some innovative further direction recognised. Finally, some people learned about the JRC.

Q2: What did you like about the workshop?

Overall, participants appreciated the positive atmosphere and the exchange of views and expertise among a broad range of experts that gave good networking opportunities. Several participants valued the participatory, collaborative and multi-sectorial approach of the activities that were carried out. The high level of diversity (different backgrounds and perspectives) and knowledge of the group that took part in the exercise were also appreciated. Finally, all participants found the JRC team very professional.

Q3: What did you dislike about the workshop?

On the down side, several participants mentioned that the motivation to organize the workshop and the way the outcomes will be used were not fully spelled out. Some participants mentioned they would have liked to receive the descriptions of the different scenarios and more information about foresight methods in advance, to better prepare themselves for the exercise. Although the organizing team acknowledges that the invitation could have been more explicit on the methodology applied (beyond mentioning the participatory nature and the objectives of the exercise), it is important to note that there were no expectations that participants would study before the workshop. On the contrary, the objective was to create a framework that allowed participants to apply their different sets of knowledge and experience in a context that was geographically close to them and in a somewhat distant future (2040). The substantial volume of content that was generated during the workshop is a demonstration of that. One participant mentioned it was difficult to act on personal behalf rather than on behalf of the institution. Another was of the opinion that the "sustainable perspective" was a value-driver somewhat imposed on the identification of measures. On this matter, the workshop organizers confirm that such perspective was chosen to encourage participants to take a broader view of analysis and implementation of the different issues so that suggestions for action could be workable for the society and the environment, while delivering value to specific sectors of activity. The challenge was to find actions that would fit this set of challenging considerations. One participant mentioned that there could have been more specificity on concrete drivers of non-compliance and failure to meet good status in the Danube. Though we acknowledge the usefulness of such exercise, it would have required a dedicated step by step approach that could not be accommodated in one workshop. Two participants felt that the introduction was too long and the level of detail given for each scenario was too high, mentioning it was unnecessary and gave a confusing message. While acknowledging this, it is important to note that we had to cater to a very diverse group with very different levels of previous awareness about the JRC, the issue and the methodology. Also, the participants had the opportunity to put forward suggestions for the scenarios which have been taken on board by the team.

Q4: How can we improve?

A few suggestions were made on how to improve the workshop. Some participants would have liked to receive the participants list (and more background info on participants) and more supporting documents beforehand. Furthermore, some suggested that there could have been more participants from the private sector and from NGOs. These can all be addressed next time. One participant suggested that a follow up workshop could be organized to gather further measures, prepare the report and introduce ideas for the promotion and dissemination of the report. As mentioned during the workshop, the insights that were generated during the workshop are being harvested and analysed, and will be shared with participants for their comments before being published. Furthermore, we hope this community of practice continues to collaborate and exchange, beyond the duration of this workshop.

6 Information on participants

| Country | Affiliation |
|---------|--|
| HU | EUSDR Water Quality Priority Area PA4 Coordination Team, Budapest |
| HR | ISRIC - World Soil Information Wageningen |
| RS | Imperial College, London |
| RO | Romproiec Electro S.R.L., Cluj-Napoca |
| UA | National Academy of Sciences, Ukraine |
| Int. | ICPDR Secretariat, Vienna |
| Int. | ICPDR Secretariat, Vienna |
| AT | Bundeskanzleramt, Vienna |
| BA | Hydro-Engineering Institute, Sarajevo |
| HR | Hrvatske Vode, Zagreb |
| SK | Slovak Academy of Sciences, Bratislava |
| SI | Ministry of Infrastructure, Ljubljana |
| HU | Global Water Partnership Central & Eastern Europe, Budapest |
| SI | Slovene Chamber of Agriculture and Forestry - Institute of Agriculture and Forestry, Maribor |
| SI | TC Vode, Thematic Center for Water Research, Studies and Project Development, Ljubljana |
| AT | Environment Agency Austria, Vienna |
| AT | BOKU, Institut für Hydrobiologie und Gewässermanagement, Vienna |
| Int | International Sava River Basin Commission, Zagreb |
| MD | Water and Sanitation Expert of the Austrian Development Agency, Coordination Office for Technical Cooperation, Austrian Embassy Chisinau |
| SK | Slovak University of Agriculture, Nitra |
| SK | Slovak University of Agriculture, Nitra |
| HU | Hungarian Water Association, Budapest |
| RO | Business Development Group, Bucharest |
| AT | Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft, Vienna |
| UK | Imperial College, London |
| BE | Research Centre of the Flemish Government, Belgium |
| RS | Faculty of Technical Sciences, Novi Sad, Serbia |
| HR | Croatian Agency for the Environment and Nature, Zagreb |
| Int. | Organization for Economic Cooperation and Development (OECD) Paris |
| HU | VTK Innosystem, Budapest |
| Int. | European Commission DG Joint Research Centre |
| Int. | European Commission DG Joint Research Centre |
| Int. | European Commission DG Joint Research Centre |
| Int. | European Commission DG Joint Research Centre |
| Int. | European Commission DG Joint Research Centre |

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct information centres. You can find the address of the centre nearest you at: https://europa.eu/european-union/contact_en

On the phone or by email

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696, or
- by electronic mail via: https://europa.eu/european-union/contact_en

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website at: https://europa.eu/european-union/index_en

EU publications

You can download or order free and priced EU publications from EU Bookshop at: <https://publications.europa.eu/en/publications>. Multiple copies of free publications may be obtained by contacting Europe Direct or your local information centre (see https://europa.eu/european-union/contact_en).

The European Commission's science and knowledge service

Joint Research Centre

JRC Mission

As the science and knowledge service of the European Commission, the Joint Research Centre's mission is to support EU policies with independent evidence throughout the whole policy cycle.



EU Science Hub

ec.europa.eu/jrc



@EU_ScienceHub



EU Science Hub - Joint Research Centre



Joint Research Centre



EU Science Hub



Publications Office

doi:10.2760/919407

ISBN 978-92-79-98389-4