Multi-Actor Communication Framework

Deliverable 7.1

Document information

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Summary

This Multi-Actor Communication Framework provides a detailed description of the types of stakeholders and targeted groups that the project aims to engage with, before, during and after the project. It will also detail the means to interact with them and gain engagement throughout the life of ISLANDR.

Keywords

ISLANDR Test Areas (ITAs), stakeholder, roundtables, serious game

Abbreviations and acronyms

Acronym	Description
WP	Work Package
C&D	Communication & Dissemination
ITA	ISLANDR Test Area

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Introduction

ISLANDR is a multidisciplinary project funded by the European Union , and it is foremost aimed at supporting the execution of the EU mission: A Soil Deal for Europe.

In order to road-test the project's findings, seven test areas (ITAs) across Europe have been identified. Key actors, stakeholders and end-beneficiaries are at the epicentre of ISLANDR. Through roundtables in the respective ITAs, the foremost assignment of local actors will be to provide feedback and offer insights as to the robustness and effectiveness of the strategies, frameworks and decision-support tools, as well as on the wider valuation approaches and financing mechanisms to be developed over the course of the project's lifetime.
In this deliverable we will study the key stakeholders, their importance, and the messages we want to address to them. We will also present the activities that we want to develop to engage with them.

1. Scope and objectives

1.1. Scope

The Multi-Actor Communication Framework within the ISLANDR project outlines a strategy to identify, engage, and maximise the contribution and impact of stakeholders involved. It ensures coordination among work packages to gather feedback essential for developing the stakeholder's strategy. This deliverable uses the pre-existing stakeholders list presented in the Grant Agreement.

The following mapping and engagement plan will be updated during the project lifetime whenever relevant to provide the most up-to-date information. Additional stakeholders will be included during the different stages of project implementation depending on the nature of the input needed, with means of reaching them and communicating with them.

1.2. Objectives

The objectives of the Multi-Actor Communication Framework are to:

- Ensure the effective use of the project's outcomes by key stakeholder groups involved in soil health.
- Actively involve the stakeholders throughout the project.

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- Establish effective channels of communication and engagement with stakeholders to foster collaboration and thus develop tailored outreach activities.
- Promote and disseminate the project's results to relevant stakeholders.
- Foster partnerships and networks among partners of different WPs and case studies.
- Inform strategic decision-making during project implementation by understanding stakeholder perspectives and priorities.

2. Operational framework

2.1. Partners contribution

LGI is leading the Multi-Actor Communication Framework activities. It will be reviewed and followed by all partners.

2.2. The role and type of stakeholders

Contrary to the target audiences who receive the end messages and results, stakeholders should be active participants in the project's lifecycle. They are engaged from its inception and involved throughout its implementation.

In the ISLANDR project, the stakeholders play a crucial role providing feedback and offering insights as to the robustness and effectiveness of the **strategies, frameworks and decision-support tools, such as the ISLANDR Roadmap**, as well as on the wider valuation approaches and financing mechanisms to be developed over the course of the project's lifetime. Thus, the stakeholders are foreseen to bring an interactive feedback loop to the research process, with a view to ensure the wider uptake of the project's outcomes and achievements.

Engagement initiatives will be conducted and will serve to co-design the project's decision-making tool, fostering collaboration and ownership among stakeholders. The information gathered during those roundtables will serve as a foundation for addressing specific barriers, challenges, and opportunities in managing and monitoring Soil Health.

The type of stakeholders involved are Policy making and regulatory bodies (water, agricultural, environment & health sectors), EU and national level, municipalities, key international stakeholder networks & projects, communities in contaminated areas, service providers/advisers, financial investors, scientific community, residents and interest groups (nature protection).

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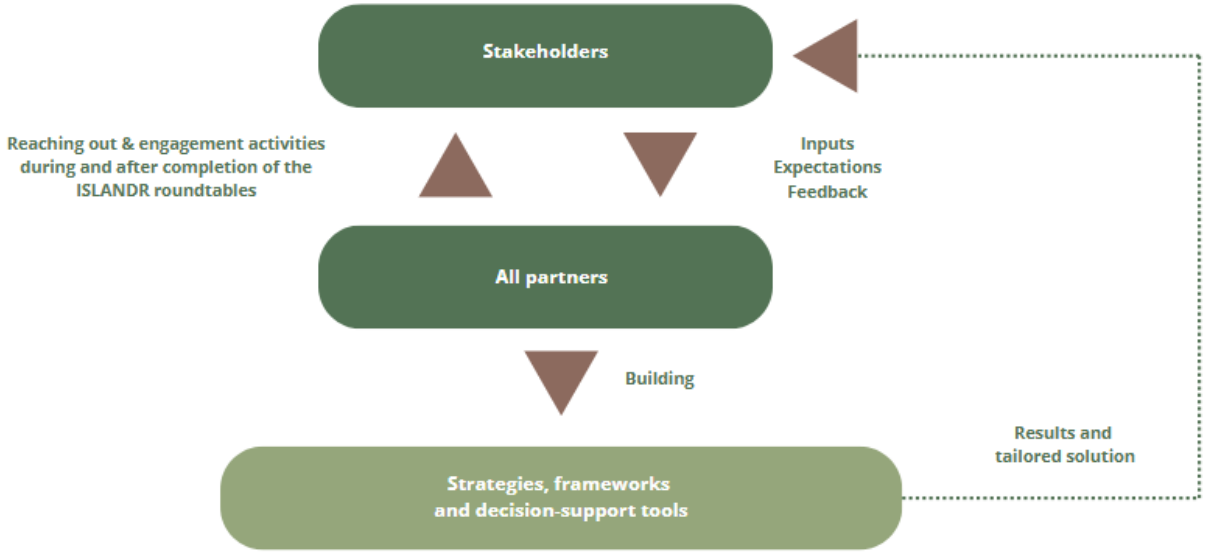

Figure 1: Stakeholder involvement in ISLANDR

2.3. A multi-level stakeholder engagement

The ISLANDR project requires an important involvement of the stakeholders throughout the ITAs. The 7 ITAs and the partner responsible for the ITA are as follow:

- **ITA#1**: Outokumpu, Finland, GTK
- **ITA#2**: Kolleberga, Sweden, CHALMERS
- **ITA#3**: Toulouse Metropolis, France, BRGM
- **ITA#4**: Mazowieckie and Lubelskie, Poland, IUNG-PIB
- **ITA#5**: Larnaca, Cyprus, TEMASOL
- **ITA#6**: Kosovo, R3
- **ITA#7**: Soesterberg, Netherlands, DELTARES

For more details regarding the organisation of a stakeholder engagement meeting such as a roundtable, see Appendix 1(Kolleberga Roundtable Summary and Method Description).

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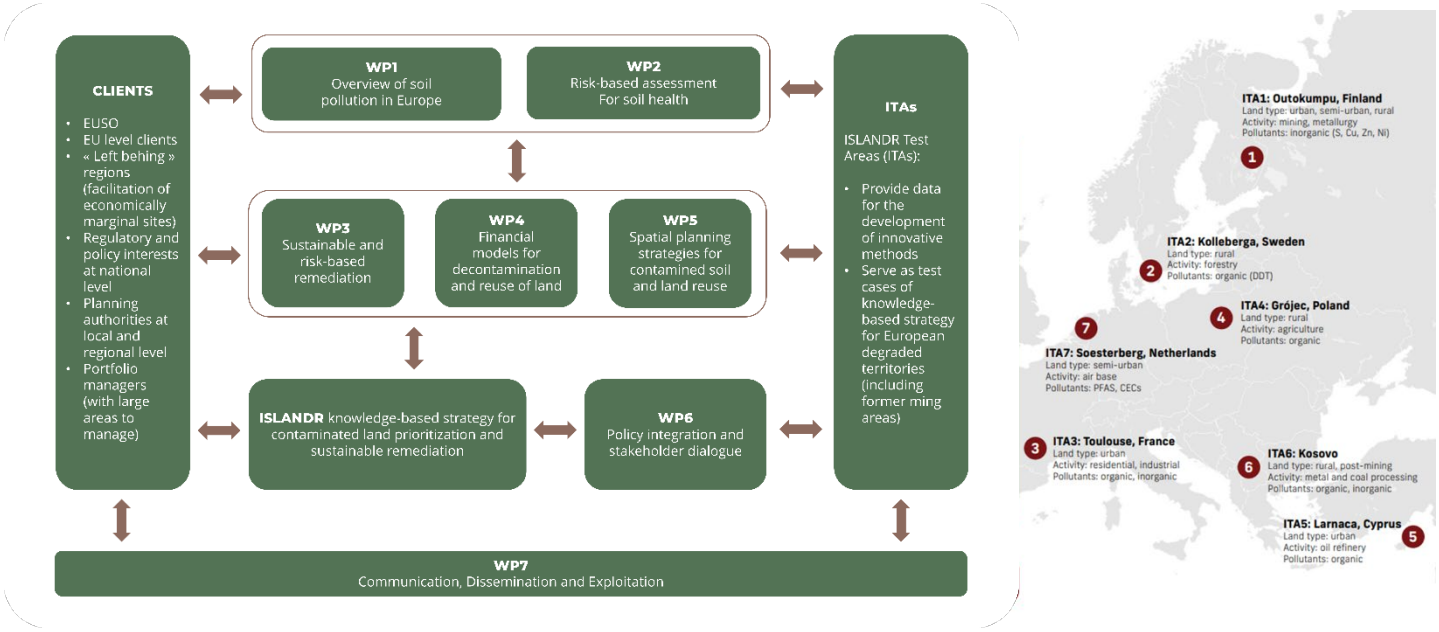

Figure 2 . ISLANDR work packages and test areas.

The stakeholders to be engaged will be both at local and regional levels in all the ITAs. Through several defined stakeholders' engagement activities (listed in Section 6), they will be solicited to provide active dialogue and a basis for rapid implementation and new project roll-out. Each ITA will involve the same stakeholder groups/subgroups with common objectives for engagement (dialogue and feedback). However, the issues presented at each ITA will vary based on the specific soil contamination issues (Fig. 2).

Stakeholder events in ITAs

ITA	Objectives & date	Stakeholders targeted
N°1: Outokumpu, Finland	A stakeholder event was organised in Finland 12th June 2024 including serious game "Let's renovate Outokumpu". Aim: Gather stakeholders to discuss on the potential solutions how to scope with various environmental risks in historical mining towns in Europe, Outokumpu as an example. (see appendix 2)	Landowner, regulator, consultants, local community, research organisations.
N°2 Kolleberga, Sweden	September 19, 2024 Aim: Gather relevant stakeholders to discuss which are the possible land	Landowner, regulator, local municipality, planners, public agency, consultant, researchers

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	uses for a site and the potential wider values from different perspectives	
N°3: Toulouse Metropolis, France,	The stakeholder meeting will be organized in 2025.	Landowner, regulator, local municipality, planners, public agency, consultant, researchers
N°4: Mazowieckie and Lubelskie, Poland	The stakeholder meeting will be organized in 2025.	Landowner, regulator, local municipality, planners, public agency, consultant, researchers
N°5: Larnaca, Cyprus	The stakeholder meeting will be organized in 2025. Aim: Gather relevant stakeholders to understand better how to add to the value proposition to a potential brownfield redevelopment project by identifying wider values and how stakeholders prioritize them.	Landowner, regulator, local municipality, planners, public agency, consultant, researchers
N°6: Kosovo	The stakeholder meeting will be organized in 2025. Aim: Gather relevant stakeholders to understand better how to add to the value proposition to a potential brownfield redevelopment project by identifying wider values and how stakeholders prioritize them	Landowner, regulator, local municipality, planners, public agency, consultant, researchers
N°7: Soesterberg, Netherlands,	The stakeholder meeting will be organized in 2025.	Landowner, regulator, local municipality, planners, public agency, consultant, researchers

Table 1: Stakeholder events in ITAs

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3. Methodology of the stakeholder mapping

3.1. Stakeholder mapping workshop

A first stakeholder mapping workshop was held online on 19 November 2024 (Fig. 3). This workshop was aimed at creating a first outline of the stakeholders that were presented in the Grant Agreement.

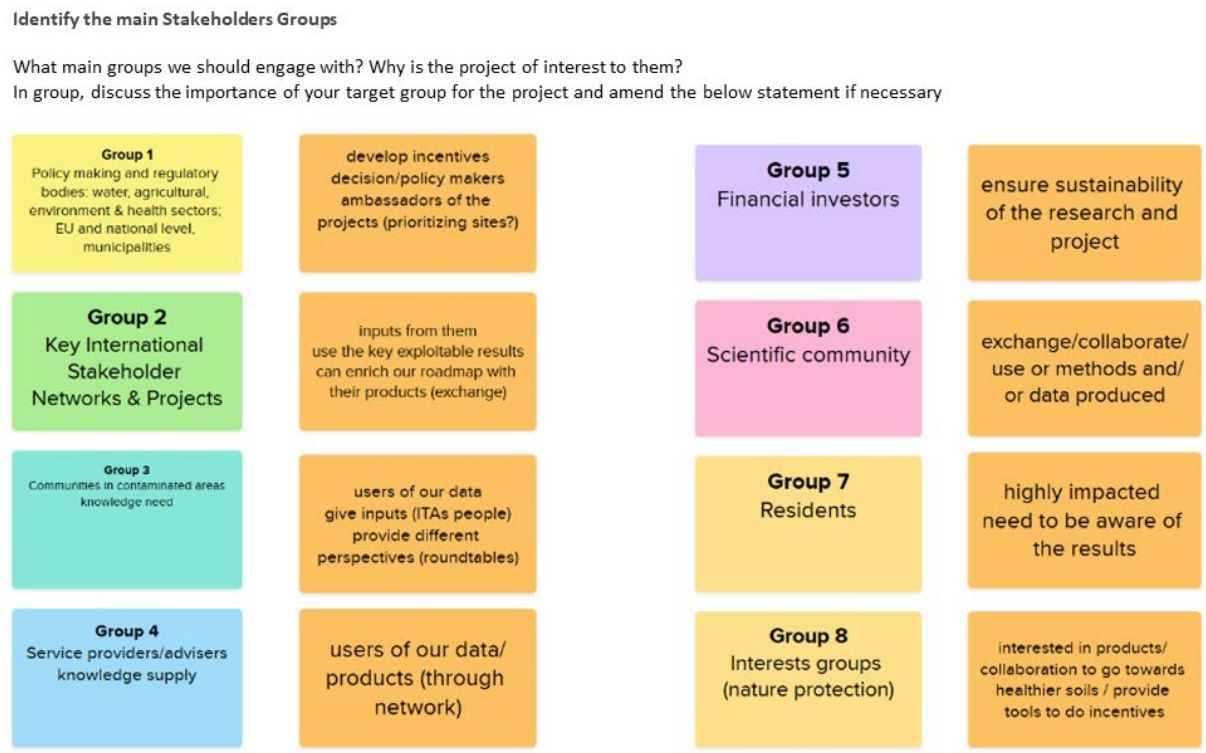

Figure 2: Extract of the mural filled by partners

The types of stakeholders identified by the partners during this workshop vary in terms of precision and audience. Some stakeholders are quite precise while others belong to wider categories. In this workshop, partners identified specific stakeholders they are in contact with or want to connect with. The high-level mapping served to carry out a more detailed mapping of sub-categories, target institutions, and specific stakeholder ways of engagements. Figure 3 highlights on the different groups of stakeholders and the reasons why they are important to the project.

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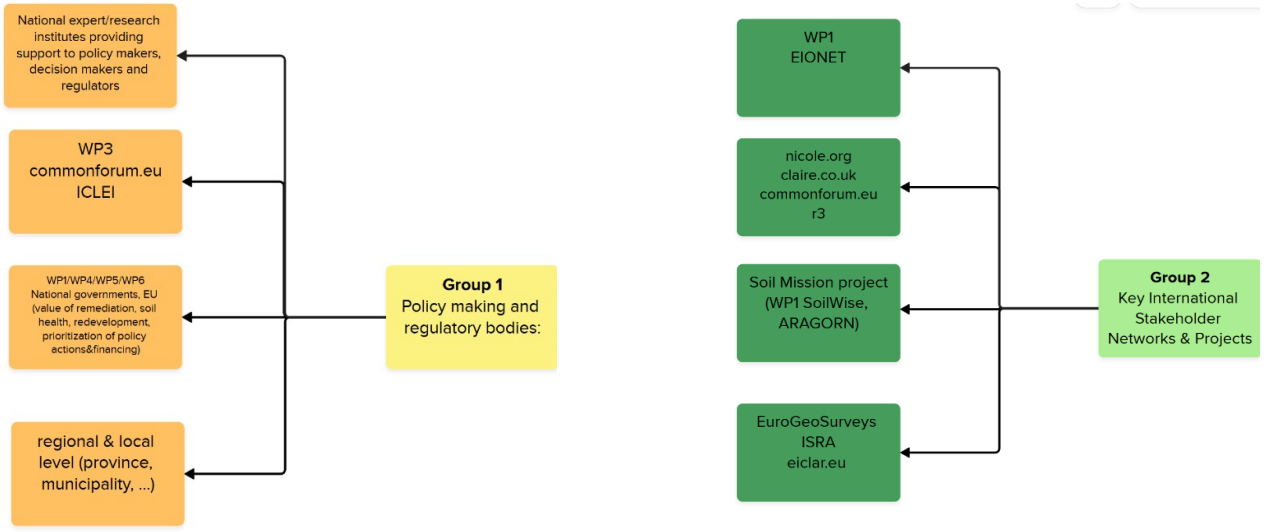
4. The mapping

4.1. The cross-sectoral stakeholder groups

The identified stakeholder groups are the following:

- Policy making and regulatory bodies: water, agricultural, environment & health sectors; EU and national level, municipalities
- Key International Stakeholder Networks & Projects
- Communities in contaminated areas
- Service providers/advisers
- Financial investors
- Scientific community
- Residents
- Interest groups (nature protection)

As referenced in Section 3, a stakeholder mapping workshop was held online. This quick exercise was to make a first brainstorming of relevant stakeholders for the project. However, this base was an interesting exercise to help partners identify specific sub-stakeholders that might not have been previously considered.



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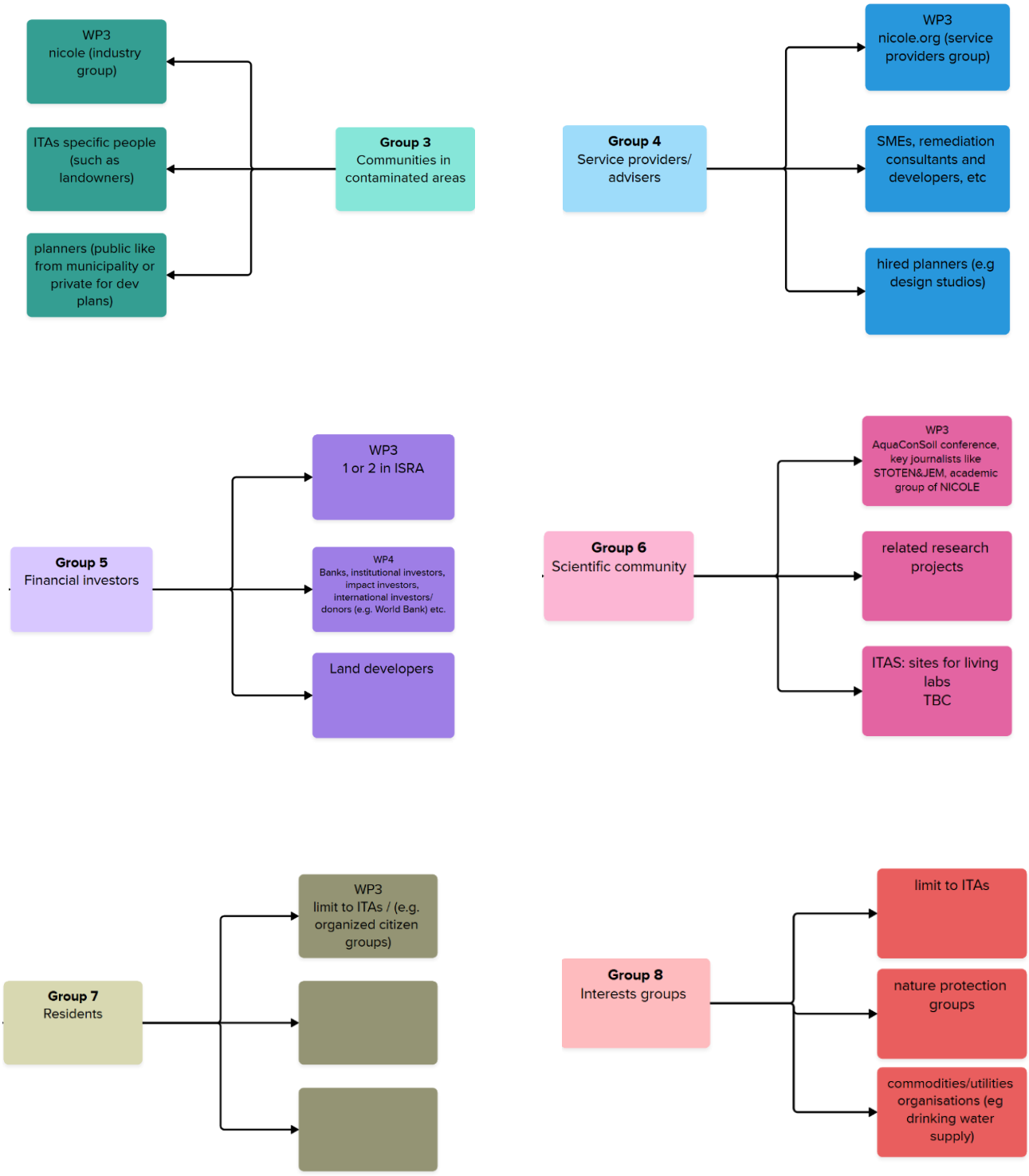

Figure 3: Screenshots of the stakeholder mapping workshop

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5. Key messages

The engagement activities of the stakeholders, mostly during the meetings organised in the Test Areas (ITAs) will be done in a way that conveys the following messages:

- The ISLANDR project is cross-disciplinary and multi-actor. It aims to promote the delivery of Green Deal objectives, in particular achieving Zero Pollution by reducing soil pollution and enhancing soil restoration.
- As it is based upon 7 ITAs, the ISLANDR findings will be designed to be used at a local/national level, by a wide variety of sectoral stakeholders.
- ISLANDR takes a carefully targeted approach in view of the large existing knowledge base, and has designed its outcomes to be easily assimilated by multiple target groups.
- The information gathered from the stakeholders during meetings organized in ITAs provide active dialogue and a basis for rapid implementation and new project roll-out. The main objective is to provide convincing arguments to remediate and redevelop a site by identifying wider values. This is especially important when the economic aspect is marginal or even unprofitable, as it is enhancing the value proposition for brownfield redevelopment.

5.1. Key messages by target group

As the stakeholders will also be part of the target audiences, some specific key messages have been identified:

Stakeholder groups	Key messages
Policy making and regulatory bodies	• ISLANDR has linked the concept of soil health/functionality as a receptor to account for in contaminated land management. *For example, considering the level of functionality and indicators necessary for an intended land use and mapping the impacts of different remediation techniques on soil functions.* • The project has developed a metadata catalogue of soil contamination data sources in co-operation with SoilWise project. • ISLANDR has gathered an overview of the local contamination areas

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	and diffuse soil data sources across Europe. • ISLANDR has mapped the wider values of brownfield remediation and redevelopment. This includes compiling methods for economic valuation of costs and benefits, to both the landowner and society, and developing a method for benefit transfer that may be used in a cost-benefit analysis.
Key international stakeholder networks and projects	• ISLANDR is developing ontology for soil contamination that defines terminology used in our project. • ISLANDR has developed a method for interpolating scare, imprecise, and clustered data. • The project has developed an approach to identify regional anomalies of diffuse soil contamination.
Communities in contaminated areas	• ISLANDR has developed a method for interpolating scare, imprecise, and clustered data. • The project has developed an approach to identify regional anomalies of diffuse soil contamination.
Service providers/advisers	• ISLANDR's roadmap and building blocks can help to remediate and redevelop sites with severe or complex contaminated soils.
Financial investors	• ISLANDR's roadmap and building blocks can help to remediate and redevelop sites with severe or complex contaminated soils. • ISLANDR has mapped the wider values of brownfield remediation and redevelopment. This includes compiling methods for economic valuation of costs and benefits to both the landowner and society (i.e., externalities). • The project has developed a method for benefit transfer that

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	may be used in a cost-benefit analysis. • The results of ISLANDR, and more specifically its roadmap, make a strong case for appropriate investment in brownfield redevelopment projects.
Scientific community	• ISLANDR is a collaborative project that welcomes outside perspectives to help develop its roadmap by adding other building blocks. • ISLANDR has developed a method for interpolating scare, imprecise, and clustered data. • The project has developed and approach to identify regional anomalies of diffuse soil contamination.
Residents	• ISLANDR aims to bring solution to accelerate soil remediation. • The project has direct benefits for society in terms of reducing risks to human health, creating a better environment, opening new ecosystems services, developing job opportunities, etc.
Interest groups	• By supporting soil health, ISLANDR contributes to enhancing ecosystem services (water and soil quality, climate adaptation, support for green etc).

Table 2: Key messages for stakeholders as target groups

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6.Engagement activities

6.1. Engagement through Serious Games Playing

6.1.1. Lead

Involving stakeholders in the remediation of a contaminated site is important to achieve sustainable and acceptable solutions. Serious games offer a participatory method that can improve stakeholder interaction and support decision-making. Serious games are particularly useful in situations where there are a large number of stakeholders and potential remediation methods. Therefore, Serious games were tested as a decision-making tool in the ISLANDR research project, which assessed the management of the environmental impacts of tailings in the Outokumpu city area.

6.1.2. What is a Serious Game?

Serious games are games whose primary purpose is not entertainment but learning, education, or behaviour change. The games have been developed as a result of the work of numerous researchers, teachers, trainers, and developers for decades. The real heyday of serious gaming began in the 1970s with the development of social scientist Clark C. Abt, and the method was popularized in the 21st century by Serious Games Ben Sawyer, founder of the Initiative. Games are widely used in various fields, such as healthcare, education, and the environment (Barbosa et al. 2014, Lameras et al. 2017, Morgan et al. 2024, Sillanpää et al. 2024). Their main purpose is to simulate real-world situations by providing participants with the opportunity to try out different decision-making options in a risk-free environment.
Serious game design is a multi-step process. The game is built to solve or understand a specific problem or scenario, so it is essential to define the goals precisely. Player analysis must also be done at the very beginning, so that the needs and motivations of the player groups can be taken into account. After this, a simplified model of the game mechanics is created, which can be, for example, a turn-based or a discussion-based game played round by round. At this stage, the game's challenges, rewards and feedback are also decided. On top of the mechanics, the actual content is created.

of Outokumpu's Serious Game was developed through two rounds of test play to ensure that the game mechanics and information content worked seamlessly together. The actual game was implemented in conjunction with the ISLANDR project seminar, funded by the European Union's Horizon Europe research and innovation program, in Joensuu in June 2024, and it was based on a game developed in France earlier in the project (Andriamasinoro et al. 2020). The goal of the game was to explore how the Serious Game could be used to increase stakeholder participation and understanding of different remediation options for a contaminated site and their impacts, and to highlight local values and views related to the area.

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6.1.3. Case Outokumpu – let's renovate Outokumpu

Outokumpu's Serious Game "Let's renovate Outokumpu" was based on the real risk management challenges in the area (Figure 6). The development of the city of Outokumpu has been tied to the development of the Outokumpu mine. A copper deposit was discovered in 1910 (Tornivaara & Kauppila 2014), which started the expansion of the city and rapid industrial development. Traces of mining activities are still visible in the area, although mining operations ended in 1989. The city's streets are partly built with tailings sand, which means that issues related to contaminated soils must be considered every time streets are dug up. Acidic, metal-rich water affects nearby lakes and groundwater. Population exposure to copper, nickel, zinc, lead and arsenic must be assessed in operations where metal-rich soil is released into dust. Large waste areas were established before modern landfill base structures were deemed necessary.

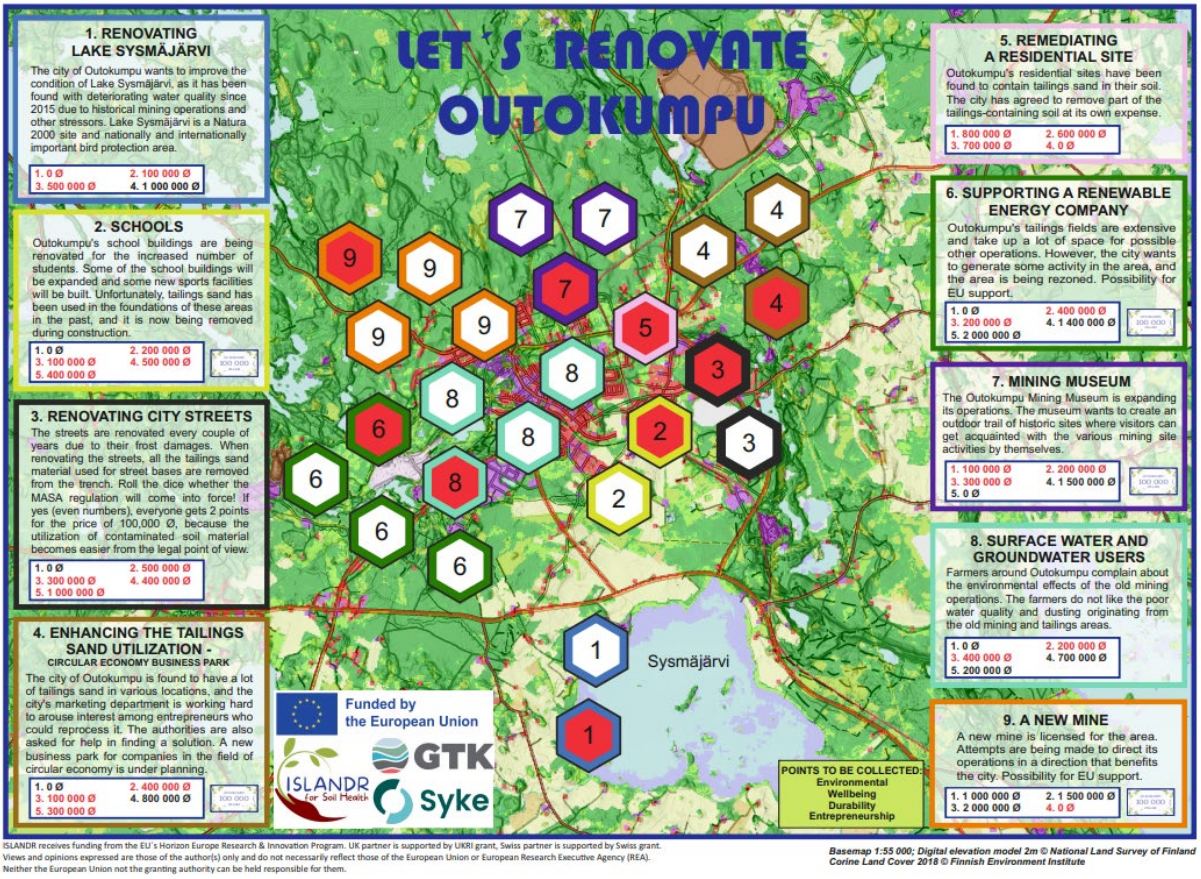

Figure 4: 9 different risk management challenges of the serious game "Let's renovate Outokumpu" (based on mining impacts commissioned for the area and other expert information)

Deciding on the objectives and methods of remediation of a former mining site is a complex process involving ecological, economic and social dimensions. The game involved representatives from various stakeholders, including local stakeholders, the Local Housing Association and the local association of the Finnish Association for Nature Conservation, regional environmental authorities, the Ministry of the Environment, city

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authorities, a representative of the mining company, consultants and project researchers from different EU countries. The participants of the event were divided into groups, and each game was guided by a game lead, ensuring that the players were technically proficient in the game and understood the rules, and that each player had a turn to present their views on the topic under discussion. If necessary, the game lead could clarify the terminology used for the players if the topic was not already familiar to them. In the game, the participants were presented with risk management challenges, which they solved by discussing with each other. The aim of each round was to jointly decide what should be done for each risk management challenge, using the options provided. The challenges and different solution options were based on a historical mining impact risk assessment report commissioned for the Outokumpu city area and other expert information.

To simulate economic impacts, a limited amount of fictitious money, Outokumpu Øllar, was introduced into the game, and the players had to decide together how to use it. The cross-pressure of social impacts was formed by the different goals of the players representing different parties in the game: players had to collect either environmental points, well-being points, sustainability points or entrepreneurship points. Ecological impacts to be discussed during the game were selected during the game design phase in cooperation with environmental experts. The problems offered included realistic and less realistic scenarios that could be implemented to improve risk management. For the sake of suspense, random options were also added to the game mechanics, such as the implementation of some of the regulations currently under planning.

6.1.4. Player experiences

The game gave stakeholders a concrete understanding of how different remediation methods affect the environment, human health and economy. The scenarios simulated in the game helped to concretize complex decision-making situations. The game also enabled open dialogue between stakeholders and provided a safe space to discuss conflicting views. The game environment helped stakeholders understand each other's perspectives and arguments. Special praise was given to the great game board (Figure 6) and the functional mechanics, which warmed up the development team, which was experienced in a variety of games.
The primary advantage of the game was considered to be the participatory discussion it produced (Figure 7). The free flow of ideas and the exchange of thoughts were, as planned, at the heart of the game. On the other hand, the game also guided thinking, as it was based on scenarios already invented by experts. The players enjoyed the playing and grouping in itself was mentioned to take the discussion away from the issue itself, as players focused on scoring the points they wanted. The different game groups also reached very different results. One group found that playing towards the same goal and optimizing the game result was seen as a more meaningful alternative than collecting points independently and playing against others. The main criticism was that gaming should not be mixed with actual decision-making. At the end of the game, all the groups gathered together, and the results of the different groups were discussed.

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Figure 5: Picture taken during the serious game (© Kristina Karvonen, GTK)

The serious game enabled participatory discussion and open dialogue between different stakeholders around a complex problem.

6.1.5. Lessons learned

Serious games can be an effective tool for stakeholder engagement, especially in complex and conflict-prone environmental restoration projects where resources and solutions are limited and stakeholders have different goals. The game provided a window into different perspectives and was used to genuinely seek solutions that would satisfy all. However, the game simplifies a complex problem and is therefore not suitable as a decision-making tool on its own – instead, it could be used as an aid to conveying information related to the restoration process. In the future, similar methods can be used more widely in environmental decision-making, where a participatory and transparent approach is needed. However, this is not recommended for the smallest contaminated sites. For a game to be both relevant, logical and enjoyable to play, time must be spent on its development and the remediation site must offer a sufficient number of different challenges with possible solutions.

For more details about the serious game, see Appendix 2.

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6.2. Additional engagement activities

The stakeholders will be engaged with different interactive methods:

- Interviews
- Questionnaires / Survey
- Focus groups
- Simulation exercises
- Evaluation forms

The methods will vary according to the type of needs as well as the advancement of the project. They will aim to gather stakeholder input, and help implement it in the most useful ways, tailored to the needs of the case study region.
All data that collected will be in compliance with GDPR regulations.
Each partner in charge of the case studies will decide of the best tool to engage with its specific stakeholders. The communication tools described in Section 6 will come as a support to facilitate engagement.

6.3. Dissemination activities

The dissemination activities led by LGI will enable even more contacts with additional stakeholders and target audiences. Events, conferences, and publications are important in the project and will increase potential opportunities and synergies.

The dissemination activities of ISLANDR include:

- Peer-reviewed open access scientific publications (~15);
- Presentations at international & national conferences and workshops and at public events in partner countries (~15-20);
- Roundtables and other interactive meetings organized in the ITAs, joined by 20-30 actors in an ITA;
- ISLANDR booths at international conferences (1-3 times);
- Press releases and articles featuring the project's progress;
- Biannual newsletter disseminated by email and through the project website;
- A Layman's report on ISLANDR's findings;
- A short documentary style project video telling local stakeholders' stories;
- Contact of EURONEWS Science in hopes of having ISLANDR explored on television.

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7.Stakeholder Engagement Internal Guidelines

All ISLANDR partners/ITA Leads are encouraged to reach out and collaborate with the stakeholders of their case studies. Partners should also consult and inform ITA leads about their engagement activities with specific stakeholder groups.

- Scripts are prepared for every activity (Focus Groups, ..) and submitted to the main working group of the activity for approval
- Transversal approach of the activities, which are shared with project partners: their topic and the calendar so the project ensures contents and objectives do not overlap between each other. This also enables to combine activities when possible
- All partners are committed to pay attention to the stakeholder fatigue: activities requests are first shared with the ITA coordinator in order to understand the willingness and availability of the stakeholders for the activity in question.

See appendices 1,2 and 3 for examples of sessions.

8.Communication Activities

8.1. Communication tools

Communication materials have been produced as part of the ISLANDR project.
These include:

- Social media accounts (LinkedIn and X);
- A printable poster (an updated version is under development);
- Flyers (an updated version is under development);
- A rollup (an updated version is under development);
- Factsheets (an updated version is under development);
- PowerPoint and Word templates;
- Project website.

All the communication material and channels will be used to present the project to the stakeholders and will facilitate their engagement. An existing graphic identity will help to build recognition and facilitate the engagement of stakeholders.
During the engagement activities, the stakeholders involved will be encouraged by partners to follow and interact with ISLANDR on social media, as well as visit the website. That way, they will be updated on the latest developments of the project and engaged with the project's activities.
The partners will also ask the stakeholders if they agree to be tagged on social media by ISLANDR, at personal and organization level. The partners will give to WP7

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communications team the names of the organisations present in the engagement activities, so the project can tag them on social media (when the account exists).
This authorization can be revoked by the stakeholders at any moment, by contacting the project.

8.2. Specific communication needs

In addition to the above communication tools, LGI can develop the following:

- A standardised PowerPoint presentation to showcase the project's details and objectives to stakeholders during the meetings;
- Formal project invitation letters to communicate with stakeholders

9.Key Performance Indicator

To ensure that the project gather enough engagement from the stakeholders, a Key Performance Indicator (KPI) have been defined and is to be achieved by the end of the project.

KPI	Means of verification and target value
Number of stakeholders at the meetings (20 – 30 actors)	Registration Form/Confirmation Email

Table 3: Key Performance Indicator

10. Conclusion

The Stakeholder mapping and engagement plan developed in this document will contribute to prioritising stakeholder outreach in line with the project's objectives and milestones and more specifically with the case studies of the project. It will be updated if needed as the partners reach a more detailed level of the stakeholder mapping.

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Appendices

Appendix 1: Kolleberga Roundtable Summary and Method Description

1. Background

For the redevelopment of contaminated sites, economic drivers vary significantly between high-value property areas and those with low financial returns, making remediation often unviable in the latter. However, considering broader societal economic aspects, including environmental and social external effects, remediation may appear more viable. Societal economic assessments are based on consequential ethics, but it is also reasonable to consider duty-based motives, such as the well-being of future generations and resource circularity. To encourage companies to invest in low financial viability areas, these "wider benefits" must be internalized in their financial models, either through goodwill or governmental instruments like taxes and fees. The ISLANDR project aims to develop financial models that incorporate these wider benefits to prioritize land decontamination and promote remediation. Identifying these benefits through roundtable discussions with diverse participants is essential for developing such models.

The overall goal of this roundtable discussion was to invite various stakeholders connected to the Kolleberga forest nursery to collectively discuss different issues related to future land use at Kolleberga, with a particular focus on identifying the different values for both the land owner and society (wider values) associated with different land uses scenarios. Specific points of discussion during the Roundtable included considering i) benefits to the landowner with a certain land use, ii) different types of remediation options that would enable a land use, iii) various challenges/barriers specific to Kolleberga, and iv) wider values to society associated with certain land use. The purpose of focusing on the wider values of Kolleberga and its natural soils, e.g., the benefits of establishing a new business at the site, various ecosystem services, the potential for future food production, etc., was to bring attention to the value of redeveloping this site that may not necessarily be included in a standard financial analysis. This Roundtable discussion makes an important contribution to the ongoing work in ISLANDR WP4.

2. Method & process description

The overall method followed to organize the Roundtable is shown below in Figure 1.

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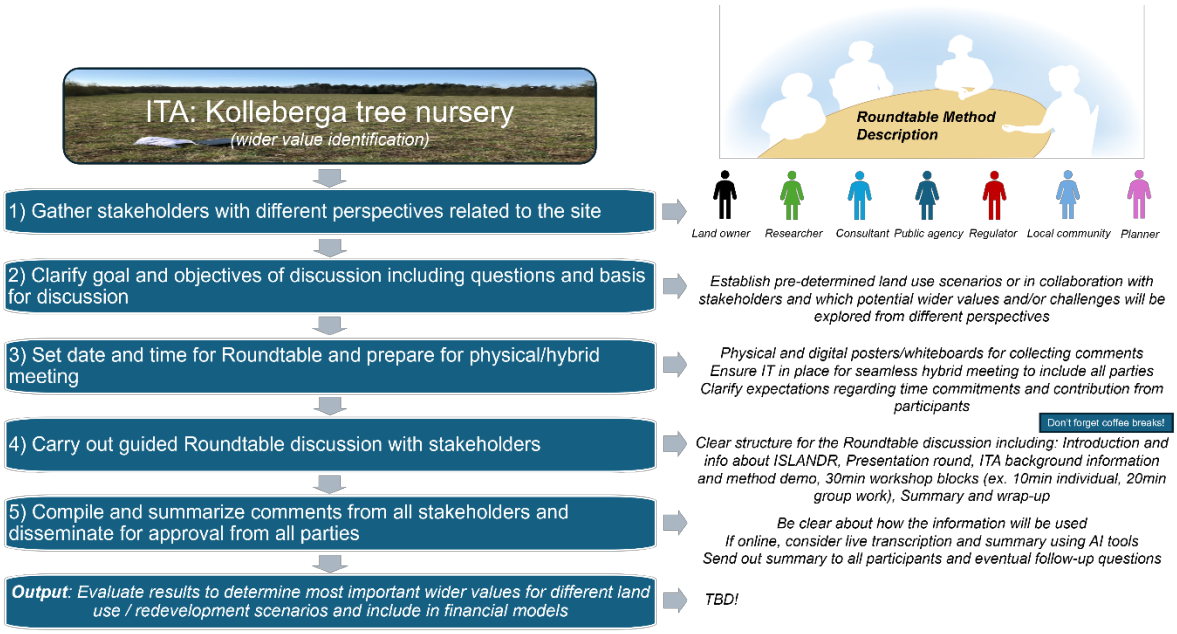

Fig.1 Roundtable method followed at Kolleberga.

The 3-hour meeting proceeded according to the following agenda:

13.00-13.20: Welcome and presentation of participants (name, organization, background/expertise)
13.20-13.35: Introduction to ISLANDR, aim and objectives with the Roundtable discussion
13.35-13.50: Introduction to the Roundtable and demonstration of "Whiteboard" in Teams
13.50-14.20: Discussion round 1: Predetermined land use 1
14.20-14.35: Coffee break
14.35-15.05: Discussion round 2: Predetermined land use 2
15.05-15.45: Discussion round 3: Land use determined during group discussion
15.45-16.00: Summary and wrap-up

In general, the discussions were focused on 3 possible land uses for the site, two of which were determined before the workshop and the third was decided through general discussion with the group and examples provided:

- Seed cultivation
- Grassland (with possibility to use for fodder)
- Renewable energy (solar)

The workshop was hybrid with 6 people in person (including representatives from Chalmers) and an additional 6 joining online through Teams. There were logistical challenges with conducting a hybrid workshop, but these were overcome by having both a physical and digital version of the poster (Fig. 2) for participants to place notes with ideas. The combination worked well.

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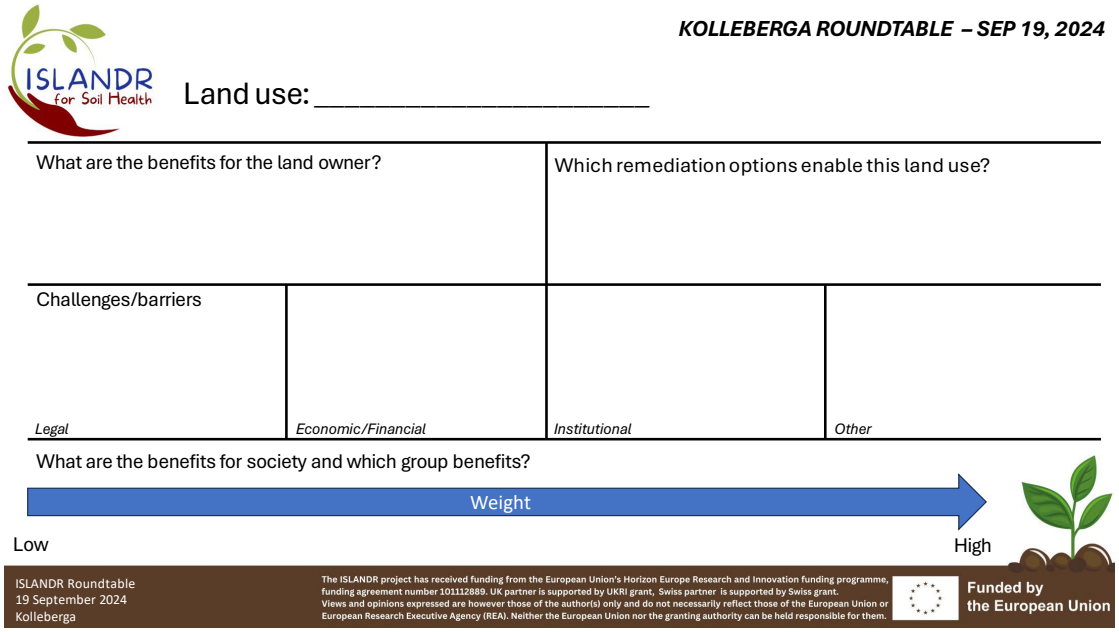

Fig.2. Poster for collecting comments from participants – one poster was created for each land use as a basis for discussion.

Attendees

The following stakeholders (organizations) were represented at the Roundtable: Landowner (Sveaskog), Consultant (Tyréns), Research (Chalmers), Regulatory agency (Söderåsens Miljöförbund), Public agency (SGU, SGI), Local Community (Klippan municipality), Local worker (Sveaskog).

3. Meeting recap

The main themes of the Roundtable discussion are summarized as follows:

Seed Cultivation: Sveaskog discussed the importance of seed cultivation, highlighting its role in enhancing genetic diversity, which is crucial for the long-term sustainability of forestry. Seed orchards can provide greater genetic diversity compared to natural forest regeneration, supporting forest growth and resilience against future challenges such as climate change and pests.

Solar Installations: Discussions centered on using contaminated land for solar installations, which would enable renewable energy production without requiring remediation. This approach supports the energy transition and allows for efficient land use, though challenges with connecting to the grid due to limited capacity were mentioned.

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Biodiversity and Ecosystem Services: Participants explored the opportunities and challenges of maintaining biodiversity under different land uses. It was noted that biodiversity requires active management and doesn't occur automatically, highlighting the need for careful planning in land use projects. Concerns were raised about whether fodder cultivation might negatively affect biodiversity.

Land Use Risk Assessment: The need for tailored risk assessments when changing land use, particularly for grazing on contaminated land, was discussed. Adjusting risk evaluations to specific land uses is essential to ensure safety for both the environment and livestock.

Land Use Flexibility: Concerns were raised about the flexibility of land-use changes, such as solar panel installations, and their potential impact on local biodiversity and recreational activities. The importance of adopting a multifunctional land-use strategy was emphasized.

Remediation Options: Various remediation alternatives were discussed, with biochar suggested as a potential strategy to manage environmental risks without limiting land use. There is also potential for natural or enhanced degradation of DDT under solar panels.

Land uses

The Roundtable discussion revolved around three different land uses in terms of their benefits for the landowner, remediation measures that would enable this land use, various challenges, and additional benefits associated with the land use. The main points for each land use is briefly summarized below:

Seed cultivation on existing land offers several advantages for the landowner, including revenue from seed production without the need to purchase new land. The land is already suitable for seed cultivation, and the production contributes to forest planting and increased genetic biodiversity in the forest. Remediation measures, such as biochar and phytoremediation, can improve the soil without disrupting seed cultivation. Challenges include the difficulty of finding suitable land, the long time for profitability (10-15 years), as well as the need for fencing surrounding the area and detailed risk assessments. The societal benefits include that the area can be used for recreation after the trees have been established, job opportunities, increased biodiversity and ecosystem services, and seed cultivation contributes to the forestry industry and climate regulation.

The **current land use as a grass meadow with the potential for fodder production** offers limited benefits for the landowner, primarily in the form of income from fodder sales or leasing of the land, and the possibility to use the land for research and development (R&D) of remediation methods. Few remediation measures are needed for the current use, but biochar can be used as an alternative for soil improvement and managing environmental risks. Challenges include legal and economic obstacles, such as uncertainty regarding permits and costs for controlling contaminants in the fodder. A

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detailed risk assessment would be required to produce and sell fodder on the site and/or graze animals. For society, this land use means open landscapes, ecosystem services, job opportunities, and increased access to animal feed.

For landowners, **solar installations** offer several advantages, including revenue from the sale of electricity and leasing of land, as well as the opportunity to preserve the land for future use. Remediation measures for contaminated land have a limited impact on the future land use, with alternatives such as biochar and electrokinetic degradation being applicable, while phytoremediation is likely unsuitable. Challenges primarily include legal and economic aspects such as infrastructure costs and administration, but there are also potential challenges like inconvenience for nearby residents and reduced property value. For the community, solar installations contribute to increased renewable (local) energy production, climate goals, job opportunities, and secure electricity supply, but they can reduce biodiversity and ecosystem services and negatively impact the local environment.

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4. Pictures

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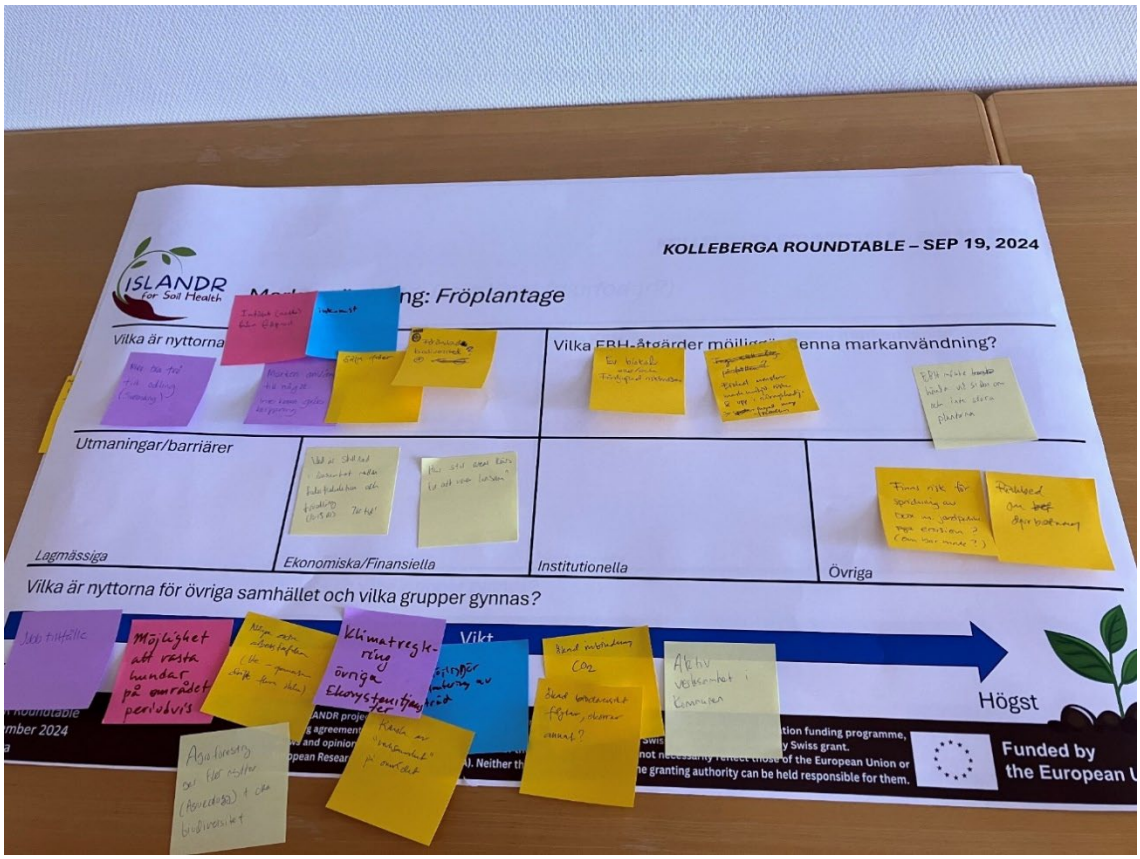

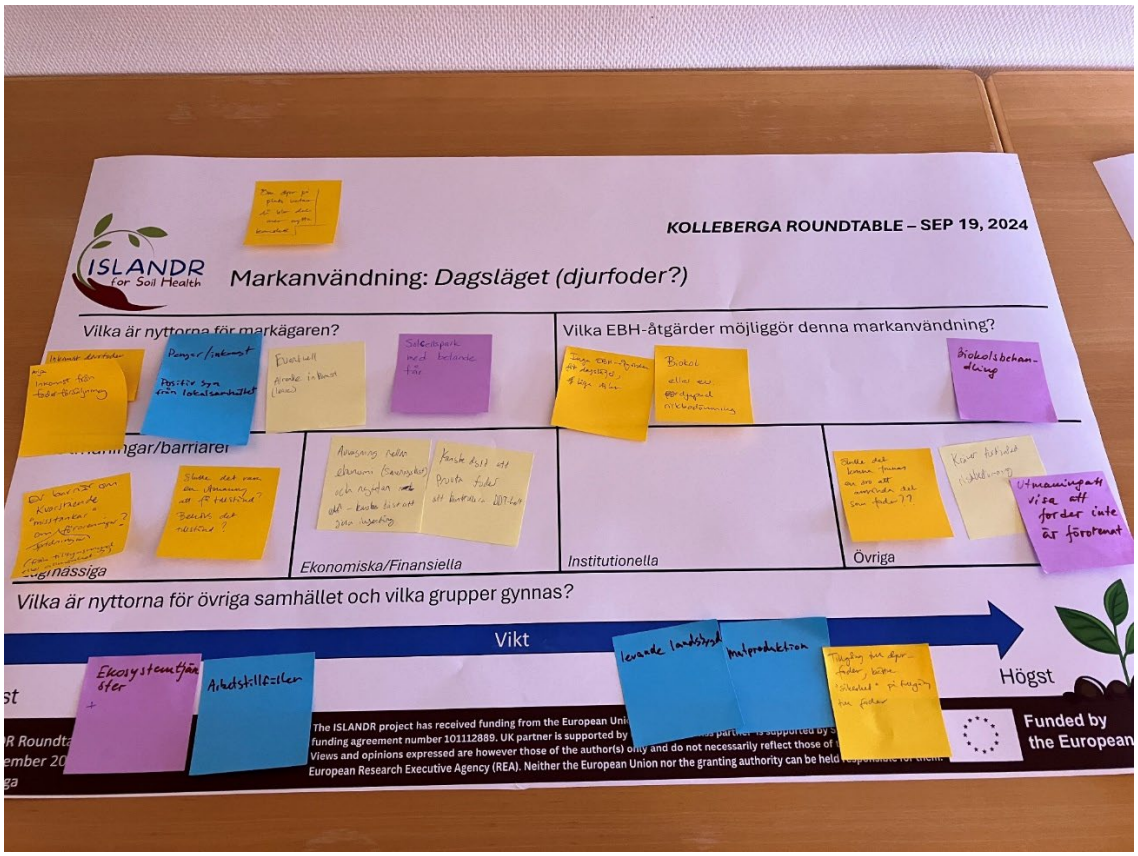

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5. Follow-up

5.1. Improvements

Suggested improvement to the poster is to drop the weighting of potential benefits from lowest to highest (Figure 3). There was not enough time to focus on this aspect of the discussion and most participants placed their idea somewhere in the middle of the arrow. Additionally, the separation of Challenges/Barriers into different categories on the poster was likely not useful as many ended up in the "Other" category. Participants could instead be asked to write the type of Barriers they believe it to be on the note with their comment. The time used was three hours, and with quite many things to discuss, so a full discussion on which group would benefit was lacking.

In addition, the discussion was largely focused on economic (use) benefits which meant that other ethical considerations such as duty-based ethics or ecocentric perspectives were lacking. More clarity on the ontology and values framework could help to broaden the scope of the discussion, e.g., by referencing the IPBES report on the diverse values of nature. This could also be linked to the use of the term "benefits" instead of "values". Asking about "values" could open the discussion to more non-instrumental values. Categorizing the benefits in terms of economic, environmental and social benefits could be used to better capture these more diverse values. Including additional viewpoints from local community members in the discussion could also broaden the discussion to consider these other viewpoints and ethical considerations.

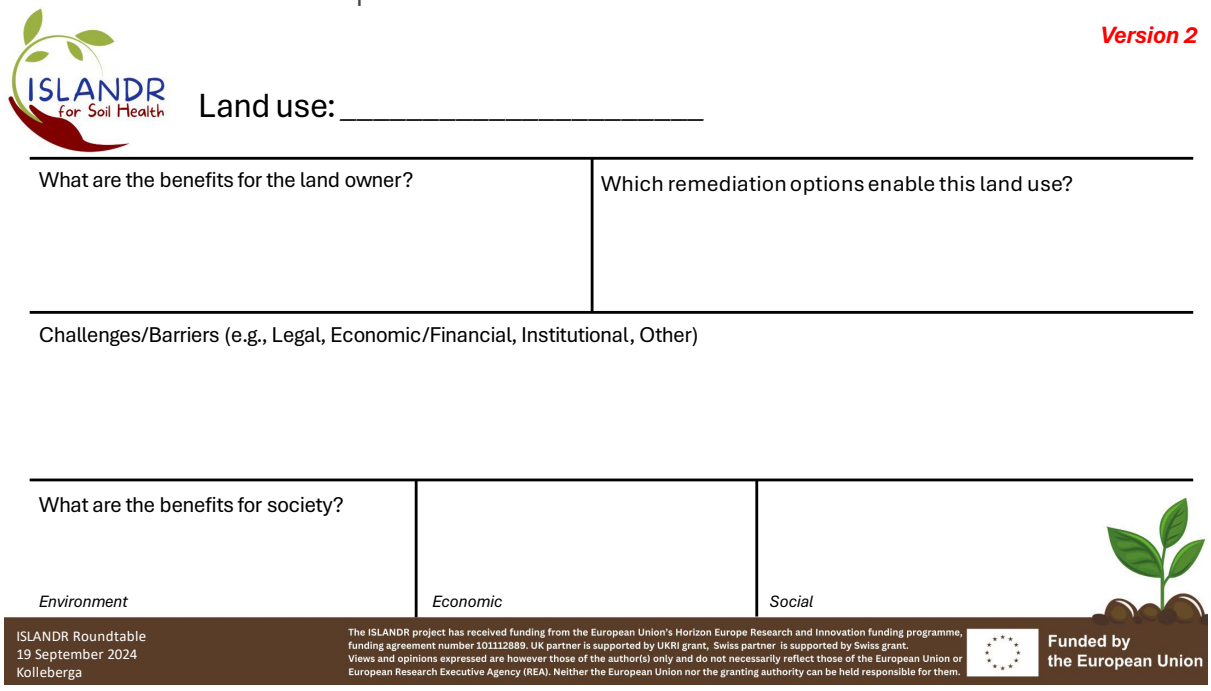

Fig.8. Suggested improvements to the poster.

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5.2. Ongoing work: Expert elicitation

The follow-up to the Roundtable is an expert elicitation workshop where the most relevant/important values (2-3) highlighted during the discussion will be explored in greater detail with a group of experts to quantify these values and indicate the uncertainty in the quantification by developing probability distributions through an expert elicitation setting. The monetized benefits would then be used in an economic analysis with cost-benefit analysis to compare the different land use scenarios.
ggg
Preliminarily, the values identified as "most important" for the three different land uses are presented in the tables below. From these lists, a few items will be selected for further quantification in an expert elicitation workshop to test this as a method.

Seed cultivation

Landowner (internal)	Society (external)
Internal benefit from seed production (10-15 years)	Future recreational use
Productive land use without needing to buy more land	Job opportunities
	A feeling of active industry in the area
	Increased biodiversity and ecosystem services

Grass meadow

Landowner (internal)	Society (external)
Internal benefit from fodder production and selling	Aesthetics
Positive view from the local community	Recreation (dog walking)
	Increased (preserved?) biodiversity and ecosystem services

Renewable energy (solar panels)

Landowner (internal)	Society (external)
Internal benefit from electricity production and selling	Reduced climate impact from electricity – energy transition
Goodwill	Secured local energy production
Preserving soil for future use	Local job opportunities
Lesser remediation investment	Greenfield savings – preventing otherwise good agricultural land used for energy production

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Appendix 2: Serious game – Environmental challenges in the historical mining towns of Europe

Case Outokumpu, eastern Finland

Mining of the copper deposit at Outokumpu, eastern Finland, started over one hundred years ago when both environmental legislation and the mining and processing technology did not yet meet modern standards. Soil, surface water and groundwater were contaminated as mining and metallurgical waste were released into the environment. Extractive wastes were used in earthworks in the Outokumpu city center. Much has been done to mitigate contamination during the past decades but there are still issues to be solved. Local authorities and environmental authorities are currently trying to find solutions and especially funding to fix the remaining environmental challenges.

The ISLANDR EU Soil Mission project coordinated by GTK https://www.gtk.fi/en/research-project/islandr-information-based-strategies-for-land-remediation/ also participates in the effort since the Outokumpu mining area is one of the ISLANDR Test Areas (Fig. 1). ISLANDR will develop, for example, a roadmap with knowledge based spatial models and approaches for contaminated land reuse and spatial planning.

Fig. 1. The Outokumpu Test Area represents European historical mining towns in the ISLANDR project. In addition, we have six other types of contaminated areas and all test areas together may assist in the development of the EU Soil Monitoring Directive proposal.

ISLANDR organized 11-12th June meetings and excursions at the Outokumpu Test Area

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Please find the program of the stakeholder meeting below. Especially we would like to emphasize the new method to develop fruitful discussions: the so called Serious game. The concept was developed at BRGM, France (beneficiary of our ISLANDR project), but the game was further developed during last spring by scientists Aura Nousiainen and Henna Jylhä (Syke) and Kristiina Nuottimäki and Emilia Kosonen (GTK) to serve the objectives of the ISLANDR project in the Outokumpu Test Area.

Five roles take part in the Serious game (one role being able to be played by one person or by a team) (Fig. 2 and Fig. 3): 1) Municipal authority for environment and health, 2) Entrepreneur, 3) Resident, 4) Municipal land use planner, and 5) Environmentalist.
The thematic objective of the game is to remediate sites (e.g. schools, lake ...) with a limited amount of money 'Outokumpu ollari'. For a given site, remediation options (solutions) are presented to the group, and the group must decide among the options, knowing that each option has a cost and generates differentiated impact values (in a form of points) on each role. The challenge of each role in the game is, at a global level, to maximize points through efficient cooperation and negotiations with the other roles while, at a local level, to reach the highest points compared to the other roles of the group.

Beyond the ISLANDR team members, the players involved in the meeting were composed of local and national stakeholders, knowing that the role each person played did not necessarily represent his/her role in real life.

We recommend this kind of approach for other GTK projects as well since role-playing game creates a relaxed atmosphere and seems to provide a nice opportunity for discussions in a collaborative mode between stakeholders that have different interests.

Fig. 2. Kristiina Nuottimäki from GTK runs the Finnish '**Outokumpu kuntoon'** -role play 12th June in the Joensuu Science Park.

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Fig. 3. Emilia Kosonen from GTK runs the English version of the **Let's Renovate Outokumpu** - role play.

Program of the ISLANDR Stakeholder Meeting at the Joensuu Science Park 12th June 2024

Chairperson: K. Loukola-Ruskeeniemi (Scientific coordinator of the ISLANDR project)

9:00- 9:05	Opening. Raisa Neitola GTK
9:05- 9:15	Address of the Ministry of Environment. Nina Lehtosalo
9:15- 9:30	ISLANDR project and the objectives of this stakeholder meeting. Kirsti Loukola-Ruskeeniemi, GTK
9:30- 9:45	Overview of the environmental issues in the Outokumpu area. Soili Solismaa, GTK
9:45-10:00	Heavy metal concentrations in the soils at Outokumpu and risk management options. Hanna Tolvanen, Kimmo Järvinen, Jukka-Pekka Tervo, Ramboll Finland
10:00-10:15	Comments from the Centre for Economic Development, Transport and the Environment. Kari Pyötsiä, Petri Naumanen

<u>Two case studies from other parts of Europe:</u>

10:15-10:30	Risk management in the historical mining area at Freiberg, Germany. Assessment and management procedures. Ingo Müller, Saxon State Office for Environment, Agriculture and Geology
10:30-10:45	Remediation activities in contaminated sites in Flanders, Belgium Joris Crynen, Santerra
10:45-11:00	Discussion

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11:00-11:15 Introduction to the Serious Game 'The Outokumpu case'. Aura Nousiainen Syke, Kristiina Nuottimäki GTK

11:15-11:30 Address of the Director General of GTK. Kimmo Tiilikainen

11:30-12:30 Lunch in the Sulo restaurant in the Joensuu Science Park 3A (ISLANDR project covers the costs)

12:30 -14:30 Serious game 'The Outokumpu case'. 5 participants in each game. 3 games in Finnish and 3 in English. Leaders: Aura Nousiainen, Kristiina Nuottimäki, Emilia Kosonen, Henna Jylhä, Timo Tarvainen, Marianne Valkama

14:30-15:00 *Orange hall:* Results of the Serious game + coffee

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Appendix 3: ISLANDR meeting and excursion in the Outokumpu Test Area, Finland

Date: 11st June 2024
Place: Meeting room in hotel Kumpu, Outokumpu town.
Teams option available but unfortunately the meeting is not hybrid. However, we will record the meeting.

Participants from GTK, Syke, BRGM, IUNG, Deltares, Nova University Lisbon, Santerra, CERTH and the ISLANDR Advisory Board

PROGRAM

Bus leaves from hotel Kimmel, Joensuu, at 8:00.

Chairperson: Kirsti Loukola-Ruskeeniemi GTK

9:00-9:10 Opening. Kirsti Loukola-Ruskeeniemi GTK
9:10-9:40 Environmental issues in the Outokumpu mining region. Soili Solismaa GTK
9:40-10:00 Environmental risk management in the Outokumpu town. Kristiina Nuottimäki GTK
10:00-10:30 Regulation of contaminated soils in Finland. Jussi Reinikainen Syke

10:30-10:45 Break

Outokumpu ITA & WPs:

10:45-11:00 WP1 evaluates how the Outokumpu regional geochemical anomaly is reflected in national GIS datasets (Task 1.1) and how the local contamination in the city is shown in the MATTI database (Task 1.2). Timo Tarvainen GTK

11:00-11:15 WP6: testing to identify any institutional barriers (T6.2) and identification of additional barriers (link to T5.1), procurement practices? => feedback to finalization of ISLANDR roadmap. Identification of key policies & regulations to consider in the planning of RM (T6.1) Jaana Sorvari Syke

11:15-11:30 WP3 needs from the Outokumpu ITA? Examine how strategic and project-based choices for land contamination management are made and support greater use of SRBLM, and greater consideration of wider benefits, soil health & low input approaches. Metal mining area, EU candidate country example, *developed* soil policy status. Nazare Couto NOVA

11:30-11:45 Discussion
11.45-12.00 Excursion sites on map. Juho Kupila GTK
12-13 Lunch (hotel Kumpu)

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13-17 Excursion with coffee break.
17:00 Bus leaves from Outokumpu to Joensuu, hotel Kimmel.

19:00 Dinner option in Joensuu

Stakeholder meeting in the Joensuu Science Park – risk management options for the environmental impacts of historical mining industry in the Outokumpu region

Date: 12st June 2024
Place: Joensuu Science Park 3A , 4th floor (**link to Joensuu Science Park Map**).
Street Address: Länsikatu 15, FI-80110 Joensuu.
Meeting rooms: *Orange Hall* 8:30-15:30 + *Chair, Garage, Round Table* 12:30-14:30.
Registration and coffee: *Orange Hall* 8:30-9:00
Lunch in *Sulo* restaurant 11.30-12.30. *Sulo* is situated close to the meeting rooms in the 3A building.

Serious game 'The Outokumpu case' will be organized in four meeting rooms: *Orange Hall (several groups), Chair, Garage, Round Table* 12:30-14:30.

Afternoon coffee: *Orange Hall* 14:00-15:00.

Participants
Representatives of the municipality of Outokumpu
Representatives of residents at Outokumpu:
Local knowledge of mining history at Outokumpu/University of Eastern Finland
Outokumpu community
Outokumpu nature friends

Ministry of Environment, Finland
Centre for Economic Development, Transport and the Environment, Finland
GTK
Ramboll Finland
ISLANDR Advisory Board

ISLANDR-project:
Geological Survey of Finland (GTK)
Finnish Environment Institute (Syke)
BRGM, France
IUNG, Poland
Deltares, Netherlands
Nova University Lisbon, Portugal
Santerra, Brussels
CERTH, Greece

PROGRAM

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8:30- 9:00 Registration and coffee (*Orange Hall)*

Chairperson: K. Loukola-Ruskeeniemi

9:00- 9:05 Opening. Raisa Neitola GTK
9:05- 9:15 Address of the Ministry of Environment. Nina Lehtosalo
9:15- 9:30 ISLANDR project and the objectives of this stakeholder meeting. Kirsti Loukola-Ruskeeniemi, GTK
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14:30-15:00 *Orange hall:* Results of the Serious game + coffee

15:30 Bus leaves for the excursion

19:00-21:00 Networking dinner and cruise with stakeholders in Lake Pielinen.

21:00 Bus leaves from Lake Pielinen to Joensuu hotel Kimmel.

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