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Project acronym:	EcoDaLLi
Project title:	ECOsystem-based governance with DAnube lighthouse Living Lab for sustainable Innovation processes – EcoDaLLi
Call:	HORIZON-MISS-2021-OCEAN-02-04 – Danube river basin lighthouse – coordination activities
Programme:	HORIZON EUROPE
Start date of project:	01.01.2023
Duration:	42 Months

Deliverable 4.2

Report of contributions by the consortium to workshops and other gatherings, networking and support actions initiated or carried out by the European Commission services in the context of the Danube Lighthouse

Grant Agreement No.: 101093908

Funded by the European Union

Deliverable Name	Report of contributions by the consortium to workshops and other gatherings, networking and support actions initiated or carried out by the European Commission services in the context of the Danube Lighthouse
Deliverable Number	D4.2
Work Package	WP4
Associated Task	T4.3.2
Due Date	M36 (December 2025)
Completion Date	13.01.2026
Submission Date	14.01.2026
Deliverable Lead Partner	Partner 8 – DDNI

Dissemination Level		
PU	Public	X
SEN	Sensitive	

Change Control | Document History				
Version	**Date**	**Change History**	**Authors**	**Organization**
1.1	26.11.2025	First draft	Matei Simionov	DDNI
1.2	17.12.2025	Version sent to reviewers	Matei Simionov	DDNI
1.3	19.12.2025	Feedback from WP lead and internal reviewer 1	Carmen Neagu (MEWF) Bernarda Matijević (Draž Municipality)	MEWF Draž Municipality
2	28.12.2025	Implementation of Feedback	Matei Simionov	DDNI
2.1	30.12.2025	Formatting corrections by coordinator	Verena Höhn	SEZ
2.2	09.01.2026	Feedback from internal reviewer 2	Albert Scrieciu	GeoEcoMar
2.3	13.01.2026	Revised version	Matei Simionov	DDNI
2.4	14.01.2026	Final check by coordinartor	Verena Höhn	SEZ

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Abbreviations and Acronyms

CSA	Coordination and Support Action
ES	Ecosystem Services
EU	European Union
IA	Innovation Action
ICPDR	International Commission for the Protection of the Danube River
IUCN	International Union for Conservation of Nature
NBS	Nature-based solutions
NGO	Non-governmental Organisation
OECD	Organisation for Economic Co-operation and Development
PCT	Project Core Team
SDG	Sustainable Development Goal
UN	United Nations
UNDAF	United Nations Development Assistance Framework
UNEA	United Nations Environment Assembly
WP	Work Package

Executive Summary

The present report (D4.2) documents how EcoDaLLi and its partners have contributed to workshops, gatherings, networking and support actions organised or initiated by European Commission services in the context of the Danube & Black Sea Lighthouse, and how these activities relate to the four EcoDaLLi Living Labs (Upper, Middle, Lower Danube and Danube Delta). It draws on available Living Lab and event reports to provide a qualitative overview of contributions, the themes addressed and the main outcomes for Danube Lighthouse governance and networking.

Through the documented activities, EcoDaLLi supported the Mission Ocean and the Danube and Black Sea Lighthouse objectives by bringing together policy makers, researchers, businesses and civil society around climate change, water systems, biodiversity, nature-based solutions and innovation. The Living Labs emerged as practical governance and networking platforms, connecting scientific evidence with local knowledge, testing approaches for stakeholder engagement, and helping to shape shared visions and roadmap elements for a Danube innovation ecosystem. Common messages include the need for integrated, cross-border approaches, stronger involvement of local communities and youth, enhanced skills and capacities (including digital and innovation-related skills), and a more systematic engagement of SMEs and business models linked to ecosystem services and the blue–green economy.

1. Project Information

1.1. Introduction – EcoDaLLi Project

The 2030 and 2050 Green Deal goals push the European Union (EU) towards integrated solutions and clear targets. EcoDaLLi, embedded in the Mission 'Restore our Ocean, Seas and Waters by 2030' will help achieve freshwater targets of the European Green Deal, integrating a systemic approach for restoration, protection and preservation for the entire Danube Basin, provided by coordinated actions.

The main objective of EcoDaLLi is to centralise Danube governance structures in terms of innovative solutions for improved ecological restoration, protection and preservation of the Danube basin and its Delta by fostering a stronger innovation ecosystem within a well-connected Practices Living Lab System, supported by a digital Portal, completely linked to the Mission Implementation Platform and the Mission Charter.

Innovative solutions open new opportunities for better water restoration, taking into consideration social innovation aspects, reducing climate change effects and reducing also costs. Nature-based Solutions (NBS) are an innovative approach offering clear benefits for mitigating global warming and biodiversity loss but present substantial challenges for policymakers. For NBS to effectively address climate change impacts, such as flooding, urban heat, and biodiversity loss, it must be widely accepted by policymakers, urban planners, local communities, and private stakeholders, incorporated into urban planning, and coordinated with other policies. By delivering multiple benefits, NBS can facilitate coordinated services across various policy sectors (Kauark-Fontes et al., 2023; Bisaro & Meyer, 2022). However, challenges to NBS implementation include ensuring the long-term sustainability of projects, addressing knowledge gaps, and developing methods for stakeholder engagement. Additional barriers involve the scarcity of practical, targeted guidance for evaluating and assessing the diverse benefits of NBS (Giordano et al., 2020; Raymond et al., 2017), the need for action-oriented frameworks to mainstream NBS (Connop et al., 2016), the lack of specific planning guidelines (Mendes et al., 2020), and insufficient data at various stages of NBS implementation.

Within this framework, Work Package 4 – “Danube river basin Lighthouse governance and networking” brings together knowledge generated in WP2 and WP3 and channels it through Living Lab structures. WP4 aims to (i) set up a community for collective knowledge sharing, (ii) develop and test a Practices Living Lab System on four sectors of the Danube river, (iii) co-create knowledge inputs for action plans using Living Labs as tools for effective governance, (iv) assess the potential of the PLLS to illustrate and strengthen Mission objectives, and (v) facilitate discussions on the Danube Lighthouse implementation charter.

1.2. Scope of Deliverable D4.2

Deliverable D4.2 – “Report of contributions by the consortium to workshops and other gatherings, networking and support actions initiated or carried out by the European Commission services in the context of the Danube Lighthouse” is produced under WP4 and is

a public (PU) report. Its overall purpose is to document and analyse how EcoDaLLi partners and Living Labs have contributed to European Commission and Danube Lighthouse–related events that support the implementation of the Mission in the Danube river basin.

More specifically, D4.2:

- provides an overview of the main workshops, gatherings, networking and support actions organised or initiated by the European Commission and related services in the context of the Danube Lighthouse, where EcoDaLLi partners have contributed;
- describes the nature of these contributions (e.g. organization of sessions, presentations, participation in panels, facilitation of discussions, Living Lab inputs);
- links these activities to the EcoDaLLi Living Lab system and to the objective of strengthening governance, innovation ecosystems and stakeholder engagement at Danube basin level;
- draws on the four Living Lab reports and other available project material to identify preliminary implications for governance, entrepreneurship and innovation support, sharing-economy and collaborative approaches, and training and capacity-building needs.

The deliverable provides, first, a brief orientation to the EcoDaLLi project and WP4, clarifying why D4.2 is produced and how it fits within the wider Mission Ocean and Danube Lighthouse framework. It then explains the approach used, outlining which information sources were analysed and what type of insights can realistically be drawn from them. Building on this, the report offers an overview of EcoDaLLi's participation in European Commission and Danube Lighthouse workshops, gatherings and networking or support actions, highlighting how and where the consortium has contributed. A dedicated part of the deliverable presents the main activities and outcomes of the four Danube Living Labs, showing how they function as concrete governance and networking platforms. These elements are then brought together in a cross-cutting analysis that identifies key messages on governance, innovation and entrepreneurship, sharing-economy and collaboration, and training and capacity-building needs in the Danube context.

The main takeaways of the report are that EcoDaLLi helps to connect local and regional actors with Mission-level processes, that the Living Labs are emerging as useful spaces for co-creation and dialogue, and that stakeholders consistently call for more integrated, cross-border approaches, stronger community and SME involvement, and better skills and capacities to implement nature-based and innovation-driven solutions.
The report concludes by turning these lessons into practical recommendations for strengthening the implementation of the Danube Lighthouse and Mission Ocean, and for making future monitoring and reporting of such contributions more effective and transparent.

2. Approach and Data Availability

2.1 Information sources used

The analysis in this report is based on material that has been produced during the EcoDaLLi project in different work packages, together with reports from key events and Living Lab activities. These documents give the background and factual information needed to describe

how the project has contributed to Danube & Black Sea Lighthouse workshops, gatherings, networking and support actions.

The first group of sources comes from earlier project work on stakeholder engagement and Nature-based Solutions in the Danube basin. This includes reports on regional workshops held in the Upper, Middle and Lower Danube and in the Danube Delta. They explain how the workshops were organised, who took part, how discussions were structured and what participants said about governance, funding, stakeholder involvement and training needs related to nature-based and innovative solutions. Another important source is a project report that maps the main organisations involved in research, public administration, business and civil society across the four EcoDaLLi areas. It also introduces the idea of the Practices Living Lab System and describes why Living Labs are useful as spaces where these actors can meet and work together. We also draw on project reports that describe sessions organised by EcoDaLLi as part of other established events. These reports set out the aims, preparation, participation and results of workshops focused on topics such as ecosystem restoration and biodiversity, reduction of water pollution, and circular or blue economy.

The second main group of sources consists of minutes and summaries from key Mission Ocean and Lighthouse meetings. This includes documentation from the launch of the Danube & Black Sea Lighthouse and from the event that presented the EcoDaLLi Living Lab system. These minutes record the main speeches, messages about Mission goals, and discussions on how to organise the Lighthouse, mobilise stakeholders and support innovative solutions in the Danube and Black Sea basins. A third group of sources is formed by detailed reports from the three regional Living Labs and the Danube Delta Living Lab.

Finally, we use a report from a regional stakeholder assembly organised under a related Mission support project in Batumi, which was closely linked to the Danube & Black Sea Lighthouse and involved EcoDaLLi. This document describes plenary sessions, roundtables and field visits on water systems, biodiversity, climate change, nature-based solutions and innovation ecosystems, and lists key challenges and proposed actions that are relevant for the roadmap for Mission implementation in the Danube and Black Sea region.
Together with supporting material such as agendas, presentations and participant lists, these sources provide the main evidence used in this deliverable to describe EcoDaLLi's contributions to Mission-related workshops and networking actions and to identify common messages and needs for governance and innovation in the Danube basin.

2.2 Main data gaps and limitations

The analysis in this report is based on documents that were produced for different purposes during the project (workshop and Living Lab reports, stakeholder mappings, minutes of Mission and Lighthouse meetings, event summaries, etc.). These sources offer rich qualitative insights into how activities were organised, who took part and which messages and ideas emerged. At the same time, the way the information is presented in each document naturally shapes what can be analysed and compared in this report.

Most of the material is narrative in nature. It focuses on discussion points, challenges, opportunities and recommendations rather than on detailed quantitative indicators such as the number of new partnerships formed or specific policy changes. This is well suited to

understanding how stakeholders perceive Mission-related topics and how they interact in workshops and Living Labs. However, it also means that the results of D4.2 are described mainly in terms of themes, examples and lessons learned, rather than in numbers. The level of detail is not identical across all documents. Some reports include full agendas, participant lists and structured summaries for each session, while others provide a more concise overview of key messages. Likewise, some events and contributions are documented in depth, whereas others are covered more briefly. For this reason, certain parts of the analysis can go into more detail, while other parts are presented as short case descriptions or illustrative examples.

This report focuses on activities and contributions for which consolidated documentation was available at the time of drafting. It therefore highlights a set of well-documented workshops, Living Labs and Mission-related events that are considered representative of EcoDaLLi's role in the Danube & Black Sea Lighthouse. The intention is not to cover every interaction in which partners may have been involved, but to use the available evidence to show clearly how the project supports governance, networking and innovation in the Danube basin.

2.3 What can and cannot be concluded from the available data

Because several activities described are relatively recent, many of their longer-term effects are still in progress. In most cases, it is possible to present immediate outputs (such as identified challenges, proposed actions, new contacts or ideas for future collaboration), while follow-up steps and impacts will continue to evolve beyond the timeframe of this report. In this context, D4.2 should be read as a qualitative synthesis of documented experiences and contributions, offering a coherent picture of main messages and emerging needs that can support the further implementation of the Danube & Black Sea Lighthouse

3. EcoDaLLi in EC / Danube Lighthouse Workshops and Networking Actions

EcoDaLLi partners have taken part in a large number of Mission Ocean and Danube & Black Sea Lighthouse events, as well as in related networking and support actions. These include high-level Mission fora, Lighthouse launch and governance meetings, cross-project and cross-basin workshops, and regional stakeholder events around the Danube and the Black Sea.

EcoDaLLi's contributions range from speaking roles and project presentations to co-organisation of events, panel moderation, and promotion of the Mission Charter and Living Lab results. In many cases, partners also used these occasions to present Nature-based Solutions guidelines, Living Lab experiences and policy recommendations, and to build links with other Mission projects and coordination actions.

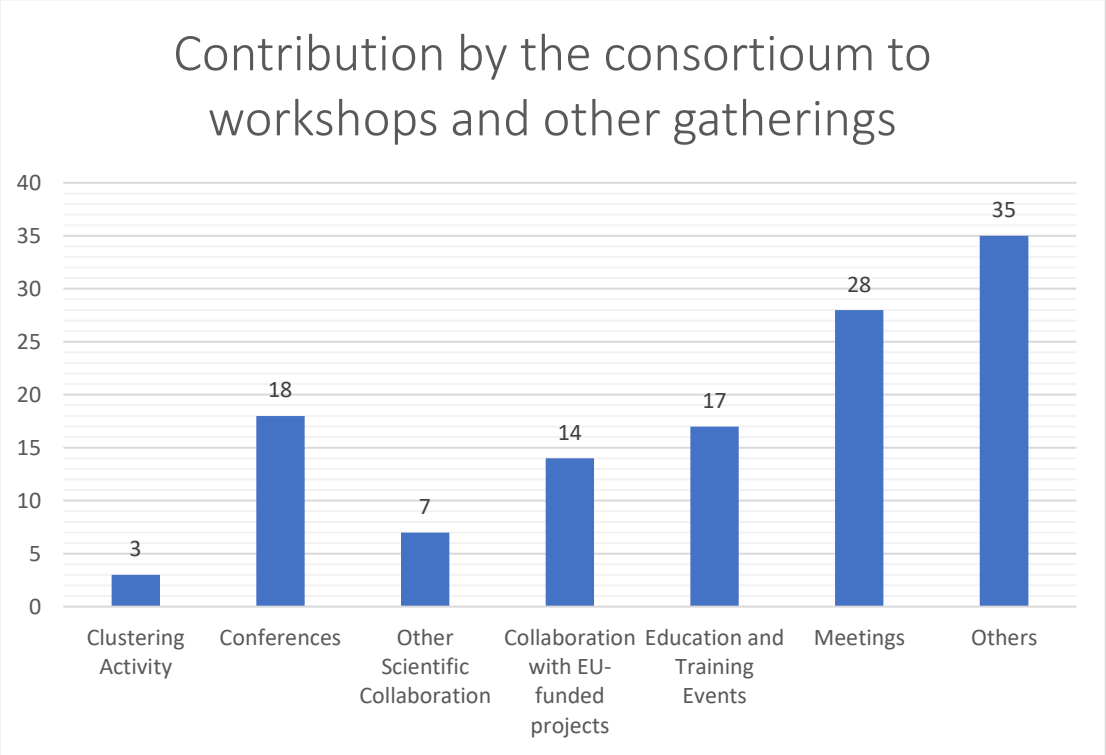

Figure 1 Distribution of consortium contributions across event categories.

Types of workshops and networking actions considered

For this report, we focus on the EC / Lighthouse-related workshops, gatherings, networking and support actions where EcoDaLLi was directly involved. These actions fall into four main types, illustrated with concrete examples from the activity tables.

Table 1 Main types of EC / Lighthouse networking actions with EcoDaLLi participation

Type of action	Examples of events	EcoDaLLi role
EC-level Mission and Lighthouse fora	•*Speaker at the Mission Ocean Forum in Brussels, Belgium* (two editions) • *Mission Ocean Conference Under Danish EU Presidency* • *European Ocean Days: Workshop "Mission Restore Our Ocean and Waters Forum"* • *European Maritime Days in Cork, Ireland: Mission Ocean Workshop "Mission Ocean – Unlocking Phase2 Scalable Governance"*	Present EcoDaLLi and the Danube & Black Sea Lighthouse; explain the Living Lab system, stakeholder mapping and policy recommendations; promote the Mission Charter; participate in panel debates and Q&A.
Danube & Black Sea Lighthouse governance and thematic events	*Co-Organisation of the Danube Lighthouse Launch in Bucharest, Romania* • *Organisation of the event "Mission Ocean – Common Action Plan Danube Lighthouse and Black Sea Strategy" in the Deltas & Wetlands International Symposium* • *Meet & Share: Mission Restore our Oceans and Waters support actions*	Co-design programmes and sessions; moderate or introduce panels; bring in Danube stakeholder perspectives and Living Lab messages on river–sea connectivity, biodiversity, NBS and innovation.
Cross-project / cross-basin networking and support actions	*Project presentation at Atlantic & Arctic Lighthouse Weekly Hour (online)* • *Participation in a Mission Ocean event: The Mediterranean Lighthouse, organised by the European Commission in close cooperation with the Italian Ministry* • *Presentation of EcoDaLLi during DaWetRest Kick-Off meeting* • *Project presentation at DaWetRest Workshop in Velika Gorica, Croatia* • *DaWetRest stakeholder workshop* • *Presentation at DaWetRest General Assembly of Beneficiaries Presentation of EcoDaLLi during DANSER Kick-Off meeting* • *DANSER initial Middle Danube Demo Meeting* • *DaWetRest Bulgarian-Romanian local stakeholder meeting under the Middle Danube Demo in the Lower Danube*	Present EcoDaLLi, Danube Living Labs and policy recommendations; exchange experience with Innovation Actions (DaWetRest, DANSER, etc.); discuss how Danube pilot sites, wetlands and river stretches can serve as demonstration areas; identify joint actions and synergies.
Support and capacity-building for Mission actors Type of action	*Short project presentation at NCP4Industry project meeting in Lisbon, Portugal* • *Staff Exchange Program between NCPs in Poland*	Raise awareness of EcoDaLLi and the Danube & Black Sea Lighthouse among National Contact Points, students and

	– Warsaw and Wroclaw • NCP Training in Brussels, with participation representatives / NCPs from IDEALIST and NCP4Industry HE Projects • Interactive student workshop on EU projects and Mission Ocean (AAAGORA and SOS2Learn, cascade funding promotion)	wider audiences; explain funding and collaboration opportunities; encourage future applications and engagement with Mission projects.

In addition, the activity tables include the “Lower Danube Living Lab on Water Systems in Tulcea, Romania”, the “Danube Delta Living Lab on Biodiversity in Tulcea, Romania” and the “Middle Danube Living Lab on Climate Change in Osijek, Croatia”, which are treated in detail in Chapter 4 but are also part of the broader Lighthouse networking landscape.

Qualitative indications of visibility and influence

The events listed above show that EcoDaLLi has been present at key moments of Mission and Lighthouse development:

- By acting as “Speaker at the Mission Ocean Forum in Brussels, Belgium”, EcoDaLLi representatives introduced the Danube & Black Sea Lighthouse, highlighted the role of EcoDaLLi as coordination and governance project, and presented early ideas on Living Labs and innovation ecosystems to a broad European audience.

- Through the “Co-Organisation of the Danube Lighthouse Launch in Bucharest, Romania”, EcoDaLLi helped shape the first official presentation of the Lighthouse, including agenda design, speaker invitations and framing of discussions around governance, funding and stakeholder engagement.

- During the “Organisation of the event ‘Mission Ocean – Common Action Plan Danube Lighthouse and Black Sea Strategy’ in the Deltas & Wetlands International Symposium”, partners used a well-known scientific forum in Tulcea to connect Danube stakeholders, Innovation Actions and EC representatives around a common action plan, combining plenary talks with the launch of the EcoDaLLi Living Lab system.

- EcoDaLLi has regularly joined cross-Lighthouse and cross-basin exchanges, such as the “Project presentation at Atlantic & Arctic Lighthouse Weekly Hour (online)” and participation in “a Mission Ocean event: The Mediterranean Lighthouse, organised by the European Commission in close cooperation with the Italian Ministry…”. These meetings allow Danube partners to learn from other sea basins and to share Danube experiences on river–sea links, wetlands and governance.

- Close cooperation with Innovation Actions is visible in events like “Presentation of EcoDaLLi during DaWetRest Kick-Off meeting”, “DaWetRest stakeholder workshop”, “Presentation at DaWetRest General Assembly of Beneficiaries”, “Presentation of EcoDaLLi during DANSER Kick-Off meeting”, “DANSER initial Middle Danube Demo Meeting” and “DaWetRest Bulgarian-Romanian local stakeholder meeting under the Middle Danube Demo in the Lower Danube”. In these events, EcoDaLLi presents the

Living Lab concept and stakeholder mapping, while DaWetRest and DANSER bring concrete restoration and navigation pilots; together they explore how to use these pilots as Mission demonstration sites.

- Support and training elements appear in actions such as “Short project presentation at NCP4Industry project meeting in Lisbon, Portugal”, “Staff Exchange Program between NCPs in Poland –Warsaw and Wroclaw”, “NCP Training in Brussels, with participation representatives / NCPs from IDEALIST and NCP4Industry HE Projects” and the “Interactive student workshop on EU projects and Mission Ocean (AAAGORA and SOS2Learn, cascade funding promotion)”. Here EcoDaLLi is used as an example to explain Mission Ocean, funding instruments and the role of Lighthouses to NCPs and students.

In a nutshell, these workshops and networking actions give EcoDaLLi a “double role”: they allow the project to bring Danube and Living Lab messages into EU-level Mission debates, and they help to translate Mission objectives back to local and regional actors by explaining them in concrete, in accessible terms.

4. Contributions from the Danube Living Labs

This chapter presents the main contributions of the four Danube Living Labs – Upper Danube, Middle Danube, Lower Danube and Danube Delta to the Danube & Black Sea Lighthouse (Figure 2). Each Living Lab is treated as a separate event, with its own context, focus and set of participants. The following sections describe how the Labs were organised, who took part, which topics were discussed and what key messages and ideas emerged. Together, they show how the Living Labs act as concrete spaces where local, regional and national actors can meet, share knowledge and co-design actions that support the objectives of Mission Ocean and Waters in the Danube basin.

Figure 2 Map of the four Living Labs in the Danube & Black Sea Lighthouse

4.1 Upper Danube Living Lab

The Upper Danube Living Lab was a collaborative framework that brought together public authorities, research and educational institutions, NGOs, businesses and other local and regional actors to address common challenges in the Danube region. It provided a space for testing ideas, exchanging knowledge and jointly developing practical solutions related to sustainable development, innovation and regional cooperation. This report presents the role and structure of the Living Lab, the main topics it addressed and the way stakeholders were involved in its activities. It also summarised the key discussions and results from the most recent workshop, which focused on understanding needs in the region, strengthening support for SMEs and improving coordination between different initiatives. The living lab was intended as an overview for policymakers, practitioners and other interested stakeholders who wished to understand the aims and added value of the Upper Danube Living Lab.

The two-day Upper Danube Living Lab brought together representatives of public authorities, research and educational institutions, NGOs and businesses. It was organised to better understand regional needs, strengthen cooperation among key actors and explore ways to support sustainable, innovation-driven development. Further, this report presents the main

outcomes of these two days, including the challenges and opportunities identified, the perspectives shared by participants, and the concrete ideas and actions proposed for the Upper Danube region.
The overall flow of the Living Lab is summarised in Table **2**, which groups the activities into several blocks from the opening group work on values and challenges to the roadmap presentation and next steps.

Table 2 Main components of the Upper Danube Living Lab

Block of the workshop	Format & main activities	Purpose in the Living Lab process
Opening and group exercise on values and challenges	Plenary introduction followed by mixed group work to list values, challenges, goals, actions and priorities for the Danube innovation ecosystem, and to draft short vision statements.	To build a shared understanding of what "good" innovation in the Danube region should look like and to surface common problems such as skills gaps, governance fragmentation and limited engagement.
Consolidation of Day 1 findings	Plenary synthesis highlighting recurring themes: sustainable development, stakeholder engagement, capacity-building, cross-border collaboration, SME support, governance alignment and education.	To turn group outputs into a concise list of key themes that can guide the roadmap work on Day 2.
Day 2 – Map / Understand	Brainstorming on "what works" and "what is missing" in the current ecosystem; identification of strengths (Interreg projects, existing cooperation, pilot actions) and obstacles (project sustainability, limited integration of innovations, weak cooperation between upper and lower Danube, policy and communication gaps).	To take stock of existing initiatives and barriers and to ensure that the roadmap builds on real experience, not just abstract ideas.
Prioritisation – "Now–How–Wow"	Ideas classified by feasibility and impact using the "Now–How–Wow" matrix; examples include promoting open science and knowledge-transfer institutions, using EUSDR Priority Areas as facilitators, enhancing networking, investing in education, clusters and incentives for innovation.	To identify which actions can be started immediately, which require more effort, and which have the potential to significantly change the ecosystem if implemented.
Implementation strategies	Groups developed concrete strategies, such as the "10 Steps to Success" youth-network plan and a "Strategy for Sustainable Engagement" focused on NGOs, private investment, citizen education and better use of funding streams.	To translate ideas into practical steps with target groups, resources and sequences, making the roadmap usable for future work.

Roadmap presentation and next steps	Participants placed key actions on a shared roadmap with short-, medium- and long-term milestones and agreed follow-up measures such as regular forums, better visibility, youth-led initiatives and cross-border policy support.	To create a joint roadmap for the Danube innovation ecosystem and outline how partners will continue collaboration beyond the workshop.

The workshop brought together a wide range of actors: decision-makers, universities and research bodies, SMEs and investors, NGOs and civil society, youth and local communities. The main stakeholder groups and their roles are summarised in Table **3**.

Table 3 Main stakeholder groups in the Upper Danube Living Lab

Stakeholder group	Role in the innovation ecosystem	Contribution to the Living Lab discussions
Decision-makers and public authorities (local, regional, national, macro-regional)	Set policy and regulatory frameworks, align funding and strategies (e.g. with EUSDR and Mission Ocean), and support cross-border cooperation.	Highlighted the need for policy alignment, indicators and long-term support for innovation and restoration; discussed how to integrate Living Lab outcomes into strategies and programmes.
Universities, research institutions and educators	Provide scientific evidence, methods and training; link research to policy and business; host youth and innovation programmes.	Stressed technology transfer, open science, new study programmes and the need to use pilots and EU projects as learning platforms for the region.
SMEs, start-ups, business support organisations and investors	Develop and scale market-viable solutions; create jobs and services linked to restoration, blue/green economy and digital innovation.	Pointed to gaps in competitiveness, access to networks and finance; supported ideas such as SME–R&D “speed-dating”, cluster development and youth competitions for innovative business ideas.
NGOs, environmental organisations and civil society	Represent community and environmental interests; help with awareness, advocacy and bottom-up initiatives.	Emphasised citizen engagement, communication, education and the need for clearer information on policies; promoted bottom-up strategies and stakeholder advocacy.
Youth, students and innovators	Bring new ideas, energy and digital skills; key to the long-term success of the ecosystem.	Proposed youth networks, summer schools and competitions; were central in the “10 Steps to Success” plan and in bridging generational gaps in ecosystem awareness.
Local communities and media	Provide local knowledge and test grounds for solutions; help communicate Mission and Lighthouse activities to the wider public.	Underlined the importance of understanding local contexts, involving communities in projects and using media and outreach programmes to increase acceptance of innovations.

The main themes and messages that emerged from the discussions are brought together in Table 4.1-3. They echo issues that appear in other Living Labs but are here framed explicitly in terms of building a Danube-wide innovation ecosystem.

Table 4 Main themes and messages from the Upper Danube Living Lab

Theme	Key messages from the Living Lab	Illustrative actions from the workshop
Capacity-building and skills	Innovation in the Danube region needs stronger skills in digitalisation, AI, ecological restoration and nature-based solutions, both in public institutions and in SMEs.	Training programmes on digital and AI skills and NBS; new study programmes; staff exchanges and peer-learning activities; youth-focused summer schools and competitions.
Cross-border and cross-sector cooperation	Many challenges (restoration, pollution, innovation gaps) are shared along the Danube; regions need better coordination and more consistent practices.	Use EUSDR Priority Areas as facilitators; enhance networking across the Danube; develop transboundary agreements on water management; regular cross-border meetings and joint initiatives.
Support for SMEs and the innovation ecosystem	SMEs need support structures, access to knowledge, finance and networks to turn innovations into market-viable solutions and to close regional gaps.	SME–R&D “speed-dating” events; flagship projects; innovation clusters; involvement of the financial sector; business models for youth programmes; better communication of project results to businesses.
Governance and policy alignment	Policies, standards and funding streams across the Danube are fragmented; better alignment is needed to support long-term innovation and environmental goals.	Develop key performance indicators; integrate policies; coordinate existing funding streams; use EUSDR as promoter of innovation; strengthen advocacy so stakeholders can influence decision-makers.
Engagement, education and public acceptance	Continuous engagement is hard to maintain and public understanding of EU programmes and sustainability benefits is limited.	Youth connector initiatives; citizen education and awareness campaigns; local community programmes; public engagement and media outreach to make Danube initiatives more visible and acceptable.

4.2 Middle Danube Living Lab

The Middle Danube Living Lab took place in Osijek, Croatia, on 11–12 June 2024 and focused on climate change impacts on agriculture and river basins in the Middle Danube region. It was organised as part of the EcoDaLLi Practices Living Lab System and brought together experts and stakeholders from universities and research institutes, local and regional authorities, national services, national parks, EU programmes and Mission projects (Table **5**).

Table 5 Main stakeholder groups in the Middle Danube Living Lab

Stakeholder group	Examples from the event	Main roles in the Living Lab
Research and academia	Faculty of Mechanical Engineering and Naval Architecture (University of Zagreb); University of Novi Sad; Faculty of Agrobiotechnical Sciences Osijek (FAZOS); IPCC focal point.	Provide data and scientific analysis on climate trends, river basin impacts, agriculture and mitigation; explain uncertainty and need for integrated approaches.
Local and regional authorities	Municipality of Draž (Mayor); Osijek-Baranja County (Deputy Mayor); Split-Dalmatia County.	Bring in local priorities and responsibilities, explain governance and funding constraints, and show how climate and restoration projects link to local development.
National services and protected areas	Croatian Meteorological and Hydrological Service; National Parks of Montenegro; Kopački Rit National Park managers.	Present climate observations and forecasts; describe pressures on wetlands, forests and lakes; explain conservation and management measures.
EU and national support agencies	Agency for Mobility and EU Programmes (Horizon Europe NCP structure).	Explain how stakeholders can access Mission and Horizon Europe funding and support services.
Mission and Lighthouse projects	DaWetRest, DALIA, DANUBE4all, EcoDaLLi partners.	Share practical examples of wetland and floodplain restoration, constructed wetlands, restoration planning and smart mobility; show how projects involve communities.
Local communities and economic actors	Representatives from municipalities visited during the field trip (Draž and Batina) and local initiatives linked to the projects.	Show on-the-ground impacts of restoration and climate measures; discuss community needs, benefits and challenges.

The overall aim of the Living Lab was to look at how climate change is already affecting the Danube basin and what this means for local communities, ecosystems and economic activities, especially agriculture. Presentations on the first day set the scene: speakers introduced the EcoDaLLi project and the EU Mission “Restore our Ocean and Waters” and provided scientific overviews of global and regional climate trends, hydrological changes in the Danube basin and their consequences for wetlands, forests and protected areas.

Two panel discussions formed the core of the event. The first panel, “Protection of local communities and ecosystems from extreme events – problems and examples of good practice”, highlighted how floods, droughts and other extremes are already affecting soils, forests and rural areas. Panelists underlined the need to combine grey and green infrastructure, to value local knowledge and to strengthen education and awareness, especially among young people and local decision-makers. The second panel, “Development of climate change mitigation measures”, showcased Mission-related projects such as DaWetRest, DALIA and DANUBE4all and discussed how their work on wetland and floodplain restoration,

constructed wetlands and basin-wide restoration planning can support climate mitigation and adaptation in the Middle Danube.
Throughout the day, the Living Lab used interactive tools to engage participants. Quizzes checked understanding of key messages and stimulated discussion, while a questionnaire invited participants to suggest social, environmental and techno-economic solutions for climate adaptation in river basins. These inputs were then reflected back to the panel, who commented on the importance of social innovation, conservation agriculture, sustainable forestry and better communication with citizens.

On the second day, a field visit to Kopački Rit National Park and to the municipalities of Draž and Batina allowed participants to see concrete examples of wetlands and riverine areas affected by climate change and restoration projects. The guided boat tour and on-site explanations illustrated how wetland protection and restoration contribute to biodiversity, flood protection and local quality of life, and how local authorities and communities are involved in these efforts.

The overall structure of the Middle Danube Living Lab is summarised in Table **6**, which groups the event into the main blocks of the programme (opening and context-setting, scientific and policy inputs, the two thematic panels, interactive elements and the field visit).

Table 6 Main components of the Middle Danube Living Lab

Day / block	Format & main contributors	Scope
Day 1 – Opening & context	Welcome by EcoDaLLi lead (Hrvoje Mikulčić); presentations from the University of Zagreb (Neven Duić), Mayor of Draž, Deputy County Mayor of Osijek-Baranja, and the European Commission (Mission Ocean).	To set the scene: explain EcoDaLLi and the Danube & Black Sea Lighthouse, underline the importance of wetlands and biodiversity, and show how Mission Ocean and the Green Deal relate to the Danube region.
Day 1 – Scientific and policy inputs	Presentations from Croatian Meteorological and Hydrological Service, IPCC focal point, National Parks of Montenegro, and the Agency for Mobility and EU Programmes.	To provide data and examples on climate trends, hydrological impacts, biodiversity pressures and available EU support mechanisms for research and innovation.
Day 1 – Panel 1: Protection of local communities and ecosystems from extreme events	Panel with speakers from University of Novi Sad, CEKOM, FAZOS and Split-Dalmatia County, plus an open discussion based on a questionnaire on social, environmental and techno-economic solutions.	To discuss how floods, droughts and other extremes affect soils, forests, agriculture and communities, and to collect ideas on solutions and priorities from participants.
Day 1 – Panel 2: Development of climate change mitigation measures	Panel with representatives of DaWetRest, DALIA, DANUBE4all and EcoDaLLi (smart mobility & SMEs), followed by a discussion on benefits for local communities.	To show how Mission projects on wetland and floodplain restoration, constructed wetlands and basin-wide restoration planning can support mitigation and adaptation in the Danube, and how to involve local actors.

Interactive elements (Day 1)	Two quizzes related to presentation content; short questionnaire on climate solutions; interactive questions shown in the room.	To check understanding, keep attention high and collect participants' own ideas; to create a more informal atmosphere and support networking.
Day 2 – Field visit	Boat tour in Kopački Rit National Park; visits to Draž and Batina to see local initiatives linked to the projects.	To see concrete examples of wetland conservation and local projects; to connect the conference messages with real landscapes, communities and management challenges.

The main discussion points from the presentations, panels and field visit are synthesised in Table **7**, which groups them into key themes, the challenges identified by participants and the types of solutions proposed. This table makes it clear that, across different sessions, the same issues kept reappearing such as climate impacts on agriculture and river basins, the need to protect communities and ecosystems from extreme events, the role of Mission projects, community involvement and education and that these were consistently linked to concrete response options like nature-based solutions, better basin governance, stronger communication and support for local actors.

Table 7 Main themes and messages

Theme	What participants highlighted	Types of solutions discussed
Climate impacts on river basins and agriculture	Warming trends, more frequent droughts and floods, soil degradation, loss of wetlands and biodiversity in the Danube basin.	Conservation and climate-smart agriculture; integrated river basin management; wetland and floodplain restoration; better use of climate data and scenarios for planning.
Protection of local communities and ecosystems from extremes	Local communities face floods, droughts and forest damage; wetlands and national parks are under pressure from drying, vegetation changes and pests.	Combining grey and green infrastructure; strengthening early warning and education; involving communities in designing measures; using nature-based solutions such as restored wetlands as buffers.
Role of Mission projects and innovation	Projects like DaWetRest, DALIA and DANUBE4all show concrete restoration and innovation actions but need stronger links to local governance and funding.	Use project demo sites as examples and training spaces; replicate good practices in new locations; support SMEs and local actors to take part; use EcoDaLLi Living Labs as a bridge between projects and territories.
Community involvement and communication	Local people have strong knowledge but often lack organisation and access to funding; without early involvement they may resist changes or feel excluded.	Invest in communication and co-creation from the start; create channels for communities to suggest solutions (questionnaires, Living Labs); help communities organise and apply for funds;

		continue dialogue through follow-up actions.
Education, skills and support structures	Lack of education on environmental and climate topics remains a barrier; many potential applicants need help to use Horizon Europe and Mission tools.	Strengthen climate and environment education for youth and decision-makers; use NCPs and agencies to support applications; develop training and capacity-building through EcoDaLLi and partner projects.

4.3 Lower Danube Living Lab

The Lower Danube Living Lab on Water Systems took place in Tulcea as part of the 31st edition of the "Deltas and Wetlands" scientific event, which brought together around 200 participants onsite and online. Around 75 people took part in the EcoDaLLi Living Lab sessions, representing project partners and local, regional and national stakeholders.

As described in Table **8** the Living Lab was organised by the Ministry of Environment, Waters and Forests of Romania (MEWF), in cooperation with the Tulcea County Prefecture and the Danube Delta National Institute. It was chaired by the Deputy General Director for Waters at MEWF. The discussions were held in three groups focusing on social, economic and environmental aspects of water systems, with a strong emphasis on local needs and local communities

Table 8 Main components of the Lower Danube Living Lab on Water Systems

Block of the event	Format & main contributors	Scope
Context within "Deltas and Wetlands"	Lower Danube Living Lab organised within the 31st edition of the "Deltas and Wetlands" DDNI scientific event, with ~200 participants overall and around 75 taking part in the Living Lab session, including project partners and local, regional and national stakeholders.	To place the Living Lab in a wider scientific and policy community, and to connect EcoDaLLi and Mission-related discussions with an established forum focused on the Danube Delta and wetlands.
Opening and framing of the Living Lab	Session chaired by the Ministry of Environment, Waters and Forests (MEWF) and supported by Tulcea County Prefecture and Danube Delta National Institute; introduction to aims of the Lower Danube Living Lab on Water Systems and the importance of addressing local level and local communities.	To explain why the Living Lab is focusing on water systems in the Lower Danube, highlight the role of local communities and set expectations for the group discussions.

Group discussions on water systems	Participants divided into three discussion groups focusing on social, economic and environmental aspects of water systems; debates on funding, programmes, bottom-up approaches, businesses linked to ecosystem services, community-based water management, education and cultural activities.	To identify concrete needs and opportunities related to water systems governance, with a strong emphasis on community involvement, sustainable economic models and awareness-raising.
Synthesis and follow-up messages	Key points from the groups were summarised around funding needs, design of targeted programmes, local initiatives, participatory approaches, sustainable practices and long-term community engagement; emphasis on continuing dialogue after the event.	To agree a shared set of messages and directions that can feed into future programmes, projects and policies, and to encourage ongoing collaboration beyond the Living Lab session.nvest in communication and co-creation from the start; create channels for communities to suggest solutions (questionnaires, Living Labs); help communities organise and apply for funds; continue dialogue through follow-up actions.

Participants (Table **9**) explored how to combine environmental protection with social and economic development in the Lower Danube region. Key messages stressed the need for better funding and targeted programmes, bottom-up solutions starting from communities, promotion of businesses linked to ecosystem services, community-based water management, education and culture-based awareness raising, and long-term community engagement.

Table 9 Main stakeholder groups in the Lower Danube Living Lab on Water Systems

Stakeholder group	Entities	Main roles in the Living Lab
National environmental and water authorities	Ministry of Environment, Waters and Forests (MEWF) representatives chairing and framing the Living Lab.	Provide policy and strategic perspective on water and biodiversity; link local messages to national programmes and Mission implementation.
Regional and local public authorities	Tulcea County Prefecture and other local/regional authorities participating in the event.	Bring in territorial priorities and constraints; ensure that Living Lab outcomes can inform county and local planning.
Research and scientific community	Danube Delta National Institute and other Romanian and international experts present at the “Deltas and Wetlands” event.	Provide scientific and technical knowledge on water systems, ecosystems and environmental pressures; support evidence-based discussions.

Local communities and NGOs	Local, regional and national stakeholders representing communities and civil society (as indicated by the mix of participants).	Share local knowledge, needs and expectations; highlight social impacts and community-level challenges; contribute to bottom-up solutions.
Economic actors and potential ecosystem-services businesses	Stakeholders interested in eco-tourism, organic farming, renewable energy and other nature-based economic activities.	Explore how economic development can support ecosystem services; identify opportunities for sustainable business models and partnerships.

4.4 Danube Delta Living Lab

The Danube Delta Living Lab on Biodiversity was held the following day within the same international symposium. It was chaired by the Danube Delta Biosphere Reserve Authority and moderated by the General Director of WWF Romania. The session started with a joint overview by all Innovation Action projects under the Danube & Black Sea Lighthouse, showing how their work supports biodiversity in the Danube River Basin.
Discussions were again organised in groups (Table 10), this time focusing on social, economic and biodiversity pillars. On the social side, participants stressed education, community involvement, policy advocacy, corporate responsibility and public outreach, including the use of media and citizen science to raise awareness

Table 10 Main components of the Danube Delta Living Lab on Biodiversity

Block of the event	Format & main contributors	Purpose in the Living Lab
Context and opening	Danube Delta Living Lab on Biodiversity held within the “Deltas and Wetlands” event; participation of MEWF and other stakeholders; session chaired by the Danube Delta Biosphere Reserve Authority and moderated by WWF Romania (as indicated in the report).	To frame biodiversity as a central theme for the Danube Delta, link the Living Lab to existing governance structures for the Biosphere Reserve and introduce the role of Mission and Lighthouse projects.
Presentation of Innovation Actions	Innovation Actions from the Danube & Black Sea Lighthouse presenting their contributions to biodiversity in the Danube River Basin.	To show concrete examples of projects and actions that support biodiversity, and to connect these initiatives with local and regional stakeholders.
Group work on social pillar	Discussions organised around education, community engagement, policy advocacy, corporate responsibility, public outreach and media/citizen science.	To identify how people and communities can be better informed and involved in biodiversity protection, and how communication and advocacy can be strengthened.

Group work on economic pillar	Discussions on sustainability, nature-based solutions and education as guiding principles for economic activities in the Delta.	To explore how economic development can be aligned with biodiversity goals, and how nature-based solutions can be supported and scaled.
Group work on biodiversity pillar	Focus on sustainable fisheries management and a clearer, more effective regulatory framework, including responsibilities, funding and monitoring.	To address specific ecological and regulatory challenges, especially related to fisheries, and to outline directions for improved rules and management.
Synthesis and actions to tackle challenges and needs	Joint reflection on stakeholder engagement, nature-based solutions and policy changes, with challenges, needs and possible actions listed.	To summarise across pillars which actions are most needed, and to point towards future work on engagement, NBS and legal frameworks within the Lighthouse.

The diversity of actors involved in the Lower Danube Living Lab is summarised in Table **11**, which shows how national authorities, regional and local administrations, the scientific community, NGOs, community representatives and economic actors were all present. The table underlines that the Living Lab was not a purely technical meeting, but a mixed governance space where policy-makers, experts and local stakeholders could discuss water systems from different perspectives and identify common priorities.

Table 11 Main stakeholder groups in the Danube Delta Living Lab on Biodiversity

Stakeholder group	Entities	Main roles in the Living Lab
National and basin-level authorities	Ministry of Environment, Waters and Forests; Danube Delta Biosphere Reserve Authority.	Provide governance framework and regulatory perspective; link Living Lab messages to national policies and basin-level strategies.
Research and scientific community	Scientists and experts participating in the “Deltas and Wetlands” community and Delta-related research institutions.	Contribute knowledge on biodiversity status, ecosystem services and ecological impacts; support evidence-based discussion under all three pillars.
Environmental NGOs	WWF Romania and other environmental organisations active in the region.	Advocate for strong biodiversity protection; bring experience with community work, campaigns and nature-based solutions; moderate discussions.
Local communities and resource users	Residents and resource users from the Danube Delta (e.g. fishers, tourism operators, local associations) represented in the discussions.	Share practical experience with resource use and conservation; identify conflicts and opportunities; co-define realistic measures and incentives.

Businesses and private sector	Companies and entrepreneurs interested in eco-tourism, sustainable products and corporate social responsibility.	Explore and commit to business models that support biodiversity; contribute to outreach and funding through CSR and partnerships.

5. Cross-cutting Findings and Implications

The previous chapters looked at EcoDaLLi's work from two main angles: how the project and its partners took part in Mission Ocean and Danube & Black Sea Lighthouse workshops and networking actions, and what happened inside the four Danube Living Labs as concrete spaces for dialogue and co-creation. This chapter brings those strands together. It does not repeat the detailed event descriptions, but looks across them to see what common messages, needs and opportunities appear again in different places and formats. The aim is to understand what these experiences tell us about governance in the Danube basin, how they support innovation and entrepreneurship, how collaboration and sharing of knowledge and resources can be strengthened, and which skills and capacities are most needed.

5.1 Living Labs as governance tools in the Danube Lighthouse

The Living Labs in the Upper, Middle and Lower Danube and in the Danube Delta are more than technical workshops: they work as practical governance spaces under the Danube & Black Sea Lighthouse. They bring together national, regional and local authorities, research organisations, NGOs, business actors and community representatives to discuss concrete problems and possible solutions for water systems, biodiversity and climate change.

Earlier analytical work on the Practices Living Lab System describes Living Labs as places where actors from the "quadruple helix" (public sector, research, business and civil society) can interact in a structured way around Mission topics. This is clearly visible in the concrete events:

- in Tulcea, the Lower Danube and Danube Delta Living Labs were linked to the "Deltas and Wetlands" symposium and involved around 75 representatives from project partners and local, regional and national stakeholders;
- in Osijek, the Middle Danube Living Lab on climate change gathered experts and decision-makers from universities, meteorological services, local authorities, national parks, EU programmes and Mission projects;
- in the Upper Danube, the Living Lab workshop used group work to bring together actors focused on innovation, SMEs, environmental restoration and macro-regional cooperation.

The different roles and characteristics of the four EcoDaLLi Living Labs are brought together in Table **12**, which compares their locations, main themes, stakeholder profiles, governance topics and types of outputs. This table makes it clear that, although each Lab has its own territorial focus and specific issues, they all function in a similar way as multi-actor platforms where stakeholders map problems, discuss priorities and generate concrete ideas and actions that can feed into Danube & Black Sea Lighthouse governance.

Table 12 Overview of Danube Living Labs as governance spaces

Territory	Location & date	Main thematic focus	Main stakeholder groups involved	Main governance topics discussed	Main types of outputs
Upper Danube Living Lab	Ulm, Germany (Upper Danube region – workshop, 2024)*	Building A Strong Danube Innovation Ecosystem	Representatives of research and academia	Coordination across governance levels	Group exercises leading to shared values, challenges, goals, actions and priorities
		Sustainable development	SMEs and business actors	improving SME and innovation competitiveness	multiple vision statements for the Danube innovation ecosystem
		Blue economy	public authorities	balancing economic and ecological priorities	lists of actions such as training on NBS, flagship projects, SME support, youth competitions and staff exchanges
		Ecological restoration	NGOs	macro-regional cooperation	
		Competitiveness	civil society	citizen engagement	
		Digitalisation and AI	macro-regional and Danube Region Strategy actors	skills gaps (digital, AI, technology transfer)	
		Alignment with EUSDR and mission objectives		need for better communication	
				stakeholder involvement	
Middle Danube Living Lab	Osijek, Croatia – 11–12 June 2024	Climate change impacts on agriculture and river basins	Experts and stakeholders from universities and research institutes	Governance of climate risks in the basin	Plenary presentations and panel discussions on problems and good practices
		protection of local communities and ecosystems from extreme events	local and regional authorities	protecting communities and ecosystems from extreme events	identification of challenges and mitigation options
		climate change mitigation measures	national meteorological and hydrological services	designing mitigation measures	interactive elements (quizzes) and a field visit to Kopački Rit and surrounding communities to connect policy and practice
		links to ecosystem restoration and sustainability through Mission projects (DaWetRest,	national parks	integrating scientific knowledge	
			EU and mobility agencies	project experience and local needs	
			Mission projects and other	strengthening cross-border and	

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		DALIA, DANUBE4all)	innovation actors	cross-sector cooperation around climate resilience	
Lower Danube Living Lab	Tulcea, Romania 14 May 2024 (within the “Deltas and Wetlands” DDNI scientific event)	Water systems in the Lower Danube	Representatives of the Ministry of Environment, Waters and Forests (MEWF)	Need for more funding and appropriate programmes	Structured group discussions (social, economic, environmental factors)
		Social elements	Tulcea County Prefecture	development of targeted programmes for water and biodiversity	key points on funding, programmes and community involvement
		Economic factors	Danube Delta National Institute (DDNI)	bottom-up solutions starting from local communities	proposals for sustainable business models
		Environmental factors	project partners and local	community-based water management	community-based water management
		sustainable water management	regional and national stakeholders	promotion of businesses linked to ecosystem services	education/awareness actions
		biodiversity protection in the region	part of a wider scientific community of ~200 participants	educational and cultural activities for awareness and engagement	follow-up dialogue among stakeholders
Danube Delta Living Lab 16 May 2024 (within the “Deltas and Wetlands” DDNI scientific event)	Tulcea, Romania 16 May 2024 (back-to-back with Lower Danube LL, in the “Deltas and Wetlands” event)	Biodiversity and ecosystem services in the Danube Delta	Scientists and researchers from Romania and abroad	Integrating biodiversity protection with socio-economic development	Synthesis of key points on funding, programmes, bottom-up approaches, ecosystem-services businesses, community-based management and education
	sustainable use of natural resources	MEWF representatives	promoting businesses linked to ecosystem services (eco-tourism, organic farming, renewable energy)		contributions to the wider Mission session “Mission Ocean – Common Action Plan Danube Lighthouse and Black Sea Strategy” hosted in the same event

	links between biodiversity, water systems and local development, within the broader Danube & Black Sea context	project partners and local and regional stakeholders participating in the joint Lower Danube/Delta Living Lab setting	strengthening public-private partnerships community engagement and education for long-term conservation and sustainable resource use		

The Living Labs use interactive formats (group discussions, panels, design sprint, world café–type exchanges) to help participants frame problems together and identify priorities. In Tulcea, stakeholders worked in three groups (social, economic and environmental factors for water systems), and one key message was the need to start from local communities and scale up to national level. In the Upper Danube, a mini-design sprint was used to co-create a roadmap for an innovation ecosystem, moving step by step from mapping the situation to defining actions and next steps. In the Middle Danube Living Lab, panel discussions and interactive elements focused on protecting local communities and ecosystems from extreme events and on climate change mitigation measures, combining project presentations with open discussion.

These formats make the Living Labs useful **governance tools** because they:

- show who the key actors are and how they relate to each other (mapping and connecting stakeholders);
- help participants agree on the main challenges and priorities (joint problem framing);
- produce lists of concrete actions, funding needs and cooperation ideas that can feed into roadmaps and project pipelines (generating shared next steps).

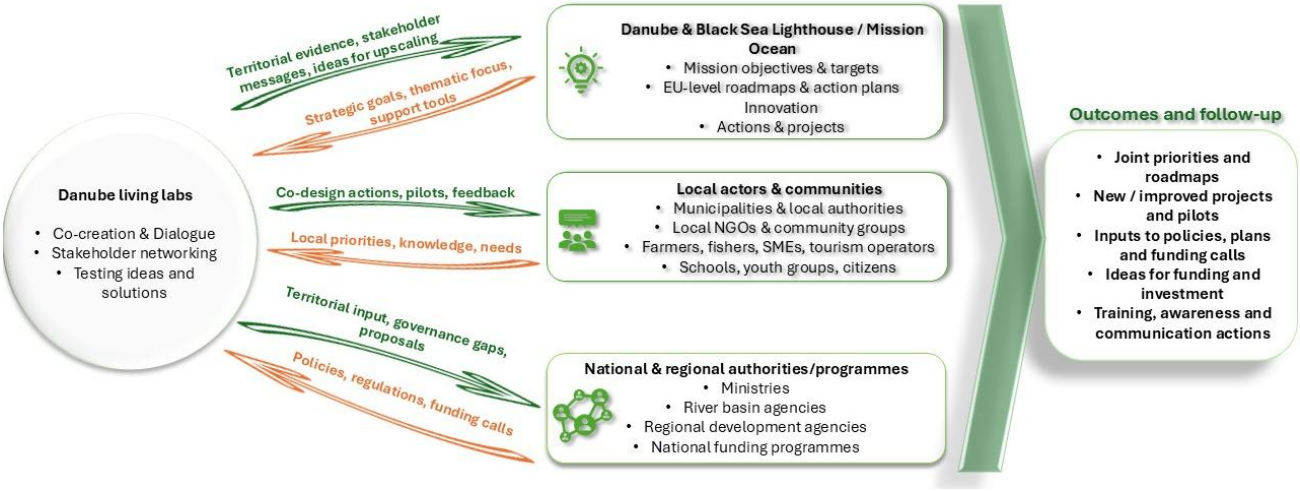

Figure 3 Schematic "governance role" of Living Labs.

As illustrated in Figure 3, the four Danube Living Labs act as an interface between local actors and communities, national and regional authorities/programmes, and the Danube & Black Sea Lighthouse / Mission Ocean. The figure shows how information, priorities and support flow in both directions between these three levels through the Living Labs, and how this interaction

leads to concrete outcomes and follow-up actions that can influence local projects, national policies and Mission-level strategies.

The Living Labs also help link local realities with Mission and Lighthouse processes. In Tulcea, the Living Labs were directly connected with a session on the “Mission Ocean – Common Action Plan Danube Lighthouse and Black Sea Strategy”, so that local discussions on water systems and biodiversity were part of a wider strategic debate. In Osijek, presentations on Mission Ocean and Danube-related projects (DaWetRest, DALIA, DANUBE4all) were combined with panels on climate impacts and good practices, making the Living Lab a bridge between Mission projects and territorial stakeholders.

From the documented experience so far, the Living Labs contribute to governance in at least three clear ways:

- ✓ Mapping and connecting stakeholders – they bring together actors who do not usually meet in regular administrative settings (e.g. scientists, local authorities, SMEs, NGOs, youth) and show where there are gaps or under-represented groups.
- ✓ Supporting joint problem framing – they help build a shared understanding of challenges such as funding, governance fragmentation, climate risks or biodiversity loss, and of the need for bottom-up and cross-border approaches.
- ✓ Generating ideas and actions – they produce priority lists, visions and proposed actions that can be used to design new projects, training activities or policy improvements (for example, roadmaps for an innovation ecosystem in the Upper Danube, or proposals for funding, business models and community engagement in the Lower Danube).

5.2 Signals for entrepreneurship and innovation

The Living Labs do not work as classic business incubators, but they sent several clear signals about where entrepreneurship and innovation can grow around the Danube Lighthouse. Across the four Labs, participants linked new economic activity very closely to ecological restoration, water management and local development, rather than to “generic” business opportunities. In the ***Upper Danube Living Lab***, the discussions focused strongly on building a Danube innovation ecosystem that supports SMEs and young innovators. Participants called for better technology transfer, stronger links between research, business and public authorities, and more support tools such as matchmaking events, staff exchanges, youth competitions and summer schools for innovative business ideas. They also stressed the need for digital and AI skills, nature-based solutions and new flagship projects that can be upscaled in the region. The ***Middle Danube Living Lab*** on climate change highlighted innovation mainly through Mission projects and pilot solutions. Presentations and discussions showed how integrated climate-adaptation projects, wetland restoration, sustainable land use and circular blue-economy approaches can create new services and jobs if they are linked to local communities and small businesses. The Living Lab also underlined the role of EcoDaLLi in connecting innovators and governance structures and in offering innovation support services and a digital portal for experimentation with new solutions. The ***Lower Danube Living Lab*** on water systems and ***the Danube Delta Living Lab*** on biodiversity and ecosystem services put a strong emphasis on business models that depend on healthy rivers and wetlands.

Stakeholders repeatedly mentioned eco-tourism, organic farming, sustainable fisheries, renewable energy and other activities that turn ecosystem services into local income and jobs, provided that they remain compatible with conservation goals. They also discussed economic incentives, public-private partnerships and funding opportunities to make nature-based solutions and conservation-friendly businesses viable in the long term.
These signals are consistent with the broader stakeholder mapping carried out in the project, which shows a high number of business and civil-society actors active in sectors such as tourism, agriculture, transport, energy and waste management across the Danube basin. This suggests that there is already a wide base of organisations that could benefit from and contribute to innovation linked to the Mission objectives.

Table **13** Signals for entrepreneurship and innovation across the Danube Living LabsTable **13** summarises the main types of entrepreneurship and innovation opportunities that emerge from the Living Lab reports and related project work.

Table 13 Signals for entrepreneurship and innovation across the Danube Living Labs

Where	Signal / theme
Upper Danube Living Lab; Danube-wide stakeholder mapping	Calls to enhance SME competitiveness, create new flagship projects and youth competitions, build a “Danube innovation ecosystem”, and provide training on digital and AI skills, nature-based solutions and ecological restoration.
Lower Danube LL on water systems; Danube Delta LL on biodiversity and ecosystem services	Discussions on eco-tourism, organic farming, sustainable fisheries, renewable energy and other activities that depend on healthy wetlands and rivers; focus on economic incentives, public-private partnerships and funding schemes that reward conservation-friendly behaviour.
Middle Danube LL on climate change; Mission-related project presentations	Use of Mission projects and EU-funded pilots as testbeds for technical, environmental and social innovations in climate adaptation, wetland restoration and circular blue-economy solutions; emphasis on using Living Labs and a digital portal to connect innovators with decision-makers.
Upper Danube LL; all Labs through education and community engagement	Proposals for youth networks, summer schools and “Youth Connector” initiatives; strong attention to citizen engagement, education and capacity-building as pre-conditions for successful and socially accepted innovations and business models.

5.3 Training and capacity-building

Across the four Danube Living Labs, training and capacity-building appear as a recurring need and as a practical output of the events themselves. Participants stressed that Mission and Lighthouse goals cannot be reached only with new projects or technology; they also require better skills, stronger local knowledge and more chances for people to learn together.

Table 14 Training and capacity-building signals emerging from the Danube Living Labs

Living Lab / context	Main training & capacity-building themes	Main target groups and suggested formats
Upper Danube Living Lab – Danube innovation ecosystem	Training on digital and AI skills, nature-based solutions and ecological restoration; knowledge transfer and technology transfer; skills for cross-border cooperation and governance.	SMEs, public authorities, NGOs, researchers and youth; formats include joint workshops and training sessions, staff exchanges, matchmaking events, youth competitions, summer schools and new study programmes focused on innovation and sustainability.
Middle Danube Living Lab – Climate change	Building understanding of climate change, river-basin management and Mission projects; practical learning on social, environmental and techno-economic solutions; training on how to use EU support systems for Missions and Horizon Europe.	Local and regional authorities, experts, teachers and students; formats include expert presentations, NCP counselling, interactive quizzes, design exercises and field visits to demonstration sites such as Kopački Rit and local pilot areas.
Lower Danube Living Lab – Water systems	Awareness and skills for sustainable water management, ecosystem-services-based businesses and community-based water governance; focus on funding, programme design and practical local solutions.	Local communities, schools, NGOs and local authorities; formats include educational campaigns, school programmes, cultural events, local water committees, participatory planning sessions and ongoing dialogue beyond the event.
Danube Delta Living Lab – Biodiversity and ecosystem services	Training on biodiversity, sustainable fisheries, nature-based solutions and sustainable economic models; capacity-building for policy advocacy and stakeholder engagement; communication and outreach skills.	Students, community members, businesses, NGOs and public authorities; formats include school and university courses, community workshops, stakeholder meetings, media campaigns, citizen-science initiatives and corporate responsibility programmes.

In the Upper Danube Living Lab, capacity-building is framed as a core part of the future Danube innovation ecosystem. The workshop summary calls for training programmes on digital and AI skills, nature-based solutions and ecological restoration, together with knowledge-transfer workshops, staff exchanges, matchmaking events and peer-learning activities between SMEs, research organisations and public authorities. Youth-focused competitions and summer schools are suggested as ways to develop the next generation of innovators and to connect them with Mission-related work.

The Middle Danube Living Lab on climate change combines expert presentations, panel discussions, interactive quizzes and a field visit as concrete training tools. Presentations from the Agency for Mobility and EU Programmes explain how national contact points support applicants to EU Mission and Horizon Europe calls, offering advice, information and tailored guidance. Panelists repeatedly underline the need for education and awareness, especially for

young people and local communities, and present examples such as the EKO-RURAL4STEM project, which strengthens STEM skills through ecology-focused learning. The quizzes and the field trip to Kopački Rit and nearby sites are used to check understanding and to show in practice how climate and restoration projects work on the ground.

In the Lower Danube Living Lab on water systems, training and capacity-building are strongly linked to local empowerment. The report highlights the need for educational campaigns, school and community programmes, and cultural activities to raise awareness on water conservation, pollution prevention and sustainable water use. The discussions also point to community-based water management, local water committees and participatory approaches as ways to build long-term skills and ownership among residents.

The Danube Delta Living Lab on biodiversity goes further in specifying training needs. Participants propose school and university programmes on biodiversity, conservation and ecosystem services, along with community workshops and stakeholder meetings where people can learn about sustainable practices and take part in monitoring and restoration. They also suggest media campaigns, social-media outreach and citizen-science activities as tools to build wider public understanding, plus training and guidance for businesses to strengthen corporate responsibility and support biodiversity-friendly economic models.

6. Conclusions

This deliverable has brought together evidence from several strands of EcoDaLLi work: the four Danube Living Labs, earlier validation workshops on nature-based solutions, the mapping of key stakeholders and projects, and EcoDaLLi's contributions to major Mission Ocean and Danube & Black Sea Lighthouse events, including the Lighthouse launch, the launch of the Living Lab system and the PREP4BLUE Stakeholder Assembly in Batumi. Taken together, these activities show that EcoDaLLi is already playing a concrete role in turning Mission objectives into real dialogue, partnerships and ideas in the Danube basin.

A first key message is that the four Danube Living Labs have proved effective as practical governance spaces. In the Upper, Middle and Lower Danube and in the Danube Delta, they have gathered ministries and basin authorities, research organisations, SMEs, NGOs and community representatives around specific topics such as climate change, water systems, biodiversity and innovation. Rather than only exchanging information, participants used group work, panel discussions and field visits to share knowledge, identify problems, and outline priorities and possible actions. The Living Labs thus function as bridges between local concerns and Mission goals, making it easier for people to see how their territory fits into the wider Danube & Black Sea Lighthouse.

A second message is that EcoDaLLi helps the Lighthouse to see "who is at the table". The stakeholder inventory work paints a clear picture of the many authorities, research bodies, companies and civil-society organisations active across the basin. By linking this mapping with the Living Lab and workshop participation, the project has started to make key players more visible and to connect actors that do not usually meet in regular administrative processes. This is essential for Mission implementation, which depends on broad cooperation across sectors and borders.

Third, the different workshops and assemblies show that the Danube region is not starting from zero. The Batumi stakeholder assembly and other Lighthouse events demonstrate that there is already strong interest in river–sea connectivity, nature-based solutions, innovation ecosystems and cross-border collaboration.

The EcoDaLLi contribution has been to bring Danube-specific experiences, Living Lab lessons and stakeholder perspectives into these discussions, helping to shape roadmaps and action points that better reflect the realities of the basin. Across all these activities, similar needs and opportunities appear. Participants repeatedly point to the importance of better governance coordination between sectors and levels, predictable funding and programme design, stronger engagement of SMEs and local communities, and more systematic training and knowledge sharing. At the same time, they see clear potential for entrepreneurship and innovation, especially where ecological restoration, climate resilience and local development meet: eco-tourism, organic farming, sustainable fisheries, renewable energy, smart mobility and other ecosystem-based business models feature prominently in Living Lab discussions.

Training and capacity-building are another strong thread. From the climate-focused Living Lab in Osijek to the water and biodiversity Labs in Tulcea, participants emphasise education in schools and universities, community workshops, training for authorities and SMEs, and better access to information on Mission funding and project development. The way the events were designed – with expert inputs, interactive exercises and field visits – already provides a model for how the Lighthouse can turn meetings into learning spaces.

Based on these findings, several practical recommendations emerge. EcoDaLLi and its partners can:

- Consolidate the Living Labs as regular governance and innovation platforms, using them not only as one-off events but as recurring forums where stakeholders review progress, update priorities and co-design new actions. This includes further developing the Practices Living Labs System to document outcomes in a comparable way.
- Make follow-up more systematic by agreeing, for each major workshop or Living Lab, a short list of next steps (who will take which idea forward, which funding or policy process it links to, and how feedback will be reported to the Lighthouse). This will help move from discussion to implementation.
- Invite SMEs and local economic actors more consistently and offer them tailored information on Mission opportunities, so that innovation and business models around ecosystem services, restoration and circular economy can grow out of Living Lab discussions.
- Use the Living Labs and the EcoDaLLi portal as hubs for training and communication, combining short courses, workshops, field visits, online materials and citizen-science activities that explain Mission goals in simple language and show how people can contribute.
- Continue improving documentation and sharing of contributions, building on the existing stakeholder and project inventories and making this information accessible through the portal and Lighthouse channels so that partners can find each other and coordinate efforts more easily.

7. References

Bisaro, A., and K. Meyer. 2022. Integrating Nature-based Solutions into policies for climate change adaptation and disaster risk reduction. A regional comparative policy analysis in the Western Balkans. IUCN, Gland, Switzerland.

Connop, S., P. Vandergert, B. Eisenberg, M. J. Collier, C. Nash, J. Clough, and D. Newport. 2016. Renaturing cities using a regionally-focused biodiversity-led multifunctional benefits approach to urban green infrastructure. *Environmental Science & Policy* 62:99–111.

Giordano, R., I. Pluchinotta, A. Pagano, A. Scrieciu, and F. Nanu. 2020. Enhancing nature-based solutions acceptance through stakeholders' engagement in co-benefits identification and trade-offs analysis. *Science of The Total Environment* 713:136552.

Kauark-Fontes, B., L. Marchetti, and F. Salbitano. 2023. Integration of nature-based solutions (NBS) in local policy and planning toward transformative change. Evidence from Barcelona, Lisbon, and Turin. *Ecology and Society* 28(2):25. https://doi.org/10.5751/ES-14182-280225.

Mendes, R., T. Fidélis, P. Roebeling, and F. Teles. 2020. The institutionalization of nature-based solutions—A discourse analysis of emergent literature. *Resources* 9(1):6.

Raymond, C. M., N. Frantzeskaki, N. Kabisch, P. Berry, M. Breil, M. R. Nita, D. Geneletti, and C. Calfapietra. 2017. A framework for assessing and implementing the co-benefits of nature-based solutions in urban areas. *Environmental Science & Policy* 77:15–24

8. ANNEXES

Annex 1: Upper Danube Living lab extensive report

Report of Upper Danube Living Lab

Day 1 Summary

Group Exercise Overview

The workshop opened with a group exercise centered on identifying shared values, challenges, goals, actions, and priorities necessary to build a strong innovation ecosystem within the Danube region. The groups also developed a forward-looking vision statement capturing their ideal outcomes. Below is a breakdown of the outputs from each group.

Group 1

- **Values**: Emphasized sustainable development, climate action, and fostering an innovation ecosystem that values upscaling potential.
- **Challenges**: Limited competitiveness and a skills gap in digital technologies, AI, and technology transfer. They also identified gaps in networking.
- **Goals**: Increase competitiveness, enhance the valorization of innovation, achieve effective technology transfer, and involve NGOs in building human resources.
- **Actions & Priorities**:
    1. Enhance public participation and education.
    2. Involve the Danube Transnational Cooperation (DTC) network and provide training on nature-based solutions (NBS).
    3. Promote smart innovation through AI and digitalization.
    4. Adopt a cross-border approach and institutionalize living labs.
    5. Support flexible work arrangements.
- **Vision Statement**: *"To obtain a strong innovation ecosystem focusing on usability, social innovation, and valorization."*

Group 2

- **Values**: Focused on sustainable development, effective communication, and creating synergies that align with thematic priorities.
- **Challenges**: The need for coordination across governance levels and selecting appropriate monitoring indicators.
- **Goals**: Improve SME and innovation competitiveness, create synergies across stakeholders, and ensure knowledge transfer.
- **Actions & Priorities**:
    1. Facilitate knowledge transfer and governance exchange.
    2. Share best practices within the Danube Region Strategy (DRS) framework.

3. Develop key performance indicators and involve public authorities.

- **Vision Statement**: *"Establishing networks to leverage Danube region assets, mobilize stakeholders, promote knowledge exchange, and enhance SMEs' innovation capacity to tackle societal challenges."*

Group 4

- **Values**: Highlighted blue economy principles and alignment with the EUSDR strategy.
- **Challenges**: Balancing economic and ecological priorities, improving macroregional cooperation, and addressing regional disparities.
- **Goals**: Encourage stakeholder involvement, foster cooperation, and achieve sustainability.
- **Actions & Priorities**:
    1. Develop new flagship projects.
    2. Enhance SME competitiveness.
    3. Close economic gaps across regions.
    4. Translate research into policy.
    5. Boost digital competencies and run joint initiatives (e.g., workshops, training).
    6. Launch youth-focused competitions and summer schools to inspire innovative business ideas.
- **Vision Statement**: *"To balance diverse interests towards shared goals, achieving a clean and economically viable Danube Region through resource efficiency."*

Group 5

- **Values**: Emphasized engagement, innovation, policy alignment, ecological restoration, cooperation, and pollution prevention.
- **Actions & Priorities**:
    1. Strengthen citizen engagement.
    2. Initiate new projects focused on research, innovation, and AI technology.
    3. Encourage nature-based solutions (NBS).
- **Vision Statement**: *"An innovation ecosystem framework with societal impact, balancing development, circular economy, and a clean environment."*

Group 6

- **Values**: Stressed the importance of a common vision, cooperation, resilience, and the support of market-viable solutions.

- **Challenges**: Difficulty maintaining continuous engagement among ecosystem players, poor communication between government, academia, and research bodies, and fostering public acceptance of EU programs.
- **Goals**: Restore ecosystems, enhance water management, prevent pollution, and support collaboration among SMEs, government, and research bodies.
- **Actions & Priorities**:
    1. Support SMEs in environmental restoration by collaborating with R&D.
    2. Improve multi-sector communication and involve the financial sector.
    3. Foster staff exchanges and matchmaking events for SMEs, government, and research.
    4. Promote peer learning and practical activities.
- **Vision Statement**: *"To be a Lighthouse for an EU Blue Deal."*

Consolidated Findings & Workshop Outcomes

The workshop successfully brought diverse perspectives together, with key recurring themes, including sustainable development, enhanced stakeholder engagement, and fostering a robust innovation ecosystem. Key areas of agreement included:

1. **Capacity Building**: Training programs on digital and AI skills, nature-based solutions, and ecological restoration to boost innovation potential.
2. **Cross-Border Collaboration**: Addressing regional disparities and achieving consistent innovation and environmental practices across Danube regions.
3. **Support for SMEs**: Establishing support structures that promote competitiveness and market viability for SMEs within the innovation ecosystem.
4. **Governance and Policy Alignment**: Working closely with governance bodies to align policy with economic and environmental priorities and promote effective knowledge transfer.
5. **Engagement and Education**: Emphasis on citizen engagement, stakeholder mobilization, and developing human resources through education.

Next Steps

Based on these outcomes, a strategic plan will be developed with recommendations for continued collaboration and support structures to address the identified goals and challenges. Further workshops and training sessions will be organized to deepen stakeholder engagement and provide practical skills development, setting the foundation for a dynamic, sustainable, and resilient innovation ecosystem in the Danube region.

Workshop Report: Day 2 – Developing a Roadmap for the Danube Innovation Ecosystem

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Objective: To collaboratively design a roadmap that fosters an innovation ecosystem in the Danube region, focusing on the successful transfer and scaling of innovations across national borders.

Methodology: Mini-Design Sprint

The workshop utilized a structured Mini-Design Sprint, guiding participants through five key steps to build a concrete roadmap: Mapping the current state, brainstorming improvements, evaluating and categorizing ideas, developing implementation strategies, and presenting a final roadmap.

Step 1: Map/Understand

The first session was a brainstorming exercise to assess the current status and needs of the Danube Innovation Ecosystem.

What Works?

Participants identified the following elements as strengths in the existing ecosystem:

- Success of Interreg Danube projects.
- Effective communication, cooperation, and stakeholder involvement.
- Transnational and cross-border cooperation, particularly in bridging ecosystem restoration and innovation.
- Successful examples of sustainable funding and capacity-building initiatives.
- Pilot actions and EU-supported projects (e.g., Horizon projects, mission projects) that provide solid frameworks for collaboration.

Challenges Identified

Key obstacles limiting the Danube region's innovation capacity included:

- Sustainability of projects beyond their funding period.
- Limited integration of innovations within existing systems.
- Insufficient cooperation between the upper and lower Danube regions.
- Complexity in stakeholder engagement and lack of political consensus on transnational issues.
- Communication gaps among actors, limited knowledge-sharing, and difficulty coordinating efforts.
- Discrepancies in policy, standards, and legislative frameworks.
- Insufficient involvement of local communities and businesses, as well as a lack of private sector awareness of sustainability's potential profitability.

Key Actors

The workshop highlighted critical players in building a successful innovation ecosystem:

- Decision-makers, local authorities, national/transnational regions.
- Universities, research institutions, educators, NGOs, business support organizations.
- Youth, innovators, investors, SMEs, start-up systems, and industry associations.
- Local communities, local media, and environmental organizations.

Step 2: Sketch

Participants collected actionable ideas to enhance the Danube Innovation Ecosystem. The suggestions focused on promoting knowledge exchange, aligning policies, fostering local involvement, and implementing technological advancements.

Step 3: Decide

Ideas were then evaluated using the "Wow-Now-How Matrix," classifying them based on feasibility and impact.

Group 1

- **HOW**: Promote open science, create national knowledge transfer institutions, and ensure policy makers are included early in project design.
- **NOW**: Initiate a "Youth Connector" initiative to engage the next generation in the Danube vision, and establish transboundary agreements in water management.
- **WOW**: Emphasize public participation to foster understanding of local contexts and maximize social impact.

Group 2

- **HOW**: Integrate policies, raise awareness, and promote project results.
- **WOW**: Use Priority Areas in the EU Strategy for the Danube Region (EUSDR) as facilitators to connect public and private sectors, engage SMEs and policy makers in feedback loops, and organize networking events (e.g., SME-R&D "speed-dating").

Group 3

- **NOW**: Enhance networking across the Danube region.
- **HOW**: Implement digital solutions, apply nature-based solutions, and designate a lead innovation authority in each country.
- **WOW**: Invest in educational initiatives, cluster development, cross-capitalization strategies with EUSDR's Mission Ocean, and explore alternative incentives to foster innovation.

Step 4: Implement

Each group then created an implementation strategy using a Canvas model adapted for ecosystem development.

Group 1: "10 Steps to Success"

1. Build a youth network for Danube innovation.
2. Share information on youth-led activities.
3. Leverage synergies between experienced professionals and youth.
4. Engage local communities and other stakeholders.
5. Develop new study programs focusing on innovation.
6. Seek new resources and funding opportunities.
7. Implement these programs across educational and business institutions.
8. Evaluate the effectiveness of these new programs.
9. Ensure consistent knowledge transfer.
10. Establish a viable business model to sustain these programs.

Group 2: Strategy for Sustainable Engagement

1. Strengthen NGO and civil society knowledge of policies.
2. Reduce reliance on public funding by mobilizing private investments.
3. Focus on citizen education and awareness.
4. Improve dissemination of project results.
5. Engage EUSDR as a strong promoter of innovation.
6. Hold regular meetings to align strategies and share outcomes.
7. Coordinate existing funding streams more efficiently.
8. Promote bottom-up strategies that give voice to local stakeholders.
9. Streamline policies to enhance implementation efficiency.
10. Encourage stakeholder advocacy to influence decision-makers.

Step 5: Roadmap Presentation

Participants presented their strategies, placing key actions onto a collective roadmap to guide the region towards an integrated and resilient Danube Innovation Ecosystem. The roadmap highlights short-term, medium-term, and long-term (5+ years) goals, aiming for a sustainable, inclusive, and scalable ecosystem that balances innovation with environmental resilience.

Workshop Outcomes and Next Steps

The workshop successfully produced a structured roadmap outlining actions that support stakeholder engagement, policy alignment, and innovation upscaling. The roadmap will serve as a foundation for future coordination efforts across the Danube region, with recommended steps including:

1. Establishing regular forums for stakeholder feedback and knowledge-sharing.
2. Promoting cross-border and transnational policies that support sustainability.
3. Enhancing the visibility of Danube initiatives through public engagement and targeted education programs.
4. Building a network of institutions, local authorities, and businesses focused on fostering innovation.
5. Developing youth-led initiatives and community programs to bridge current generational gaps in ecosystem awareness.

This roadmap provides a strategic framework for continuous collaboration and capacity-building within the Danube Innovation Ecosystem, aligning innovation goals with sustainable development and regional resilience.

Middle Danube Living Lab: Climate Change

Osijek, Croatia

June 11-12, 2024.

Project Acronym:	EcoDaLLi
Project Title:	ECOsystem-based governance with DAnube lighthouse Living Lab for sustainable Innovation processes
Call:	HORIZON-MISS-2021-OCEAN-02-04 – Danube river basin lighthouse – coordination activities
Programme:	HORIZON EUROPE
Start Date:	01.01.2023
Duration:	42 months

Funded by the European Union

Contents

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Executive Summary

The Middle Danube Living Lab, held on June 11-12, 2024, brought together experts and stakeholders to address climate change impacts on agriculture and river basins through a multifaceted approach. The event featured presentations on innovative projects like DaWetRest, DALIA, and DANUBE4all, which focus on ecosystem restoration, sustainability, and community engagement. Panel discussions emphasized the importance of integrating local knowledge with scientific research and technology to adapt agricultural practices and manage river basins effectively. Interactive quizzes and a field trip to Kopački Rit, Draž, and Batina allowed participants to see the real-world impact of these initiatives. The Living Lab highlighted the need for collaboration and community involvement to achieve sustainable climate resilience.

1. Introduction to the Project

The European Union's 2030 and 2050 Green Deal goals emphasize the necessity for integrated solutions and clear targets to achieve sustainability. EcoDaLLi is designed to address these needs, particularly within the framework of the Mission 'Restore our Ocean, seas, and waters by 2030.' EcoDaLLi focuses on achieving the freshwater targets of the European Green Deal by adopting a systemic approach for the restoration, protection, and preservation of the entire Danube Basin through coordinated actions.

The primary objective of EcoDaLLi is to centralize the governance structures of the Danube region by implementing innovative solutions for ecological restoration, protection, and preservation. This will be achieved by fostering a robust innovation ecosystem within a well-connected Practices Living Lab System, supported by a comprehensive digital portal that is fully integrated with the Mission Implementation Platform.

Innovative solutions proposed by EcoDaLLi offer new opportunities for enhanced water restoration. These solutions consider social innovation aspects, mitigate the effects of climate change, and reduce associated costs. By improving governance at the Danube Basin level through dedicated EcoDaLLi tools, the project aims to encourage these innovative solutions, alter perceptions regarding water ecosystem restoration and climate change, and develop value chains based on ecosystem services. This approach will contribute to the Green Deal's decarbonization goals, result in cleaner water, enhance the environmental state, and create jobs in sensitive areas along the basin, especially in the Danube Delta.

EcoDaLLi will facilitate connections between innovators and governance structures by maintaining networks and offering dedicated Living Labs for knowledge co-creation. The project will host workshops and provide a custom-made digital portal for fostering synergies and offering innovation support services. This will enable the experimentation with new solutions, aiding the innovation ecosystem in creating circular services that contribute towards a Sustainable Blue Economy in the Danube Basin and beyond.

Welcome speech

At the EcoDaLLi Living Lab conference held on June 11, 2024, in Osijek, Hrvoje Mikulčić, the project lead of EcoDaLLi, welcomed the attendees. He introduced the event's focus on addressing the impact of climate change on the Danube Basin, emphasizing the project's goal of improving the quality of life along the Danube through sustainable solutions and international collaboration.

Figure 1 Welcome speech

Faculty of Mechanical Engineering and Naval Architecture

Professor Neven Duić from the Faculty of Mechanical Engineering and Naval Architecture at the University of Zagreb gave a presentation focused on the need to both fight and adapt to climate change. Drawing from his extensive experience with EU projects, he emphasized the importance of the Danube for biodiversity and its significance to Europe as a whole. He highlighted the dramatic loss of wetlands, with 80% of wetland territory having been dried up in the past. He stressed the need to engage local communities in ecological conservation efforts. Moreover, he discussed the conflict between agriculture and biodiversity, noting that agricultural practices often do not support biodiversity. The goal is to find ways to live with nature both ecologically and economically.

Figure 2 Faculty of Mechanical Engineering and Naval Architecture

Municipality of Draž Mayor

Stipan Šašlin, the Mayor of Draž Municipality, which is actively involved in the EcoDaLLi project, delivered the next presentation. He greeted the attendees and emphasized the importance of protecting the remaining wetlands in Draž, including both the shoreline and inlets. He highlighted the Danube's role in connecting Europe and emphasized that successful projects like EcoDaLLi require strong communication and collaboration among all countries involved.

Figure 3 Municipality of Draž Mayor

County Mayor

The next presentation was given by Josip Miletić, the Deputy Mayor of Osijek-Baranja County. He reiterated the importance of preserving the natural environment and emphasized the county's commitment to supporting projects like EcoDaLLi that focus on conservation and ecological restoration efforts.

Figure 4 County Mayor

EU Mission: Restore our Ocean and Waters

Andreea Strachinescu, Head of Unit for Maritime Innovation, Marine Knowledge, and Investments at DG MARE, European Commission, delivered a presentation that provided an in-depth overview of the EU Mission Ocean and its initiatives for a sustainable Blue Economy and ocean restoration. She emphasized the mission's goals to restore oceans and waters across Europe by 2030 through research, innovation, governance, collaboration, and citizen participation. Key objectives of the mission include protecting and restoring marine and freshwater ecosystems, preventing pollution, and achieving carbon neutrality and circularity within the blue economy. The presentation also covered the creation of a Digital Ocean and Waters Knowledge System, which will involve developing a European Digital Twin of the Ocean and integrating biodiversity monitoring data. Strachinescu highlighted the growing importance of the Blue Economy and the need to elevate Mission Ocean on the EU agenda, especially as a new European Commission is being assembled by the end of the year. She highlighted the significance of associated regions in replicating successful results and stressed the importance of the Mission Charter, which unites stakeholders in the commitment to restoring oceans and waters by 2030. Despite progress, she noted that the Danube region is lagging behind other regions in the number of projects and needs to catch up.The presentation also outlined several initiatives, including the EIB/MARE Blue Champions Initiative, and the BlueInvest initiative. The Mission Work Programmes for 2021-2024 were discussed, highlighting funding opportunities under the Horizon Europe program with substantial budget allocations dedicated to various projects. Strachinescu emphasized public mobilization efforts, including citizen science initiatives, education campaigns, and community-driven business models Upcoming events, such as the Digital Twin Ocean Forum in Brussels on June 13, 2024,

and European Ocean Days, were highlighted as opportunities for further engagement and collaboration. Strachinescu concluded by urging stakeholders to join the Mission Charter and actively participate in Mission Ocean initiatives to ensure its priority on the new EU Commission's agenda.

Figure 5 EU Mission: Restore our Ocean and Waters

EcoDaLLi Presentation

Dr. Nadja Schlichenmaier, the project coordinator for EcoDaLLi, presented on the Danube & Black Sea Lighthouse, which focuses on protecting and restoring the ecosystems and biodiversity of the Danube River and Black Sea basins. She outlined the key role of the Coordination and Support Action (CSA) in mobilizing a diverse community of stakeholders across the Danube basin, including the Danube Delta. The CSA's efforts are directed towards establishing initiatives that align with the lighthouse's objectives, ensuring effective governance by enhancing synergies among various national, regional, and local projects.The the importance of creating an innovation ecosystem that attracts investors and businesses emphasized. She detailed how the CSA will support these goals by offering a broad portfolio of services and business models designed to enhance regional development and environmental protection. The presentation also highlighted the Mission Charter as a crucial mechanism for mobilizing stakeholder commitment. The Charter is intended to strengthen cooperation and align efforts across various actions to achieve the transformative changes needed to restore Europe's oceans and waters by 2030. Dr. Schlichenmaier encouraged stakeholders to participate in the Charter, pointing out that currently only 37 out of 493 actions

from the Danube basin are included and emphasized the need for greater regional involvement to demonstrate the basin's contributions.

Figure 6 EcoDaLLi Presentation

Croatian Meteorological and Hydrological Service

The next presentation was delivered by Ivan Güttler from the Croatian Meteorological and Hydrological Service. In his presentation, Güttler provided a comprehensive overview of climate change, examining both global and regional contexts with a specific focus on the Danube region. He began by discussing the global context of climate change, highlighting the observed warming trends worldwide. Güttler presented data on rising global temperatures and analyzed regional variations to show how different areas are experiencing changes at varying rates. He also discussed global CO2 emissions from fossil fuels and total net emissions, emphasizing their significant contribution to the ongoing climate crisis. The presentation further explored the future of climate change, outlining projected scenarios based on current emission trajectories and potential mitigation efforts. Focusing on the basin context, Güttler shifted to the Danube region, presenting specific observations related to climate change impacts. He showed detailed data on temperature trends within the Danube basin, including the number of frost days, total precipitation levels, and the frequency of dry days. This regional analysis highlighted the increasing variability and extremes in weather patterns, which could have significant implications for the local ecosystems and communities reliant on the Danube River.

EcoDaLLi

Figure 7 Croatian Meteorological and Hydrological Service

IPCC

The next presentation was delivered by Natasa Markovska, the IPCC Focal Point at the Research Centre for Energy and Sustainable Development, MANU, and a faculty member at UKIM. Markovska offered an in-depth overview of climate change impacts on river basins, drawing insights from the Intergovernmental Panel on Climate Change (IPCC) and focusing on the specific challenges of the Danube River Basin. She began by discussing the role of the IPCC in climate science, highlighting its comprehensive reports that guide global climate policies. Markovska emphasized that river basins are vital ecological systems that provide freshwater, support biodiversity, and are crucial for agriculture and human settlements. The presentation explored how climate change is affecting these systems, focusing on the challenges and impacts on river basin management. Markovska noted the significant hydrological impacts of climate change, such as shifts in precipitation patterns and river flow regimes, and an increase in extreme weather events like floods and droughts. These changes pose new challenges for managing river basins, necessitating adaptive strategies. She then addressed the ecosystem and socio-economic impacts, explaining that altered water temperatures and flow patterns disrupt ecosystems, leading to habitat loss, biodiversity decline, and water quality issues. These environmental changes have substantial socio-economic consequences, affecting agriculture, industry, fisheries, and human health. Focusing on the Danube River Basin, Markovska outlined its diverse climatic zones and socio-economic importance, noting the basin's susceptibility to increased hydrological variability, more severe floods and droughts, ecosystem stress, and deteriorating water quality. She discussed adaptation and mitigation strategies, including projected climate scenarios predicting a 1.5 to 2.5°C rise in temperatures by 2050 and shifts in precipitation patterns. She highlighted the

need for strong policy frameworks and governance, emphasizing the role of the International Commission for the Protection of the Danube River (ICPDR) in promoting sustainable water management. The presentation concluded with a discussion on best practices for addressing climate change, such as integrated water resources management, nature-based solutions, technological innovations, community engagement, and transboundary cooperation. Markovska shared case studies like the Danube Floodplain Project and the Lower Danube Green Corridor, demonstrating the benefits of coordinated environmental restoration and sustainable management practices.

Figure 8 IPCC

National Parks of Montenegro

The next presentation was delivered by Ana Uskoković from the National Parks of Montenegro. Uskoković discussed the various national parks in Montenegro and the significant challenges they face due to environmental changes and human impact. She noted that about 8% of Montenegro's land is designated as national parks, which include diverse ecosystems like wetlands, forests, and lakes. However, these areas are increasingly affected by drought, particularly the wetlands, which are highly sensitive to changes in water availability. A major issue highlighted is the overgrowth of vegetation in lakes, which threatens to overtake them completely. This problem is made worse by the lack of rainfall, causing lakes to shrink despite regular efforts to clear excess vegetation. An example given was Biogradsko Lake, which is notably losing water. The disappearance of lakes has further repercussions on the surrounding forests, which are highly sensitive to changes in water levels. This is particularly evident in Prokletije National Park, where the drying of water bodies affects the health of the forest ecosystems.

Additionally, Uskoković highlighted the issue of bark beetles, an invasive species causing significant damage to forests within these national parks. These beetles are destroying trees, and efforts are underway to identify hotspots of infestation and manage the problem effectively. The challenges faced by Montenegro's national parks underscore the need for comprehensive management strategies to protect these vital ecosystems from ongoing environmental and ecological threats.

Figure 9 National parks of Montenegro

Agency for Mobility and EU Programmes

The next presentation was given by Ivan Munjin, a Senior Adviser in the Department for Thematic Areas of the EU Framework Programme at the Agency for Mobility and EU Programmes. Munjin's presentation focused on the support mechanisms available for stakeholders involved in the Horizon Europe framework, particularly in relation to the EU Missions. Munjin began by outlining the structure and stakeholders of the national support system for Horizon Europe in Croatia. This system includes coordinators of national contact points, program committee members, and specialized working groups on EU Missions. Munjin emphasized the role of the coordinator, who is responsible for managing the activities of all stakeholders, serving as the central point for information exchange with the European Commission, and promoting Horizon Europe initiatives within Croatia. He elaborated on the function of National Contact Points (NCPs), which are crucial for informing and advising Croatian applicants to the Horizon Europe calls. NCPs provide individualized counseling to applicants, disseminate information from the European level to national stakeholders, and promote the program to enhance the inclusion and diversification of Croatian applicants and participants. They also support program committee members and other stakeholders in navigating the application processes and requirements of Horizon Europe.

Figure 10 Agency for Mobility and EU Programs

Panel #1: Protection of local communities and ecosystems from extreme events-Problems and examples of good practice

The panel discussion began with brief introductions from each panelist.

University of Novi Sad

The first to speak was Professor Miroslav Vesković from the University of Novi Sad. With a background that includes a recent tenure at the European Commission working on policy-making, Professor Vesković emphasized the importance of integrating policy with research to effectively address the challenges posed by extreme environmental events. Professor Vesković highlighted the significance of uncertainty in climate models, stressing that a comprehensive understanding of these uncertainties is crucial for creating effective policies. He also underscored the importance of education in this context, pointing out the need to engage young people and prepare the next generation. By fostering education and awareness, he believes it is possible to cultivate a more informed and proactive community that is better

equipped to protect local environments and respond to extreme events.

Figure 11 University of Novi Sad

CEKOM

The next panelist was Dr. Ivan Ambroš, Director of CEKOM (Competence Centre Ltd. for Research and Development). Dr. Ambroš introduced himself and shared his extensive background, emphasizing his work on sustainable forestry, regional development, and strategic planning. He discussed the significant efforts underway to enhance climate resilience and sustainable forestry management in the region. A key point of his presentation was the Sustainable Forestry Initiative in the Spačva Basin, which is the largest contiguous lowland oak forest in Europe, known for its high-quality Slavonian oak. The project aims to balance economic activities with ecological preservation, using innovative methods to improve the sustainable management of this vital ecosystem. Dr. Ambroš emphasized the need for innovative approaches to climate adaptation, mentioning that CEKOM plays a crucial role in coordinating various stakeholders, including governmental bodies, educational institutions, and the private sector, to achieve sustainable development goals. Finally, he touched on the importance of education and capacity-building initiatives, such as the EKO-RURAL4STEM project, aimed at strengthening STEM skills among teachers and students through ecology-focused programs.

Figure 12 CEKOM

FAZOS

The next panelist, Professor Danijel Jug from the Faculty of Agrobiotechnical Sciences at the University of Osijek (FAZOS), addressed the topic of climate change and agriculture, focusing on the question: "What is our response?" Professor Jug began by explaining the profound impact of climate change on agricultural practices, particularly the increasing frequency of severe droughts, which are likely to have devastating effects on global food production. He emphasized that as the climate becomes more unpredictable, there is a pressing need for sustainable agricultural systems that use water more efficiently and reduce the reliance on fertilizers and pesticides, which are both costly and environmentally harmful.Professor Jug highlighted several major threats to soil health, including acidification, contamination, erosion, and desertification, all of which are exacerbated by climate change and poor soil management practices. He argued that these degradation processes differ significantly across regions but are universally detrimental to the soil's capacity to support agriculture. Desertification, in particular, was defined as the degradation of land in arid, semi-arid, and dry sub-humid areas, primarily due to climatic variations and human activities.To address these challenges, Professor Jug proposed a range of strategies for adapting crop production systems to the changing climate. He discussed the importance of both local and global efforts, such as Conservation Agriculture, Climate Smart Agriculture, and Sustainable Land Management, which aim to improve soil health and crop resilience. He also spoke about the necessity of developing new cultivars and improving existing ones to better withstand climate stressors.

Figure 13 FAZOS

Splitsko-Dalmatinska County

The final speaker, Martin Bučan from the Split-Dalmatia County, presented on the regional context of climate change adaptation and mitigation efforts. Bučan highlighted the unique geographical and demographic characteristics of Split-Dalmatia County. Bucan explained that the County has several administrative departments and services established to manage its self-administration and comply with various laws and regulations. Among these, the Administrative Department of Economy, EU Funds, and Agriculture plays a crucial role, especially in the context of projects related to climate change and sustainability. This department is responsible for managing EU-funded programs and projects, which are vital for implementing climate adaptation and mitigation strategies. Bucan also touched on the County's recent projects, carried out from 2019 to 2022, underlining the public entity nature of the organization, which does not engage in economic market activities but focuses on public administration and services. The presentation concluded with an emphasis on the need for continued efforts and collaboration at local and regional levels to effectively address the challenges posed by climate change in the Split-Dalmatia County.

Figure 14 Split-Dalmatia County

Panel #1 discussion

During the coffee break, all conference participants were asked to suggest solutions to climate change with a specific focus on river basins. They were asked to provide ideas across three categories: social, environmental, and techno-economic solutions. The results of the questionnaire are provided in the annex.

Following the break, the panelists were presented with these popular solutions and asked to provide their commentary. Professor Vesković emphasized the importance of social solutions, arguing that local communities often have valuable knowledge and experience relevant to their specific areas and the challenges they face. He noted the necessity of balancing grey and green infrastructure solutions, as there is no clear distinction between purely nature-based and grey infrastructure. He stressed the need for an effective combination of citizen involvement and specialized technical knowledge to address climate challenges. Dr. Ambroš underscored the importance of integrating new knowledge and technology in ways that are socially and environmentally acceptable. He argued that profit should not be the primary driver of climate

solutions. Instead, innovations should be guided by considerations of social and environmental impact to ensure sustainable outcomes. Professor Danijel Jug focused on soil conservation, pointing out that traditional plowing is one of the most harmful practices for soil health. He advocated for eliminating plowing and adopting new green methods such as conservation tillage, which would help protect the soil. Jug also highlighted the critical role of education in promoting these sustainable agricultural practices, noting that informed communities are better

positioned to implement and support effective soil conservation strategies. Martin Bučan discussed the importance of finding a balanced approach when introducing new ideas and practices, especially given the influence of political changes on public attitudes toward environmental issues. He pointed out that a lack of education on environmental topics remains a significant challenge and stressed the importance of educating young people to foster a more environmentally conscious society. Bučan emphasized that a well-informed public is crucial for driving meaningful change and ensuring the successful adoption of new climate solutions.

Figure 15 Panel #1 discussion

Figure 16 Interactive question

Panel #2 Development of climate change mitigation mesures

The second panel discussion began with brief introductions from each panelist.

DaWetRest

The first panelist was Boian Koulov, a representative of the DaWetRest project (Danube Wetlands and Floodplains Restoration through Systemic, Community-Engaged, and Sustainable Innovative Actions). Koulov emphasized the strategic importance of the Danube River, which is part of the Black Sea basin, highlighting the need for a strong regional identity and brand to effectively "sell" the value of this area to both local and international stakeholders. Koulov stressed that all members of the European Union must collaborate closely to achieve effective climate action in the region. He advocated for a shift from traditional watershed management to a more integrated watershed basin planning approach, one that encompasses not just environmental management but also governance, business interests, profitability, social considerations, and sensitivity to local contexts. According to Koulov, it is crucial to determine what environmental actions are necessary to advance the region's climate goals and ensure its sustainable development. A key point in Koulov's presentation was the need for decisions to be grounded in scientific evidence. He mentioned that the DaWetRest project provides comprehensive data from the Danube region that should be disseminated widely to inform policy and decision-making. This data serves as a critical resource for understanding the current state of the region's ecosystems and for guiding restoration efforts. He also underscored the importance of educating people, particularly students, about these issues, aiming to raise awareness and foster a deeper understanding of the diverse interests that come into play in environmental conservation.

Koulov highlighted the innovative actions being taken under the DaWetRest project to restore floodplains and wetlands connected to the main river.

Figure 17 DaWetRest

DALIA

Atila Bezdan presented the Danube Region Water Lighthouse Action (DALIA) project on the panel. The DALIA project is focused on the Danube River basin, aiming to innovate in freshwater restoration and protection. Bezdan outlined that the project spans 48 months and involves 22 partners from nine countries working across nine demo sites. These sites are designed to develop and implement innovative and replicable solutions to restore and protect freshwater ecosystems, which have been severely impacted by human activities and climate change. The project aims to directly address these threats through a combination of technological innovation and community engagement. The DALIA project also plans to expand its impact by opening a call for ten replication pilot sites, which will be selected in June 2024. These new sites will build on the successes of the initial nine demo sites, fostering wider adoption of effective freshwater management practices across the Danube basin. A significant part of Bezdan's presentation focused on the "Begečka Jama" site in Serbia, where water quality and the ecosystem have been degraded due to pollution from illegal dump sites, pesticide residues, and untreated wastewater. To combat these issues, the project is utilizing constructed wetlands, a nature-based solution that uses natural vegetation, soils, and microbes to treat domestic wastewater and industrial effluents. These constructed wetlands are particularly suitable for small settlements because they are less expensive than conventional water treatment solutions, have lower operational and maintenance costs, and do not negatively impact the ecosystem. Bezdan highlighted the importance of developing innovative solutions for freshwater restoration, emphasizing that

these efforts must be scalable and adaptable to different contexts within the Danube River basin. The DALIA project not only aims to improve local water quality and ecosystem health but also seeks to serve as a model for similar initiatives across Europe.

Figure 18 DALIA

DANUBE4all

Matej Marušić was representing DANUBE4all ("Restoration of the Danube River Basin for Ecosystems and People from Mountains to Coast) project. DANUBE4all is an EU "Lighthouse Initiative" that supports the mission "Restore our Ocean and Waters by 2030." The primary goal of DANUBE4all is to restore freshwater ecosystems throughout the Danube River Basin (DRB). The project is focused on developing a scientifically grounded and practically oriented Restoration Action Plan for the Danube River Basin (RAPDRB). It aims to address several significant environmental challenges, including the extensive loss of river connectivity, degradation of associated ecosystems, and biodiversity losses. The project also emphasizes the importance of nature-based solutions to revitalize human interactions with the river and restore its natural functions. Marušić highlighted that the restoration of wetlands plays a crucial role in the project. Wetland restoration is essential for protecting stored carbon and reducing carbon emissions, thereby contributing to climate change mitigation. Moreover, restored wetlands increase climate resilience by providing natural barriers against coastal storm surges, reducing wave damage and floods, and stabilizing shorelines, water supplies, and local microclimates. The project is currently being implemented across three demonstration sites: the Upper, Middle, and Lower Danube. Marušić provided detailed insights into the Upper Danube Demo Site, located at Paradeis Island between Vienna and the Slovakian border, within the Donau-Auen National Park. This site is undergoing significant sedimentation and succession due to river regulation, which has led to the loss of side branches and the

disappearance of the island's character. The proposed restoration activities at this site include reconnecting side channels and side arms, removing groynes, and restoring riverbanks from 'riprap' hard-surfacing to more natural gravel areas and steep banks. The planning process has already yielded positive results. Hydrological models of the agreed technical scenarios show significant improvements in the hydrological situation on-site and the restoration of lateral connectivity of the hind channel without impacting navigation. However, the budget may be insufficient for all the planned measures. To address this, the project team has explored several options for attracting additional resources, including proposals to the Open Rivers Foundation and preparing an INTERREG project.

Figure 19 DANUBE4all

Delia Dimitriu

Delia Dimitriu, the Head of Climate Change & Circular Economy at GEOSTUD, concluded the panel by discussing smart mobility solutions in the ECODALLI project. Dimitriu emphasized the challenges and opportunities of integrating small and medium-sized enterprises (SMEs) into environmental projects, particularly in the context of wetland restoration. According to Dimitriu, there is often a lack of attention and support from authorities towards innovative and sustainable mobility solutions. Despite this, SMEs are generally well-regarded and have shown considerable development in various sectors. However, finding SMEs that are willing and able to engage in wetland restoration projects remains a significant challenge. This reluctance or difficulty may stem from a lack of expertise, resources, or perceived market opportunities in the niche area of wetland restoration. Dimitriu argued that involving SMEs in such projects could lead to faster and more efficient implementation of restoration activities. SMEs are often more agile and innovative, allowing them to adapt quickly to new methods and practices necessary for effective ecosystem restoration. She highlighted the need for stronger collaboration between public authorities, SMEs, and environmental organizations to foster a more supportive environment for these crucial activities. By bridging the gap between policy

and practice, Dimitriu suggested that smart mobility solutions and SME involvement could significantly enhance the efficiency and impact of environmental restoration projects like those under ECODALLI, ultimately contributing to broader sustainability and climate resilience goals.

Figure 20 Delia Dimitriu

Discussion

During the panel discussion, the focus was on how the projects represented by the panelists could benefit local communities. Each panelist offered insights into the ways their respective projects involve and impact locals, emphasizing the importance of engagement, education, and communication. Atila Bezdan highlighted that the DALIA project aims to directly involve local communities in the wastewater treatment process. He explained that the participation of locals is driven by their desire for clean water, which aligns with the project's goals. By working together on these initiatives, communities can benefit from improved water quality, which is crucial for their health and well-being. Boian Koulov emphasized that creating a conducive environment for community involvement is essential. He pointed out that for local communities to be effectively engaged, there needs to be a shift in the climate of interaction — meaning fostering an atmosphere where open communication and access to information are prioritized. This approach not only supports environmental goals but also lays the foundation for economic development. Koulov also noted the challenge of frequent changes in local leadership, such as mayors, who need continuous education and involvement to sustain the momentum of community-driven projects. Matej Marušić discussed the importance of co-creation as a pillar of the DANUBE4all project. He shared an example of how reconnecting local lagoon areas can improve water oxygenation and salinity, which is vital for the ecosystem. Marušić stressed that effective communication with local communities was key to understanding that certain areas were unsuitable for agriculture, thus avoiding potential conflicts. He underscored that

good communication channels are critical to ensuring that local knowledge and needs are incorporated into project planning and execution. Delia Dimitriu added that for local communities to truly benefit from climate and environmental projects, they must be involved from the outset and have a significant voice in the decision-making process. She observed that while locals possess valuable traditional knowledge, they often lack organization and the ability to secure funding. Dimitriu argued that it is crucial to help these communities organize themselves and obtain the necessary resources. If community involvement is left too late, merely for testing solutions, it becomes more challenging to ensure that the projects meet local needs and preserve indigenous knowledge.

Figure 21 Panel #2

Quizzes

During this day of the Living Lab, two quizzes were conducted that pertained to the content of the various presentations. These quizzes were designed to engage the participants and ensure they had a clear understanding of the topics discussed. The interactive nature of the quizzes encouraged active participation and dialogue among attendees, which helped to enhance the overall conference experience. The quizzes not only served as a tool for reinforcing the knowledge shared during the presentations but also fostered a sense of community and collaboration among participants. This engagement contributed significantly to making the conference more dynamic and effective.

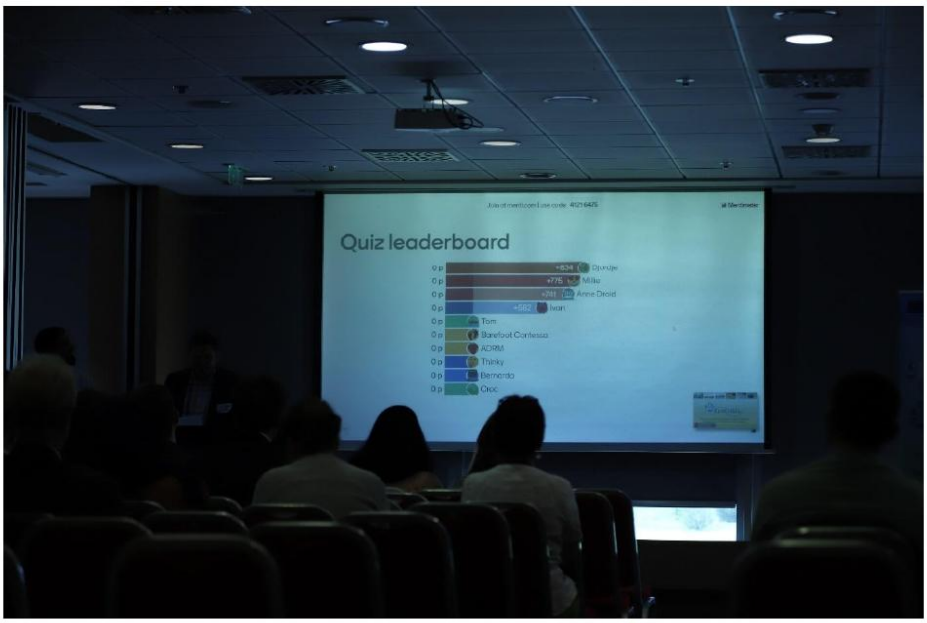

Figure 22 Quiz

On the second day of the Living Lab, a field trip was organized to visit areas that are benefiting from the various projects discussed during the conference. Participants had the opportunity to see firsthand the positive impacts of initiatives such as wetland restoration, improved water management, and nature-based solutions on local ecosystems and communities. The field trip allowed attendees to observe the practical application of the projects' strategies and interventions, providing a tangible context to the theoretical knowledge shared during the presentations. This experience also facilitated deeper discussions and understanding among participants about the challenges and successes of implementing climate change mitigation measures in real-world settings.

Visit to National Park Kopački Rit and boat ride

During the field trip on the second day of the Living Lab, participants visited Kopački Rit National Park, one of the largest and most well-preserved wetlands in Europe. The trip included a guided boat ride through the park, allowing attendees to experience the natural beauty and rich biodiversity of the area up close. The tour guide provided detailed information about the diverse species of flora and fauna that inhabit the park, highlighting its importance as a critical habitat for numerous bird species and aquatic life. Participants learned about the unique vegetation that thrives in this wetland ecosystem and the ongoing conservation efforts to protect and preserve it. The visit offered an immersive experience, underscoring the ecological value of Kopački Rit and its significance in regional climate resilience and biodiversity conservation efforts.

Figure 23 Visit to National Park Kopački Rit and boat ride

Arrival in Draž and Batina

The second destination of the field trip was the town of Draž, which plays a key role in several of the projects featured at the conference. In Draž, participants explored local initiatives and projects that are closely linked to the themes discussed during the Living Lab. The visit provided insights into how these projects are implemented on the ground and their impact on the community and environment. Additionally, the trip included a visit to Batina, another key location involved in the projects.

Figure 24 Group photo of participants

4. Conclusion

The Middle Danube Living Lab, held on June 11-12, 2024, provided a comprehensive platform for discussing and addressing climate change impacts on agriculture and river basins. The event brought together diverse experts and stakeholders to explore innovative solutions across social, environmental, and techno-economic dimensions. Interactive elements such as quizzes and discussion sessions engaged participants and enriched the conference experience, fostering a dynamic exchange of ideas. Key discussions highlighted the importance of integrating local knowledge with scientific evidence, particularly in adapting agricultural practices and managing river basins. The panel discussions provided valuable insights into how projects like DaWetRest, DALIA, and DANUBE4all are actively contributing to ecosystem restoration and sustainability. These projects showcase the benefits of collaboration and the need for community involvement in driving meaningful change. The field trip to Kopački Rit, Draž, and Batina offered participants an opportunity to witness the practical impacts of these initiatives firsthand. The visits underscored the significance of local engagement and the tangible benefits that result from well-coordinated environmental and conservation efforts. Overall, the Living Lab underscored the necessity of a multifaceted approach to climate change, combining scientific research, technological innovation, and community involvement to build resilience and achieve sustainable outcomes.

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Annex

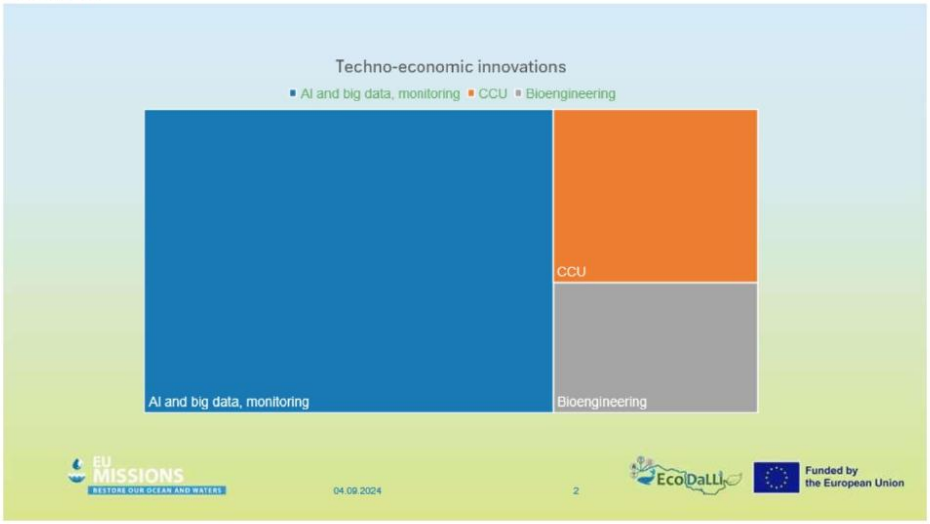

Figure 25 Techno-economic innovation

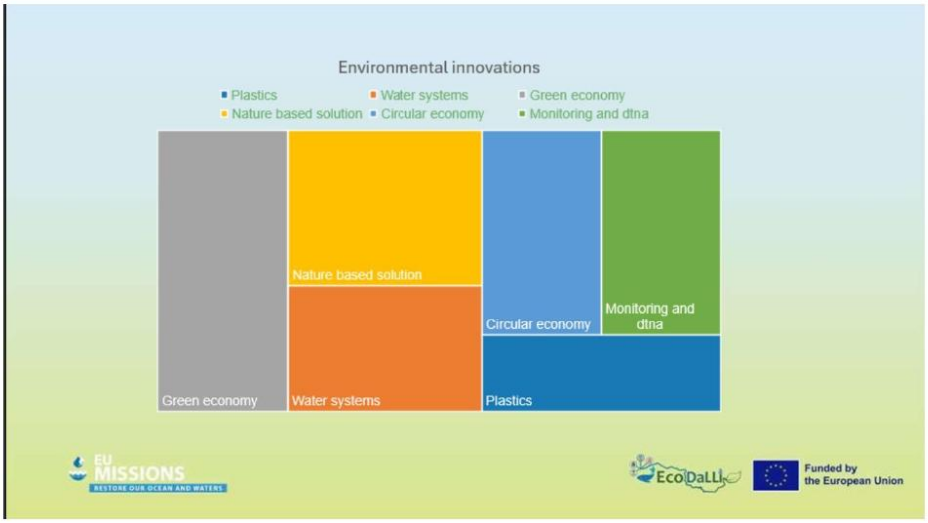

Figure 26 Environmental innovation

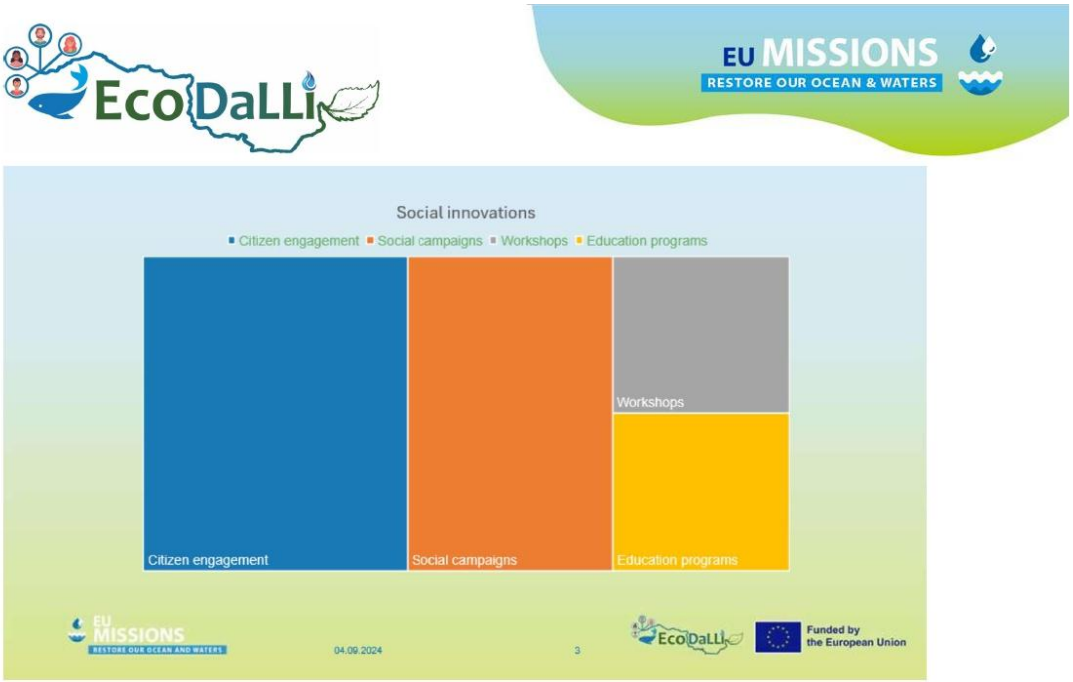

Figure 27 Social innovation

Annex 3: Lower Danube and Danube Delta Living lab extensive report

Project acronym:	EcoDaLLi
Project title:	ECOsystem-based governance with DAnube lighthouse Living Lab for sustainable Innovation processes - EcoDaLLi
Call:	HORIZON-MISS-2021-OCEAN-02-04 —Danube river basin lighthouse – coordination activities
Programme:	HORIZON EUROPE
Start date of project:	01.01.2023
Duration:	42 Months

Lower Danube Living Lab on Water Systems and Danube Delta Living Lab on Biodiversity, part of the 31st edition of the "Deltas and Wetlands" DDNI Scientific Event Community

May 14 - 16, 2024

Grant Agreement No.: 101093908

Funded by the European Union

Deliverable Name	
Deliverable Number	
Work Package	WP4
Associated Task	
Due Date	
Completion Date	21.05.2024
Submission Date	20.06.2024
Deliverable Lead Partner	
Deliverable Author	Răzvan Gabriel ODOR, Carmen NEAGU

Dissemination Level		
PU	Public	X
SEN	Sensitive	

Change Control | Document History				
Version	**Date**	**Change History**	**Authors**	**Organization**
1	21.05.2024		Răzvan Gabriel ODOR Carmen NEAGU	MMAP

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On May 14 and 16, 2024, the representatives of the Ministry of Environment, Waters and Forests, Ms. Carmen Neagu, water expert, and Mr. Răzvan Gabriel Odor, international relations expert, participated at the "Mission Ocean - Common Action Plan Danube Lighthouse and Black Sea Strategy" session, and at the EcoDaLLi Lower Danube Living Lab on Water Systems and the Danube Delta Living Lab on Biodiversity. The Lower Danube Living Lab on Water Systems was organized by the Ministry of Environment, Waters and Forests of Romania (MEWF) in collaboration with Tulcea County Prefecture and the Danube Delta National Institute (DDNI). These events were part of the 31st edition of the "Deltas and Wetlands" DDNI Scientific Event Community.

At the 31st edition of the "Deltas and Wetlands" DDNI Scientific Event Community, there were approximately 200 participants (onsite and online). The aforementioned living labs included the participation of 75 representatives from project partners and local, regional and national stakeholders.

One of the significant advantages of the Lower Danube Living Lab on Water Systems and Danube Delta Living Lab on Biodiversity was its association with the 31st Symposium Deltas and Wetlands. The Ministry of Environment, Waters and Forests of Romania is grateful to DDNI for offering the opportunity to organize the Lower Danube Living Lab on Water Systems during the symposium. This setting brought together important scientists and researchers from Romania and abroad, ensuring a high level of specialized knowledge.

The Lower Danube Living Lab on Water Systems was chaired by Mr. Gheorghe Constantin, Deputy General Director for Waters at the Ministry of Environment, Waters and Forests of Romania. Stakeholders gathered in person to discuss in three groups on social, economic and environmental factors related to water systems. Mrs. Delia Dimitriu as moderator of this living lab session summarized one of the key points: the importance of addressing the local level and local communities.

Through these debates, participants explored various strategies and actions aimed at promoting sustainable development and addressing the challenges faced by the Lower Danube region. The involvement of the MEWF in these discussions underscored the importance of integrating economic and social considerations into our environmental initiatives, with emphasis on the water field.

Key points included:

- **The need for more funding and appropriate programs**

  Securing Funding: Advocating for increased financial resources from national and international bodies to support initiatives aimed at sustainable water management and biodiversity protection.

  Program Development: Identifying and developing targeted programs that address specific challenges within the water and biodiversity sectors. This may involve collaborations with governmental agencies, NGOs, and international organizations to create effective and sustainable programs.

- **Bottom-up solutions starting from local communities to the national level**

  Local Initiatives: Empowering local communities to take the lead in identifying issues and developing solutions that are tailored to their specific needs and contexts.

  Community Involvement: Ensuring that community voices are heard in the decision-making processes at higher levels of government, thereby fostering a more inclusive and participatory approach to policy development.

  Scalable Solutions: Developing local solutions that can be scaled up and adapted to broader national strategies, ensuring that successful initiatives can have a wider impact.

- **Promoting businesses linked to ecosystem services**

  Sustainable Business Models: Promoting business practices that are environmentally friendly and sustainable, such as eco-tourism, organic farming, and renewable energy.

  Economic Incentives: Providing incentives for businesses that engage in activities beneficial to ecosystems, such as tax breaks, grants, or subsidies.

  Public-Private Partnerships: Facilitating partnerships between the public sector and private businesses to enhance investment in ecosystem services and sustainable practices.

- **Community-Based Water Management**

  Local Water Committees: Establishing committees composed of community members to oversee water use and conservation efforts.

  Participatory Approaches: Involving community members in decision-making processes regarding water resource management, ensuring their needs and knowledge are integrated into management plans.

  Sustainable Practices: Educating and supporting communities in adopting sustainable water use practices to ensure long-term resource availability.

- **Educational campaigns and cultural activities to raise awareness and engage local communities**

  Educational Programs: Implementing programs in schools and communities to teach about water conservation, pollution prevention, and the importance of healthy water systems.

  Engaging Content: Creating engaging content such as documentaries, workshops, and interactive sessions to spread awareness.

  Cultural Activities: Organizing events like river clean-ups, festivals, and educational walks to connect people with their local water bodies and celebrate the cultural importance of water.

- **Community Engagement**

  Active Participation: Involving community members in monitoring, restoration, and sustainable resource management projects.

  Local Involvement: Ensuring that conservation efforts are inclusive and reflect the needs and knowledge of local communities.

  Long-Term Commitment: Building long-term relationships with communities to foster a culture of conservation and sustainable resource use.

Also, during the Lower Danube Living Lab on Water Systems, the MEWF representatives have disseminated water related promotional materials that the MEWF prepared for the participants, with focus on local stakeholders. The debates continued even after the events, fostering ongoing dialogue and collaboration.

Further, on May 16, 2024, the MEWF participated at the Danube Delta Living Lab on Biodiversity, within the International Symposium. Chaired by the Danube Delta Biosphere Reserve Authority and moderated by Orieta Hulea, General Director of WWF Romania, the session began with a comprehensive overview by all Innovation Action projects within the Danube & Black Sea Lighthouse, highlighting their contributions to biodiversity in the Danube River Basin.

The discussions were also divided into three groups, focusing on social, economic, and biodiversity pillars.

Key points included on social pillar:

- **Implementing educational programs**

  School Programs: Integrating biodiversity topics into school curriculums to educate young students about the importance of biodiversity, ecosystem services, and conservation practices from an early age. Activities can include interactive lessons, field trips, and hands-on projects.

  University Courses: Developing specialized courses and research opportunities at universities focused on biodiversity, conservation biology, and environmental science. This can help produce a new generation of scientists and professionals equipped with the knowledge and skills to tackle biodiversity challenges.

  Community Workshops: Organizing workshops and training sessions for community members to educate them on local biodiversity, sustainable practices, and how they can contribute to conservation efforts. These workshops can be tailored to different age groups and community needs.

- **Encouraging community engagement and policy advocacy**

  Community Involvement: Encouraging local communities to participate in biodiversity monitoring, restoration projects, and sustainable resource management. Community

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members can contribute valuable local knowledge and play a hands-on role in conservation efforts.

Policy Advocacy: Working with policymakers to develop and implement policies that support biodiversity conservation. This includes advocating for the creation and enforcement of protected areas, sustainable land-use planning, and biodiversity-friendly agricultural practices.

Stakeholder Meetings: Organizing regular meetings and forums where community members, scientists, policymakers, and other stakeholders can discuss biodiversity issues, share ideas, and collaborate on solutions.

- **Promoting corporate responsibility and public outreach events**

  Sustainable Practices: Encouraging businesses to adopt environmentally friendly practices such as sustainable sourcing, reducing pollution, and minimizing habitat destruction. Companies can also invest in conservation projects and adopt corporate social responsibility (CSR) initiatives focused on biodiversity.

  Partnerships: Forming partnerships between businesses, NGOs, and government agencies to support biodiversity projects. These partnerships can leverage resources, expertise, and influence to achieve greater impact.

  Public Outreach Events: Organizing events such as workshops, seminars, and public talks to raise awareness about biodiversity issues. These events can engage the public, provide education, and inspire action to protect biodiversity.

  Community Events: Hosting community events like clean-up drives, tree planting, and biodiversity fairs to involve local residents in conservation activities and foster a sense of ownership and responsibility towards their local environment.

- **Utilizing media campaigns and citizen science programs**

  Media Campaigns: Utilizing various forms of media, including social media, television, radio, and print, to spread awareness about biodiversity issues and inspire action. Campaigns can feature documentaries, interviews with experts, success stories, and informational content to reach a wide audience.

  Social Media: Leveraging social media platforms to engage with the public, share updates on conservation projects, and encourage participation. Interactive content such as live streams, Q&A sessions, and photo contests can increase engagement and visibility.

Further, the economic pillar discussions focused on addressing future challenges and needs through a comprehensive approach. These were categorized into the following actions: sustainability, nature-based solutions, and education:

- **Sustainability**

  Challenge: Ensuring that economic development does not compromise the ecological health of the Danube Delta region.

  Need: Developing economic models that integrate sustainability principles, balancing economic growth with environmental preservation.

  Action: Promote sustainable business practices, encourage eco-tourism, and support industries that adhere to green principles.

- **Nature-based solutions**

  Here we sub - categorized the nature-based solutions into 3 phases:

  ***Initial Phase - Incentive**:*

  Challenge: Lack of motivation among stakeholders to adopt nature-based solutions.

  Need: Create incentives for businesses and communities to adopt eco-friendly practices.

  Action: Provide financial incentives, subsidies, and tax benefits to encourage the adoption of nature-based solutions.

  ***Design Phase**:*

  Challenge: Lack of effective designs and models for implementing nature-based solutions.

  Need: Develop robust and scalable nature-based solution models.

  Action: Engage experts to design solutions tailored to the local environment and needs.

  ***Implementation Phase**:*

  Challenge: Difficulties in practical implementation and scaling of nature-based solutions.

  Need: Effective strategies for rolling out nature-based solutions across the region.

  Action: Implement pilot projects, monitor their outcomes, and scale successful models.

- **Education**

  Challenge: Limited awareness and understanding of sustainable practices and nature-based solutions.

  Need: Comprehensive educational programs to inform and empower local communities and stakeholders.

  Action: Develop and deliver educational campaigns, workshops, and training sessions focusing on sustainability and nature-based solutions.

Actions to Tackle Challenges and Needs:

- **Stakeholder Engagement**

  Challenge: Ensuring active participation and buy-in from all relevant stakeholders.

  Need: Strong and continuous engagement with stakeholders.

  Action: Regular meetings, forums, and consultations to gather input and foster collaboration.

- **Nature-Based Solutions**

  Challenge: Scaling and mainstreaming nature-based solutions.

  Need: Broad adoption and integration of nature-based solutions.

  Action: Incentivize adoption, develop and pilot effective designs, and implement widely.

- **Policy Changes**

  Challenge: Outdated legal frameworks that do not support modern eco-friendly solutions.

  Need: Progressive policy changes that enable sustainable practices.

  Action: Advocate for and implement policy reforms to facilitate a shift from traditional methods to innovative, eco-friendly solutions.

With respect to the biodiversity pillar, the discussions mainly focused on the sustainable fisheries management and regulatory framework, namely:

- **Sustainable Fisheries Management**

  Challenge: Overfishing and habitat degradation threatening fish populations and aquatic ecosystems.

  Need: Implement sustainable fishing practices to preserve biodiversity.

  *Action: **Catch Limits**: establish and enforce catch limits to prevent overfishing; **Seasonal Bans**: implement seasonal bans during critical breeding periods to allow fish populations to recover; **Protected Areas**: designate protected areas where fishing is restricted or prohibited to conserve biodiversity.*

- **Comprehensive Regulatory Framework**

  Challenge: Lack of clear and effective regulations to support biodiversity conservation.

  Need: A detailed and enforceable regulatory framework that supports biodiversity initiatives.

  *Action: **Clear Responsibilities**: define who is responsible for implementing and monitoring conservation measures; **Penalties and Measures**: establish clear penalties for non-compliance and outline specific conservation measures; **Timelines and Funding**: specify timelines for implementation and secure funding for conservation*

projects; ***Expected Results and Assessment****: set clear, measurable outcomes and methods for assessing progress. Update the regulatory framework based on findings and evolving needs.*

In an interactive segment, stakeholders actively contributed measures related to biodiversity, laying the groundwork for collective action within the Danube & Black Sea Lighthouse. In conclusion, the discussion emphasized the need for an appropriate regulatory framework and stakeholder engagement at all levels, with Nature-Based Solutions (NBS) at the forefront of discussions.

These sessions showcased the power of collaboration and collective action in addressing complex challenges, reinforcing EcoDaLLi's commitment to fostering partnerships and driving tangible progress in biodiversity conservation within the Danube River Basin and beyond.