NEXOGENESIS
STREAMLINING WATER RELATED POLICIES

Deliverable 5.1

Report on Stakeholder Engagement

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Abstract

This deliverable (D5.4) “Report on Stakeholder Engagement” is developed within WP5 and aims to present the process followed to support co-creation with stakeholders and its results. This process consists of five steps: (1) stakeholder engagement aim, (2) stakeholder analysis, (3) stakeholder engagement plan, (4) stakeholder management and sustainment, (5) evaluation process. It further elaborates on the changes made to the plan (3) based on the evaluations (5), and summarizes the respective aims (1), stakeholder landscapes (2) and the management and sustainment of each of the case studies. This analysis is based on the stakeholder engagement plans that were produced at months 12, 24 and 36 for each of the five case studies, and the evaluations carried out in the final project year. The report also reflects on the challenges encountered throughout the project, the opportunities that arose and the overall lessons learnt from these complex Nexus settings.

Keywords

Case studies; Stakeholder engagement; Transdisciplinary; Co-creation

Abbreviations and Acronyms

CS(s)	*Case Study(ies)*
D	*Deliverable*
IUWMA	*Inkomati-Usuthu Water Management Area*
M	*Month*
MFA	*Ministry of Foreign Affairs*
MS	*Milestone*
NEPAT	*NExus Policy Assessment Tool*
NXG	*NEXOGENESIS*
PPCF	*Privacy Policy Consent Form*
SH(s)	*Stakeholder(s)*
SHE	*Stakeholder Engagement*
SLNAE	*Self-Learning Nexus Assessment Engine (name discontinued and renamed to NEPAT)*
UVPP	*User-Validated Policy Package*
WEFE	*Water-Energy-Food-Ecosystem*
WP	*Work Package*
WS	*Workshop*

Executive Summary

Deliverable 5.1 (D5.1) documents the design, implementation, and evaluation of the Stakeholder Engagement (SHE) process used in the NEXOGENESIS (NXG) project. It focuses on how knowledge co-creation and co-production were approached across five case studies (CSs), reflecting the project's commitment to interdisciplinary and transdisciplinary collaboration. The SHE process supported the broader project objectives—including the development and validation of the NEPAT (Nexus Evaluation, Policy, and Assessment Tool) and user-validated policy packages—by promoting ongoing dialogue between scientific and societal stakeholders (SH).

The project unfolded in three engagement phases:

- **Co-Exploration** (early phase): Built a common understanding among SHs and set the foundation for collaboration.
- **Co-Design** (mid phase): Involved SHs in shaping project content, such as indicators, models, policies, and NEPAT design.
- **Co-Development** (final phase): Focused on validation, policy roadmap development, and fostering commitments to implementation.

Each CS developed an annual SHE plan aligned with the early, mid or late project phase and the respective local context. The SHE process followed a five-step cycle:

1. Define engagement aims.
2. Conduct stakeholder analysis.
3. Draft the engagement plan.
4. Manage and sustain relationships.
5. Evaluate the engagement process.

The SHE process demonstrated notable success across all three engagement phases. Its flexible structure allowed CSs to adapt engagement to changing realities, SH expectations, and contextual challenges. During **co-exploration**, early workshops, interviews, and mapping exercises established a strong foundation of mutual understanding, enabling the identification of key actors, relationship dynamics, and varying SH expectations across the WEFE nexus. Although engagement was initially uneven—with sectoral imbalances and underrepresentation of high-power SHs—the process successfully initiated trust-building and alignment of local perspectives with project goals.

In the **co-design** phase, the project addressed earlier gaps by diversifying engagement formats, strengthening communication, and clarifying the policy relevance of tools like NEPAT. This phase was marked by visible integration of SH input into technical outputs, such as indicators and policy package development, and an expanded reach to both grassroots and institutional actors.

Finally, in the **co-development** phase, while sustained engagement proved more challenging—particularly with high-power, low-interest SHs—the project fostered deeper learning, built trust, and empowered certain SH groups through tailored outreach, hybrid

workshops, and participatory development and improvement of the projects tools and results. Though full systemic empowerment was constrained by time and resources, the process generated relationships and capacities that offer potential for post-project continuation and impact.

In summary, the SHE process showed the following characteristics:

- ✓ The project managed to attract the interest of a wide group of SHs (roughly 700 SHs in total in the register) and retain and sustain the engagement of a solid set of actors (150 consented SHs and about 20-30 SHs per CS with active involvement).
- ✓ The adopted process was intense and time-consuming but proved to allow for the necessary flexibility in time and space to adapt SHE activities to the needs of the CSs, its SHs and the project.
- ✓ While the SHE evaluation was cumbersome and complex, it provided valuable insight into SH perceptions and the knowledge creation achieved, allowing CS leads to adapt their activities to their SHs capacities.
- ✓ SHs overall felt well engaged and valued which resulted in a high level of trust in the knowledge produced and the usability of the outputs of the project.
- ✓ SH fatigue and challenges to engage with certain actor groups (energy and food sectorial actors and high power SHs) could not be fully avoided or overcome, resulting in varying degrees of adoption and potential impact of the uptake of the project outputs and outcomes.

Moving forward and applying the NXG SHE process to other contexts the following lessons emerged as critical:

1. **Managing diverse stakeholder expectations**
   SHs varied in their preferred roles—some wanted to co-produce solutions, others preferred to observe or influence. These expectations evolved over time and differed between and within CSs. Flexibility in engagement formats (e.g., technical vs. deliberative sessions) are essential to address these needs. CS leads and their institutions must thus have the necessary capacities, visibility and power to lead and shape these multi-actor processes in their contexts.
2. **Depth vs. breadth of engagement**
   A central challenge was balancing deep engagement with local and marginalized SHs (to build trust and empowerment) with broad engagement targeting decision-makers (to ensure policy relevance). While some CSs managed this dual objective effectively, others struggled due to time, budget, or institutional constraints. Care needs to be taken to address SH expectations around this topic to avoid disillusionment and SH fatigue and disengagement.
3. **Institutional anchoring and sustainability**
   Empowerment and sustained engagement are difficult to achieve in time-bound research projects. Some CSs secured a mechanism for continued SHE through other (EU) research projects. Fostering exchange about post-project engagement occurred early on in NXG and facilitated debate with and amongst SHs for SHE sustainment.
4. **Trust as a critical asset**
   Trust—between SHs and project teams, and among SHs themselves—emerged as a key legacy. While not always measurable in outputs, trust enhances the potential for

sustained collaboration and eventual policy impact. SHs trusted the results of NXG because it was based on scientific evidence that was regularly shared with and carefully explained to SHs, including how their input was used in the research process.

5. **Methodological and practical challenges**
   Implementing the NXG SHE across five CSs presented logistical and methodological difficulties. Workshop time was limited, survey responses were uneven, and SH fatigue was a real issue. Despite this, combining participatory formats with qualitative reflection yielded valuable insights, especially when CS leads and SHs helped interpret the data. Offering a variety of engagement formats and catering to SH needs showed SHs that NXG was serious about wanting to engage effectively and truly with them.

The NXG SHE process offers critical lessons for future co-creation efforts in sustainability governance and the WEFE Nexus. While the project successfully built relationships and delivered functional tools, lasting systemic change requires extended timelines, institutional commitments, and continued capacity-building. In sum, D5.1 demonstrates that while co-creation processes are inherently complex and constrained, they can plant the seeds for durable change—provided that relationships are nurtured, learning is mutual, and implementation is sustained beyond the project's end.

Report Contents

Project Deliverable 2
Abbreviations and Acronyms 4
Executive Summary 5
Report Contents 8
List of figures 10
List of tables 23
Introduction 28
Project Summary 28
The Case Studies 28
Purpose and structure of this document 29
PART I: Stakeholder Engagement Process in NXG ..... 33~~34~~
Stakeholder engagement principles and considerations ..... 33~~34~~
NXG Stakeholder engagement process ..... 34~~35~~
Step 1: Stakeholder engagement aims ..... 36~~37~~
Step 2: Stakeholder analysis ..... 36~~37~~
Step 3: Stakeholder engagement plans ..... 42~~43~~
Step 4: Stakeholder management and sustainment ..... 48~~49~~
Step 5: Stakeholder engagement evaluation ..... 49~~50~~
PART II: Stakeholder Engagement across NXG Case Studies and time ..... 53~~54~~
Early engagement (summary from the month 12 Stakeholder Engagement Plans) ..... 54~~55~~
Stakeholder engagement aims ..... 55~~56~~
Stakeholder analysis ..... 55~~56~~
Stakeholder engagement plans ..... 61~~61~~
Stakeholder management and sustainment ..... 61~~61~~
Stakeholder engagement evaluation ..... 66~~66~~
Lessons learned from co-exploration ..... 67~~67~~
Mid-project engagement (summary from the month 24 Stakeholder Engagement Plans) ..... 69~~69~~
Stakeholder engagement aims ..... 70~~70~~

Stakeholder analysis ..... 71~~71~~
Stakeholder engagement plans ..... 74~~74~~
Stakeholder management and sustainment ..... 76~~76~~
Stakeholder engagement evaluation ..... 82~~82~~
Lessons learned from co-design ..... 85~~85~~
Late-project engagement (summary from the month 36 Stakeholder Engagement Plans) ..... 87~~87~~
Stakeholder engagement aims ..... 89~~88~~
Stakeholder analysis ..... 92~~91~~
Stakeholder engagement plans ..... 94~~93~~
Stakeholder management and sustainment ..... 98~~96~~
Stakeholder engagement evaluation ..... 105~~103~~
Lessons learned from co- development ..... 109~~107~~
Final engagement (summary from the month 42 - 46 evaluations) ..... 111~~109~~
Reflections ..... 114~~112~~
Conclusion ..... 116~~114~~
Adapting to SH needs ..... 116~~114~~
Challenges and opportunities - Lessons learnt ..... 136~~134~~
References ..... 140~~138~~
Annexes ..... 142~~140~~
PART III: Case study specific Stakeholder Engagement Plans ..... 142~~140~~
Early engagement (month 12 Stakeholder Engagement Plans) ..... 142~~140~~
Mid-project engagement (Month 24 Stakeholder Engagement Plans) ..... 222~~219~~
Late-project engagement (Month 36 Stakeholder Engagement Plans) ..... 320~~317~~
Final engagement (Month 42-46 evaluations) ..... 442~~438~~
Supplementary material: Forms, templates and guidelines ..... 462~~458~~
Annex 1: Privacy Policy Consent Form ..... 462~~458~~
Annex 2: Stakeholder Tiers and Categories ..... 468~~464~~
Annex 3: Survey for the Stakeholder Engagement Evaluation (WS 1 & 2) ..... 471~~467~~
Annex 4: Survey for the Stakeholder Engagement Evaluation (WS 3, 5/6) ..... 479~~475~~
Annex 5: Template for assessing the modes of co-creation ..... 488~~484~~
Annex 6: Workshop guidelines ..... 492~~488~~
Annex 7: Overview of workshop participation ..... 508~~504~~

Annex 8: Changes in the modes of co-creation and their respective importance to the SHE aims .....514~~510~~

Annex 9: Questions on outcomes and impacts added in the WS6 survey .....523~~519~~

List of figures

Figure 1: Location of all case studies. CS3 and CS5 are overall transboundary (striped area) but the focus in NXG is on the Romanian and South African regions, respectively (solid-filled area).....29

Figure 2: The objectives of the NXG project as formulated in the grant agreement and the impact that the SHE plans intend to facilitate.....30

Figure 3: Overview of the phases of the co-creation process and the timing of the yearly SHE plans. 31

Figure 4: Overview of the timing of the administration of the SHE plans throughout the phases of the project. 31

Figure 5: Steps of NXG's stakeholder engagement process.....32

Figure 6: Co-Creation process. Based on IAP2 (2018) and Bojovic et al. (2021).....34~~35~~

Figure 7: Phases of co-creation and their relation to knowledge generated. Modified from Brandt et al. (2013).....35~~36~~

Figure 8: Stakeholder analysis sub-steps based on Reed et al. (2009) indicating chosen methods. .....36~~37~~

Figure 9: Overview of stakeholder tiers and categories .....39~~40~~

Figure 10: Example of Power-Interest map and the main actions to consider for the stakeholders in each quadrant.....40~~41~~

Figure 11: Process followed to carry out the stakeholder analysis.....41~~42~~

Figure 12: Overview of the type of evaluation that took place at the different workshops and the change in strategy. .....51~~52~~

Figure 13: Temporal orientation of the placement of the 1st SHE plan in the project time frame. .....54~~55~~

Figure 14: Overview of stakeholder distribution across WEFE sector in all CSs – early project .....58~~58~~

Figure 15: Differences between the distribution of stakeholder across the WEFE sectors in the preliminary and the official stakeholder list – early project .....59~~59~~

Figure 16: Overview of stakeholder gender distribution across case studies – early project .....59~~59~~

Figure 17: Overview of the relationships between stakeholders, based on the perception of CS-Leads. Cf: Conflict; Cm: complementary, Cp: cooperation; NE: non-existent; Blanks – early project 60

Figure 18: Basis for the evaluation material and change in the evaluation process – early project 66

Figure 19: Temporal orientation of the placement of the 2nd SHE plan in the project time frame. 69

Figure 20: Overview of stakeholder distribution across WEFE sector in all case studies – mid-project 71

Figure 21: Differences between the distribution of stakeholder across the WEFE sectors in the preliminary and the official stakeholder list – mid-project 72

Figure 22: Overview of stakeholder gender distribution across case studies– mid-project 72

Figure 23: Overview of the relationships between stakeholders, based on the perception of CS-Leads. Cf: Conflict; Cm: complementary, Cp: cooperation; NE: non-existent; Blanks – mid-project 74

Figure 24: Modes of co-creation as identified by case study leads (early project) and stakeholders at WS3 (mid-project)..... 75

Figure 25: Ideas on SH sustainment as per plenary discussions with stakeholders at WS3 (green boxes indicate potential fora to explore sustainment)– mid-project..... 82

Figure 26: Basis for the evaluation material and change in the evaluation process – mid-project 83

Figure 27: Temporal orientation of the placement of the 3rd SHE plan in the project time frame 88

Figure 28: Overview of stakeholder distribution across WEFE sector in all case studies – late project 91

Figure 29: Differences between the distribution of stakeholder across the WEFE sectors in the preliminary and the official stakeholder list – late project 92

Figure 30: Overview of stakeholder gender distribution across case studies – late project 92

Figure 31: Overview of the relationships between stakeholders, based on the perception of case study leads. Cf: Conflict; Cm: complementary, Cp: cooperation; NE: non-existent; Blanks late project..... 93

Figure 32: Modes of co-creation as identified by case study leads (early project), stakeholders at WS3 (mid-project) and re-evaluated by case study leads (late-project) in terms of their desired and the de-facto mode of co-creation..... 94

Figure 33: Ideas on stakeholder sustainment as per case study leads, WP1 and WP5 teams' reflections – late project; blue boxes – aims and reflections, light green boxes – ideas for sustainment, dark green boxes – informal agreement on sustainment, orange boxes – way forward on sustainment unclear..... 103

Figure 34: Temporal orientation of the placement of the final SHE evaluation in the project time frame ..... 111~~109~~

Figure 35: Basis for the evaluation material and change in the evaluation process – end-project ..... 112~~110~~

Figure 36: Changes of modes of co-creation over time including the stakeholder perceptions in the final evaluation. ..... 114~~112~~

Figure 37: Evolution of identified SHs in the register in the different CSs over time. ..... 118~~116~~

Figure 38: Relative amount of consented SHs in the case studies over time. ..... 119~~117~~

Figure 39: Distribution of number of stakeholders across the WEFE nexus sectors in the case studies over time. *stakeholders could be assigned to more than one WEFE Nexus sector. ..... 119~~117~~

Figure 40: Relative distribution of male to female (and other) stakeholders across case studies and time. ..... 120~~118~~

Figure 41: Relative female to male distribution of stakeholders across case studies and time. ..... 120~~118~~

Figure 42: Relative distribution of power-interest levels of stakeholders across case studies and time. ..... 121~~119~~

Figure 43: Relative distribution of the types of relationship of stakeholders across case studies and time. ..... 122~~120~~

Figure 44: Average number of workshop participants ..... 126~~124~~

Figure 45: Overview of the average gender-distributed participation across all case studies and workshops. ..... 127~~125~~

Figure 46: Sectoral workshop participation. The lower graph is normalized; stakeholders could self-identify as belonging to more than one sector. The full list of sectoral participation can be found in Annex 7. ..... 128~~126~~

Figure 47: Evolution of ideas for stakeholder sustainment and post-project networks over time. ..... 131~~129~~

Figure 48: Overview over the average gender, sectoral affiliation and relative level of experience of the survey respondents across WSs 2, 5 and 6. ..... 133~~131~~

Figure 49: Results of the assessment of perceived degree of engagement in the project by caste study' stakeholders across time. ..... 134~~132~~

Figure 50: Perceived knowledge generation across the three areas of knowledge generation over time ..... 135~~133~~

Figure 51: Perceived knowledge generation in different outcome domains and their relation to outcome achievement; symbols relate to the Objectives of NXG, relating to – from left to right – Objective 4, Objective 1, Objective 3 and Objective 2 (see full description of Objectives in Figure 2). ..... 136~~134~~

Figure 52: Distribution of stakeholders across the WEFE sectors for CS1 - Nestos/Mesta. One stakeholder can be assigned to one or more sectors. ..... 143~~141~~

Figure 53: Gender distribution for CS1 - Nestos/Mesta. One stakeholder identified with both female and male. 144142

Figure 54: Distribution of stakeholders across categories for the case CS1 - Nestos/Mesta 144142

Figure 55: Power-Interest Map for CS1 - Nestos/Mesta. Above: based on the CS-Leads' perception; and below: based on the scoring provided by stakeholders in the PPCF (some stakeholders did not provide input)). For data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents. 145143

Figure 56: Actor-Linkage Matrix for CS1-Nestos/Mesta. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent. 146144

Figure 57: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads. 146144

Figure 58: CS1-Nestos/Mesta scoring for co-creation approaches 147145

Figure 59: Preferred approaches to co-creation by stakeholders in the Nestos/Mesta river basin. The acronym BG stands for stakeholders from Bulgaria and GR for stakeholders from Greece. 156153

Figure 60: Stakeholders whose responses amount to the mode 'Empowering Voices'. The acronym BG stands for stakeholders from Bulgaria. 156154

Figure 61: Stakeholders whose responses amount to the mode 'Reframing Power'. The acronym BG stands for stakeholders from Bulgaria and GR for stakeholders from Greece. 157154

Figure 62: SHs whose responses amount to the mode 'Brokering Power'. The acronym BG stands for stakeholders from Bulgaria and GR for stakeholders from Greece. 158155

Figure 63: Stakeholders whose responses amount to no particular mode of co-creation. The acronym BG stands for stakeholders from Bulgaria and GR for stakeholders from Greece. 158155

Figure 64: Distribution of stakeholders across the WEFE sectors for CS2 - Lielupe. One stakeholder can be assigned to one or more sectors. 161158

Figure 65: Gender distribution for CS2 – Lielupe 161158

Figure 66: Power-Interest Map for CS2 - Lielupe. Above: based on the CS-Leads' perception; and below: based on the scoring provided by stakeholders in the PPCF (some stakeholders did not provide input)). For data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents. 162159

Figure 67: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads. 163160

Figure 68: Actor-Linkage Matrix for CS2-Lielupe. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent. 164161

Figure 69: CS2-Lielupe scoring for co-creation approaches 165162

Figure 70: Distribution of stakeholders across the WEFE sectors for CS3 - Jiu. One stakeholder can be assigned to one or more sectors. ..... 174~~171~~

Figure 71: Gender distribution for CS3 – Jiu ..... 174~~171~~

Figure 72: Distribution of stakeholders across categories for the case CS3 - Jiu. ..... 175~~172~~

Figure 73: Power-Interest Map for CS3 - Jiu. Above: based on the CS-Leads' perception; and below: based on the scoring provided by stakeholders in the PPCF (some stakeholders did not provide input)). For data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents. ..... 176~~173~~

Figure 74: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads. ..... 177~~174~~

Figure 75: Actor-Linkage Matrix for CS3-Jiu. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent. ..... 178~~175~~

Figure 76: CS3-Jiu scoring for co-creation approaches ..... 179~~176~~

Figure 77: Distribution of stakeholders across the WEFE sectors for CS4 – Adige. One stakeholder can be assigned to one or more sectors. ..... 188~~185~~

Figure 78: Gender distribution for CS4 – Adige. ..... 188~~185~~

Figure 79: Distribution of stakeholders across categories for the case CS4 - Adige. .... 189~~186~~

Figure 80: Power-Interest Map for CS4 – Adige. Above: based on the CS-Leads' perception – SH-64 and SH-69 were not rated; and below: based on the scoring provided by stakeholders in the PPCF (some stakeholders did not provide input)). For data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents. ..... 190~~187~~

Figure 81: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads. ..... 191~~188~~

Figure 82: Actor-Linkage Matrix for CS4-Adige. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent. ..... 192~~189~~

Figure 83: CS4-Adige scoring for co-creation approaches ..... 193~~190~~

Figure 84: Distribution of stakeholders across the WEFE sectors for CS5 – IUWMA. One stakeholder can be assigned to one or more sectors. ..... 203~~200~~

Figure 85: Gender distribution for CS5 – IUWMA. ..... 203~~200~~

Figure 86: Power-Interest Map for CS5 – IUWMA. Above: based on the CS-Leads' perception; and below: based on the scoring provided by stakeholders in the PPCF (some stakeholders did not provide input)). For data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents. ..... 204~~201~~

Figure 87: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads. ..... 205~~202~~

Figure 88: Actor-Linkage Matrix for CS5-IUWMA. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent. ..... 206~~203~~

Figure 89: CS5-IUWMA scoring for co-creation approaches.....207~~204~~

Figure 90: Preferred approaches to co-creation by stakeholders in the Inkomati-Usuthu river basin. .....214~~211~~

Figure 91: Stakeholder whose response amounts to the mode 'Researching Solutions'. .....215~~212~~

Figure 92: Stakeholders whose responses amount to the mode 'Empowering Voices'. 216~~213~~

Figure 93: Stakeholders whose responses amount to the mode 'Brokering Power'. .....216~~213~~

Figure 94: Stakeholders whose responses amount to 'Navigating Differences'. .....217~~214~~

Figure 95: Stakeholder whose response amounts to no particular mode of co-creation. .....217~~214~~

Figure 96: List of outcomes desired by stakeholders. Outcomes coloured in green were scored >6.0 on average, while the ones in red were scored <5.5 on average. .....218~~215~~

Figure 97: Preferred approaches to co-creation by stakeholders in the Adige river basin. .....218~~215~~

Figure 98: Stakeholders whose responses amount to the mode 'Empowering Voices'. 219~~216~~

Figure 99: Stakeholders whose responses amount to the mode 'Navigating Differences'. .....219~~216~~

Figure 100: Stakeholders whose answers did not amount to any mode of co-production. .....220~~217~~

Figure 101: List of outcomes desired by stakeholders. Outcomes coloured in green were scored >6.0 on average, while the ones in red were scored <5.5 on average.....221~~218~~

Figure 102: Degree of perceived engagement by WS3 participants in the project (dark bars) and the workshop (light bars) .....223~~220~~

Figure 103: Level of importance and expectations per outcomes of the SHE process at WS3. .....224~~221~~

Figure 104: Knowledge generated in WS3 in different NXG areas.....224~~221~~

Figure 105: SH perspective on the desired approaches to co-creation – together yielding the mode 'Brokering Power'. Legend (in clockwise order from the top): 1) Influence powerful actors; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together.....226~~223~~

Figure 106: Distribution of stakeholders across the WEFE sectors for CS1 - Nestos/Mesta. One stakeholder can be assigned to one or more sectors. .....231~~228~~

Figure 107: Gender distribution for CS1 - Nestos/Mesta. One stakeholder identified with both female and male. .....231~~228~~

Figure 108: Distribution of stakeholders across categories for the case CS1 - Nestos/Mesta .....232~~229~~

Figure 109: Power-Interest Map for CS1 - Nestos/Mesta. based on the CS-Leads' perceptionFor data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents. 233230

Figure 110: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads. 233230

Figure 111: Actor-Linkage Matrix for CS1-Nestos/Mesta. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent. 234231

Figure 112: Degree of perceived engagement by WS3 participants in the project (dark bars) and the workshop (light bars) 242239

Figure 113: Level of importance and expectations per outcomes of the SHE process at WS3. 242239

Figure 114: Knowledge generated in WS3 in different NXG areas..... 243240

Figure 115: SH perspective on the desired approaches to co-creation – together yielding the mode 'Empowering Voices**.** Legend (in clockwise order from the top): 1) Influence powerful actors; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together. 244241

Figure 116: SH perspective on the desired approaches to co-creation**.** Legend (in clockwise order from the top): 1) Influence powerful actors; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together..... 245242

Figure 117: Distribution of stakeholders across the WEFE sectors for CS2 - Lielupe. One stakeholder can be assigned to one or more sectors..... 249246

Figure 118: Gender distribution for CS2 – Lielupe 250247

Figure 119: Power-Interest Map for CS2 - Lielupe. based on the CS-Leads' perception; For data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents. 251248

Figure 120: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads..... 251248

Figure 121: Actor-Linkage Matrix for CS2-Lielupe. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent. 252249

Figure 122: Degree of perceived engagement by WS3 participants in the project (dark bars) and the workshop (light bars) 260257

Figure 123: Level of importance and expectations per outcomes of the SHE process at WS3. 261258

Figure 124: Knowledge generated in WS3 in different NXG areas..... 261258

Figure 125**:** SH perspective on the desired approaches to co-creation – together yielding the mode 'Brokering Power'. Legend (in clockwise order from the top): 1) Influence powerful actors;

2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together.....263260

Figure 126: Distribution of stakeholders across the WEFE sectors for CS3 - Jiu. One stakeholder can be assigned to one or more sectors.....267264

Figure 127: Gender distribution for CS3 – Jiu.....268265

Figure 128: Distribution of stakeholders across categories for the case CS3 - Jiu. 269266

Figure 129: Power-Interest Map for CS3 - Jiu. Above: based on the CS-Leads' perception. For data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents. 269266

Figure 130: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads.....270267

Figure 131: Actor-Linkage Matrix for CS3-Jiu. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent. 271268

Figure 132: CS3-Jiu scoring for co-creation approaches 273270

Figure 133: Degree of perceived engagement by WS3 participants in the project (dark bars) and the WS (light bars).....280277

Figure 134: Level of importance and expectations per outcomes of the SHE process at WS3. 281278

Figure 135: Knowledge generated in WS3 in different NXG areas.....281278

Figure 136: SH perspective on the desired approaches to co-creation – together yielding the mode 'Reframing Power'. Legend (in clockwise order from the top): 1) Influence powerful actors; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together 282279

Figure 137: Distribution of stakeholders across the WEFE sectors for CS4 – Adige. One stakeholder can be assigned to one or more sectors.....287284

Figure 138: Gender distribution for CS4 – Adige. 287284

Figure 139: Distribution of stakeholders across categories for the case CS4 - Adige....288285

Figure 140: Power-Interest Map for CS4 – Adige, based on the CS-Leads' perception. For data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents. 289286

Figure 141: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads.....290287

Figure 142: Actor-Linkage Matrix for CS4-Adige. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent. 291288

Figure 143: CS4-Adige scoring for co-creation approaches.....292289

Figure 144: Degree of perceived engagement by WS3 participants in the project (dark bars) and the workshop (light bars) 300297

Figure 145: Level of importance (dark blue) and expectations (light blue) per outcomes of the SHE process at WS3. 300297

Figure 146: Knowledge generated in WS3 in different NXG areas 301298

Figure 147: SH perspective on the desired approaches to co-creation – together yielding the mode 'Empowering Voices'. Legend (in clockwise order from the top): 1) Influence powerful actors; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together 302299

Figure 148: Distribution of stakeholders across the WEFE sectors for CS5 – IUWMA. One stakeholder can be assigned to one or more sectors. 308305

Figure 149: Gender distribution for CS5 – IUWMA. 308305

Figure 150: Distribution of stakeholders across categories for the case CS5- Inkomati Ushutu 309306

Figure 151: Power-Interest Map for CS5 – IUWMA, based on the CS-Leads' perception. For data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents. 310307

Figure 152: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads. 311308

Figure 153: Actor-Linkage Matrix for CS5-IUWMA. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent. 312309

Figure 154: CS5-IUWMA scoring for co-creation approaches 313310

Figure 155: Comparing the Approaches/Modes of Co-Creation as assessed by CS leads. Icons from the top in clockwise order: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together 323320

Figure 156: Comparing the CS's and SHs' Approaches/Modes of Co-Creation. Icons from the top in clockwise order: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 323320

Figure 157: Distribution of SHs across the WEFE sectors for CS1 - Nestos/Mesta. One SH can be assigned to one or more sectors 333330

Figure 158: Gender distribution for CS1 - Nestos/Mesta. One SH identified with both female and male. 333330

Figure 159: Distribution of SHs across categories for the case CS1 - Nestos/Mesta 334331

Figure 160: Power-Interest Map for CS1 - Nestos/Mesta. based on the CS-Leads' perception. For data protection and privacy matters, SHs are anonymised; for internal use CS-Leads know which SH each number represents. 335332

Figure 161: Share of types of relationships across SHs. Characterised based on the perception of CS-Leads. 336333

Figure 162: Actor-Linkage Matrix for CS1-Nestos/Mesta. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent. 337334

Figure 163: Approaches/Modes of Co-Creation of the CS Leads. Icons in clockwise order starting with the top icon: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together 346343

Figure 164: Approaches/Modes of Co-Creation of National, Regional, and NGO/Other SHs. Icons in clockwise order starting with the top icon: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together.....347344

Figure 165**:** Approaches/Modes of Co-Creation of the Local SHs. Icons in clockwise order starting with the top icon: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together 347344

Figure 166: Comparing Approaches/Modes of Co-Creation of the CS Leads and SHs. Icons in clockwise order starting with the top icon: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together.....348345

Figure 167: Distribution of SHs across the WEFE sectors for CS2 - Lielupe. One SH can be assigned to one or more sectors. 356353

Figure 168: Gender distribution for CS2 – Lielupe 357354

Figure 169: Power-Interest Map for CS2 - Lielupe. based on the CS-Leads' perception; For data protection and privacy matters, SHs are anonymised; for internal use CS-Leads know which SH each number represents.....358355

Figure 170: Share of types of relationships across SHs. Characterised based on the perception of CS-Leads. 358355

Figure 171: Actor-Linkage Matrix for CS2-Lielupe. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent. 359356

Figure 172: Approaches/modes of Co-Creation as assessed by CS lead. Icons from the top in clockwise order: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together.....369366

Figure 173 : Approaches/modes of Co-Creation, comparing SH and CS perceptions. Icons from the top in clockwise order: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together.....370367

Figure 174: Distribution of SHs across the WEFE sectors for CS3 - Jiu. One SH can be assigned to one or more sectors. 379376

Figure 175: Gender distribution for CS3 – Jiu.....380377

Figure 176: Distribution of SHs across categories for the case CS3 - Jiu. 381378

Figure 177: Power-Interest Map for CS3 - Jiu. Above: based on the CS-Leads' perception. For data protection and privacy matters, SHs are anonymised; for internal use CS-Leads know which SH each number represents. 382379

Figure 178: Share of types of relationships across SHs. Characterised based on the perception of CS-Leads. 383380

Figure 179: Actor-Linkage Matrix for CS3-Jiu. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent. 384381

Figure 180: Approaches/modes of Co-Creation as assessed by the CS lead. Icons from the top in clockwise order: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together 393390

Figure 181: Approaches/modes of Co-Creation, comparing perceptions of CS lead and SHs. Icons from the top in clockwise order: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together..... 394391

Figure 182: Distribution of SHs across the WEFE sectors for CS4 – Adige. One SH can be assigned to one or more sectors. 403400

Figure 183: Gender distribution for CS4 – Adige. 403400

Figure 184: Distribution of SHs across categories for the case CS4 - Adige. 404401

Figure 185: Power-Interest Map for CS4 – Adige, based on the CS-Leads' perception. For data protection and privacy matters, SHs are anonymised; for internal use CS-Leads know which SH each number represents. 405402

Figure 186: Share of types of relationships across SHs. Characterised based on the perception of CS-Leads. 406403

Figure 187: Actor-Linkage Matrix for CS4-Adige. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent. 407404

Figure 188: Approaches/modes of Co-Creation, as assessed by the CS leads. Icons from the top in clockwise order: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together 418415

Figure 189: Approaches/modes of Co-Creation, comparing CS lead and SH perceptions. Icons from the top in clockwise order: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together..... 419416

Figure 190: Distribution of SHs across the WEFE sectors for CS5 – IUWMA. One SH can be assigned to one or more sectors. 430426

Figure 191: Gender distribution for CS5 – IUWMA. 430426

Figure 192: Distribution of SHs across categories for the case CS5- IUWMA..... 431427

Figure 193: Power-Interest Map for CS5 – IUWMA, based on the CS-Leads' perception. For data protection and privacy matters, SHs are anonymised; for internal use CS-Leads know which SH each number represents. 432428

Figure 194: Share of types of relationships across SHs. Characterised based on the perception of CS-Leads. 433429

Figure 195: Actor-Linkage Matrix for CS5-IUWMA. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent. 434430

Figure 196: Degree of perceived engagement by CS1-WS5 participants in the project (dark bars) and the workshop (light bars) 443439

Figure 197: Degree of perceived engagement by CS1-WS6 participants in the project (dark bars) and the workshop (light bars). 444440

Figure 198: Level of importance (dark blue) and expectations (light blue) per outcomes of the SHE process at CS1-WS5. 444440

Figure 199: Level of importance (dark blue) and expectations (light blue) per outcomes of the SHE process at CS1-WS6. 445441

Figure 200: Knowledge generated in CS1-WS5 in different NXG areas. 445441

Figure 201: Knowledge generated in CS1-WS6 in different NXG areas. 446442

Figure 202: SH perspective on the desired and experienced approaches to co-creation CS1-WS6. The SHs desired "Empowering Voices" (green) and experienced "Researching Solutions" (yellow). Legend (in clockwise order from the top): 1) Influence powerful actors; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together 447443

Figure 203: Degree of perceived engagement by CS2 - WS5 participants in the project (dark bars) and the workshop (light bars) 449445

Figure 204: Degree of perceived engagement by CS2 - WS6 participants in the project (dark bars) and the workshop (light bars). 450446

Figure 205: Level of importance (dark blue) and expectations (light blue) per outcomes of the SHE process at CS2 - WS5. 450446

Figure 206: Level of importance (dark blue) and expectations (light blue) per outcomes of the SHE process at CS2 - WS6. 451447

Figure 207: Knowledge generated in CS2 - WS5 in different NXG areas 452448

Figure 208: Knowledge generated in CS2 - WS6 in different NXG areas 452448

Figure 209: SH perspective on the experienced approaches to co-creation. Both SHs from Latvia (dark green) and Lithuania (light green) experienced the mode of co-creation "Empowering Voices". Legend (in clockwise order from the top): 1) Influence power; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together 453449

Figure 210: Degree of perceived engagement by CS3 - WS6 participants in the project. 454450

Figure 211: Level of importance (dark blue) and expectations (light blue) per outcomes of the SHE process CS3-WS6.....455~~451~~

Figure 212**:** SH perspective on the desired and experienced approaches to co-creation WS6 – CS4. The SHs desired “Navigating Differences” (dark blue) and experienced “Reframing Agency” (light blue). Legend (in clockwise order from the top): 1) Influence powerful actors; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together.....457~~453~~

Figure 213: Degree of perceived engagement by CS5 - WS5 participants in the project (dark bars) and the workshop (light bars) .....459~~455~~

Figure 214: Level of importance (dark blue) and expectations (light blue) per outcomes of the SHE process at CS5 - WS5.....459~~455~~

Figure 215: Knowledge generated in CS5 - WS5 in different NXG areas.....460~~456~~

Figure 216: SH perspective on the desired and experienced approaches to co-creation. The SHs desired a mode of co-creation not capture by Chambers et al. (red) and experienced “Brokering Power” (purple). Legend (in clockwise order from the top): 1) Influence powerful actors; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together .....461~~457~~

List of tables

Table 1: Overview of the 5 case studies 29

Table 2: Type of relationships identified in the actor-linkage matrix 4041

Table 3: Example of the overview table of the main component in stakeholder engagement process (P=Power; I=Interest) 4243

Table 4: Overview of co-creation themes and approaches according to Chambers et al. (2021) 4445

Table 5: Aims of NXG workshops as per Milestone 5 report (MS5) 4546

Table 6: Characteristics of workshop modalities 4748

Table 7: Overview of the short aims determined by the CS-Leads – early project 5556

Table 8: Overview of the stakeholder identification across CSs – early project.....5858

Table 9: Overview of Power-Interest scoring of stakeholders, based on the perception of CS-Leads 6060

Table 10: Overview of co-creation modes across case studies as identified by CS leads.6161

Table 11: Overview of the suggested actions to be focused on for the coming years based on the initial plan. 6262

Table 12: Comparison between the case study specific aims from the early perspective of case study leads and mid-project views of stakeholders; bold crosses present divergences between the case study leads' and stakeholders' views. 7070

Table 13: Overview of stakeholder identification across case studies – mid-project 7171

Table 14: Overview of Power-Interest scoring of stakeholders, based on the perception of case study leads – mid-project.....7373

Table 15: Overview of potential opportunities and risks from three of the six modes of co-creation as per Chambers et al. 2021 7575

Table 16: Overview of the SH management activities and actions to best engage with SHs based on the overall evaluation of the situation in mid-project. 7878

Table 17: Comparative view of early, mid and late SHE aims as per the view of the (SHs and) CS leads (crosses in bold show additions, while grey, strikethrough crosses show aims that have been removed).....8988

Table 18: Overview of the perceived level of achievement of the CS's SHE aims as per interviews with CS leads in June 2024. 9089

Table 19: Overview of the stakeholder identification across case studies – late-project....9291

Table 20: Overview of Power-Interest scoring of stakeholders, based on the perception of case study leads – late project.....9493

Table 21: Generalized engagement activities across case studies in this final project year. 9896

Table 22: Overview of the SH management activities and actions to best engage with SHs based on the overall evaluation of the situation in the late project phase. 9997

Table 23: Summarized answers from MS23 regarding CS specific stories of change and desired policy impacts. 107105

Table 24: Qualitative comparison of early engagement aims with the perceived level of aims achievement and their relationship to the modes co-creation chosen to achieve the aims. (light grey numbers show aim achievement of aims that were originally not foreseen to be attained by CS leads) 124122

Table 25: CS1-Nestos/Mesta summary information of stakeholder identification as of Sept. 2022 143141

Table 26: Description of approaches for CS1-Nestos/Mesta based on the scoring exercise done by CS-Leads and following Chambers et al. (2021). 148146

Table 27: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS1-Nestos/Mesta. SH: Stakeholder. 150148

Table 28: Overview of opportunities and risk linked to Mode 2 "Empowering voices" and the approaches that ranked higher in CS1-Nestos/Mesta. Based on Chambers et al. (2021). 153151

Table 29 CS2-Lielupe summary information of stakeholder identification as of Sept. 2022 161158

Table 30: Description of approaches for CS2-Lielupe based on the scoring exercise done by CS-Leads and following Chambers et al. (2021) 166163

Table 31: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS2-Lielupe. SH: Stakeholder. 168165

Table 32: Overview of opportunities and risk linked to Mode 5 "Navigating differences" and the approaches that ranked higher in CS2-Lielupe. Based on Chambers et al. (2021). 171168

Table 33: CS3-Jiu summary information of stakeholder identification as of Sept. 2022 174171

Table 34: Description of approaches for CS3-Jiu based on the scoring exercise done by CS-Leads and following Chambers et al. (2021) 180177

Table 35: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS3-Jiu. 182179

Table 36: Overview of opportunities and risk linked to Mode 1 "Researching solutions" and the approaches that ranked higher in CS3-Jiu. Based on Chambers et al. (2021). 185182

Table 37: CS4-Adige summary information of stakeholder identification as of Sept. 2022 188185

Table 38: Description of approaches for CS4-Adige based on the scoring exercise done by CS-Leads and following Chambers et al. (2021) 194191

Table 39: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS4-Adige. SH: Stakeholder. 196193

Table 40: Overview of opportunities and risk linked to Mode 1 "Researching solutions" and the approaches that ranked higher in CS4-Adige. Based on Chambers et al. (2021). .....199~~196~~

Table 41: CS4-Adige summary information of stakeholder identification as of Sept. 2022 .....203~~200~~

Table 42: Description of approaches for CS5-IUWMA based on the scoring exercise done by CS-Leads and following Chambers et al. (2021).....208~~205~~

Table 43: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS5-IUWMA. .....209~~206~~

Table 44: Overview of opportunities and risk linked to Mode 1 "Researching solutions" and the approaches that ranked higher in CS5-IUWMA. Based on Chambers et al. (2021). .....212~~209~~

Table 45: CS1-Nestos/Mesta summary information of stakeholder identification as of Sept. 2023 .....230~~227~~

Table 46: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS1-Nestos/Mesta. .....236~~233~~

Table 47: Overview of opportunities and risk linked to Mode 2 "Empowering voices" and the approaches that ranked higher in CS1-Nestos/Mesta. Based on Chambers et al. (2021). .....239~~236~~

Table 48: CS2-Lielupe summary information of stakeholder identification as of Sept. 2023 .....249~~246~~

Table 49: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS2-Lielupe. .....254~~251~~

Table 50: Overview of opportunities and risk linked to Mode 5 "Navigating differences" and the approaches that ranked higher in CS2-Lielupe. Based on Chambers et al. (2021). .....257~~254~~

Table 51: CS3-Jiu summary information of stakeholder identification as of Sept. 2022 267~~264~~

Table 52: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS3-Jiu. .....274~~271~~

Table 53: Overview of opportunities and risk linked to Mode 1 "Researching solutions" and the approaches that ranked higher in CS3-Jiu. Based on Chambers et al. (2021). .....277~~274~~

Table 54: CS4-Adige summary information of stakeholder identification as of Sept. 2022 and updated in September 2023 .....286~~283~~

Table 55: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS4-Adige. .....294~~291~~

Table 56: Overview of opportunities and risk linked to Mode 1 "Researching solutions" and the approaches that ranked higher in CS4-Adige. Based on Chambers et al. (2021). .....297~~294~~

Table 57: CS5-Inkomati summary information of stakeholder identification as of Sept. 2022 and updated numbers from 2023.....307~~304~~

Table 58: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS5-IUWMA. .....315~~312~~

Table 59: Overview of opportunities and risk linked to Mode 1 "Researching solutions" and the approaches that ranked higher in CS5-IUWMA. Based on Chambers et al. (2021). 318315

Table 60: Self-evaluation of the implementation of the 2023 SHE plan recommendations 320317

Table 61: Recommendations from the Berlin meeting -CS1 325322

Table 62: Aims for the co-creation, divided by type of knowledge. In bold are those aims identified as particularly relevant for the remaining duration of the project. 329326

Table 63: CS1-Nestos/Mesta summary information of SH identification as of Sept. 2024 332329

Table 64: Overview of the main SHE components of the SHE plan for CS1-Nestos/Mesta. 339336

Table 65: Priorities of the different plans and how these were accomplished and changed over the course of the project. 341338

Table 66: Self-evaluation of the implementation of the 2023 SHE plan recommendations 344341

Table 67: Recommendations from the Berlin meeting 350347

Table 68: Aims for the co-creation, divided by type of knowledge. In bold are those aims identified as particularly relevant for the remaining duration of the project. 354351

Table 69: CS2-Lielupe summary information of SH identification as of Sept. 2024.....356353

Table 70: Overview of the main SHE components of the SHE plan for CS2-Lielupe. ...361358

Table 71: Priorities of the different plans and how these were accomplished and changed over the course of the project. 364361

Table 72: Self-evaluation of the implementation of the 2023 SHE plan recommendations 367364

Table 73: Recommendations from the Berlin meeting – CS3.....372369

Table 74: Aims for the co-creation, divided by type of knowledge. In **bold** are those aims identified as particularly relevant for the remaining duration of the project. 376373

Table 75: CS3-Jiu summary information of SH identification as of Sept. 2022.....379376

Table 76: Overview of the main SHE components of the SHE plan for CS3-Jiu. SH: SH. 385382

Table 77: Priorities of the different plans and how these were accomplished and changed over the course of the project. 388385

Table 78: Self-evaluation of the implementation of the 2023 SHE plan recommendations 391388

Table 79: Recommendations from the Berlin meeting - CS4 397394

Table 80: Aims for the co-creation, divided by type of knowledge. In bold are those aims identified as particularly relevant for the remaining duration of the project. Aims indicated by other CS are relevant but not this CS are in grey cells.....400397

Table 81: CS4-Adige summary information of SH identification as of Sept. 2022 and updated in September 2023 and September 2024 402399

Table 82: Overview of the main SHE components of the SHE plan for CS4-Adige.....409406

Table 83: Priorities of the different plans and how these were accomplished and changed over the course of the project. 412409

Table 84: Self-evaluation of the implementation of the 2023 SHE plan recommendations 415412

Table 85: Recommendations from the Berlin meeting – CS5.....422419

Table 86: Aims for the co-creation, divided by type of knowledge. In bold are those aims identified as particularly relevant for the remaining duration of the project. Aims indicated by other CS are relevant but not this CS are in grey cells.....427423

Table 87: CS5-Inkomati summary information of SH identification as of Sept. 2022 and updated numbers from 2023 and 2024.....429425

Table 88: Overview of the main SHE components of the SHE plan for CS5-IUWMA....436432

Table 89: Priorities of the different plans and how these were accomplished and changed over the course of the project. 439435

Table 90: Example of the questions asked to WPs to know about information and consultation content. 492488

Table 91: Example of the questions asked to CS-Leads to know what SHs want to be informed about and consult. 492488

Table 92: Registration document for workshops (Source: SIM4NEXUS) 494490

Table 93: Checklist from six to three months before the workshop 495491

Table 94: Checklist three months before the workshop 496492

Table 95: Checklist one month before the workshop 496492

Table 96: Checklist one week before the workshop.....497493

Table 97: Equipment list.....498494

Table 98: Checklist for the day(s) of the workshop 499495

Table 99: checklist for after the workshop.....500496

Table 100: Relevant gender-related definitions used as guidance in NXG.....501497

Introduction

Project Summary

Water, energy, food, and ecosystems (WEFE) are interconnected and comprise a coherent system (nexus), which is characterised by complexity and modulated by climatic and socio-economic drivers. In the nexus, economic development (including optimal trade, market, and policy solutions) is hampered by resource constraints and their interconnectedness. In addition, the adoption of a sectoral approach in developing and implementing policies may affect nexus characteristics, which in turn can affect decision-making and policy formulation.

NEXOGENESIS (NXG) developed and validated:

a) A stakeholder (SH) co-creation approach for WEFE nexus governance that integrates a policy coherence assessment methodology, a governance assessment tool, and the development of governance roadmaps. This approach is embedded within a comprehensive SH co-creation process, supported by a policy impact assessment tool (SLNAE/NEPAT, see point b), to identify User-Validated Policy Packages (UVPPs) and to define actionable pathways for their adoption and implementation as foundational elements of stakeholder agreements;

b) A Self-Learning Nexus Assessment Engine (SLNAE, later on referred to as the NExus Policy Assessment Tool NEPAT) exploiting reinforcement learning, and supporting streamlining (water-related) policies into the WEFE nexus;

c) A WEFE Nexus Footprint, accompanying the NEPAT.

NXG applied a SHs' co-creation approach for WEFE nexus governance (see D1.1, D1.2, and D1.4) to five case studies (CS): four European and one in Southern Africa. Through these CSs, strong stakeholder engagement and validation of outputs, the project intends to improve policies and policymaking processes to enhance cooperation and help the EU achieve targets related to the Water Framework Directive, the greener Common Agricultural Policy, Green Deal ambitions, as well as ambitions on water diplomacy.

The Case Studies

NXG applies its approach to five CSs (Figure 1~~Figure 1~~ and Table 1~~Table 1~~) with a variety of nexus policy issues to be explored. The application of coherent approaches throughout the project ensures a common connection between the cases and fosters the exchange of ideas and experiences among CSs, allowing for broader comparative conclusions and recommendations to be drawn. The five CSs cover diverse spatial, social, and cultural characteristics as well as development challenges backgrounds. They also feature strong WEFE nexus relations, with the potential for disruption from policy implementation, and allow for an assessment of how water-related policies can be streamlined into the nexus. They allow for out-scaling to broader regions due to the diversity of cases, and the coherent framework. Dedicated CS partners offer access to SH consultation at different tiers, ensuring maximum engagement and project impact.

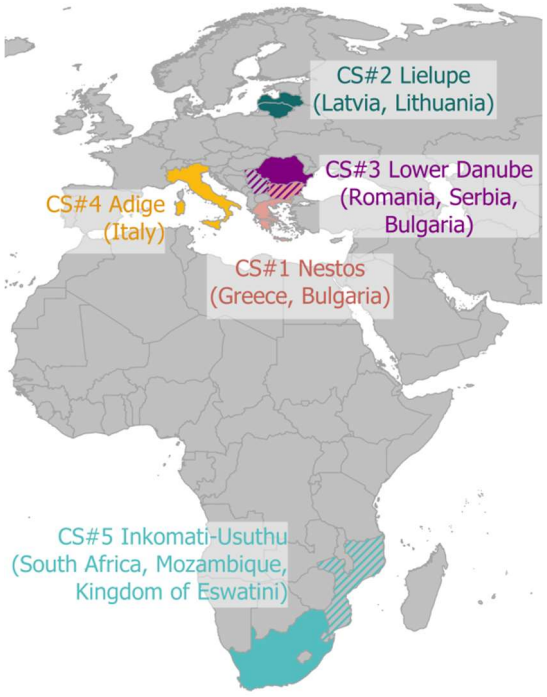


Figure 1: Location of all case studies. CS3 and CS5 are overall transboundary (striped area) but the focus in NXG is on the Romanian and South African regions, respectively (solid-filled area).

Table 1: Overview of the 5 case studies

Case Study Name	Countries	Project Category
Nestos/Mesta	Greece (EL), transboundary with Bulgaria (BG)	frontrunner
Lielupe	Lithuania (LT), transboundary with Latvia (LV)	frontrunner
Jiu	Romania (RO)	follower
Adige	Italy (IT)	follower
Inkomati-Usuthu	South Africa (RSA)	follower

Purpose and structure of this document

The purpose of Deliverable 5.1 (D5.1) is to present the NXG Stakeholder Engagement (SHE) process for co-creation of knowledge and how it was adapted to and implemented by the five CSs during the project. In NXG, consortium members came from various disciplines. Therefore, the project embraced inter- and transdisciplinarity and learning. We refer here to the definitions of Scholz and Steiner (2015) where *"interdisciplinarity may be defined as the merging of concepts and knowledge from different [scientific] disciplines*" and "*transdisciplinary processes relate scientific knowledge and rigour to experiential knowledge*" – i.e., the inclusion of non-scientific actors in knowledge creation. The project applied a transdisciplinary approach of working with and through SHs in each site allowing for learning experiences between consortium members and local actors (vertical learning), as well as learning experiences across actors of multiple locations (horizontal learning). While the project focused on co-creation[1], there was also a focus on co-production[2] of knowledge. Thus, both terms are used

[1] '*"Co-creation", by contrast, is a term from commercial business that has only fairly recently become popular in the public sector.'* (Brandsen and Horingh, 2018)

[2] '*The term "co-production" finds its scholarly origins in the public sector, in the work of Ostrom and other econo-mists who studied collaboration between public departments and citizens*.' (Brandsen and Horingh, 2018)

in this document as both the engagement with the public sector and the development of semi-commercial tools (e.g. the NEPAT) were carried out. SHs are defined here as "*individuals, groups and organizations who are affected by or can affect those parts of the phenomenon (this may include non-human and non-living entities and future generations)*" (Reed et al. 2009). Therefore, SHs include consortium members and non-consortium actors.

The aim of having consistent SHE plans was to facilitate cohesive but tailored processes that would support the achievement of the five main NXG Objectives (Figure 2~~Figure 2~~) and in particular the objectives related to the demonstration and validation of the NXG tools, such as the NEPAT and the UVPPs, and the NXG framework as a whole.

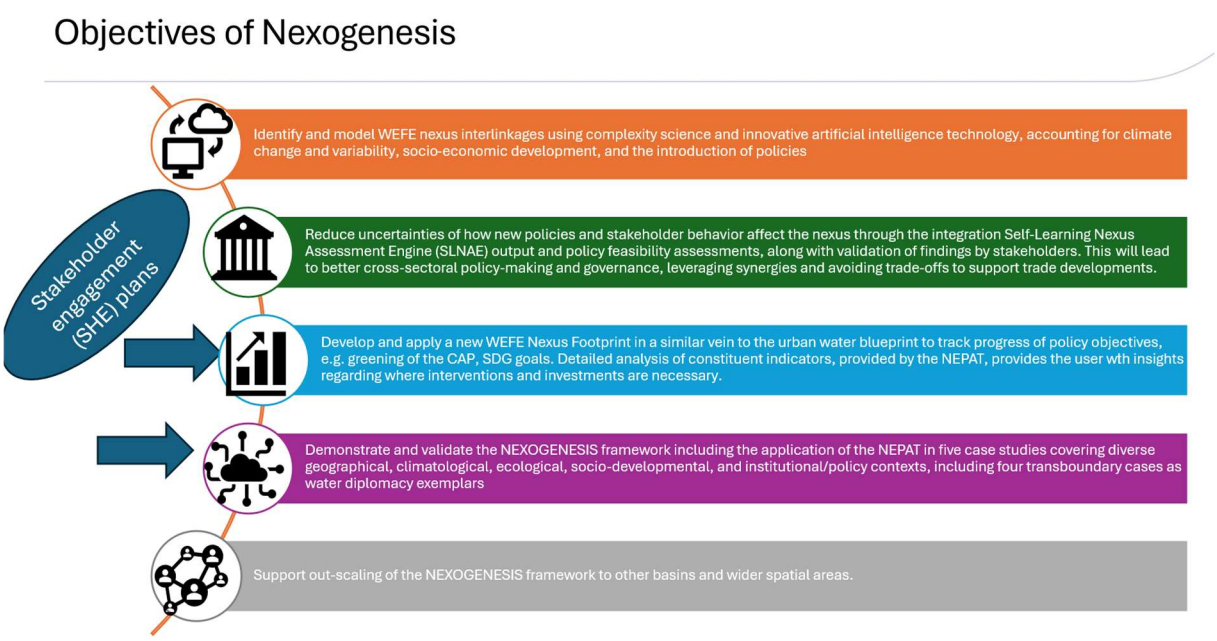


Figure 2: The objectives of the NXG project as formulated in the grant agreement and the impact that the SHE plans intend to facilitate.

The project evolved through three main phases of engagement (Figure 3~~Figure 3~~), namely:

- **co-exploration**, which occurred in the early phase of the project and intended to set a common ground;
- **co-design**, in the middle of the project, focusing on the development of scientific content and tools, such as the data, models, indicators and scenarios, as well as policies and the NEPAT outline;
- **co-development**, in the final stages of the project, looking for the validation of results and outputs and the development of roadmaps and agreements.

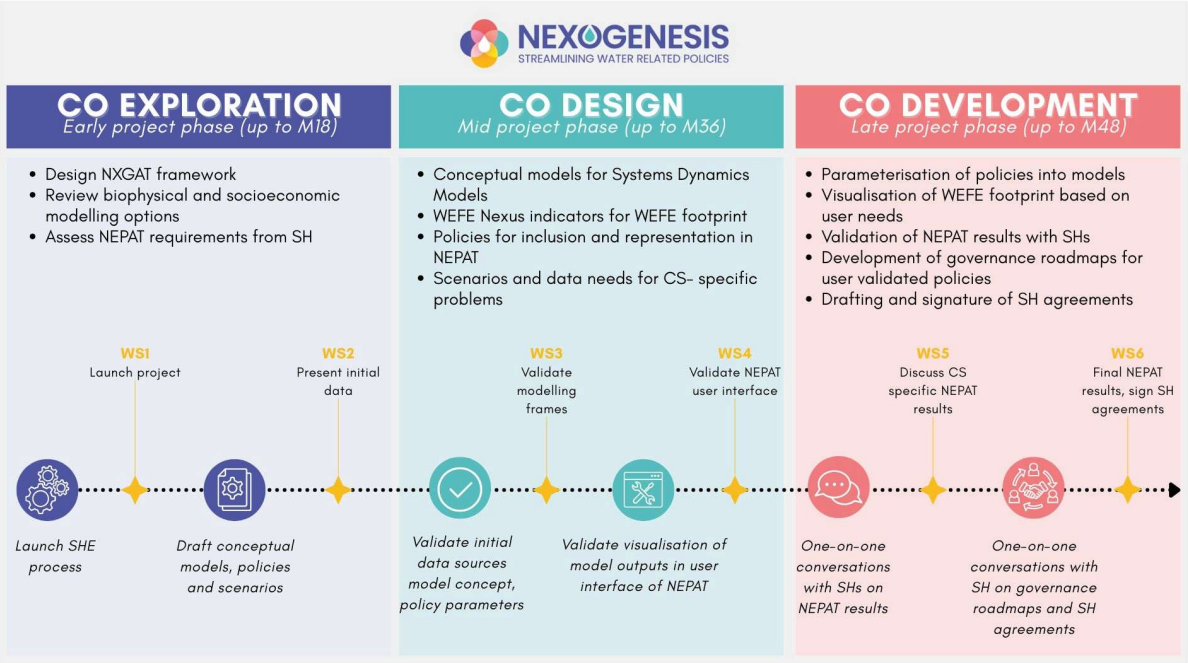


Figure 3: Overview of the phases of the co-creation process and the timing of the yearly SHE plans.

The NXG project occurred over a lifetime of 48 months. For each project year (i.e. every 12 months), individual SHE plans were developed for each of the five CSs (Figure 4~~Figure 4~~). The plans intended to support the CS leads in adapting to the requirements of the phases and to the local contexts.

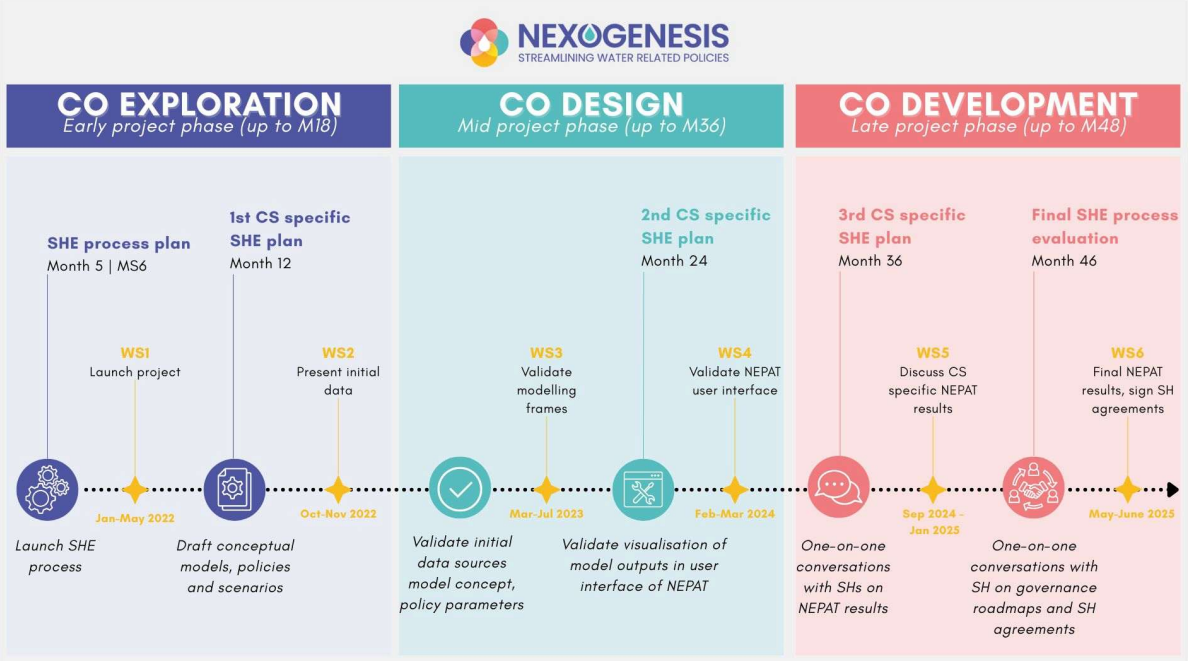


Figure 4: Overview of the timing of the administration of the SHE plans throughout the phases of the project.

The NXG SHE process helped explore the SH landscape to identify who should be engaged how, when, and in which activities and was thus designed as an iterative cyclic process divided into five steps (Figure 5~~Figure 5~~), namely:

Step 1. Stakeholder engagement aim
Step 2. Stakeholder analysis (identification, differentiation, and relationships)
Step 3. Stakeholder engagement plan
Step 4. Stakeholder management and sustainment
Step 5. Stakeholder engagement process evaluation

Figure 5: Steps of NXG's stakeholder engagement process

This deliverable is structured as follows:

(1) PART I: Stakeholder Engagement Process in NXG~~PART I: Stakeholder Engagement Process in NXG~~: outlines the steps for developing the NXG SHE plan
(2) PART II: Stakeholder Engagement across NXG Case Studies and time~~PART II: Stakeholder Engagement across NXG Case Studies and time~~:
    (1) Summary findings of each of three phases of the SHE,
    (2) Conclusion~~Conclusion~~, including lessons learned and recommendations.
(3) References~~References~~, and
(4) Annexes~~Annexes~~:
    (1) PART III: Case study specific Stakeholder Engagement Plans~~PART III: Case study specific Stakeholder Engagement Plans~~: presents the individual CS specific plans for each of the phases, followed by
    (2) Supplementary material: Forms, templates and guidelines~~Supplementary material: Forms, templates and guidelines~~.

Hyperlinks in the document shall help the reader navigate this report with greater ease. **For the most condensed overview of the SHE process results (20 pages) read the following chapter: Adapting to SH needs~~Adapting to SH needs~~.**

PART I: Stakeholder Engagement Process in NXG

Sustainability sciences aspire to include perspectives that go beyond those of involved scientists and are, therefore, strongly related to transdisciplinarity and transdisciplinary research. Transdisciplinary research is "*a facilitated process of mutual learning between science and society that relates a targeted multidisciplinary or interdisciplinary research process and a multi-stakeholder discourse for developing socially robust orientations about a specific real-world issue (either a problem or a case)"* (Scholz and Steiner 2015). This multi-SH discourse often results in participatory processes which may pursue (1) top-down means of communication through information-sharing and consultation of opinions and/or (2) bottom-up modes such as deliberations, co-design, co-production and co-decisions (Mark S. Reed et al. 2018).

Interaction with SHs in transdisciplinary work helps in the creation and exchange of knowledge, supporting capacity as well as consensus building that strives for social transformation (Scholz and Steiner, 2015; Moser, 2016). The participation of SHs can facilitate access to information while increasing the responsiveness of the scientific work that intends to support a transition or transformation (Brombal et al., 2018). However, it is not free of challenges, as there are inherent differences in the interests across the involved people, having to balance aiming for scientific advancements and rigor with obtaining grounded and practical benefits, or between tackling future or immediate needs via long- or short-term views, among others (Moser, 2016).

For a fruitful interaction it is important to have a deeper look at the SHE process. Exploring and organising this process for engagement and participation can facilitate interaction and result in well-informed outcomes (de Vente et al., 2016; Bojovic et al., 2021). This means having insights into the aim or purpose of the engagement, who should be engaged and how, the interest of those being engaged, and the relationships between the SHs that will be engaged.

Stakeholder engagement principles and considerations

Effective SHE is grounded in core principles from international best practices ('Stakeholder Engagement: A Good Practice Handbook for Companies Doing B' n.d.), including: **commitment** (early recognition and action), **integrity** (mutual respect and trust), **respect** (acknowledging rights and values), **transparency** (open and timely communication), **inclusiveness** (broad participation), and **trust** (meaningful dialogue). NXG commits to these principles while remaining adaptable to the varying needs of SHs across different CSs.

Complementing these values, sustainability science and participatory research highlight additional criteria (de Vente et al., 2016; Reed et al., 2014), such as: balanced participant selection, accessible and diverse communication, trust-building, empowering SHs with knowledge and decision-making power, independent facilitation, long-term engagement, and adaptive approaches respecting cultural and contextual differences. Collective management bodies can also help bridge knowledge gaps among SH groups.

Key considerations for SHE include:

- **Time and resources**: Building trust and inclusive engagement is time-intensive and resource-demanding, especially when technical education or broad participation is needed.
- **Managing expectations**: Clear communication on project limits helps prevent unrealistic SH expectations.
- **Ensuring participation**: Cultural norms, internal community conflicts, and power dynamics may hinder participation—local liaison officers can help navigate this.
- **Avoiding SH fatigue**: Repeated engagement without tangible outcomes leads to disillusionment. This can be mitigated by setting realistic expectations, avoiding empty promises, and ensuring SH feedback is acknowledged and integrated.

NXG Stakeholder engagement process

Following ProClim (1997), Brandt et al. (2013), Bojovic et al. (2021), and IAP2 (2018) we understand SHE as a co-creation of knowledge (three types of knowledge: system, target, transformation) in three phases (co-exploration to start engaging SHs, co-design to further involve them, and co-development to empower them) and six different ways (information, consultation, involvement, collaboration, and empowerment).

NXG aimed at co-creating knowledge with SHs. To create this knowledge the connection with SH varied in aim and form, but mainly followed three steps with different phases (IAP2 2018; Bojovic et al. 2021) (Figure 6~~Figure 6~~):

1. Co-exploration: Information phase – Aimed at exploring the context and raising awareness of SHs.
2. Co-design: Consultation and involvement phases – Aimed at a knowledge exchange in which SHs are asked for input and feedback (consultation) as well as to discuss on certain topics of interest (involvement) to enable understanding of their concerns and aspirations.
3. Co-development: Collaboration and empowerment phases – Aimed at a co-development of solutions (transformation pathways) based on co-decision (collaboration) and sometimes empowerment in which SHs own the decision-making process.

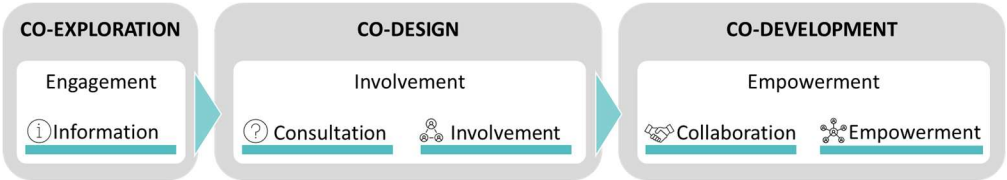


Figure 6: Co-Creation process. Based on IAP2 (2018) and Bojovic et al. (2021)

A transdisciplinary setting allows engaging with SHs, throughout the abovementioned phases, to identify and define current problems and work on solutions (e.g., Brandt et al. 2013). To fulfil this task, it is necessary to create knowledge, and, thus, it is important to clarify which knowledge will be created and how this links to the interaction with SHs.

In NXG we structured the co-created knowledge in three types (ProClim 1997):

- System knowledge: knowledge about the current state of the real-world situation and its context
- Target knowledge: knowledge about the desired target state
- Transformation knowledge: knowledge about the pathways from the current to the target state

Regarding how these knowledge types related with the co-creation phases, Brandt et al. (2013) noticed a weak but existing link between the three knowledge types and the different ways of engaging SHs (Figure 7~~Figure 7~~). In general, system knowledge can be created from all the phases of engagement – especially between consultation and collaboration –, whereas the transformation knowledge mainly derives from the last phase (Brandt et al., 2013).

Additionally, it is likely that not all SHs are involved in all phases, as several or even all might be informed but not all will engage in collaboration or empowerment. The distribution of the SHs across these engagement phases depends on the aim of the engagement, the type of SHs, their interest, and their relationships with each other and with the project. Thus, it might differ across phases and CSs.

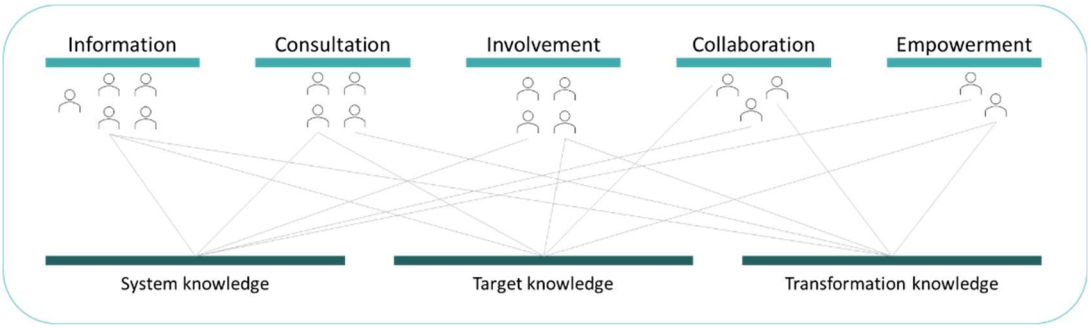


Figure 7: Phases of co-creation and their relation to knowledge generated. Modified from Brandt et al. (2013).

To allow for adaptive management, NXG follows a 5-step SHE process that is repeated every 12 months (i.e. month 12, month 24 and month 36 of the project) (Figure 4~~Figure 4~~ and Figure 5~~Figure 5~~):

- **Step 1** is the definition of the SHE aim to ensure a clear process and allow defining expectations and communicating to the SHs their role in the co-creation process.
- **Step 2**, SH analysis, starts with the identification of who should be involved when, where and how (e.g., SH 1 should be informed, whereas there should be close collaboration to empower SH 2) by classifying SHs and analysing their relationship to the project, as well as to each other.
- **Step 3**, SHE plan, assesses the SH's interest to identify incentives and benefits that can drive their engagement in the project.
- **Step 4**, SH management and sustainment, determines how to maintain this interest and engagement of the SH throughout the duration of the project and how to sustain the SH's engagement beyond the lifetime of the project.
- **Step 5** aims at evaluating the participatory process and its effects on the project, as well as on the CS's objectives.

We describe below how each of the steps were designed.

Step 1: Stakeholder engagement aims

The first step of the SHE process was to define clear aims for the engagement, to give sense and frame the entire process. Before setting these aims, it is important to differentiate between the aims and points of views of the researchers in the project on the one hand (top-down) and the SHs' perspectives on the other hand (bottom-up), with the CS-Leads acting as hinge between these two. This distinction is important for a clear communication, as there are two types of messages to be delivered: (a) general message delivered from the project's point of view (top-down), and (b) CS-specific messages related to each context (bottom-up). Whereas work within WP5 focuses on the case-specific bottom-up view, communication efforts in WP6 extend towards the top-down aims.

In NXG, aims were defined (a) by CS leads in the early stages of the project, where they were asked to define these aims in line with the three types of knowledge (system, target and transformation), based on their perspectives and contextual insights on the CS's situation, (b) by SHs towards the middle of the project (WS3), and (c) by CS leads after the 2nd General Assembly meeting in case a shift in the aims was needed for the second half of the project.

Step 2: Stakeholder analysis

In a second step, a SH analysis was carried out. In NXG, this analysis included three sub-steps, following Reed et al. (2009): (a) SH identification, (b) SH categorisation and differentiation, and (c) SH relationships (Figure 8~~Figure 8~~).

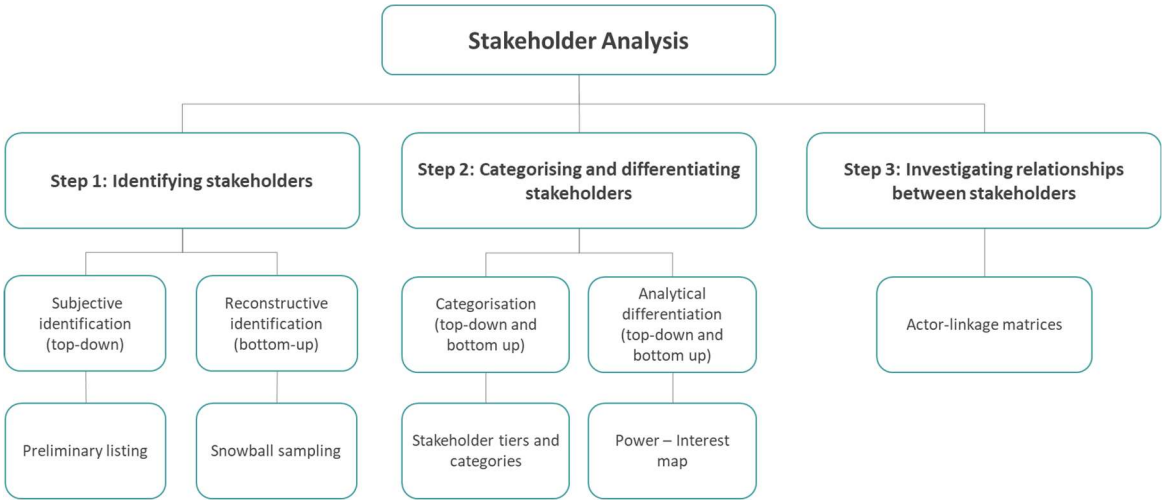


Figure 8: Stakeholder analysis sub-steps based on Reed et al. (2009) indicating chosen methods.

Identification

To start the SHE process, SH identification is key. It is primarily a process of listing, collecting, and storing basic information about people, entities or organisations that are affected by or affect the project. This enables the continuation of the SHE process as it allows identifying the aim and type of connection with the SHs, i.e., who should be involved when, where and how. In NXG the listing of SHs was referred to as "SH register".

The SH register was regularly revised and updated throughout the duration of the project, to include changes in the number and categorisation of SHs. This was carried out every twelve months in the preparation of the new SHE plans. There can be an interdependent relation between defining the aim and identifying relevant SHs, as SHs are identified according to the aim, but they can also help defining the aim. Hence, the importance of a regular update of the register for this iterative process It is important to mention that a strong iteration is possible at the beginning of the project, but the aim should be set at the earliest stage possible with as little few changes as possible throughout the duration of the project. Nonetheless, if changes to the aim changes need to occur, because the context has shifted or new needs arise, this needs to be accounted for and made transparent.

In NXG, the SH information was organised and stored in a SH register drawn up as an Excel document for each of the CSs that included (but is not limited to[1]) the following data items collected for each identified SH:

- Last name of SH
- First name of SH
- Designation
- Organisation
- Role in Project
- E-mail
- Type of SH (Tier 1, 2 or 3 – see next section)
- Expectations (or also potential driving factors)
- Level of power*
- Level of interest*

*More details about the levels of power and interest in the sub-section “Stakeholder differentiation and categorisation”.

The SH register was placed in the consortium’s shared data platform and is only intended for internal use. Consent to be placed included in the SH register was actively sought from each of the SHs by CS-Leads (see Annex 1: Privacy Policy Consent Form). In accordance with NXG’s MS6 SH data and information was collected, stored, analysed and archived in line with EU GDPR (see also Avellán et al, 2025). The Data Officer contacts were presented to each SH after successfully completing the registration process. All consortium members interacting with SHs (by collecting the data) were to follow these rules and were solely responsible for any misconduct. No specific SH management or SH relationship management tool was used. Tracking of interactions with SHs was the responsibility of the consortium member interacting with those SHs. Reporting about issues was done through the respective grievance channels set up within the project.

The registration of SHs from a project’ perspective was carried out by the CS-Leads in a two-stage process:

[1] Additional columns for SH differentiation and categorisation may include e.g., WEFE sectors, SH’s expertise (strategic or technical knowledge).

- First stage: SHs were preliminary 'placed' in one of the categories based on the subjective perception of the consortium member (CS-Leads and their teams) that suggested this actor to be a relevant SH.
- Second stage: Listed SHs were contacted to help identify new SHs.

A final SH register, and categorisation was compiled by comparing and combining the results of both stages. This list was revised and updated throughout the duration of the project (every 12 months in preparation of the new SHE plan).

Categorisation and differentiation

Stakeholder tiers and categories

The categorisation and differentiation of SHs helps characterising the SH landscape to prioritise and determine which SH will be engaged how in the engagement phases and how they will be engaged. In NXG, a first categorisation was done in three broad tiers:

- **Tier 1**: This tier includes SHs that were **directly engaged in the project implementation and/or outcomes** and were strongly case-specific (e.g., representatives of the local municipality, civil society organisations -CSOs-). SHs potentially collaborated (they might be informed or consulted only) in the processes of development of the models and NEPAT, and analysis and validation of policy suggestions.

- **Tier 2**: This tier included SHs with an **interest in the application of project results and products**. A wider constellation of interested SHs (e.g., local government, European policy departments -EC DGs-, SHs in different basins) who wish to utilise the NXG engine may be engaged.

- **Tier 3**: This tier included SHs with a **general interest in the project**. This was a wide group of SHs for the dissemination of outcomes which included neighbouring basin or country authorities, business or private enterprises, and national planning agencies.

These tiers formed the basic characterisation of SHs within the SH register. We further defined how these tiers related to the different levels of engagement. Tier 1 included SHs that can be part of all phases of the engagement depending on their interest, whereas tiers 2 and 3 were probably more likely to be informed only.

The SH in the tiers described above can be further categorised (Figure 9~~Figure 9~~). These categories help consortium members to 'think outside the box' or beyond the 'usual suspects', thus allowing expansion of SH identification. For an initial identification, the focus was set on further specifying SHs from tier 1, with some hints on tiers 2 and 3, but in principle, all SH categories were found across all tiers. Annex 2: Stakeholder Tiers and Categories~~Annex 2: Stakeholder Tiers and Categories~~ presents the categories, a brief description, and some examples. These categories were suggested to the CS-Leads for the identification but are not limiting and CS-Leads were encouraged to include other categories as well.

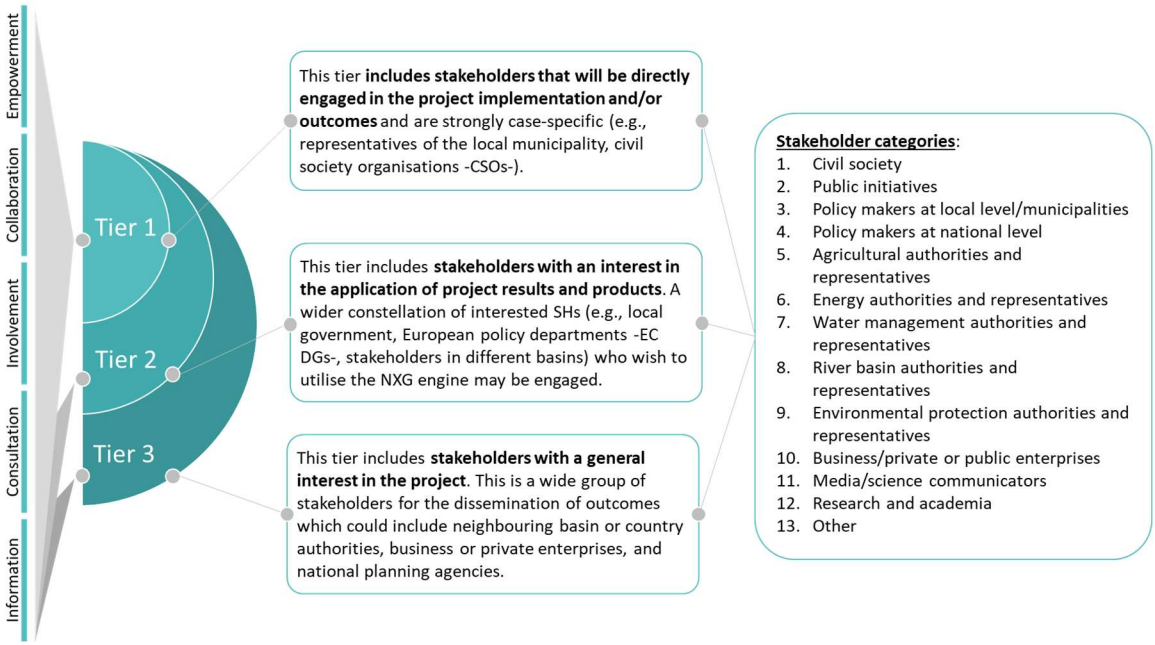


Figure 9: Overview of stakeholder tiers and categories

Power-Interest Maps

After differentiating SHs based on their type of engagement (tiers) and activity (categories), there are other categorisation methods that can lead towards a prioritisation of SHs for their engagement in the project, such as power – interest maps (also known as influence – interest maps) (Reed et al. 2009). Here, **power** is understood as the ability of the SH to change or stop the achievement of the CS's aim, whereas **interest** is the amount of involvement the SH has in the CS, namely the size of the overlap between the SH's and the CS's needs.

In a first step, the CS-Leads provided their own (preliminary) assessment of the level of interest and power of each SH on a scale from 0 to +10 based on their own perception (with 0 representing low and +10 high power or interest). This categorisation helped classifying SHs into four categories (Figure 10~~Figure 10~~): (i) Low interest – High power, (ii) High interest – High power, (iii) High interest – Low power, and (iv) Low interest – Low power. This categorisation was intended to identify key players (e.g., High interest – High power) to develop targeted communication and engagement strategies that reduce SH fatigue by adjusting to the particular needs of the SH.

In addition to the perception of CS-leads, SHs themselves were asked to place themselves in a category when filling out the Privacy Policy Consent form (see Annex 1: Privacy Policy Consent Form). This complemented the preliminary listing and data collection and provided important insight into the different levels of perceptions.

This categorization was intended to inform the communication strategy and all other WPs. It also helped identify key players that may play a leading role in delivering the anticipated outcomes in D6.11 Policy Impact Strategy.

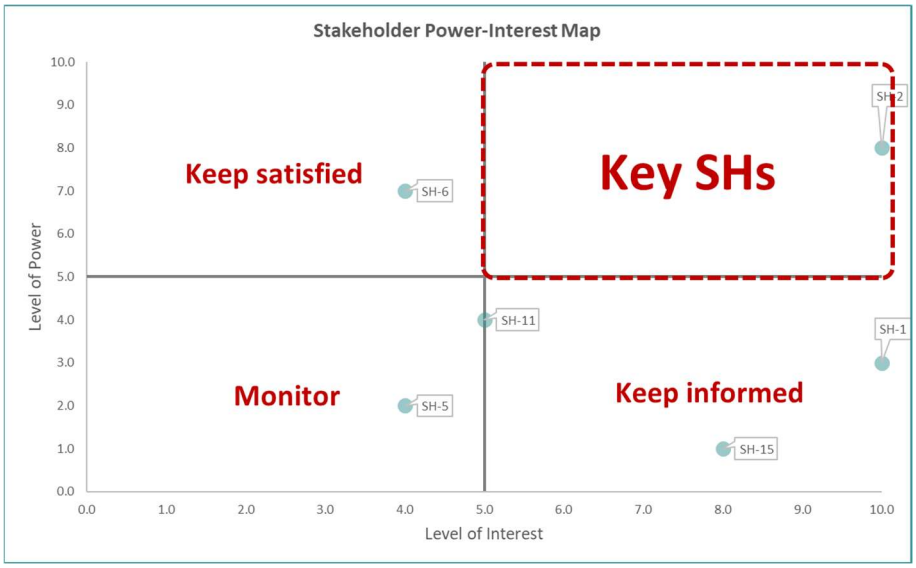


Figure 10: Example of Power-Interest map and the main actions to consider for the stakeholders in each quadrant.

Relationships between stakeholders

A rather practical and easy-to-implement method to identify relationships among SHs is an actor-linkage matrix (Reed et al., 2009). The SHs are listed in the first column and row of a matrix and relationships are identified between pairs of SHs. Table 2~~Table 2~~ indicates the types of relationships identified and the respective generic examples.

Table 2: Type of relationships identified in the actor-linkage matrix

Type of relationship between SHs	Description	Illustrative example
Conflict (Cf)	There is a trade-off in the fulfilment of the interests/aims of these SHs.	*Interest of energy authority on water allocation is in conflict with the environmental protection authority - hampering an agreement.*
Complementary (Cm)	The fulfilment of one SH's interests/aims enables or enhances the fulfilment of the second SH's interests/aims.	*An agricultural private sector company requires that the water management authority considers their water supply needs in the water allocation plans. While it is the aim of the authority to map all the needs.*
Cooperation (Cp)	These SHs work together for the fulfilment of common interests/aims.	*A civil society organisation works with the river basin authority in gathering water quality data.*
Non-existent (NE)	These SHs have no relationship.	*A civil society organisation that belongs to one country (administrative area) and whose work/interests/aims do not connect/relate to a SH in another country (administrative area).*

The categorisation of relationships revolved around the capacity of SHs to develop or achieve aligned policies and agreements. This is one of the SHE aims related to co-producing transformation knowledge.

To identify relationships, the CS-Leads followed the next steps:

1. List the SHs that consented in the first column of the matrix (the template generated the additional columns automatically).
2. Go through the matrix, starting with the first row of the first column, indicating whether CS leads perceived the pair of SHs being compared as having an interaction of conflict (CF), complementarity (CM), or cooperation (CP), or even non-existing (NE), in the development or achievement of aligned policies and agreements.
3. Fill only half of the matrix (bottom-right half) as no directionality was considered in the relationships. This means that the relationship from SH1 with SH2 is assumed to be the same as the relationship from SH2 with SH1.

The results of this matrix helped identifying a focus of the CS SHE plan, e.g., creating relationships if there was a majority of NE relationships, reducing conflicts by building or increasing trust, enhancing cooperation by connecting SHs with each other.

Overview of the stakeholder analysis process

Overall, there is a cyclic character within the activities involved in the SH analysis, as shown in Figure 11~~Figure 11~~: (1) CS-Leads determined the aim of the SHE; (2) CS-Leads listed SHs known to them that are relevant for the aim; (3) CS-Leads classified SHs according to the defined tiers and categories, thought about and added to the list the "unusual suspects" that might be relevant, and added their perceived SHs' level of power and interest; and (4) CS-Leads contacted SHs of the SH list and asked for their consent to be formally added to the register and engaged in the project. These SHs then were asked to identify additional potential SHs.

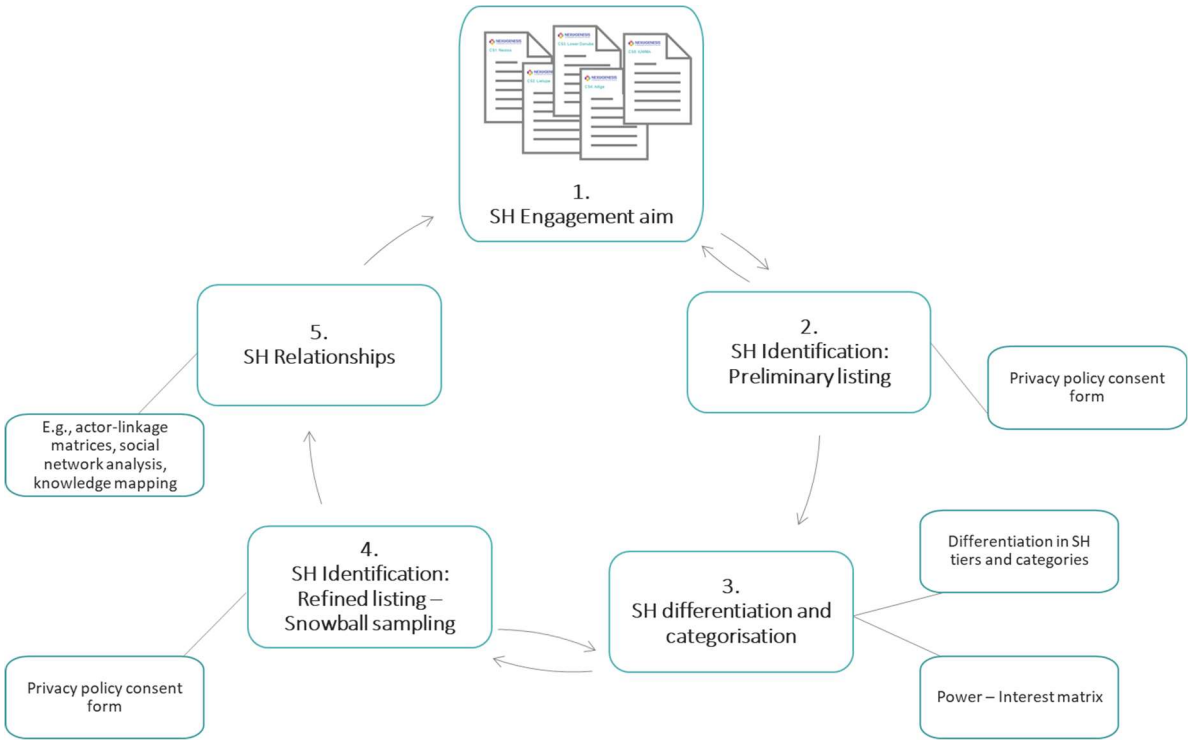


Figure 11: Process followed to carry out the stakeholder analysis

It is important to highlight the iterative character of SH analysis. It becomes especially relevant for the determination of the SHE aim, because as more SHs are identified and contacted, new

views on the initial problematic arise, maybe supporting slight modifications of the aim. Likewise, the more CS-Leads get to interact with the SHs the easier it becomes to e.g., identify a more accurate level of interest. Subsequently, the mapping can vary. This then supports the idea that the SH analysis is an ongoing process, that requires regular updates and fine-tuning.

Step 3: Stakeholder engagement plans

Stakeholder engagement plan aims and structure

The overall aim of the SHE plans was to outline activities of SHE that help achieve the aims of each of the CSs in line with the activities, outputs, outcomes and impacts of the NXG project. The plans set out a strategy and provided rough guidelines for which SH to involve in which process and why. This allowed for better transparency in the selection of involved SHs while maintaining inclusiveness but also enhancing commitment without overburdening SHs.

The key objectives of this plan were as follows:

- Obtain an oversight and collect relevant information of SHs and SH groups related to the CS aims (internal and external);
- Help identify SHs and SH groups that are relevant to either of the societal goals;
- Help identify SHs and SH groups that can maximize scientific impact;
- Inform other WPs on the most effective means through which to disseminate project information, and to ensure regular, accessible, transparent and appropriate consultation and co-decision as deemed fit;
- Outline a SHE process that provides SHs with an opportunity to influence product design and policy recommendations;
- Define roles and responsibilities for the implementation of the plan; and
- Align with the project's reporting and monitoring measures to ensure the effectiveness of the SHE process and periodical reviews of the plan based on findings.

Based on the information collected through the SH analysis and the evaluation (see step 5) recommendations for activities of engagement were created. An overview table of who should be involved in which phase of the engagement process, to foster what type of engagement, and how, was developed for each plan (Table 3~~Table 3~~). The content of the plan was adapted to the needs, aims and co-creation mode of each CS. (NOTE: while the individual plans are explained in detail in Part III, the *changes* to these plans are also shown in Part II, under the SH management section, to make them easier to understand)

Table 3: Example of the overview table of the main component in stakeholder engagement process (P=Power; I=Interest)

	Co-exploration	**Co-design**		**Co-development**	
	Information	**Consultation**	**Involvement**	**Collaboration**	**Empowerment**
WHO?	All categories should be properly informed	E.g., civil society, public initiatives, businesses, authorities, media	E.g., civil society, public initiatives, authorities	E.g., authorities and policymakers	E.g., authorities; and e.g., civil society, small enterprises

WHY?	E.g., Low PI	E.g., Low to medium PI	E.g., Medium PI	E.g., Medium to high PI	E.g., High PI and medium to low P with high I
WHAT?	E.g., Informing about results on held meetings and WS	E.g., Consult about perception of trust context	E.g., Involve in framing trust problems	E.g., Engage in framing the problem and developing solution pathways	E.g., Engage in framing and finding solution pathways by themselves
HOW?	E.g., emails, newsletter, first workshop (WS1[1])	E.g., surveys, workshops	E.g., surveys, focus groups, interviews	E.g., focus groups, interviews, workshops, signing commitment documents	E.g., focus groups, workshops, training/capacity building

To better structure the plans in a manner that allowed characterising each CS but also raising comparative conclusions across them, we used a tool to categorise each of the CSs within the modes of co-creation developed by Chambers et al. (2021). The authors identify 66 dimensions that capture how co-creation processes are approached (8), designed (16) and implemented (11), supported by certain capacities (3), and pursue (14) and produce (14) particular outcomes. Each of the dimensions is standardised on a Likert scale from 1 to 7, with 1 generally describing a low and 7 a high degree of manifestation. Of these 66 dimensions, the 8 describing different approaches to co-creation are at the centre of the evaluation framework. Depending on their degree of manifestation in a co-creation process, they yield 6 different 'typical' modes of co-creation which in turn are to varying degrees positively or negatively co-related to the remaining dimensions, namely:

1. **Researching solutions**: Focus on co-creating knowledge to guide decision-making, influencing policies and future interventions.
2. **Empowering voices**: Explicit focus on empowering SHs and address a bigger social diversity.
3. **Brokering power**: Focus on engaging powerful SHs and fostering dialogue to direct policies and management actions rather than co-creating knowledge.
4. **Reframing power**: Main interest on engaging all SHs to shift power dynamics, practices, and policies through reframing current narratives.
5. **Navigating differences**: Focus on relating together with and among SHs, learning and empowerment.
6. **Reframing agency**: Focus on creating spaces to work on collective agency, relating together and reframing the problems.

Their clustering results from the combination of scoring the level of alignment of eight different approaches for four themes of knowledge co-creation (purpose, power, politics, and pathways) (Table 4~~Table 4~~).

[1] For further indications on workshops, a workshop checklist was developed for NXG, based on previous experiences and input of consortium members.

Table 4: Overview of co-creation themes and approaches according to Chambers et al. (2021)

Theme	Approach	Description
Purpose *Why do stakeholders co-create?*	Solve problems	Focus on how solutions should be designed and implemented for problems that are defined on at an early stage.
	Reframe problems	Focus on facilitating a reframing of views on problems and solutions.
Power *How is human agency conceptualised?*	Shape direct agency	Focus on changing behaviours of SHs directly linked to the CSs' WEFE nexus situations.
	Shape systemic agency	Focus on challenging existing paradigms and goals at higher governance levels related to the CSs' WEFE situations.
Politics *How are power relations changed?*	Influence powerful actors	Focus on engaging powerful SHs to change their power over marginalised SHs.
	Empower marginalized actors	Focus on engaging marginalised SHs to shift power relations with powerful SHs.
Pathways *How are impacts catalysed?*	Produce knowledge	Focus on creation and transfer of scientific knowledge products to generate impacts.
	Relate together	Focus on relating and doing together with and among SHs to create space for outcomes.

In NXG, we used this approach and the associated scoring framework by asking CS-Leads to score how far they considered that each approach fit the aims, context, and challenges of the CS. This exercise was carried out with CS leads towards the beginning, middle and end of the project by filling in a template (Annex 5: Template for assessing the modes of co-creation~~Annex 5: Template for assessing the modes of co-creation~~) and a subsequent interview. At the same time, the SHs views on which mode of co-creation they would desire was carried out through WS activities in the middle (WS3) and end (WS6) of the project. More information on this can also be found in Step 5: Stakeholder engagement evaluation~~Step 5: Stakeholder engagement evaluation~~. In Part II of this deliverable, we show the changes in perceived and desired modes of co-creation by CS leads and/or SHs throughout time.

Main stakeholder engagement activities - Workshops and workshop modalities

Throughout the duration of the NXG project, the main activities for SHE were defined for all CSs (see Figure 10 in Milestone 2: Roadmap). These activities are briefly summarized as follows:

1. **Six SH engagement WS (see more information below)**
   The aim of the WSs was to create a consistent and iterative framework where SHs were presented with the newest findings, asked for their feedback on outputs and products, and lastly supported in the development of a joint agreement.

2. **Perception Surveys and Surveys**
   Distributed surveys to capture SH views on governance, WEFE linkages, and policy priorities.
3. **Semi-Structured SH Interviews**
   In-depth interviews to explore governance settings, power dynamics, barriers to coherence, and capacities.
4. **SH Feedback on Simulation Outputs**
   Interactive interpretation of conceptual models, system dynamics structure and outputs, NEPAT results and WEFE indicators with SHs to test assumptions and adjust scenarios.
5. **Participatory Development of Policy Packages**
   Collaborative design of integrated policy mixes, drawing on SH experience, feasibility insights, and trade-off discussions.
6. **Co-Development of Governance Roadmaps**
   Participatory process to design implementation pathways, institutional roles, and timelines for policy action.
7. **Negotiation and drafting of SH agreements**
   Joint creation of formalized agreements or commitments to action among SHs, rooted in project findings.
8. **SH Involvement in Upscaling and Replication Discussions**
   Dialogue on how project approaches could be transferred or scaled, with SH input on conditions for success.

NXG carried out six WSs with SHs throughout the duration of the project (Table 5~~Table 5~~). As these WS present a significant element of SHE an internal document at the beginning of the project that outlined common strategies for carrying these out was developed. A large portion of this guideline can be found in Annex 6: Workshop guidelines~~Annex 6: Workshop guidelines~~.

The WS intended to fulfil different aims throughout the project to service co-creating knowledge towards transformative change (Table 5~~Table 5~~). While the aims were in general pre-defined at the beginning of the project, a co-creative consortium-wide approach was followed to allow for the integration of specific needs, either from the technical partners or the CS. In this way, particular needs were addressed to service the project, scientific and CS related needs through adaptive management (see also Content and programme of the workshop~~Content and programme of the workshop~~ in Annex 6).

Table 5: Aims of NXG workshops as per Milestone 5 report (MS5)

Task	Aim	Month (M)
Workshop 1	The aim of workshop 1 is to **start the SHE process and trust building**. This workshop is relevant for WPs 1-6. During the workshop, project expectations, initial policy, and governance system capacity to support WEFE nexus will be analysed and SHs' perspectives, preferences (WP1) will be debated. Also, initial data and available models will be discussed (WP2), the WEFE footprint idea will be presented (WP3), data management plan (WP4) and CS communication strategy (WP5) will be outlined. Finally, plans for communication, dissemination, and outreach (WP6) will be presented.	M7-9

Task	Aim	Month (M)
Workshop 2	**This workshop will focus on Task 1.2 of WP1** (round 1 of nexus governance and policy assessment) **and Tasks 3.1 and 3.5 of WP3**. SH policy preferences, desired future directions and policy gaps will be discussed (WP1). A draft conceptual model will be presented and debated (WP3) and there will also be discussion on the WEFE nexus indicators, where SHs will be asked to provide weighting for different indicators.	M12-14
Workshop 3	This workshop will be **devoted to WP1** (Task 1.4 and round 2 of nexus governance and policy assessment Task 1.2), **and WP 3** (2.2. and 2.3) **needs**. First, draft policy packages will be discussed, refined, and finalised (WP1). Second, biophysical, and socioeconomic modelling results will be presented to SHs, and their inputs will be gathered (WP2).	M20-22
Workshop 4	During this workshop, **the final WEFE nexus footprint will be presented and discussed** (WP3). In addition, visualisation needs of SH, as well as translation of policy packages to technical requirements will be addressed (WP4).	M27-29
Workshop 5	In this workshop, **WP1 will discuss with SHs the results of trade-offs and synergies mapping**, focusing on (un)acceptable & non-negotiable policies, as well as compensation measures to manage the trade-offs. Moreover, the **results of complexity science (WP3) and 1st SLNAE/NEPAT run results (WP4) will be presented**, to enable validation by SHs and revision of policy packages. Exploitation of the project results will also be discussed (WP6). Followers will validate the policy packages, while front runners will provide input to adjust the policy packages for a second run of the SLNAE/NEPAT.	M37-40
Workshop 6	This workshop will **focus on WP1 and WP4 work**. The results of the 2nd SLNAE/NEPAT run results for the frontrunner CS will be presented and their policy packages will be validated with the SHs. River contract and governance and roadmap will be discussed and validated in all CS workshops.	M45-47

NXG used a variety of WS formats ranging from fully online through hybrid approaches and face-to-face settings (a full overview of dates, locations and modalities can be found in Annex 7: Overview of workshop participation~~Annex 7: Overview of workshop participation~~). The choice of the format was based on the needs of the CSs in the different phases of the project (see advantages and disadvantages of each modality in Table 6~~Table 6~~). Rather information sharing driven or consultative type WS needs, for instance in WSs 1 and 4, took place mostly online or in a hybrid form. The aim here was to reach a large number and broad range of SHs. Other WSs that focused more on co-creation of knowledge and engagement, such as WSs 2, 3, 5 and 6, took place mostly in face-to-face or hybrid settings, often also in more than one location and, if needed, with translation, to allow for the diverse sets of SHs to come together and learn from each other. This was, for instance, the case for WSs 2, 3 and 5 for CS 1 of the Nestos/Mesta River basin, where the CS team organized two separate events on each side of the border in Greece and Bulgaria, and two 'international' events to bring both sides together.

Table 6: Characteristics of workshop modalities

Face-to-Face	Online	Hybrid
Advantages: - Tends to provide a closer environment to build trust and basic familiarity with other stakeholders (i.e., breaks offer an opportunity for professional networking, knowledge exchange, building personal connections that opens doors). - Facilitates dialogue between sessions.	Advantages: - Allows more participation, including partial participation. - Easier to record and digitally track participants as well as their comments (e.g., chat). - Enables participation of stakeholders who cannot travel to on-site venues due to constraints around distance, time, budget, transportation options, mobility (e.g., especially in transboundary cases and river basins with a large geographic area). - Can allow for multiple workshops on the same topic to be held on the same day, offering more opportunities for participation according to stakeholder schedules (e.g., a morning session and an afternoon session)	Advantages: - Tends to provide a closer environment to build trust. - Facilitates dialogue between sessions. - Flexibility for attendees to still participate online if their planned in-person availability changes unexpectedly on short notice and travel is no longer possible. - Inclusive for stakeholders with different participation preferences.
Disadvantages: - Increased preparation requirements (e.g., catering, accommodation, travelling tickets), finding an appropriate (e.g., neutral) and accessible venue for participants travelling a distance to attend, facilities that can suit workshop environment). - Reduced workshop length especially for transboundary cases (e.g., limitations to overnight trips for multi-day workshops) and may restrict participation based on visa application requirements .	Disadvantages: - Does not facilitate further interaction between participants. - Allows multi-tasking, thus participants may not be paying full attention. - (Access to) Stable internet connection is a limiting participation factor for certain stakeholders (or even the understanding of or ability to use virtual tools) - In the absence of participants' comments during discussions sessions, generally unable to gauge participants' interest and	Disadvantages: - Increased preparation requirements, especially for the coordination between both modalities (e.g., ensuring equal participation opportunities of people on site and in online platform). - Requires sufficient technical capacity (e.g., speakers for in-person attendees to hear the contributions of online participants and microphones for online participants to hear the contributions of in-person participants)

	understanding of material, validation of results, etc.	

Step 4: Stakeholder management and sustainment

Stakeholder management

SH management is strongly linked to SHE and pursues the main purpose of reducing the risk of SH fatigue and maximizing the gains of SHE for the project outcomes. While for SHE the type of SHs to be engaged is more relevant and thus the SH categorization is useful, SH management relies more strongly on making use of the understanding of the SH's interests and their perceived need to be engaged.

The Power-Interest analysis gives a good indication about which key SHs to take particular care of. Also, along with asking the SHs for their consent of being formally included in the SH register expectations, they were asked to provide their expectations of the project. The SH management and sustainment considered these expectations and tried to fulfil or maintain them in time. An overview of the most common interests and aims of engagement mentioned by SHs is found below:

1. Policy Design and Implementation • Development of evidence-based and targeted policy measures • Application and exploitation of decision support tools (NEPAT) to support planning and implementation • High-level uptake of project results
2. Integrated Resource and Ecosystem Management • Improved water use and resource management • Adoption of integrated and climate-resilient resource management approaches • Protection and integrated management of ecosystems
3. Nexus Understanding and Monitoring • Quantification and analysis of interlinkages across the WEFE nexus • Improved monitoring through specific indicators
4. Cross-Sectoral and Transboundary Collaboration • Promotion of cross-sectoral cooperation • Strengthening transboundary collaboration and coordination mechanisms
5. SH Participation and Awareness • Enhancing awareness and social inclusion • Development of local coalitions to support decision-making
6. Institutional and Governance Arrangements • Interest in institutional development or establishment of specialized authorities • Building capacity for coordinated governance
7. Risk and Conflict Management • Flood risk management and protection • Addressing conflicts between competing resource uses
8. Knowledge Acquisition and Project Familiarity • General knowledge acquisition • Understanding the project's scope, goals, and scientific basis

The SH management sections of the SHE plans looked at and compared the types of SHE activities suggested from the plans of the previous year with those of the current or new year. This allowed looking at changes in management that were due to changes in context, aims or aspects of SHE that arose in the respective CS.

Stakeholder sustainment

At the end of a project interactions often cease, and collaborative actions stop. Engaged SHs often tend to disengage as it is unclear to them how future engagement with the project team will be possible. NXG is not immune to this reality but tried to implement sustainment strategies

to provide SH with (1) the knowledge base produced and (2) a set of targeted contact points for further interaction. First and foremost NXG intends to develop tools that are useful to support integrated management across the WEFE sectors that is sustainable.

Thus, in NXG a proactive approach was taken to SH sustainment and from mid-project onwards (WS3) SHs were actively asked to brainstorm, think and come up with a post-project plan of SHE sustainment. The main aim here was for SHs to find existing platforms, for a and networks which could benefit from nexus thinking. The exercise of thinking about SH sustainment was repeated at every WS that took place from then on.

In addition, the following set of actions are foreseen or were carried out to provide SHs with interactions points and the possibility to sustain their interest:

1) The NXG project website remains running and is maintained providing information about specific innovations (products and services) and links to relevant people and/or organisations.
2) Innovations proposed are taken up for commercialisation or administration by SHs including authorities or external companies, ideally before the project ends or shortly after the project ends.
3) For each CS one or more governance roadmaps are developed describing specific actions and responsibilities for the implementation of the UVPP and/or local actions after the project is finished. This also includes continued work with stakeholders to further develop the roadmaps to uncover (and create) new opportunities for engaging in ongoing and upcoming policy processes (that were not previously identified), which could make use of the project's outputs and results.
4) A user guide and a teaching guide is developed for the further use of the NEPAT both for general users but also for students in higher education institutions.
5) Some of the consortium members will explore opportunities to get engaged in new (HORIZON Europe) projects in order to further advance NXG solutions or to apply the solutions in other sectors.
6) Inviting stakeholders to be part of further development of scientific outputs, for example, as co-authors of planned journal articles for which they contributed knowledge.

In general, NXG focuses on creating a sense of ownership for CS SHs about the project and its results. By co-creating the project in a transdisciplinary manner, the basis for sustainment is created throughout the project and not just at the end.

Step 5: Stakeholder engagement evaluation

The final step of the SHE process cycle is to evaluate the quality of the engagement process carried out. The aim of the evaluation process was to provide the CS leads and the consortium with a continuous feedback loop to capture the needs and wants of the SHs and maximize co-creation of knowledge across the project members. As such both process quality itself as well as process output quality was assessed through surveys and WS activities. The evaluation of the SHE process builds on Chambers et al. (2021). The framework was chosen for the evaluation for three main reasons:

- The framework is exhaustive, in the sense that it sheds light on both process quality as well as outcomes;

- The quantitative nature of the framework simplifies comparisons within and across the CSs of the project, and;
- It provides a heuristic tool for CSs, illustrating the trade-offs linked to the various modes of co-production they pursue.

Specifically, we developed a survey based on the dimensions of a co-creation process of this framework. Generally, we adopted the Likert scale of the original framework but simplified the language where necessary to make it amenable to a non-academic audience. However, for the purposes of the evaluation, we initially reduced the number of the dimensions we included into the survey from 66 to 24 (see Annex 3: Survey for the Stakeholder Engagement Evaluation (WS 1 & 2)~~Annex 3: Survey for the Stakeholder Engagement Evaluation (WS 1 & 2)~~). Through the remaining dimensions respondents were asked to share their perceptions of the current level of conflict and solidarity, respectively (2), rate the importance and degree of met expectations of intended outcomes (14), and identify their preferred degree of manifestation of the approaches to co-creation (8). The other dimensions either refer to facts (e.g. project budget) rather than preferences, or responses were determined to be of little added value to the evaluation (e.g. in a trial run, respondents rated all 11 dimensions referring to the way co-creation is implemented with '7s', not differentiating between them).

At or after the first or second WS (depending on the CS), the first iteration of the survey was distributed to SHs and contained the abovementioned 24 dimensions. CSs were given the option to either provide a link to SHs to an online surveying platform (EUSurvey) or distribute a paper-based version and record the answers electronically later. This iteration of the survey was to set a baseline regarding the expectations and preferences of SHs at the beginning of the project.

This initial version of the survey only yielded rudimentary results and therefore limited insights into the SHE process. The response rate to the survey was low, with feedback from SHs indicating an overly complex survey as being an issue. Thus, towards the end of 2022 and in early 2023, a new strategy was developed between WP5 and the CS-leads (see an overview of which kind of evaluation was carried out at which WS in Figure 12~~Figure 12~~). This resulted in a revised survey (see Annex 4: Survey for the Stakeholder Engagement Evaluation (WS 3, 5/6)~~Annex 4: Survey for the Stakeholder Engagement Evaluation (WS 3, 5/6)~~), which was henceforth distributed at the end of WSs 3, 5 and/or 6 (depending on the CS).

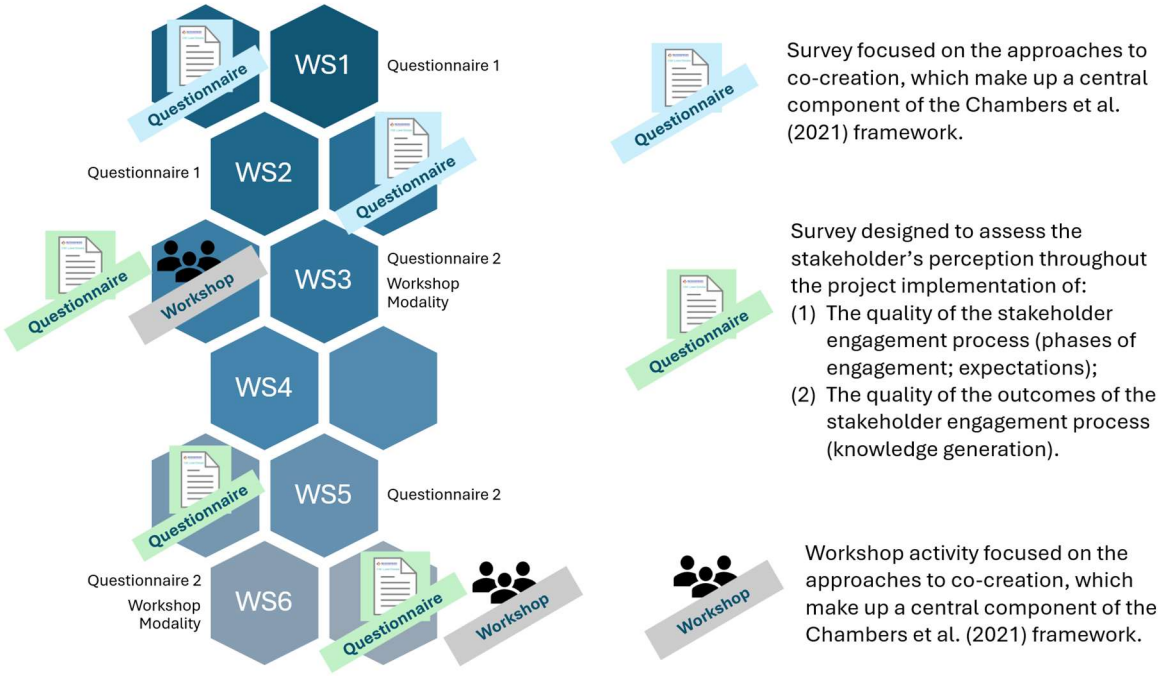


Figure 12: Overview of the type of evaluation that took place at the different workshops and the change in strategy.

In this revised version, questions regarding the approaches to co-creation as well as the level of conflict and solidarity were removed. While the questions regarding the approaches to co-creation were replaced with an in-person activity at the 3rd and 6th WSs (see below), the ones regarding conflict and solidarity were removed due to their potential sensitivity and instead evaluated with the CS-leads based on their experiences. Meanwhile, questions regarding the perceived degree of co-creation and the knowledge gained through a given WS were added. The added questions were supposed to shed light on whether SHs are satisfied with their level of engagement, thus assessing SHE process quality, and whether the WSs helped bring about knowledge gain amongst SHs as intended, hence rather determining process output quality.

Instead of the questions regarding the preferred approaches to co-creation, CSs conducted an activity at the 3rd and 6th WSs. The replacement of survey questions with the in-person activity served the purpose of extracting the most complex parts from the survey to instead elicit this vital information for the evaluation in a dialogue with SHs. The activity included either plenary or break-out group discussions on the (dis)advantages of differentiated foci on the respective approaches to co-creation, eliciting which approaches the respective SHs deemed appropriate (3rd WS) for their CS or what approaches they experienced/would have deemed appropriate (6th WS) in the context of NXG (see the template used to guide the WS activity and a visual example of the material used for this activity at the 3rd WS in the Lielupe CS in Annex 5: Template for assessing the modes of co-creation~~Annex 5: Template for assessing the modes of co-creation~~). The responses from SHs were then juxtaposed with the preferences and experiences of the CS leads to illuminate whether expectations of the SHs and the project team align or differ, and possible adjustments to the co-creation process would need to be made.

In addition to the evaluation process to understand SH needs, a number of learning, feedback and reflection instances across CSs were built into the project or emerged over time that allowed for the adaptation of the SHE plans. As such, the foreseen interviews between WP5

leads and CS leads for the intermediate reports in months 18 and month 36, as well as for the final deliverable D5.7 Recommendations, experience, lessons learned from all CSs, due in month 46, yielded valuable insights that were reflected in the respective SHE plans. Furthermore, two WP1-WP5 three-day reflection WSs were conducted face-to-face in months 29 (in Berlin) and 41 (in Athens) allowed to address issues of SHE but also of knowledge and capacity needs of CS leads as well as of SHs. Reflections from these meetings and interviews, as well as from discussion during the yearly General Assemblies, were included and can be found in the respective CS SHE plans.

The iterative evaluation provided insights into how priorities evolved over the duration of the project (incl. tying any changes to particular WSs) and allowed the project team to align interactions with and between SHs (during and in between WSs) as well as ultimate project outputs better with the expectations of the SHs.

PART II: Stakeholder Engagement across NXG Case Studies and time

This section provides a summary of SHE across all CSs in the early, mid and late engagement phases of the project as well as the final evaluation. It follows the five steps of the SHE plan outlined in the previous section for each phase of the project. This section intends to highlight the main focus of SHE in the different phases of the project (co-exploration, co-design, co-development), showcasing different approaches in the CSs as observed. It provides an overview of the progress throughout time.

What can be observed is:

- **Aims** largely stayed the same throughout the project with slight modifications in some of the cases.
- The **number of identified SHs increased steadily** in the early and mid-phase of the project, plateauing towards the second half of the project. Consent rates varied across CSs and stabilized around 20-30% in most. Female participation was highest in CS2 and 3, low in CS1 and 4, and reached parity in CS5 in the second half of the project. Distribution across sectors was uneven, with generally high participation of water and ecosystems SHs, and low participation of energy and food sector SHs. SHs were largely of high interest. Linkages across SHs varied across CSs, with some, like CS3 exhibiting more conflicting partners than other. Generally, over time, more non-existent relationships were identified as more SHs that have no connections to each other were identified.
- The **engagement plans were tailored towards the phase** and the modes of co-creation. Generally, more information sharing and consultation type activities were suggested in the early phase, whereas involvement became more prominent in the mid-phase. In the late phase, collaboration and empowerment activities were sought to move SHs towards the adoption of the tools.
- The management plans **were adapted on a yearly basis and were tailored to CS specific needs**. Recommendation for WS modalities, for instance became more CS specific as time evolved. Sustainment was actively assessed starting from WS3 and matured towards the end of the project with concrete suggestions in some of the cases, e.g. as was the case for CS2.
- **SHE evaluation took up significant time and effort** and included both understanding SH perceptions (through the surveys) as well as that of CS leads (reflection sessions, interviews, retreats). These various assessments shaped the suggestions for tailored activities, e.g. for specific or targeted one-on-one conversations or seeking out particular SH groups.

Overall, the processes helped to provide a consistent framework for all CSs while allowing for tailored activities and emphases to suit the local context.

Early engagement (summary from the month 12 Stakeholder Engagement Plans)

While the SHE strategy as outlined in Part I was set with MS6 in month 5 (January 2022) of the project, the first SHE plans were developed with and delivered to CS in month 12 (September 2022) (Figure 13~~Figure 13~~). These first plans were based on the initial SH recorded in the SH register and the results of the first attempt to evaluate the SHE process. The evaluation process proved, however, cumbersome and challenging to SHs and CS leads and was thus revised carefully going forward. This first plan marks the end of the co-exploration phase of the early phase of the project where CS leads got to know the SHs, the CS problems and needs and SHs got together in the two first WSs. While WS1 focused largely on presenting the project to SHs, WS2 started gathering data, views on the conceptual models, and thoughts on policies. Also, the first CS interviews took place to assess the governance frameworks and the policy coherence. The plans are thus designed to **change engagement modalities from less of a focus on information sharing towards a larger emphasis on co-design** through consultation and involvement. The aim here was for SHs to feel involved in the development of the tools by providing feedback and showing them how their input is being used in the project outputs. The plan also aimed at expanding the reach of the project to SHs that had not been identified and involved so far.

Individual SHE plans for the early engagement phase can be found in Part III:

- CS1: Nestos/Mesta
- CS2: Lielupe~~CS2: Lielupe~~
- CS3: Jiu~~CS3: Jiu~~
- CS4: Adige~~CS4: Adige~~
- CS5: IUWMA~~CS5: IUWMA~~

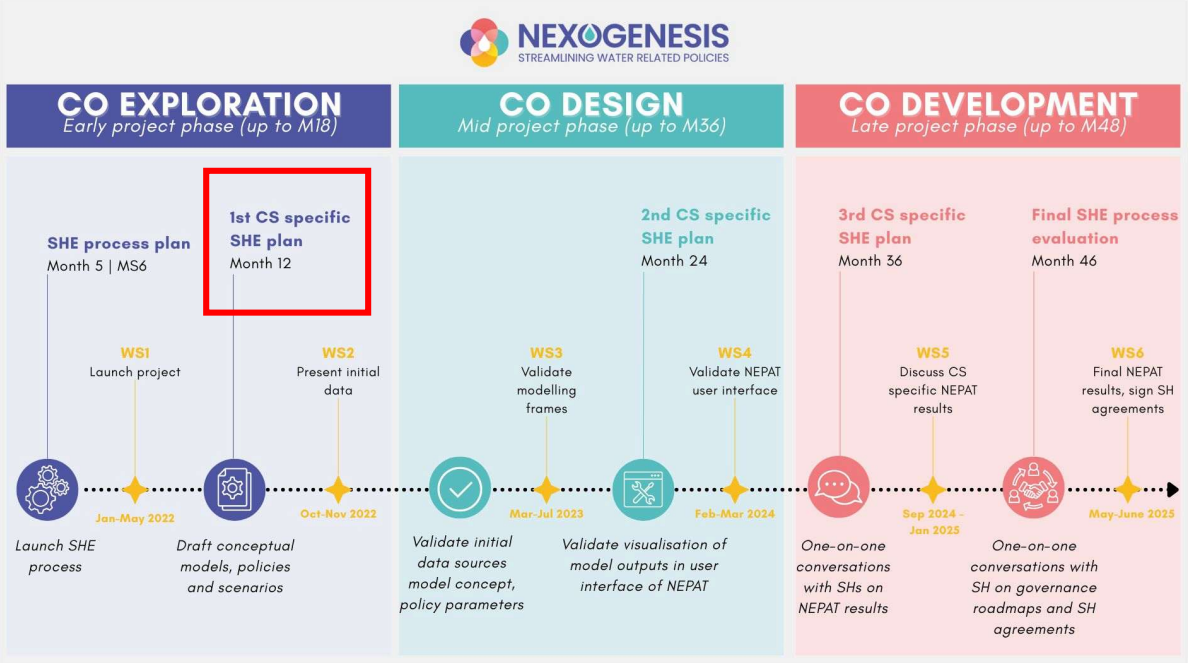


Figure 13: Temporal orientation of the placement of the 1st SHE plan in the project time frame.

Stakeholder engagement aims

To identify commonalities across CSs, their desired SHE aims were clustered based on the use of similar terms and on scope. Aims were clustered within each knowledge type. The CS-specific aims were clustered in 15 overarching aims (Table 7~~Table 7~~).

For the system knowledge, overall, most CSs aimed to understand the current WEFE nexus problem and the organisational and management context through the interaction with SHs about. For the target knowledge, most CSs thought that knowledge needs to be created for a state of enhanced cooperation and reduced conflicts. Regarding the transformation knowledge, for most CSs the aim of the SHE was to work on aligning policies and agreements.

Table 7: Overview of the short aims determined by the CS-Leads – early project

	Short Aim (cluster)	CS1	CS2	CS3	CS4	CS5
System knowledge	Understanding the WEFE Nexus problem	X	X	X	X	
	Characterising the context		X	X		X
	Understanding the organisational and management context	X	X	X	X	X
	Identifying conflicts	X		X		
	Gathering data and developing models	X				
Target knowledge	Future expectations	X		X		
	Balanced solutions for sustainable development		X			X
	Enhanced cooperation and reduced conflicts	X	X	X	X	
	Awareness and infrastructure improvements			X		X
Transformation knowledge	Aligned policies and agreements	X	X		X	X
	Pathways to enhance awareness of resource management			X	X	
	Co-design and -validation of NXG tools and capacity building			X	X	
	Identification WEFE Nexus components and indicators			X		X
	Improved communication and linked silos		X	X		
	Infrastructural requirements					X

Stakeholder analysis

Stakeholder identification

More than 500 SHs were preliminary listed by the CS-Leads but only 79 formally provided their consent to being included as official SHs in the SH register, via the Privacy Policy Consent Form (PPCF). On average there was only a 17.8% consent rate (as of Sept. 2022) (

Table 8

~~Table 8~~). This highlighted the need to increase the interest of SHs in being engaged in the NXG project.

Only SHs that had consented, described as 'official SHs', were considered for data analysis and the development of the engagement plans.

Table 8: Overview of the stakeholder identification across CSs – early project

	CS1 Nestos/Mesta	CS2 Lielupe	CS3 Jiu	CS4 Adige	CS5 IUWMA	TOTAL
Preliminary	63	75	94	150	153	535
With consent	12	23	25	10	9	79
Without consent	51	52	69	140	144	456
With consent	19.0%	30.7%	26.6%	6.7%	5.9%	14.8%
Average consent	17.8%					

Across CSs, there was a clear dominance of SHs belonging to the water and ecosystems sectors, whereas energy and food related SHs were largely absent from the register of official SHs (Figure 14~~Figure 14~~ and Figure 15~~Figure 15~~). The CSs were thus given the task to identify and engage these SHs in the next period.

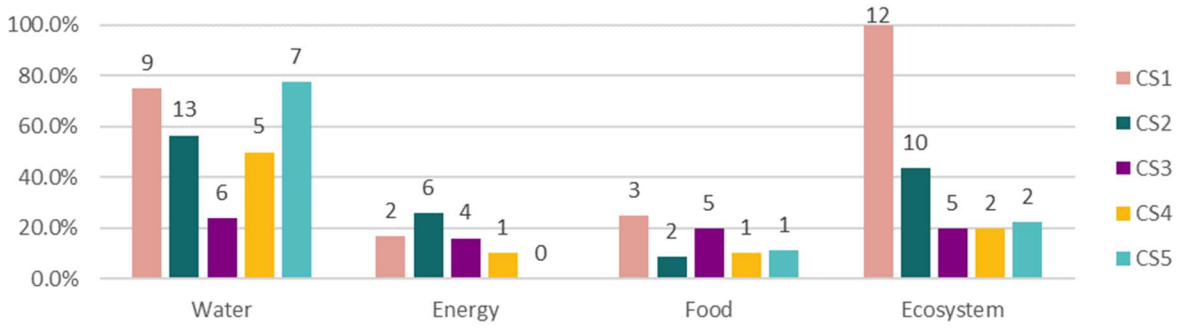


Figure 14: Overview of stakeholder distribution across WEFE sector in all CSs – early project

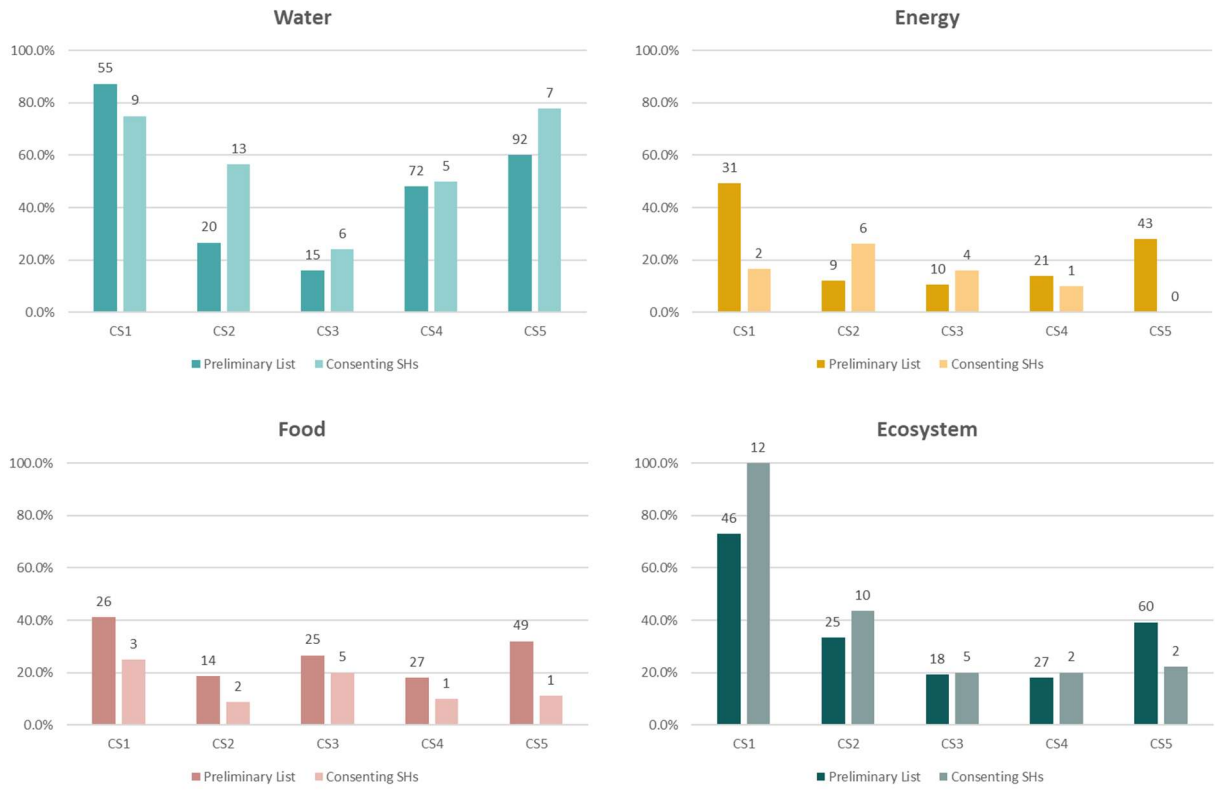


Figure 15: Differences between the distribution of stakeholder across the WEFE sectors in the preliminary and the official stakeholder list – early project

Gender distribution is highly dependent on the CS and the respective historic context. CS with a background in Soviet history showed, in general, a higher female representation than "Western" societies (Figure 16~~Figure 16~~). As such, CS2 (Lithuania, Latvia) and CS3 (Romania) showed a 60% female ratio, whereas CS1 (Greece and Bulgaria), CS4 (Italy) and CS5 (South Africa) showed between 20% and 40% female representation. On average the ratio of female representation across all CSs was at 40%.

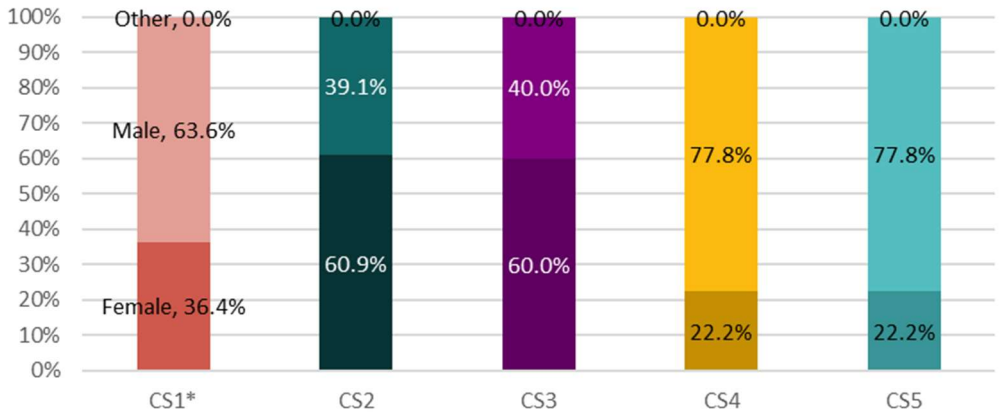


Figure 16: Overview of stakeholder gender distribution across case studies – early project

Stakeholder differentiation and categorisation

More than 80% of the consenting SHs were of high interest (which is to be expected) (Table 9~~Table 9~~). In most cases, SHs were of high interest and high power (HI-HP) except for CS2 where most SHs were of high interest and low power (HI-LP). In CS1, there was almost parity between HI-HP and HI-LP SHs. The CSs generally had no official low interest high power (LI-HP) SHs (these would, for instance, be the energy SHs or national policymakers). At this early stage, the number of SHs in the samples was still low, and only partially meaningful. It is important to note that these shares only related to SHs that had consented to being placed in the register and not the overall distribution of all SHs identified. Our research has shown that this type of analysis leads to a bias towards high interest SHs but also helps understanding better the kind of SHs that interact with the project (see Avellán et al. 2025).

Table 9: Overview of Power-Interest scoring of stakeholders, based on the perception of CS-Leads

	CS1	CS2	CS3	CS4	CS5	TOTAL
High Interest - High Power (HI-HP)	6	7	19	5	7	44
High Interest - Low Power (HI-LP)	6	14	6	3	2	31
Low Interest - High Power (LI-HP)	0	0	0	0	0	0
Low Interest - Low Power (LI-LP)	0	2	0	2	0	4
TOTAL	12	23	25	10	9	79
% HI-HP	50.0%	30.4%	76.0%	50.0%	77.8%	56.8%
% HI-LP	50.0%	60.9%	24.0%	30.0%	22.2%	37.4%
% LI-HP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% LI-LP	0.0%	8.7%	0.0%	20.0%	0.0%	5.7%

Stakeholder relationships

CS leads characterized 669 relationships between SHs. The largest identified share of relationships was complementary (41% overall), followed by cooperative (27%) and non-existent (24%) (Figure 17~~Figure 17~~). Complementary relationships were seen most strongly in CS2 (54%) and CS3 (47%), whereas CS4 saw a high percentage of non-existent relationships (71%). At this early stage, these numbers showed, that, at this stage of the process, the identified SHs know each other for the most part and have good and positive relationships.

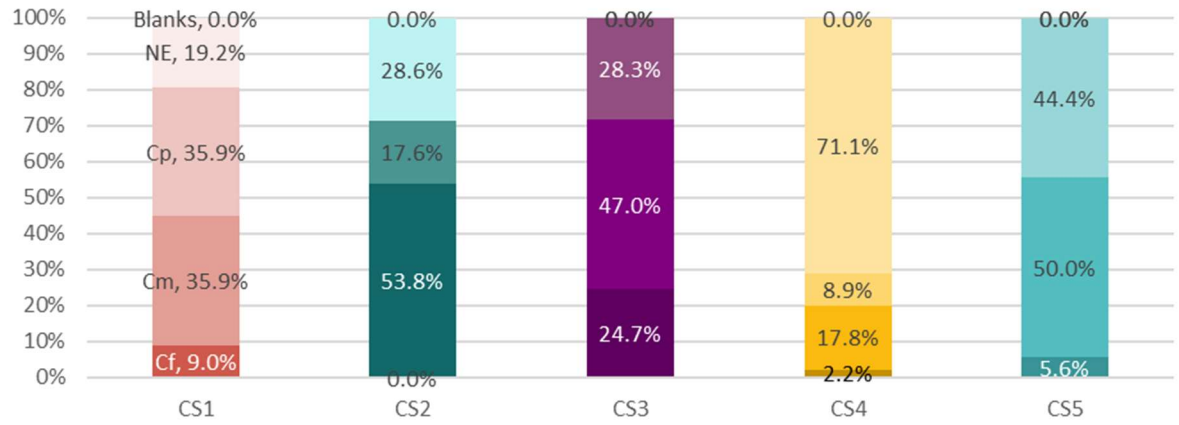


Figure 17: Overview of the relationships between stakeholders, based on the perception of CS-Leads. Cf: Conflict; Cm: complementary, Cp: cooperation; NE: non-existent; Blanks – early project

Stakeholder engagement plans

During and after the 1st General Assembly, CS leads were asked to identify their preferred mode of co-creation based on the modes identified by Chambers et al. (2021). They noted these preferences via a survey that was operationalized and adapted in its complexity to the project needs (see Annex 5: Template for assessing the modes of co-creation~~Annex 5: Template for assessing the modes of co-creation~~). From this, the co-creation processes in NXG converged to three main co-creation modes: "Researching solutions", "Empowering voices", and "Navigating differences" (Table 10~~Table 10~~). Interestingly, for the three 'follower' CSs, where the Nexus concept was recently introduced, the prevailing co-creation mode was Mode 1 "Researching solutions"; whereas for the two 'frontrunner' CSs other foci played a decisive role in defining the co-creation modes. CS1 was more focused on finding solutions with SHs, including less powerful SHs in interaction with more powerful ones; and CS2 focused on relating together, raising awareness, increasing cooperation and provide knowledge for decision-making.

Table 10: Overview of co-creation modes across case studies as identified by CS leads

Mode	Brief description	Case studies
1. Researching solutions	Focus on co-creating knowledge to guide decision-making, influencing policies and future interventions.	CS3, CS4, CS5
2. Empowering voices	Explicit focus on empowering SHs and address a bigger social diversity.	CS1
5. Navigating differences	Focus on relating together with and among SHs, learning and empowerment.	CS2

Stakeholder management and sustainment

Recommendations on how to manage SHs in the first plan were fairly similar across CSs as only initial contacts with actors had been made and the project had only been presented to them (Table 11~~Table 11~~). The focus for Year 2 of the project (2023) was thus largely to further increase the interest of SHs and find lower interest, marginalized SHs. For CS1 specifically, reaching out to high-power and high-level SHs was encouraged. Recommendations for the subsequent years were kept generic and aimed at deepening the abilities of SHs to meaningfully engage with the project, first through consultation (2024) and ultimately through empowered engagement and decision-making (2025).

Sustainment was not addressed in this first SHE plan.

Table 11: Overview of the suggested actions to be focused on for the coming years based on the initial plan.

From 2022 Plan

Plan	Levels of engagement	CS1	CS2	CS3	CS4	CS5
2023	**Information sharing**	Think of incentives that might increase the interest of marginalized, low-interest SHs such as invitations to events, highlighting research results of interest to them or providing them with free access to results and findings. Invite SHs to subscribe to the NXG newsletter.	Think of incentives that might increase the interest of marginalized, low interest SHs such as invitations to events, highlighting research results of interest to them or providing them with free access to results and findings. Invite SHs to subscribe to the NXG newsletter.	Think of incentives that might increase the interest of marginalized, low interest SHs such as invitations to events, highlighting research results of interest to them or providing them with free access to results and findings. Invite SHs to subscribe to the NXG newsletter.	Think of incentives that might increase the interest of marginalized, low interest SHs such as invitations to events, highlighting research results of interest to them or providing them with free access to results and findings. Invite SHs to subscribe to the NXG newsletter.	Think of incentives that might increase the interest of marginalized, low-interest SHs such as invitations to events, highlighting research results of interest to them or providing them with free access to results and findings.
	Consultation	WP1 governance assessment interviews; surveys during or after each WS (e.g., WP1 and WP5); perception about the ALM and the shown conflicts and cooperation potential if appropriate. Show at each WS which advancements/decisions were made based on the SHs' inputs (feedback to the feedback or acknowledging their inputs).	WP1 governance assessment interviews; surveys during or after each WS (e.g., WP1 and WP5); perception about the ALM and the shown non-existent and cooperation potential if appropriate. Show at each WS which advancements/decisions were made based on the SHs' inputs (feedback to the feedback or acknowledging their inputs).	WP1 governance assessment interviews; surveys during or after each WS (e.g., WP1 and WP5); perception about the ALM and the shown conflicts and cooperation potential if appropriate. Show at the next WS which advancements/decisions were made based on the SHs' inputs (feedback to the feedback or acknowledging their inputs).	WP1 governance assessment interviews; surveys during or after each WS (e.g., WP1 and WP5); perception about the ALM and the shown non-existent relationships and the cooperation potential if appropriate. Show at the next WS which advancements/decisions were made based on the SHs' inputs (feedback to the feedback or acknowledging their inputs).	WP1 governance assessment interviews; surveys during or after each WS (e.g., WP1 and WP5); perception about the ALM and the shown conflicts and cooperation potential if appropriate. Show at each WS which advancements/decisions were made based on the SHs' inputs (feedback to the feedback or acknowledging their inputs). Have focussed sessions with SH groups prior to the WSs to get specific data.

Involvement	Activities in all WSs with especial focus on WS2 and WS3 for the identification of needs and discussion on policy needs, interviews for WP1, and WP3; and focus on WS4 and WS5 for WP3 and WP4 outputs.	Activities in all WSs with especial focus on WS2 and WS3 for the identification of needs and discussion on policy needs, interviews for WP1, and WP3; and focus on WS4 and WS5 for WP3 and WP4 outputs. Additional activities that foster exchange between SHs from different sectors, categories, and countries are helpful. Plan activities to share the outputs of the provided feedback and discuss about it.	Activities in all WSs with a special focus on WS2 and WS3 for the identification of needs and discussion on policy needs, interviews for WP1, and WP3; and focus on WS4 and WS5 for WP3 and WP4 outputs. Plan activities to share the outputs of the provided feedback and discuss about it.	Activities in all WSs with especial focus on WS2 and WS3 for the identification of needs and discussion on policy needs, interviews for WP1, and WP3; and focus on WS4 and WS5 for WP3 and WP4 outputs. Additional activities that foster exchange between SHs from different sectors, categories, and regions of the river basin are helpful.	Activities in all WSs with especial focus on WS2 and WS3 for the identification of needs and discussion on policy needs, interviews for WP1, and WP3; and focus on WS4 and WS5 for WP3 and WP4 outputs. Additional activities that foster exchange between SHs from different sectors, categories are helpful. Plan activities to share the outputs of the provided feedback and discuss about it.
Collaboration	Plan activities to share the outputs of the provided feedback and discuss about it.	WSs – activities to co-decide features and design of the tools (WS2 to WS6), focus groups (within or in between WS2 and WS3), role activities to build trust. 1-on-1 activities to bring in marginalized current low-interest or uninformed SHs.	WSs – activities to co-decide features and design of the tools (WS2 to WS6), focus groups (within or in between WS2 and WS3), role activities to build trust. 1-on-1 activities to reduce conflicts of conflicting SHs, but also to bring in marginalized current low-interest or uninformed SHs.	WSs – activities to co-decide features and design of the tools (WS2 to WS6), focus groups (within or in between WS2 and WS3), role activities to build trust. 1-on-1 activities to reduce conflicts of conflicting SHs, but also to bring in marginalized current low-interest or uninformed SHs	WSs – activities to co-decide features and design of the tools (WS2 to WS6), focus groups (within or in between WS2 and WS3), role activities to build trust. 1-on-1 activities to reduce conflicts of conflicting SHs, but also to bring in marginalized current low-interest or uninformed SHs. Provide a roadmap or plan with the activities of next year to crosscheck time availability and ensure participation.

Empowerment	WSs – activities to co-decide features and design of the tools (WS2 to WS6), focus groups (within or in between WS2 and WS3), role activities to build trust. 1-on-1 activities to reduce conflicts of conflicting SHs, but also to bring in marginalized current low-interest or uninformed SHs.	Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations). So that the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded SHs. Frequent smaller conversations of transnational peer SHs may need to happen to allow for recognition of peers and for technical discussions about transboundary solutions (e.g., ecological low flows, abstraction needs, conservation measures, etc.). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.	Frequent smaller conversations of peer SHs from different sectors may need to happen to allow for recognition of peers and for technical discussions about solutions (e.g., ecological low flows, abstraction needs, conservation measures, etc.). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.	Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations) so that, the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded SHs. Frequent smaller conversations of peer SHs across different regions may need to happen to allow for recognition of peers and for technical discussions about transboundary solutions (e.g. ecological low flows, abstraction needs, conservation measures, etc.). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.	Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations) so that, the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded SHs. Frequent smaller conversations of sectoral peer SHs may need to happen to allow for recognition of peers and for technical discussions about solutions (e.g., ecological low flows, conservation measures, tourism activities). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.

2024	Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations) so that, the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded SHs. Frequent smaller conversations of transnational peer SHs may need to happen to allow for recognition of peers and for technical discussions about transboundary solutions (e.g. ecological low flows, abstraction needs, conservation measures, etc.). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.	Maintain the interest of the engaged SHs and focus on the relationships between them, including power dynamics and building trust to enhance collaboration.	Maintain the interest of the engaged SHs and focus on the relationships between them, including power dynamics and building trust to enhance collaboration.	Maintain the interest of the engaged SHs and focus on the relationships between them, including power dynamics and building trust to enhance collaboration.	Maintain the interest of the engaged SHs and focus on the relationships between them, including power dynamics and building trust to enhance collaboration.
2025	Focus on co-decision activities and further planning on sustainment of SHs as well as on the defined agreements.	Focus on co-decision activities and further planning on sustainment of SHs as well as on the defined agreements.	Focus on co-decision activities and further planning on sustainment of SHs as well as on the defined agreements.	Focus on co-decision activities and further planning on sustainment of SHs as well as on the defined agreements.	Focus on co-decision activities and further planning on sustainment of SHs as well as on the defined agreements.

Stakeholder engagement evaluation

During the early engagement phase of the project, preliminary insights were gathered from both CS-leads and SHs to better understand expectations, priorities, and preferred approaches to co-creation, as well as the perceived importance of different outcomes of co-creation processes.

An evaluation based on the survey 1 (see Annex 3: Survey for the Stakeholder Engagement Evaluation (WS 1 & 2)~~Annex 3: Survey for the Stakeholder Engagement Evaluation (WS 1 & 2)~~) was carried out in CS1, 4 and 5 at or after the first or second WSs (CS2 and CS3 could not collect the necessary data through surveys at this particular stage of the project) (Figure 18~~Figure 18~~). As discussed in Part I, it is important to note that while SH views regarding preferred modes of co-creation were initially collected through structured surveys, subsequent stages of the project relied on interactive WS formats. Despite this shift in methodology, the type of information elicited remained largely consistent and is therefore considered comparable across engagement phases. Also, questions regarding the importance of outcomes stayed consistent throughout all stages of the project and can therefore likewise be compared. The results across the CSs are summarised below. The individual results can be found in PART III: Case study specific Stakeholder Engagement Plans~~PART III: Case study specific Stakeholder Engagement Plans~~.

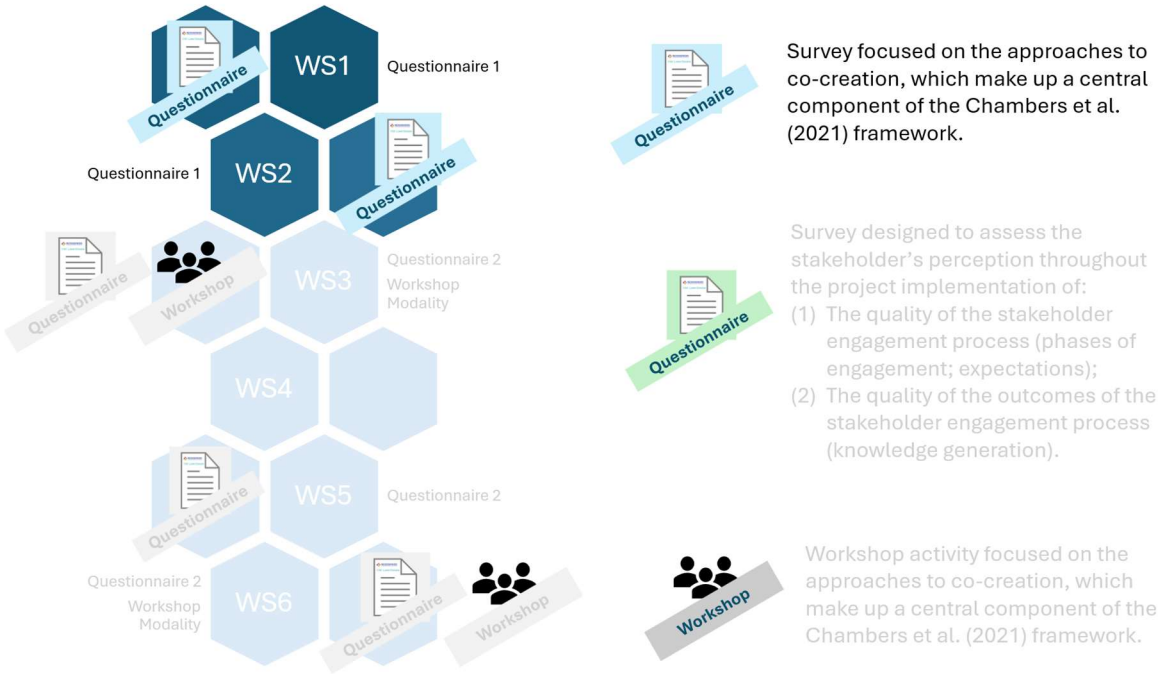


Figure 18: Basis for the evaluation material and change in the evaluation process – early project

While CS-leads in the newer or less Nexus-experienced ("follower") sites gravitated toward a "Researching Solutions" mode, leads in the "frontrunner" CSs pursued "Empowering Voices" and "Navigating Differences". SHs, however, did not uniformly mirror these preferences. Across most CSs where survey data was collected (CS1, CS4, CS5), SHs' views were more spread across co-creation modes, suggesting a broad epistemic diversity and diverse SH base. While some SHs aligned closely with the preferred, research-focused mode of the CS leads, others deemed those approaches focused on relationship building and/or lobbying

powerful SHs more relevant. Since surveys were answered anonymously at this stage of the project, we cannot make a definitive statement about which SHs generally preferred which mode of co-creation. However, since we collected information on a respondent's country of origin, we can say that in CS1, for example, Bulgarian SHs (who are generally considered more marginalised according to the analysis through the power-interest matrix) deemed 'empowering voices' to be more urgent than their Greek counterparts. Likewise, several SHs in CS1 and CS5 voiced a preference for brokering agreements among powerful actors, which they believed would enable implementation and systemic change. This highlights a tension: while broader inclusion is seen as normatively desirable, many SHs also recognize that effectiveness may hinge on power-centric negotiations. Thus, while "Empowering Voices" was often rated positively, the preferred path to impact sometimes necessitated temporary emphasis on "Brokering Power" or relationship-building among key decision-makers.

The data revealed surprisingly consistent views on the desired outcomes of the engagement processes. Across CSs, outcomes such as capacity development, ecological improvement, and social outcomes were repeatedly rated highly by SHs. Interestingly, knowledge production and knowledge transfer—while fundamental to the project's design—were often deprioritized by SHs, especially in CS4 and CS1. This suggests that SHs view knowledge as a means rather than an end, valuing it primarily when it enables practical or institutional change.

A noteworthy paradox emerged in the evaluations of social equitability. In both CS4 and CS5, even though many SHs championed the empowerment of marginalised actors, they rated equitability relatively low as a desired outcome. This may reflect either a reluctance to confront underlying power dynamics or a belief that representational inclusion does not automatically equate to systemic redistribution. It might also indicate that SHs equate equitability with abstract justice rather than tangible gains and thus prioritize capacity and policy alignment instead.

In sum, early engagement across the NXG CSs revealed shared aspirations for more inclusive and impact-oriented co-creation, but also significant variations in SH and CS-lead expectations.

Lessons learned from co-exploration

The co-exploration phase of the NEXOGENSIS project laid a rich foundation for SHE, mutual understanding, and knowledge co-creation across diverse CS. Through WSs, interviews, and early assessments, this phase helped identify the key actors, map their relationships, and surface differing expectations and capacities across the WEFE nexus. It also tested initial approaches to participation, co-creation, and the alignment of SH perspectives with project objectives. The lessons that emerged from this early phase include:

- **Initial engagement was broad but uneven:** While over 500 SHs were initially identified, only 79 formally consented to engagement. There was a clear overrepresentation of water and ecosystems sectors, with energy and food sectors underrepresented. Consent and sustained interest are harder to secure than initial identification; more strategic outreach is needed.
- **SH diversity and expectations varied widely:** SHs across different countries and CSs showed diverse expectations regarding outcomes (capacity building, ecological

improvements) and engagement modes (researching solutions, empowering voices, navigating differences). One-size-fits-all engagement models do not suit diverse socio-political and cultural contexts.

- **Strong interest-high power SHs dominated the register:** The analysis showed bias towards high-interest SHs, with few low-interest, high-power SHs (like national policymakers) engaged. The project risks echo chambers unless strategic efforts are made to engage those with high influence but currently low interest.
- **Relationship mapping showed generally positive interactions:** Many relationships were complementary or cooperative; however, some CSs showed a large share of non-existent relationships, particularly where prior nexus thinking was minimal. While this showed that there is a foundation of trust and collaboration to build on, bridging disconnected SHs remained important.
- **Evaluation process and methodology evolved over time:** Feedback mechanisms and evaluations shifted from structured surveys to interactive formats, revealing pragmatism and contextual flexibility. Engagement tools needed to adapt to SH feedback and logistical realities without compromising comparability.
- **SHs value practical outcomes over pure knowledge:** SHs often deprioritized knowledge production unless it led to institutional or ecological improvements. Practical relevance had to guide tool development and policy discussions.

The early engagement phase provided important insights into SH dynamics, engagement strategies, and contextual needs across the CSs. The evaluation of this phase revealed shared aspirations for inclusivity and impact, and key divergences in expectations and capacities in CS leads and SHs. As we transitioned to the co-design phase, these lessons informed a more targeted, adaptive, and outcome-oriented engagement process. By translating SH insights into co-created tools and policies, we ensured that NXG continued to foster trust, deliver relevance, and ultimately supported more integrated and coherent resource governance across the WEFE nexus.

Mid-project engagement (summary from the month 24 Stakeholder Engagement Plans)

At the mid-point of the project, NXG was at a critical moment for setting the stage for post-project success (Figure 19~~Figure 19~~). The CS leads managed to reach out to a number of varied SHs and convinced (some of) them to be actively engaged in the project's activities, such as the WSs. Three WSs took place up to this stage, with WS3 crucial for the validation of the modelling framework, the indicators for the WEFE Nexus footprint, the future scenarios and the CS relevant policies that are represented in the NEPAT. In WS3 the team also presented the current CS SH landscape and introduced a new survey as well as an activity to better understand the SHs' wishes of how to co-create knowledge. The mid-project SHE plan **changed gears from co-design to co-development** with the aim of preparing the SHs to take ownership of the project's main outputs (the NEPAT, the WEFE indicator and the UVPPs) and to start working towards the governance roadmaps, the SH agreements and sustainment of the Nexus approach post-project. At the same time, CS leads dealt with SH fatigue and a sense of lack of power of the core SH group to induce meaningful change. The mid-project SHE plan thus needed to strike the balance between asking more from SHs while keeping their interest in mind and not overburdening them.

Individual SHE plans for the mid-project engagement phase can be found in Part III:

- CS1: Nestos/Mesta~~CS1: Nestos/Mesta~~
- CS2: Lielupe~~CS2: Lielupe~~
- CS3: Jiu~~CS3: Jiu~~
- CS4: Adige~~CS4: Adige~~
- CS5: IUWMA~~CS5: IUWMA~~

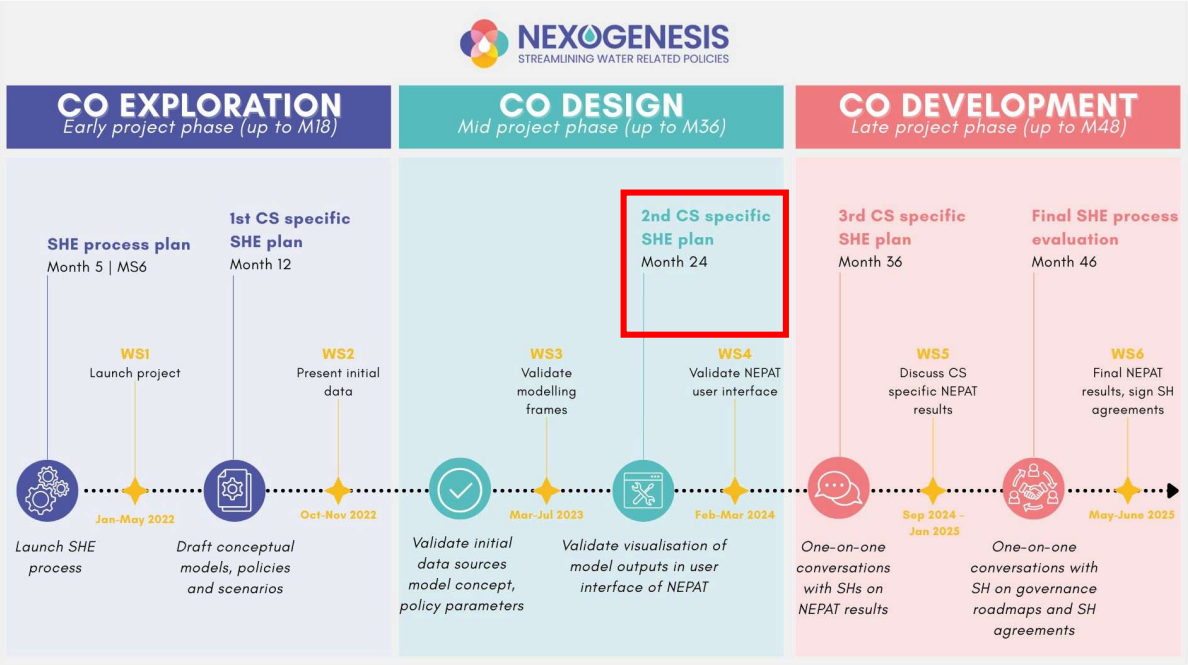


Figure 19: Temporal orientation of the placement of the 2nd SHE plan in the project time frame.

Stakeholder engagement aims

At WS3 a survey and a WS activity were conducted to better understand the SHs desired engagement outcomes. These views were mapped against the aims defined at the early stage by CS leads. Table 12~~Table 12~~ offers a view over both sets of aims and shows that there were slight differences in the views of CS leads and SHs. As such, differences could be seen in the system knowledge aims where SHs placed less emphasis on characterising or understanding the context than CS leads, as well as on the need to align policies and agreements in the transformation knowledge aims. At the same time, SHs placed a stronger emphasis on the need to achieve balanced solutions for sustainable development as target knowledge, to use the WEFE nexus components and indicators, and to co-validate NXG tools as transformation knowledge aims. These aims were kept in mind when designing the new SHE plans for this mid-project plan (the 3rd project year), to mitigate SH fatigue and sustain interest while aiming to empower the engaged SHs to co-own the developed tools. A revision of the aims by CS leads was agreed at the 3rd General Assembly of the project in Sept. 2023, reflected in the late project SHE plan.

Table 12: Comparison between the case study specific aims from the early perspective of case study leads and mid-project views of stakeholders; bold crosses present divergences between the case study leads' and stakeholders' views.

	Early Engagement (CS leads view)					**Mid Engagement (SH view)**				
Aims for SHE per type of co-generated knowledge	**CS1**	**CS2**	**CS3**	**CS4**	**CS5**	**CS1**	**CS2**	**CS3**	**CS4**	**CS5**
System knowledge										
Understanding the WEFE Nexus problem	X	X	X	X		X	X	X		**X**
Characterising the context		X	X		X			X		
Understanding the organisational and management context	X	X	X	X	X	X				X
Identifying conflicts	X		X				**X**	X		
Gathering data and developing models	X					X				
Target knowledge										
Future expectations	X		X					X		**X**
Balanced solutions for sustainable development		X			X	**X**	X	**X**		X
Fostered cooperation and reduced conflicts	X	X	X	X		X	X	X		**X**
Awareness of water as a depleting resource			X					X		
Required infrastructural improvements					X					
Policy impacts										
Empowered (local) stakeholders						**X**				
Transformation knowledge										
Aligned policies and agreements	X	X		X	X		X			
Pathways to enhance awareness of resource management			X	X				X		**X**

Co-design and -validation of NXG tools and capacity building			X	X		**X**	**X**	X	
WEFE Nexus components and indicators			X		X	**X**	**X**	X	X
Improved communication and linked silos	X	X					X	X	**X**
Infrastructural requirements					X				

Stakeholder analysis

Stakeholder identification

SH identification advanced significantly in the past year with now over 100 more SHs identified (662 vs 535) and an almost two-fold number of official SHs (143 vs. 79) (Table 13~~Table 13~~). Consenting to being officially placed in the SH register, while not necessary, was deemed to be useful as it gave the SHs a sense of officially belonging to the project and gave the project team a better understanding of the SH composition (see Avellán et al. 2025).

Table 13: Overview of stakeholder identification across case studies – mid-project

	CS1-Nestos/Mesta	CS2-Lielupe	CS3-Jiu	CS4-Adige	CS5-IUWMA	TOTAL
Preliminary	91	96	108	189	178	662
With consent (PPCF)	29	30	34	17	33	143
Without consent	62	66	74	172	145	519
With consent (%)	31,9%	31,3%	31,5%	9,0%	18,5%	21,6 %
Without consent (%)	68,1%	68,8%	68,5%	91,0%	81,5%	

While the dominance of water and ecosystems-related SHs was still prominent, a slightly larger share of food and energy SHs could be seen in some CSs, particularly so in CS5 (Figure 20~~Figure 20~~, Figure 21~~Figure 21~~). Bringing the energy SHs to the table was identified as a particularly challenging task. European energy SHs in the watersheds are mostly hydropower production plants, their owners and operators, whereas South African energy SHs come from coal fired power production and the interbasin transfer of water required for this. These SHs often have high power (but low interest) in the release and allocation of water. Their lack of presence is not unique to this project but was highlighted as a re-occurring phenomenon by SHs across the CSs and the coordinating bodies that exist in their respective watersheds.

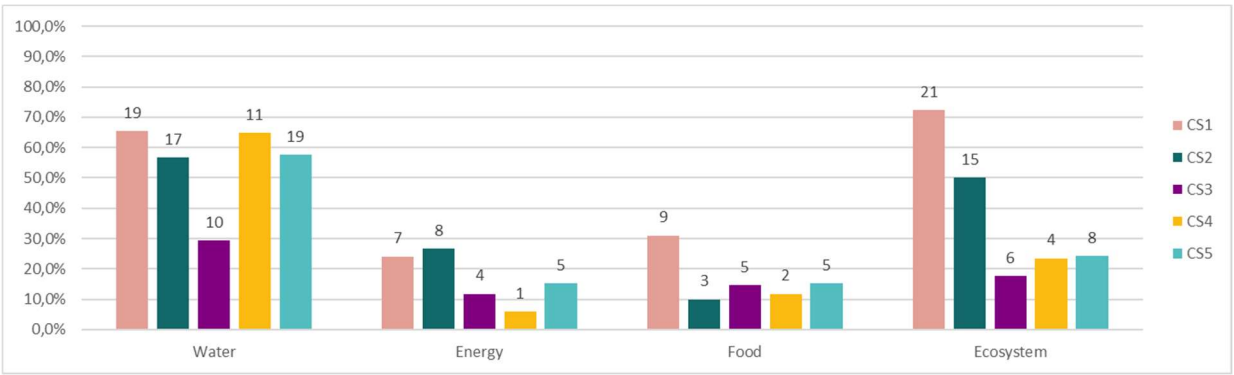


Figure 20: Overview of stakeholder distribution across WEFE sector in all case studies – mid-project

Figure 21: Differences between the distribution of stakeholder across the WEFE sectors in the preliminary and the official stakeholder list – mid-project

Gender distribution only changed marginally. CS2 (Lithuania, Latvia) and CS3 (Romania) continued showing a 60% female ratio, whereas CS1 (Greece and Bulgaria) and CS4 (Italy) showed less than 30% female representation. CS5 (South Africa), however, was close to parity with 45% female participation (Figure 22~~Figure 22~~). The latter was particularly laudable as this was double the share of the previous year. On average the ratio of female representation across all CS was at 43% (as compared to 40% in the previous year).

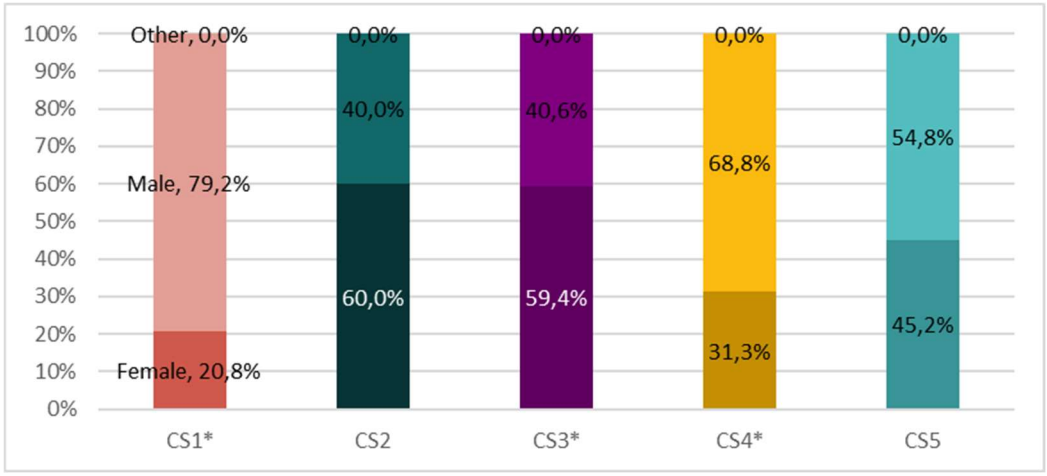


Figure 22: Overview of stakeholder gender distribution across case studies– mid-project

Stakeholder differentiation and categorisation

More than 80% of the official SHs were of high interest (which is to be expected) (Table 14~~Table 14~~). In most cases, SHs were of high interest and high power (HI-HP) except for CS2 where most SHs were of high interest and low power (HI-LP). In CS1, there was almost parity between HI-HP and HI-LP SHs. The CSs generally had no consenting low interest high power (LI-HP) SHs (these would, for instance, be the energy SHs or national policymakers). While the number of SHs in the categories changed, their share stayed largely the same compared to the previous year.

Table 14: Overview of Power-Interest scoring of stakeholders, based on the perception of case study leads – mid-project

	CS1	CS2	CS3	CS4	CS5	
Power-Interest Map						TOTAL
High Interest - High Power (HI-HP)	12	10	21	13	20	76
High Interest - Low Power (HI-LP)	11	15	8	4	7	45
Low Interest - High Power (LI-HP)	0	0	0	0	1	1
Low Interest - Low Power (LI-LP)	2	2	1	0	1	6
TOTAL	25	27	30	17	29	128
% HI-HP	41,4%	33,3%	61,8%	76,5%	60,6%	54,7%
% HI-LP	37,9%	50,0%	23,5%	23,5%	21,2%	31,2%
% LI-HP	0,0%	0,0%	0,0%	0,0%	3,0%	0,6%
% LI-LP	6,9%	6,7%	2,9%	0,0%	3,0%	3,9%

Stakeholder relationships

Combined, CS leads characterized a very impressive 2053 relationships between actors. While in the previous year the largest identified share of relationships was ‘complementary’, in this year’s representation many new non-existent relationships were identified (39% overall) (Figure 23~~Figure 23~~). This is largely due to the fact, that SHs did not know each other in the transboundary settings, which was particularly true for CS1 and CS2 where transboundary WSs were held to bring together SHs from the bordering countries for the first time. Cross-provincial SHs were also brought together in CS4. ‘Complementary’ and ‘cooperative’ relationships had a similar share (27,6% and 26,8% respectively). The share of ‘conflictual’ relationships was identified as highest in CS3; but here SHs also know each other.

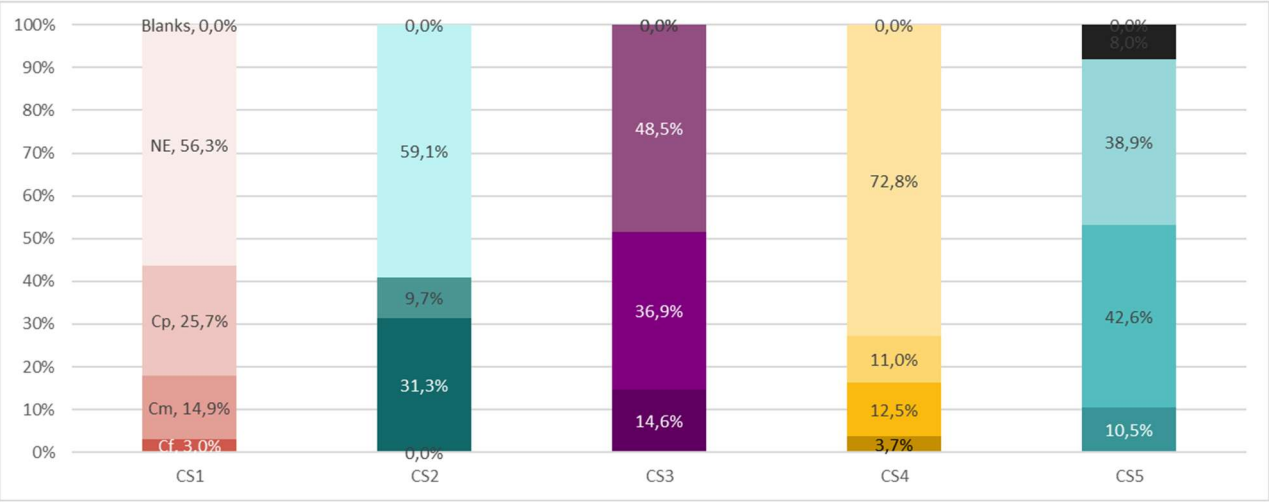


Figure 23: Overview of the relationships between stakeholders, based on the perception of CS-Leads. Cf: Conflict; Cm: complementary, Cp: cooperation; NE: non-existent; Blanks – mid-project

Stakeholder engagement plans

At WS3, SHs were engaged in a WS activity that was intended to assess the SHs' preferred mode of co-creation (see the explanation to this activity in Step 5: Stakeholder engagement evaluation~~Step 5: Stakeholder engagement evaluation~~). While CS leads had put an emphasis on gaining a good understanding of the current situation, context and problems, SHs saw a larger potential in working with the existing power relationships, either through brokering or reframing them, or empowering voices (Figure 24~~Figure 24~~). Table 15~~Table 15~~ gives an overview of opportunities and risks that come with some of these modes of co-creation. As such '*researching solutions'* and '*empowering voices*' put an emphasis on knowledge generation for specific goals, as has been the case in the project so far in terms of gathering information about the particular problems at hand, designing the conceptual models, collecting data, and understanding the governance and SH landscapes. In CSs 2 and 5 the CS leads' view for how to induce change was thus similar to those of the CS SHs. However, in some of the CSs SHs sense that this (common) understanding was not enough to induce meaningful changes in the modus operandi and thus, in some cases would have rather seen a change in the processes of decision making (CS3 and CS4). In both of these cases, thinking in larger contexts may have help in inducing the SHs' desired change.

These reflections on the mode of co-creation drove the development of the SHE plans for the following year and were reflected in the activities suggested in the respective SHE components. They are summarised in the table in the next section – SH management.

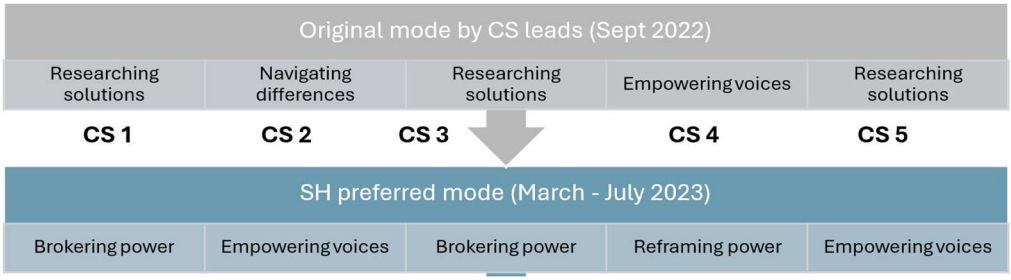


Figure 24: Modes of co-creation as identified by case study leads (early project) and stakeholders at WS3 (mid-project)

Table 15: Overview of potential opportunities and risks from three of the six modes of co-creation as per Chambers et al. 2021

Mode of co-creation cluster	Unique opportunities	Critical risks
Researching solutions	Can achieve specific set goals (for example, building an ecosystem model) Can produce and transfer knowledge to inform and justify policy changes that decision makers already want to make	• More likely to overly place blame on marginalized actors for sustainability problems • Less attention to process and equitability can result in superficial engagement with marginalized actors • Interventions may legitimize existing power relations and systems • Projects may struggle to engage actors that they seek to influence due to prioritizing their own values and solutions • More likely to reinforce already dominant views of problems and solutions, and to obscure alternatives • Can inhibit the potential to reframe perspectives • May create echo chambers that fetishize the power of knowledge to create desired impacts • Emphasis on the value of scientific knowledge can crowd out alternative expertise and ideas • Tying of budgets to fixed knowledge production activities may inhibit the pursuit of emergent goals
Empowering voices (same as above plus)	Can produce and transfer knowledge to advocate for higher level policy changes, build capacities and address local needs	• May fetishize the role of speaking 'truth' to power to shift higher level views and policies • Efforts to empower particular views can inhibit possibilities for reframing perspectives • Powerful actors may block processes that are against their interests, especially if blame narratives are used

		• May overlook power imbalances and politics occurring within local settings
Brokering power	Can build legitimate and flexible processes to empower tangible changes to perspectives, networks, institutions, policies and practices	• Solution-oriented actors may not want to engage • Reflexivity can inhibit developing concrete actions • Successful reframing alone may fail to trigger shifts in policies and practices • Emphasizing points of difference too soon can inhibit common ground • Apparent cooperation and consensus can be the result of subjugation if power dynamics are poorly managed • Social inequalities may be accelerated if voluntary contributions are not suitably valued • Very risky without high legitimacy, strong networks and highly skilled facilitation and brokering to create safe spaces for reflection and dialogue • Actors involved may try to co-opt the process to serve their own interests • Exclusion of marginalized actors may lead to solutions that further marginalize them

Stakeholder management and sustainment

Management

The overall SH landscape and analysis of the current situation gave rise to CS-specific suggestions for how to manage SH interaction and engagement for the subsequent 12 months. These suggestions are summarised in Table 16~~Table 16~~ below. As mentioned in the introduction to this part of the report, this year's plan switched gears from co-design to co-development and set the stage for SHs to be empowered to use and make use of the tools developed in NXG but also of the results that were co-developed. Therefore, the activities shifted away from awareness-raising and bringing new SHs into the WSs but rather (1) giving back to the SHs in the form of sharing scientific knowledge, showing how their inputs have been included in the development of the tools and results (feedback to the feedback), and including SHs in agenda setting and hosting of WSs; (2) engaging with high power SHs through one-on-one conversations and in specific high-visibility activities (e.g. meetings of river basin committees, or regional development groups) to allow for Nexus thinking to become more prominent; and (3) engaging with key SHs towards the framing of river contracts/SH agreements.

Specifically tailored recommendations were given to each CS to reflect their own contexts. As such CS1 worked with a large set of local actors that felt the need to be heard by national level authorities; thus, the recommendation here was for the research team to make the project results noticed by national authorities through their existing personal and institutional connections and channels. For CS2, the recommendation was to work through the ministerial channels of their engaged SHs to raise awareness towards the need of an inter-ministerial working group. CS3 was focusing strongly on national level processes that could profit from taking up nexus thinking into their planning process; here local champions could be used to give the idea more weight. In CS4, conflicts across the actors were not easily solvable by the project team; professional facilitators were recommended to help with reducing friction. For CS5, the recommendation was to build on the new relationships that had formed and make use of these to float the idea of nexus thinking to higher power SHs that had not been involved or engaged in the project thus far.

Table 16: Overview of the SH management activities and actions to best engage with SHs based on the overall evaluation of the situation in mid-project.

From 2023 Plan

Plan	CS1	CS2	CS3	CS4	CS5
2023	The SH register was expanded and new SH categories, like the business sector were added. A larger SH of low power – low interest SH was established. However, the gender distribution and the lack of high power- low interest SH is still an issue.	While the SH register was expanded, the distribution remained the same as in 2022. Mostly high-interest SHs are present in the current SH register.	The SH register was slightly expanded but distributions stayed mostly the same. SH are happy with the way the project is interacting with them.	The SH register was slightly expanded, and the gender imbalance is not as drastic as before. SH are now largely from the water sector. The PI distribution remained the same and the ALM continues revealing high levels of actors that have no relationships.	The SH register was significantly expanded. The SH base has a better gender balance, but is still slanted towards the water sector and high interest SH.
2024					
Information sharing	Better inform SHs about updates and processes at the project level which may allow for further instances to co-design.	Think of incentives that might increase the interest of marginalized, low interest SHs such as invitations to events, highlighting research results of interest to them or providing them with free access to results and findings.	Provide SH with system knowledge, i.e. providing them with easily understandable results of the (biophysical and) socio-economic modelling and what this means to the WEFE Nexus and particularly to policies.	Ask the SHs to join the newsletter for instance or to follow us on social media.	Keep information sharing up by sharing results and outputs of the project and the WSs regularly (e.g. thank you notes to participants summarising the main outcomes of the WSs).

Consultation	Provide SH with system knowledge, i.e. providing them with easily understandable results of the biophysical and socio-economic modelling and what this means to the WEFE Nexus.	Share as much scientific evidence with the SH as possible (even if they may not understand the scientific papers).	Emphasise presenting project results to high-power SHs, trying to instil a Nexus-thinking amongst them.	Plan activities to share the outputs of the provided feedback and discuss about it.	For the next phase of the project, you may want to move further towards higher levels of engagement by involving a key set of SHs in agenda setting and invitation of SHs, timing and or hosting of WSs.
Involvement	It has proven effective to focus on one particular issue where there is shared interest amongst SHs, and then formulate actions to address it. Possibly start with an issue that matters to high-level decision-makers in both riparian states (i.e. Greece and Bulgaria).	Show at each WS which advancements/ decisions were made based on the SHs' inputs (feedback to the feedback or acknowledging their inputs). Plan activities to share the outputs of the provided feedback and discuss about it.	Discuss with high-power SHs how project outputs can be specifically integrated/translated into policies.	Additional activities that foster exchange between SHs from different sectors, categories, and regions of the river basin are helpful.	Additional activities that foster exchange between SHs from different sectors, categories are helpful.
Collaboration	Consider one of the following options: a) gather inputs from marginalised SHs and convey them to powerful SHs, b) manage to bring everybody to the same table and provide a platform for common dialogue, or c) have two events with one focusing on technical aspects and local-level networks and another one on high-level dialogue and	Consider organizing a high-power event for (political) SH from both countries to allow for awareness raising on the Nexus and floating the idea of an inter-ministerial cross-country working group.	Focus on transformation knowledge to help SH reframe and target policy uptake and management practices. Possibly shift focus at the remaining WSs, focusing on how NXG results can be specifically fed into the policy-making process.	Find professional support for WS facilitation. Try to 'market' as part of or integrate the WS into the proceedings of other institutions (e.g., the river basin authority).	There is an opportunity to create new networks and relationships that were not present before the project and allow a neutral space to assess the conflicts and negotiate areas for more cooperation and collaboration.

	‘signing off’ on actions to be taken.				
Empowerment		Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations). So that the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded SHs. Frequent smaller conversations of transnational peer SHs may need to happen to allow for recognition of peers and for technical discussions about transboundary solutions (e.g., ecological low flows, abstraction needs, conservation measures, etc.). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.		Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations) so that, the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded SHs. Frequent smaller conversations of peer SHs across different regions may need to happen to allow for recognition of peers and for technical discussions about transboundary solutions (e.g. ecological low flows, abstraction needs, conservation measures, etc.). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.	Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations) so that, the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded SHs. Frequent smaller conversations of sectoral peer SHs may need to happen to allow for recognition of peers and for technical discussions about solutions (e.g., ecological low flows, conservation measures, tourism activities). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.
2025	Stay focused on providing evidence base and the results from the research. This is your largest asset.	Stay focused on providing evidence base and the results from the research. This is your largest asset.	Stay focused on providing evidence base and the results from the research. This is your largest asset.	Stay focused on providing evidence base and the results from the research. This is your largest asset.	Stay focused on providing evidence base and the results from the research. This is your largest asset.

	Work with policy makers to integrate policy suggestion from the NEPAT.	Work with policy makers to integrate policy suggestion from the NEPAT.

Sustainment

At WS3, a plenary discussion was held with SHs about their views and thoughts on the need for SH sustainment and how to implement this in the respective CSs, if any. Figure 25~~Figure 25~~ gives an overview of the initial ideas collected here (full information can be found in the respective sections of the SHE plans in PART III of this report and the WS reports, stored in the project's internal repository). In general, SHs were very much in favour of sustaining these fora for discussions. Many SHs mentioned that the River Basin Committee or Authority would be the most suited entity to convene and organize these kinds of meetings as is the case already in CS5 for a sub-catchment of the Inkomati-Usuthu River Basin. CS4 SHs highlighted the need for common production and use of data and information to allow for common decision-making, more than having an exchange platform. CSs 1 and 2 highlighted the need for involving 'higher-ups' to validate or mandate the creation of a transboundary dialogue forum. Lastly, CS3 highlighted the importance of expanding the possibility to interact with other SHs such as NGOs that had not engaged with the project yet to also obtain their views. These sustainment ideas were picked up again in the next and last SHE plans and were particularly important for the establishment of SH agreements ('river contracts') and for post-project impact. Overall, SHs were grateful that the project team were considering and thinking about post-project SH sustainment at this, relatively, early stage of the project.

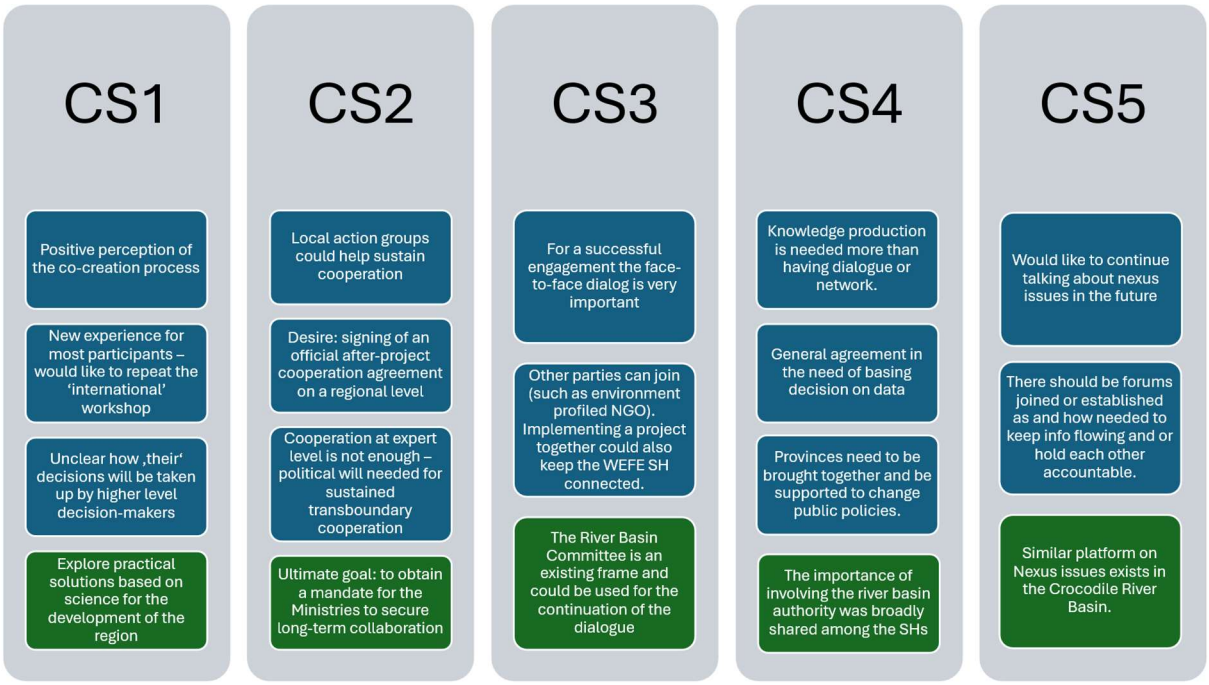


Figure 25: Ideas on SH sustainment as per plenary discussions with stakeholders at WS3 (green boxes indicate potential fora to explore sustainment)– mid-project

Stakeholder engagement evaluation

As the previous surveys had yielded very few responses a new strategy for SH evaluation was co-developed with CS leads which resulted in splitting the survey into a survey and a WS activity (Figure 26~~Figure 26~~). The survey now also contained elements that allowed to assess the quality of the SHE process and its outcomes.

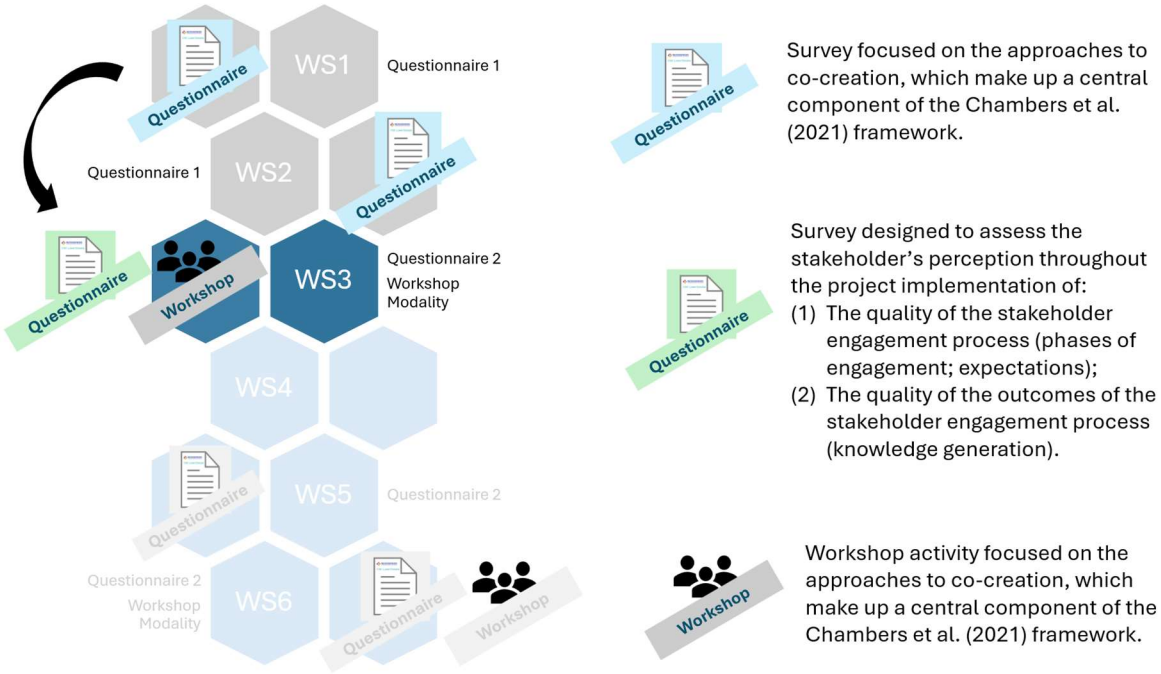


Figure 26: Basis for the evaluation material and change in the evaluation process – mid-project

Stakeholder Perceptions of Process Quality

SH self-assessments of their engagement level with NXG were gathered as part of the revised mid-project survey. Respondents were asked to rate their degree of involvement using a scale based on five categories: "Informed", "Consulted", "Involved", "Collaborated with", and "Empowered." The distribution of responses varied across the five CSs, reflecting both differences in the structure of engagement activities and the local SH landscape.

- In CSs 3 and 5, SHs most frequently indicated that they had been "Collaborated with", with several also identifying as having been "Involved". These two CSs showed the highest overall levels of perceived engagement. SHs referenced their repeated participation in project activities and their belief that their perspectives had influenced project direction.
- In CSs 1 and 4, perceptions of engagement were more mixed. While some SHs reported being "Involved", others stated they had only been "Consulted" or "Informed." Findings here point to a more fragmented experience of engagement and suggest that while opportunities for participation existed, they were not perceived as consistently meaningful across all actors.
- In CS2, SHs predominantly described their role as having been "Informed" or "Consulted", with some indicating no involvement at all at the time of the survey.

Across CSs at this stage of the projects, very few SHs reported feeling "Empowered", suggesting that while many were invited to participate and contribute, decision-making influence remained limited. This result is consistent with common challenges in transdisciplinary research, where empowering SHs to shape project outcomes often requires more sustained and iterative engagement than what can be achieved within typical project timelines.

These engagement-level self-assessments offered critical feedback to CS teams during the project, enabling recalibration of facilitation strategies and SH outreach in the second half of the project.

Preferred Modes of Co-Creation

During WS3, SHs across the CSs expressed varying preferences regarding the desired mode of co-creation. While CS-leads generally favoured "Researching Solutions", focused on generating actionable knowledge and decision-support tools, SH perspectives reflected more diverse priorities. These include empowerment, relationship-building, and institutional negotiation.

- In CS1, SH preferences were divided among "Empowering Voices," "Reframing Power," and "Brokering Power." While CS-leads sought to empower less powerful actors, some SH advocated for systemic critique or dialogue among influential players. The challenge here was to elevate marginalised voices without provoking resistance from dominant actors. Recommendations urged CS-leads to carefully navigate power asymmetries, ensuring that both high-power and low-power SHs were meaningfully included.
- In CS2, both CS-leads and SHs aligned around "Empowering Voices," reflecting a shared focus on awareness-raising, cooperation, and decision-making support. This alignment created favourable conditions for inclusive co-creation, with fewer risks of expectation mismatch.
- SHs in CS3 predominantly preferred "Brokering Power," emphasising policy coordination and engagement with institutional decision-makers. This diverged from the CS-leads' focus on "Researching Solutions," raising concerns that project outputs might be underutilised unless they gained traction with powerful actors. As a result, the need to engage high-level SHs early and meaningfully was highlighted.
- In CS4, SHs preferences split between "Empowering Voices" and "Navigating Differences," indicating a desire for inclusive participation and relationship-building in a high-conflict context. This stood in partial contrast to the CS-leads' solution-focused orientation. The engagement process was advised to provide space for high-interest, low-power actors while avoiding the alienation of dominant SHs — a careful balancing act to ensure both legitimacy and impact.
- CS5 exhibited the most diverse preferences, with SH views spanning four modes. Recommendations pointed to the necessity of avoiding preconceived solutions, building trust, and ensuring that engagement reached both grassroots actors and "the real people with the power."

In this mid-project phase, across all the CSs, the importance of engaging both low-power and high-power actors became apparent. Focusing on this engagement offered opportunities to increase legitimacy, implementation feasibility, and local ownership — but also introduced facilitation risks, such as reinforcing power imbalances or generating conflict. The various co-creation modes carried trade-offs: CS teams were therefore encouraged to adopt adaptive engagement strategies, capable of accommodating multiple co-creation modes. In several cases, this required layered processes that combined technical work with inclusive dialogue and high-level engagement.

Stakeholder Perspectives on Knowledge Creation

SHs were asked to reflect on their learning experiences across three knowledge domains: system, target, and transformational knowledge.

- System knowledge was consistently perceived to have improved, particularly in CSs 1, 3, and 5, where SHs reported a better understanding of Nexus interlinkages and governance structures.
- Target knowledge, relating to actionable solutions and strategies, was also reported positively—especially in CSs 3 and 5—reflecting SH recognition of the relevance of discussions on interventions and sectoral integration.
- Transformational knowledge, concerning shifts in governance perceptions or systemic change, was rated lower across all CSs. While some SHs in CSs 4 and 5 indicated that project activities had opened space for reflection, broader transformation remained limited—likely due to structural constraints or the relatively short project time frame.

These findings confirmed that while the project succeeded in enhancing understanding of complex Nexus dynamics and identifying potential solutions, more fundamental shifts in governance mindsets and behaviours were harder to achieve at this point of the project.

Desired Outcomes of Co-Creation

SHs rated a range of potential outcomes associated with the engagement process. Several outcomes stood out across CSs:

- Capacity development was consistently ranked as a high priority, particularly in CSs 1, 2, and 5, reflecting a desire among SHs to improve their ability to engage with and manage Nexus-related issues.
- Ecological outcomes, network-building, and process quality also received high scores, showing the importance placed on inclusive, collaborative engagement and environmental impact.
- In contrast, social equitability and institution-building were generally rated lower—even in contexts where marginalisation was acknowledged. This may suggest a pragmatic focus on feasible improvements over deeper institutional reform.
- Across all CSs, SHs expressed a noticeable gap between their expectations and perceptions of delivery, especially regarding policy uptake, implementation, and institutional alignment. This highlighted the importance of linking engagement efforts to concrete decision-making and governance processes.

Lessons learned from co-design

Findings from the mid-project engagement informed a number of strategic recommendations for CS teams, many of which were integrated into the second half of the project:

- **Balance co-creation expectations:** In cases where SH preferences diverged from CS-lead orientations, efforts were made to diversify engagement formats—e.g. separating technical WSs from SH deliberations—to ensure that multiple needs could be addressed.

- **Strengthen vertical and horizontal engagement:** Emphasis was placed on involving both high-level decision-makers and community representatives, particularly in CSs where SH preferences reflected a wide power spectrum.
- **Enhance communication:** In CSs where SH felt less informed, targeted communication materials and clearer framing of project goals were developed to reinforce transparency and foster engagement continuity.
- **Clarify pathways to impact:** Responding to concerns around limited perceived delivery of key outcomes, greater effort was invested in connecting project outputs with policy processes, including through tailored policy briefs, modelling demonstrations, and national-level discussions.
- **Facilitate trust and relationship-building:** In contexts characterised by low trust or institutional fragmentation, greater attention was recommended to be paid to fostering mutual understanding and informal dialogue between sectors.

The lessons from this phase of the process highlight the importance of adaptability, clarity, and relationship-building in complex, multi-SH projects. The mid-project adjustments helped align SH expectations with project realities, demonstrating that co-creation is not a one-size-fits-all process but one that must be flexible with and sensitive to context-specific needs, power dynamics, and levels of engagement. In the last project phase, sustaining the momentum built during the project up to this point required continued investment in inclusive, transparent communication; stronger vertical and horizontal linkages; and ongoing opportunities for trust-building across sectors. Embedding these principles into late project activities and initiatives was crucial to ensure that the project's outcomes could translate into lasting impact.

Late-project engagement (summary from the month 36 Stakeholder Engagement Plans)

In this 3rd and final SHE plan the focus was on inducing meaningful transformation. The concluding year was geared towards the final validation of project results from the NEPAT and the WEFE Nexus footprint. It was characterized by intense conversations and discussions with (key) SHs on the UVPPs and the respective governance roadmaps that led towards the identification and signing of SH agreements ('river contracts'), or the building blocks of such agreements. The previous year had set the stage for the ability to use the NEPAT. Much work had happened 'behind the scenes' as the models were completed and transferred into NEPAT; the user interface of NEPAT was tested and improved through the consortium in the 2nd and 3rd General Assemblies (Sept. 2023 and 2024 respectively), the tri-weekly co-creation meetings and in WS4 with SHs. Material to aid the user in working with NEPAT was produced through videos and guidelines. This final SHE plan thus focused on **co-development** through collaboration with and empowerment of SHs to facilitate the future use of the co-produced knowledge, its products and tools.

Individual SHE plans for the late-project engagement phase can be found in Part III:

- CS1: Nestos/MestaCS1: Nestos/Mesta
- CS2: LielupeCS2: Lielupe
- CS3: JiuCS3: Jiu
-

CS4: Adige

- ~~CS4: Adige~~
- CS5: IUWMA~~CS5: IUWMA~~

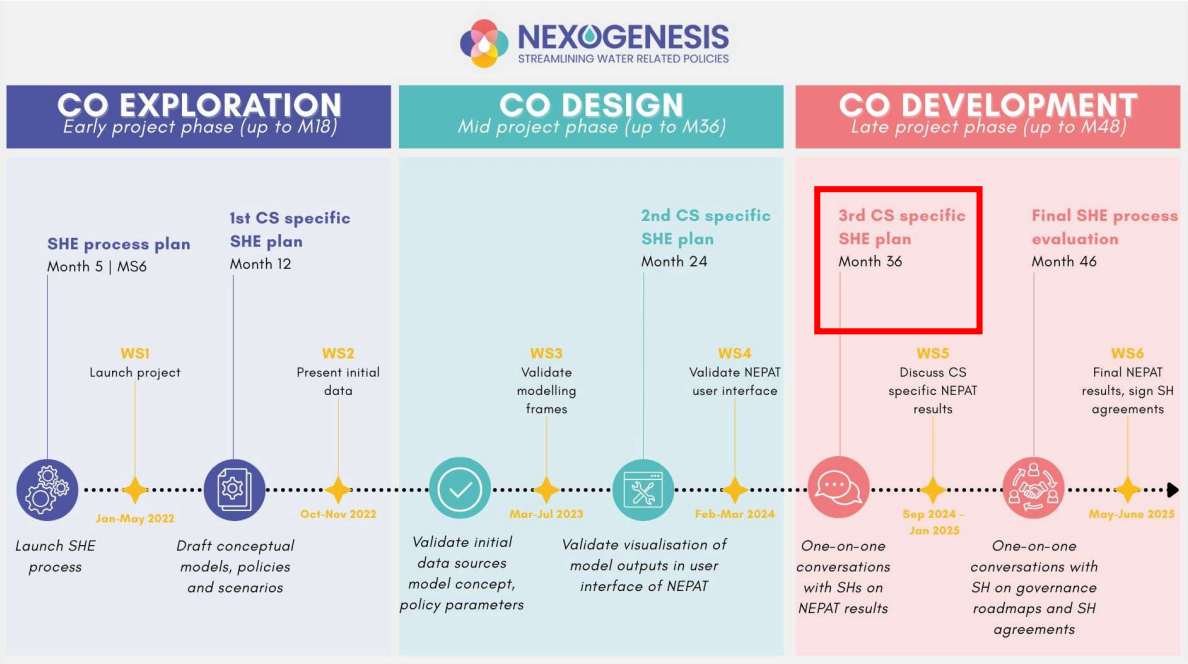


Figure 27: Temporal orientation of the placement of the 3rd SHE plan in the project time frame

Stakeholder engagement aims

At the 2nd General Assembly, the consortium decided to revise the CS specific aims and to adapt them to the CS context, if necessary. Table 17~~Table 17~~ provides a comparison of the early and late project views of CS leads on SHE aims. Most changes occurred in the SHE aims of CS1 whereas the other cases introduced no or minor changes. Thus, aims remained rather stable across the project lifetime.

Table 17: Comparative view of early, mid and late SHE aims as per the view of the (SHs and) CS leads (crosses in bold show additions, while grey, strikethrough crosses show aims that have been removed).

	Early Engagement (CS view)					Mid Engagement (SH view)					Late Engagement (CS revised view)				
Aims for SHE per type of co-generated knowledge	**CS1**	**CS2**	**CS3**	**CS4**	**CS5**	**CS1**	**CS2**	**CS3**	**CS4**	**CS5**	**CS1**	**CS2**	**CS3**	**CS4**	**CS5**
System knowledge															
Understanding the WEFE Nexus problem	X	X	X	X		X	X	X		**X**	~~X~~	X	X	X	
Characterising the context		X	X		X			X			**X**	X	X		X
Understanding the organisational and management context	X	X	X	X	X	X				X	~~X~~	X	X	X	X
Identifying conflicts	X		X				**X**	X			X		X		
Gathering data and developing models	X					X					~~X~~				
Checking if model results are fit fur purpose											**X**				

Target knowledge															
Future expectations	X		X					X	**X**	~~X~~		~~X~~			
Balanced solutions for sustainable development		X			X	**X**	X	**X**	X		X				X
Fostered cooperation and reduced conflicts	X	X	X	X		X	X	X	**X**	X	X	X	X		
Awareness of water as a depleting resource			X					X				X			
Required infrastructural improvements					X										X
Policy impacts										**X**					
Empowered (local) stakeholders						**X**									
Transformation knowledge															
Aligned policies and agreements	X	X		X	X		X			X	X		X	X	
Pathways to enhance awareness of resource management			X	X				X	**X**			X	X		
Co-design and -validation of NXG tools and capacity building			X	X		**X**	**X**	X				X	(X)		
WEFE Nexus components and indicators			X		X	**X**	**X**	X	X			X			X
Improved communication and linked silos		X	X				X	X	**X**		X	X			
Infrastructural requirements					X										~~X~~
Trust building										**X**					

In June 2024, interviews were held with CS leads to determine their perception about how much the SHE aims they had set for the CSs were being achieved. During the interview the different aims as identified previously and reassessed in the meantime were discussed and CS leads were asked to rate the level of achievement of these aims as per their understanding of the progress of the project work in the CSs. Table 18~~Table 18~~ shows the results across all CSs.

Overall, CS leads rated the level of achievement above average, with an almost full achievement in the system knowledge related aims, a higher-than-average achievement of target knowledge aims, and a mid-range achievement of transformational knowledge aims. CS1, CS3 and CS5 showed the highest overall impressions of having achieved their aims overall. CS4 showed a good level of perceived achievement in system knowledge aims but struggled with achieving target and transformational knowledge aims. While CSs showed high confidence in having largely achieved to characterise the contexts, understanding nexus issues, and raising awareness about water as a depleting resource, working towards formal agreements and aligned policies, as well as determining the requirements to invest in infrastructure were deemed as the most difficult aims to address.

Table 18: Overview of the perceived level of achievement of the CS's SHE aims as per interviews with CS leads in June 2024.

Current level of achievement

	Aims for co-creation per type of co-generated knowledge	(1=not at all achieved, 7=fully achieved) CS1	CS2	CS3	CS4	CS5
System knowledge	Deepen/improve understanding of the (state of) WEFE Nexus problems (e.g., river basin management, energy transition, water scarcity) and identify pressures	7	5	7	6	N/A
	Characterise (social, economic, ecological, and institutional) context	7	5	7	6	7
	Understand the institutional, organisational and political context and river basin management plans (incl. neighbouring countries)	6	6	7	6	5
	Identify conflicts/synergies between SHs as well as actions and strategies	6	N/A	7	5	N/A
	Get data for model development	3	6	7	4	N/A
	Average System Score	*5,8*	*5,5*	*7*	*5,4*	*6*
Target knowledge	Know about future expectations/perspectives (in general and for assessment tools)	7	6	6	3	N/A
	Determine solutions/systems (and their drivers) that balance sectors	5	4	6	3	5
	Diffuse conflicts between sectors (e.g., through the use of a common language), moving towards cooperation and trust	6	4	7	3	N/A
	Raise awareness of water as a depleting resource	7	N/A	7	6	N/A
	Gain knowledge on required infrastructural improvements	6	N/A	6	3	6
	Average Target Score	*6,2*	*4,7*	*6,4*	*3,6*	*5,5*
Transformation knowledge	Develop and implement formal agreements and aligned policies for a coordinated river basin management, including:	4	5	1	1	4
	Design of pathways to enhance awareness of (water) resources management	4	4	5	N/A	N/A
	(Co-)Design and (co-)validate NXG tools/platform (e.g., WEFE Footprint), and build capacity (e.g., to use the NXG tools)	5	4	7	3	N/A
	Identify relevant WEFE Nexus components and indicators	6	5	7	6	7
	Improve communication between SHs and break silos,	5	5	N/A	3	N/A
	Determine the requirements to invest in infrastructure	5	N/A	1	N/A	5
	Average Transformation Score	*4,8*	*4,6*	*4,2*	*3,3*	*5,3*
	Overall Perceived Aims Achievement Score	**5,6**	**4,9**	**5,9**	**4,1**	**5,6**

Stakeholder analysis

Stakeholder identification

The SH base had now stabilized with almost 700 SHs in the register in total and roughly 150 official SHs (Table 19~~Table 19~~). In the past year the CS leads were asked to revisit the register and remove, update or change SHs that may no longer have been relevant for the project or had moved on to other roles. Consent-rates had now stabilized around the average rates of 20% (with CS1 being above average and CS4 being below average). In the CS, a core group of 10-20 SHs had formed that was strongly engaged in the project and sees the importance of the project results.

Table 19: Overview of the stakeholder identification across case studies – late-project

	CS1-Nestos/Mesta	CS2-Lielupe	CS3-Jiu	CS4-Adige	CS5-IUWMA	TOTAL
Preliminary	102	118	129	187	154	690
With consent (PPCF)	33	30	33	16	34	146
Without consent	69	88	96	171	120	544
With consent (%)	32,4%	25,4%	25,6%	8,6%	22,1%	21,2%
Without consent (%)	67,6%	74,6%	74,4%	91,4%	77,9%	

Overall, the distribution across sectors stayed roughly the same, with a preponderance of water and ecosystem SHs and a difficulty in reaching energy and food related SHs (Figure 28~~Figure 28~~ and Figure 29~~Figure 29~~). Nonetheless, these few SHs were taking part in NXG activities or were being directly targeted in one-on-one conversations by CS leads.

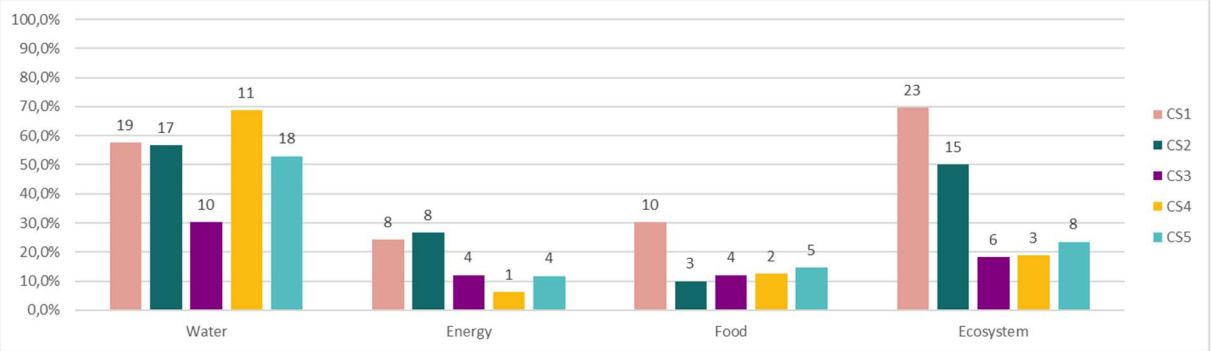


Figure 28: Overview of stakeholder distribution across WEFE sector in all case studies – late project

Figure 29: Differences between the distribution of stakeholder across the WEFE sectors in the preliminary and the official stakeholder list – late project

The overall SH landscape now almost reached gender parity (45,6% consented female SHs), even though female rates remained low in CSs 1 and 4, and generally high in CSs 2 and 3. This is also reflected in the participation at WS5 were near gender parity was reached across all SH (see Figure 45~~Figure 45~~ in the Conclusion).

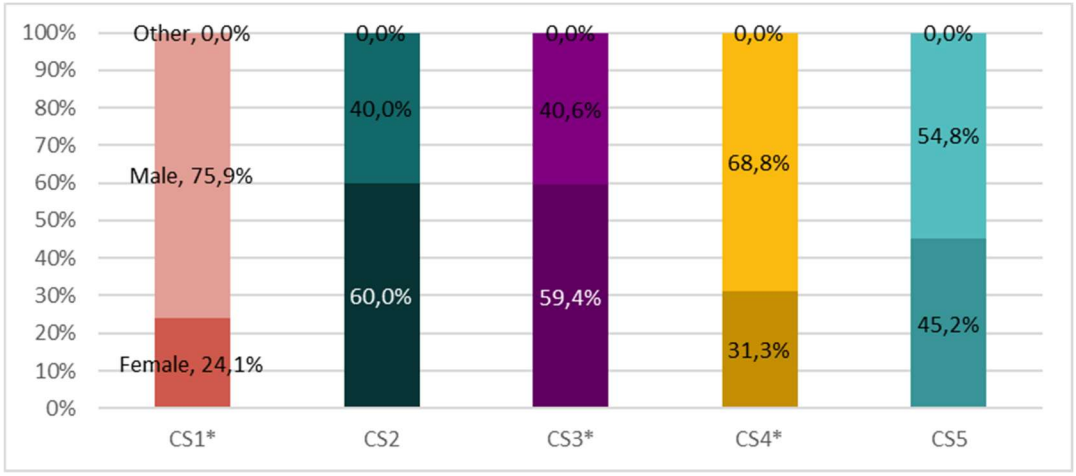


Figure 30: Overview of stakeholder gender distribution across case studies – late project

Stakeholder differentiation and categorisation

As the SH base was now largely consolidated the number of HI-HP SHs was also solidified (Table 20~~Table 20~~). This was particularly true for CSs 3, 4 and 5, whereas CS1 had a roughly equal share of HI-HP and HI-LP SHs, and CS2 exhibited half of their entire SH base as HI-LP SHs. One needs to keep in mind, that interest and power ranks were provided by

CS leads. A difference in perception of what constitutes a high or a low power SH may exist across CS leads.

Table 20: Overview of Power-Interest scoring of stakeholders, based on the perception of case study leads – late project

	CS1	CS2	CS3	CS4	CS5	
Power-Interest Map						TOTAL
High Interest - High Power (HI-HP)	12	10	22	13	24	81
High Interest - Low Power (HI-LP)	15	15	5	4	7	46
Low Interest - High Power (LI-HP)	0	0	0	0	1	1
Low Interest - Low Power (LI-LP)	2	2	1	0	1	6
TOTAL	29	27	28	17	33	134
% HI-HP	36,4%	33,3%	66,7%	81,3%	70,6%	57,6%
% HI-LP	45,5%	50,0%	15,2%	25,0%	20,6%	31,2%
% LI-HP	0,0%	0,0%	0,0%	0,0%	2,9%	0,6%
% LI-LP	6,1%	6,7%	3,0%	0,0%	2,9%	3,7%

Stakeholder relationships

The relationships across actors remained largely the same, as the SH base did not change significantly since the previous year (Figure 31~~Figure 31~~). One difference can, however, be seen in CS3 where the share of cooperative relationships increased from 48,5% to 64,9% and conflicting relationships almost halved (from 14,6% to 7,6%). Overall, since early engagement the share of relationships identified as rather conflicting dropped from 8,3 to 5,2%, whereas the share of relationships identified as cooperative largely stayed the same (27,0% to 28,7%).

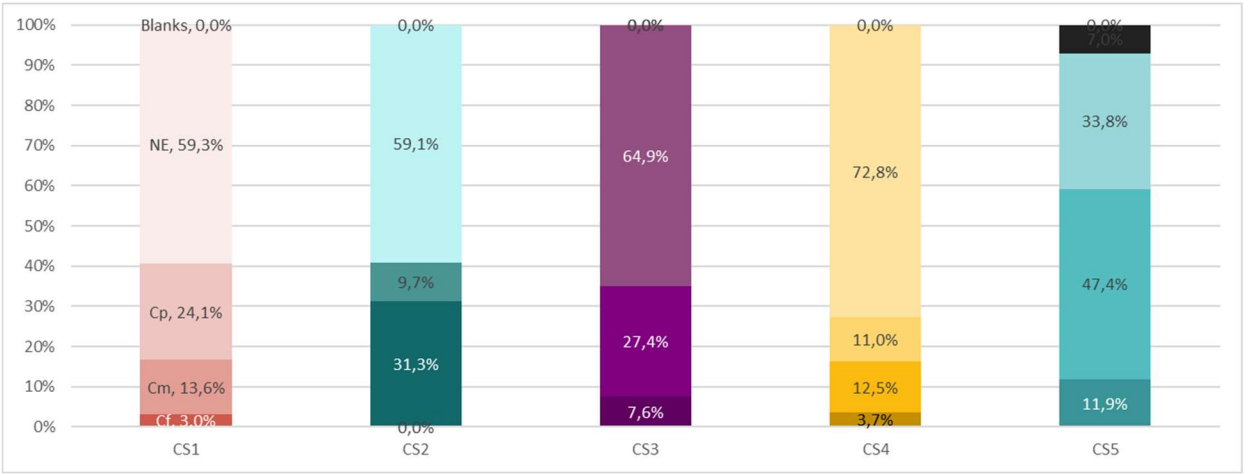


Figure 31: Overview of the relationships between stakeholders, based on the perception of case study leads. Cf: Conflict; Cm: complementary, Cp: cooperation; NE: non-existent; Blanks late project

Stakeholder engagement plans

During the interviews conducted in June 2024 between WP5 and the CS leads, the latter were asked to reassess their perspectives on the modes of co-creation. A template was distributed beforehand to allow CS leads ample time to reflect both upon their perceived desired mode of co-creation, as well as their perceived de-facto mode. The result was, in most cases, not that clear. This means that the resulting modes of co-creation did not overlap with the categories as defined in Chambers et al. 2021, resulting in undetermined modes of co-creation (CSs 3, 4 and 5) (Figure 32~~Figure 32~~). Interestingly, the desired modes of co-creation of CS1 and CS5 overlapped with those of their SHs ('brokering power' and 'empowering voices' respectively).

Whereas those of CS3 ('brokering power' and 'reframing agency') showed some similarities in their properties, CS2 ('empowering voices' and undetermined) and CS4 ('reframing power' and 'empowering voices') showed less similar properties. The lack of clear categorization was not necessarily something negative, as Chambers et al. 2021 determined these categories based on projects around sustainable development of ecosystems. In a future research article, we intend tp explore the role of these categories and properties within the categories further to understand their importance in Nexus projects.

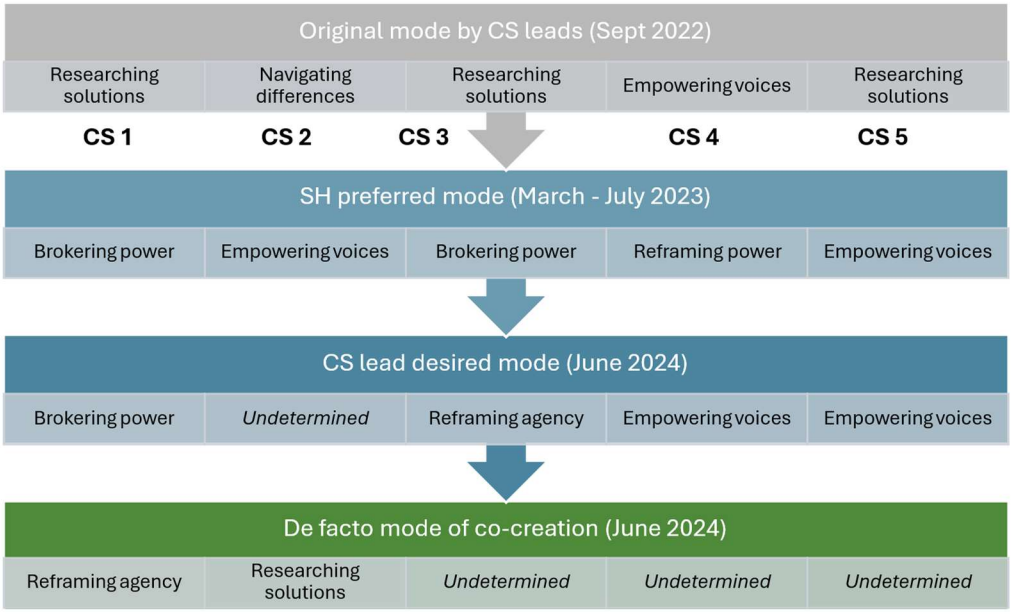


Figure 32: Modes of co-creation as identified by case study leads (early project), stakeholders at WS3 (mid-project) and re-evaluated by case study leads (late-project) in terms of their desired and the de-facto mode of co-creation

In this very last project year, the aim was to discuss the final NEPAT results with SHs in order to agree on UVPPs and their governance roadmaps to arrive at a SH agreement (or building blocks towards such an agreement) to change certain working modalities and improve overall conditions. As such, while the activities suggested for each CS were individual and context specific (see Table 22~~Table 22~~), common working modalities emerged as can be seen in

Table 21

~~Table 21~~. These activities included, working towards a high-level event to target higher-level decision-makers (provincial, national), showcasing the NEPAT and its results, targeting the creation of a follow-up group (see also SH sustainment below), and working through the existing core group of SHs as ambassadors or champions for sustained change.

Table 21: Generalized engagement activities across case studies in this final project year.

Information	Consultation	Involvement	Collaboration	Empowerment
A high-level final event with all key (local) SHs inviting high level (national/provincial) representation where the final results are presented with the aim of a hand-shaking/agreement ceremony sealing the SH agreement → invite press	Training session on how to use and implement of NEPAT, depending on the type of SH in a WS setting (take note of your own WS recommendations) or in one-on-one sessions with SHs that are more difficult to reach.		Regular get-together of certain groups (task forces, working groups, river basin management, etc.) for sustained exchange on nexus issues.	Use of ambassadors to speak on Nexus matters in other groups and settings; informal meetings to unfreeze stuck processes.

Stakeholder management and sustainment

Management

In this year's SHE plans, CS leads had the task to evaluate to which degree they had been able to work towards or achieve the previous year's recommended actions (Table 22~~Table 22~~). As such, all CS complied with the agreed cleaning of the SH register (in particular to remove SH information that may not have been GDPR compliant) and its update (SHs that have left or moved jobs). In general, CS leads responded well to the suggested sets of activities from the previous' year's SHE plan. Activities for co-exploration (information sharing) and co-design (consultation and involvement) were followed easily. Project information and results was shared via email and through one-on-one meetings. WS4 served as a good platform to provide SH with more extensive system knowledge and to show how the SHs inputs had been used to feed into the project results (e.g. the elements of the SDM, the indicators used in the WEFE footprint, the policies present in the NEPAT, the design features of the user interface of the NEPAT, etc.). Activities related to co-development (collaboration and empowerment) proved more challenging to undertake in most CSs. Reaching (low interest) high power SHs through other communication means than explored so far - e.g. one-on-one conservations through direct contacts but also through active SHs, small groups, technical conversations - was deemed to be challenging as it was not foreseen within the project budget and activities. Lastly, in all CS the creation of a new network, or the expansion of an existing network, forum, task force or working group related to nexus exchange and management was seen as important but setting this up in practice was considered challenging.

This final plan put a strong emphasis on the advancements that could be done at WS5 where the NEPAT was presented to SHs and the policy packages were agreed upon. While a final SH agreement was to emerge in WS6, CS leads were clear that many one-on-one and focus group discussions needed to happen between WS5 and WS6 to make this happen.

Table 22: Overview of the SH management activities and actions to best engage with SHs based on the overall evaluation of the situation in the late project phase.

From 2024 Plan

Plan	CS1	CS2	CS3	CS4	CS5
2023	The SH register was modified to be GDPR compliant.	The SH register was modified to be GDPR compliant.	The SH register was modified to be GDPR compliant.	The SH register was modified to be GDPR compliant.	The SH register was modified to be GDPR compliant.
		The core SH group in Latvia is formed by representatives from Latvia University of Life Sciences and Technologies, Latvian Environment, Geology and Meteorology Centre and Bauska County municipality. In Lithuania the most active (engaged) SHs are from Center for Environmental Policy (AAPC).			Following the increased attention to the energy and food sectors, an increase is food sector SHs has been seen, however the energy sector is still very much under-represented.
					SHs believe that the public sector agricultural SHs are under-represented. SHs believe that SHs from organisations that promote indigenous / traditional knowledge should be included.
2024					

Information sharing	Done via emails including updates on the progress of the project, phone calls with some SHs, sharing of project promotional material (e.g. flyers) and the organization of a focus group (co-organised with WP1), and it will be further developed until the end of the project. We are going to inform more SHs, especially high-level decision makers, during the last year of the project where the NEPAT tool for the Nestos/Mesta CS will be ready for demonstration.	SH lists were updated by adding new contacts, e.g., from ministries. Invitations to the events were sent to large group of SH.	Key SH were consulted (online meetings) during the development of the SDM directly contributing to completing the input data and for validating the outcome. This paved the interest for the online WS(#4) on NEPAT decision support tool, facilitating a high rate of participation. Further on the tool was used in a ”live”, hands-on session managed by EURECAT (WS #5), by a core group of SH from the SDG nuclei in the WEFE ministries in RO (with potential to be the future WEFE Nexus taskforce/NEPAT end users)	The updated policy packages were shared via email exchanges, also asking for data to integrate them in the SDM / NEPAT. The updated hydrological model was presented in a small WS in Eurac.	A project update was sent to SHs on 2 November 2023, including the outcomes of the governance and policy assessment, conceptual models and complexity science models.

Consultation	During the 4th SH WS (February 2024), the first version of the NEPAT and its functionalities was demonstrated to SH by EURECAT and a menti-survey regarding possible future improvements of the tool was shared. Lielupe CS was presented as an indicative example.	SH were provided with background information materials, presentations from research, e.g., NXG partners delivered	An international WS Water-Energy-Food-Ecosystems (WEFE) Nexus for Sustainable Development was carried out during the NXG Annual Meeting Bucharest, Romania September 17-19, 2024	The exchange between different sectors/categories was brought forward through activities planned under the hat of other projects (which were partially or completely overlapping in terms of study area- conflicts addressed) to (i) ensure consistency and avoid repetitions (ii) not to overload SHs with requests and participatory activities. For instance, we took part in the moderation of the table on water in the SH WS of the South Tyrol Climate Change Adaptation Plan. There policies and adaptation measures were discussed.	Prior to WS 4, email requests were sent to key SHs to encourage attendance of the WS. Following WS 4, a summary document was shared highlighting the key outcomes.
Involvement	One representative of the Special Secretariat for Water (Ministry of the Environment and Energy) participated in the online Focus Group that took place in May 2023. But higher-level decision makers are not engaged in the project yet.	SH inputs were reflected in presentations on the CS activities SH feedback to outputs was taken in interactive sessions and discussions	Discussions initiated from the start of the project, follow-up steps planned during 2024 and 2025 once the NEPAT is finalised. for further utilisation and integration in the one-stop-shop that will be created in Romania's Centre of Excellence for Sustainable Development (CEXDD). Additionally explore further utilization in education at the Bucharest Faculty of Agro-Environmental Economy	We have not organised a comprehensive CS WS since WS3. We are planning to have WS4-5-6 within a broader event on Adige in Eurac, potentially also with professional moderator (if budget allows). + See point above	WS 5 has specifically been set up in two different locations to enable key SHs to attend the sessions. A virtual session to include all interested in the NEPAT functioning has also been set up. Separate sessions were decided upon to shorten the amount of time required from key SHs, thus motivating their attendance.

Collaboration	Gathered inputs from marginalised SHs and convey them to powerful SHs: farmers that are marginalised SHs but have expressed urgent needs for reforming water allocation schemes – Municipality of Nestos that is a low-level decision-maker	Wide range of activities were employed in the project implementation; however, these were not designed specifically to the low-interest SH.	Follow-up plan to stimulating the use of the tool in SD policy making context to break silos for stimulating sustainable action and in an educational context for building up on nexus thinking by future professionals	1-on-1, small group discussions have been caried out, but not national conversations. We recognise the importance of smaller conversations of peer SHs across different regions, however these have proved more difficult to organise, so we focussed more on exchanges between sectors (within the same region).	The hosting of WSs has allowed SHs to network and to voice their concerns.
Empowerment	High-level decision makers to be involved and be included in the final SH agreement.	Setting the SH agreement on common activities in the Lielupe RB was discussed at the 4th SH WS. Wide range of possible activities were identified for further implementation.	Targeted meetings with „NEXUS champions" will be organised during the remining duration of the NXG to follow the actual knowledge transformation processes and use opportunities for promotion of the NXG overall approach support (SHE, governance assessment, policy inventory, NEPAT). Agree on additional capacity building or other type of needs to ensure policy making level is making use of NXG results		WS 5 will explore the potential roles and responsibilities for successful implementation of policy packages
2025					

Information sharing	Invite high-level SHs from both countries to final WS and 'agreement ceremonies'.	Have a transboundary event and 'launch' the Transboundary working group	Develop NXG activities around key international days (e.g., World Water Day, Danube Day). NXG activities in all CSs > official public launch of NXG recommendations	Organize an in-person project event where all results are presented Organize one event where all river basin actors (incl. researchers) are participating presenting their innovations and, involving different ongoing projects	SHs recommended that a project-wide virtual event should be organised toward the end of the project (with a political inflection) that brings together key decision makers from the various CS. Key results could be presented, and SHs could exchange strategies for implementation.
Consultation	Showcase (Co-)Designed and (co-)validated NXG tools/platform (e.g., SLNAE/NEPAT, WEFE Footprint), and build capacity (e.g., to use the NXG tools, to transition to renewable energy) Organize one-on-one conversations on NEPAT results.	Hold a training session on how to use and make use of NEPAT, depending on the type of SH in a WS setting (take note of your own WS recommendations) or in one-on-one sessions with those trickier SHs	Hold training sessions for SHs on how to use NEPAT e.g.; at national level with the SDG nuclei in WEFE ministries (@ the GA in September in Bucharest); in the curricula of the faculty of Economic at the University	Hold a training session on how to use and make use of NEPAT, depending on the type of SH in a WS setting (take note of your own WS recommendations)	Hold a training session on how to use and make use of NEPAT, depending on the type of SH in a WS setting (take note of your own WS recommendations)
Involvement	Nudge transboundary SHs to come together for a yearly meeting to discuss WEFE Nexus issues.	Suggest the creation of a Transboundary working group (meetings 1-2 times per year)	Suggest the creation of Task Force (ad-hoc gathering of SHs with support from the River Basin Management Authorities) (also upscale to other basins) and through SD department, TF to be attached to existing structures. à Pursue agreement on taking over the NEPAT tool and make use of it in SD policy making and educational contexts		Make use of existing regional forums and regional sustainable development. SH agreement could be to just link into one of the groups and have them take up Nexus thinking. > Incorporation of the proposed policy packages (that form the best possible footprint) into immediate planning. > More cross-sector collaboration and increased understanding of the impact of

					sectoral policies on other sectors.
Collaboration	Suggest informal meetings and visits of high-level national decision-makers to the River Basin to unfreeze the process of the TB agreement.	Use NEPAT to bridge national and local > results of NEPAT for the national ministries (environment agriculture, economics, climate and energy) and river basin authorities to see impact of integrated policies vs. silo policies.	Identify the champions that have now been empowered to talk on 'our' behalf on the Nexus in their settings.	Suggest regular meetings among researchers and different SHs to share advancements on data sharing and model developments	Suggest the establishment of a network of cross sectoral SH in South Africa. Find ongoing platforms, initiatives and demonstrate NEPAT and NXG co-creation approach in these venues and aim for a commitment to continue and expand these exchanges.
Empowerment	Bring the two mayors together for a "clean the river day?" where they shake hands, take picture and agree to organize a similar event annually				Expand, build the network on NEXUS talks across these forums and authorities. Identify ambassadors that can prompt these exchanges beyond the project

Sustainment

While the ideas from WS3 from the SHs seemed promising, they were also not necessarily tangible. Further conversations with and amongst CS leads were therefore held during the General Assembly meeting in Sept. 2023 and during the WP1-WP5 co-creation 3-day retreat in Berlin in Jan. 2024. Figure 33~~Figure 33~~ shows an overview of the reflections from those meetings. It shows that only CS2 managed to secure a process with which to maintain SHE around nexus issues as BEF (Baltic Environment Forum), the CS2 lead, can continue these interactions in the framework of another EU project until 2027. CSs 1 and 4 were unclear how to sustain SHE post-project, whereas CS3 and CS5 were positive that willingness to integrate nexus conversations at various existing fora is present. The latter two used the final year to continue exploring those avenues.

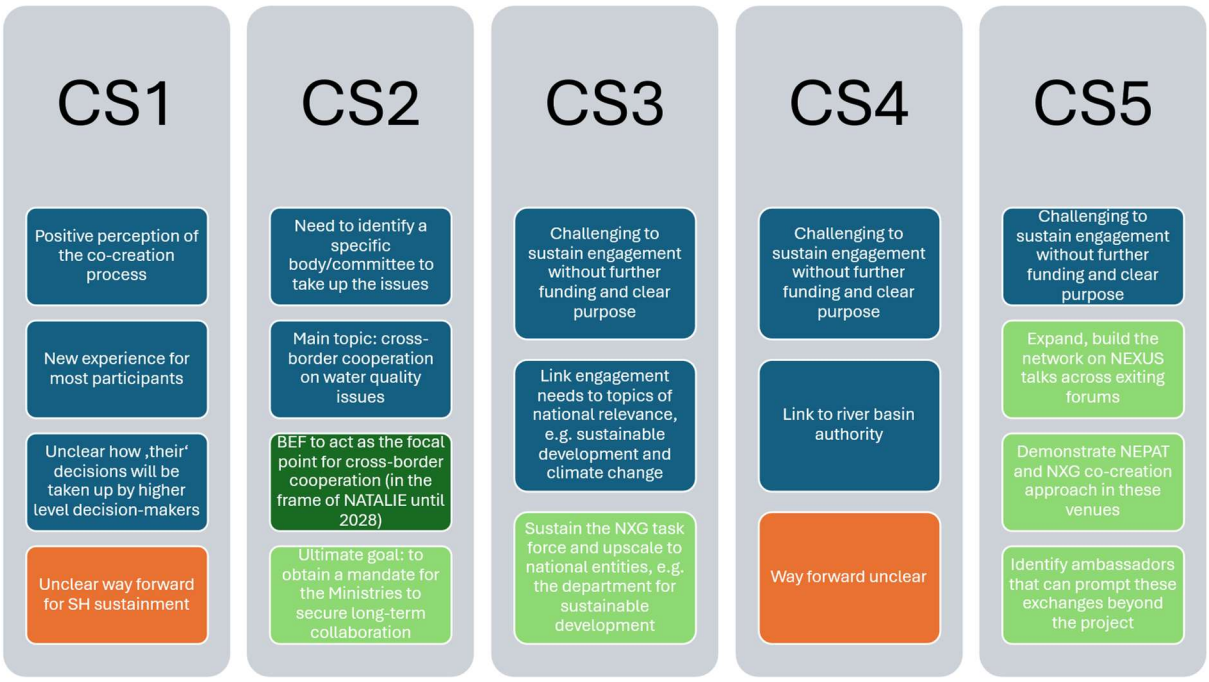


Figure 33: Ideas on stakeholder sustainment as per case study leads, WP1 and WP5 teams' reflections – late project; blue boxes – aims and reflections, light green boxes – ideas for sustainment, dark green boxes – informal agreement on sustainment, orange boxes – way forward on sustainment unclear.

Stakeholder engagement evaluation

In the past year only one WS took place which had the sole focus of obtaining feedback on the user interface of the NEPAT, its look and feel, and its functionality. Hence, no systematic survey was administered here. Instead, the SHE evaluation worked with the extensive reflection material that was elaborated through the various interactions across WP5, WP1 and the CS leads. Specifically, these were:

(1) In January 2024 (month 29) the WP1-WP5-CS leads 3-day retreat in Berlin to (a) reflect on the SHE process so far, (b) discuss the needs of the governance roadmap and the 'river contracts' to be drawn up by the end of the project, and (c) draw lessons learned

from the process and suggest adapted strategies with a view of achieving the river contracts and the needed SH sustainment.

(2) Throughout the early part of 2024 (months 30 to 26), interviews that took place between WP5 and CS leads to feed into Milestone 23: Second intermediate report on case study implementation and co-creation activities for the [respective CS]. Information relevant for the SHE plan update was extracted from the latter parts of MS23, namely 'Impact maximization' and 'Lessons learned'.

(3) In June 2024, additional focused interviews took place with CS leads to gauge 1) to what extent CS have, in their own perception, reached the aims they had set for themselves and 2) whether priorities and expectations have changed based on their experiences throughout the project. The results of these interviews are reflected above already in the aims (Table 18~~Table 18~~) and the engagement plans sections (Figure 32~~Figure 32~~).

(4) In preparation of the plans throughout August and September 2024, CS leads were asked to self-assess their implementation of the suggested SHE activities as suggested in the previous plan. The result of this assessment is reflected above in the section on SH management in Table 22~~Table 22~~.

Recommendations from the 'Berlin meeting' revolved around three main areas and were integrated into the late-project engagement plans:

1) Reflections on the **WS modalities** resulted in CS specific recommendations on how to carry out WSs. As such for the different CS, the following recommendations were made:
   a) CS1 – no specific recommendations.
   b) CS2 - Keep the face-to face WS approach, invite project partners including modelers and tool developers, as they are the ones who could provide scientific support which is of high importance. Obtaining feedback from SHs via evaluation surveys, as well as learning from other CS on SHE approaches, successes and challenges is always useful to get inspiration for agenda development and communication tools to be applied during the interaction with SHs at the events.
   c) CS3 - For the remaining WSs keep the following in mind: Reduce the number of targets in each of the WSs; One-way scientific language presentations were hard to follow; Translation and interpretation were useful; Break-out rooms were not possible – people want to stay in plenary.
   d) CS4 - When holding a WS or an event take a look at your own recommendations of how to best frame and carry-out those WSs for maximum results.
   e) CS5 - SHs encouraged the use of the hybrid meeting method for future WSs. When carrying out WSs or events keep in mind your own recommendations and lessons learned.
2) Reflections on **SH dynamics** where CS leads were in agreement that finding dates with SHs for WSs is becoming increasingly challenging. Some CSs are dealing more prominently with SH fatigue then others. This is reflected also in the answers to the policy impact questions of MS23 below.
3) **Suggestions for local actions.** These were integrated as ideas for information sharing or empowerment in the respective SHE plans of the CS. Ideas ranged from a 'river clean-up event' to a handshake of transboundary mayors.

Information from M23 can be found in Table 23~~Table 23~~ and highlights (a) the importance of the scientific basis of the project for SH, (b) the challenges of dealing with SH fatigue and the sense of lack of power of the committed SHs to induce meaningful change, and (c) the trust that has been built with the SHs but also across SHs which is crucial for any work going forward.

Table 23: Summarized answers from MS23 regarding CS specific stories of change and desired policy impacts.

Nexus	**Q: To which degree do you think are stakeholders 'convinced' by the Nexus approach the project is offering? What are some of the pros and cons that they are voicing?** Consensus across CS that SHs are convinced that the 'nexus' offers an opportunity to overcome current deadlock situations Pros: ➢ Scientific basis of the approach ➢ Opportunity to cooperate and collaborate with SHs outside of their typical realm ➢ Better understanding of the societal value of the resources and ways to manage them sustainably Cons: ➢ The level of power of the involved SHs to make effective changes (influence over policy making versus own sphere of influence) ➢ The representativity of SHs that show up and the lack of certain sectors or levels of SHs which leads to lack of data, information and the opportunity of exchange ➢ The fact that most administrative processes are set up and done in silos ➢ Another project, whose results will sit on a 'shelf' which leads to SH fatigue and demoralization		
Stories of change	**Q: What was the most significant change that you observed in your stakeholders - in their attitudes, in their interaction with you, in their interactions with each other?** ▪ Trust in the project team and the project's results and outputs due to its scientific evidence base and the effort of CS leads to keep in touch with SHs ▪ Increased trust across SHs (dialogue across Transboundary RB)	**Q: What do you think caused that change - which activity(ies), which interactions, which kind of knowledge that was generated?** ▪ Face-to-face and one-on-one interactions helped build this trust ▪ Continuous request for input and presentation of how inputs were incorporated into the project tools, results and outputs (e.g. policy preferences, conceptual	**Q: Was there anything that surprised you in how the project is unfolding? If so, what is it and why is it surprising/unexpected to you?** ▪ The continued participation of a core of SHs in many of the project events due to their belief in the importance of the Nexus approach and the results that the project is delivering ▪ The increasing interest of SHs to work in cross-

	▪ Increased willingness to contribute to the project with knowledge to shape its outcomes ▪ Interest in contributing to local changes -- SH sustainment critical for post-project impact	models, interview results into the governance assessment, etc.) ▪ Allow for a space to interact with each other that is otherwise not given ▪ Tailored engagement approaches for High-Power SHs that do not take part in other regular project activities	border settings which offers the opportunity to learn from each other, identify common problems, and finding collective local solutions to these ▪ The fact that project SHs talk about the importance of the Nexus and advertise the project and its results in other settings unrelated to the project (spontaneous ambassadors)
Policy impacts	**Q: What policy impact do you think you would like to achieve? Which one do you think is realistically possible within the timeframe of the project?** Policy impacts range from influencing the implementation of specific policies, to using the results of the NEPAT for immediate policy implementation, to changing policy making processes. The following have been highlighted by the CS: **CS1:** Limitation of water losses in the agricultural sector and increase of renewable energy generation (in particular from PV) **CS2**: Mainstreaming the use of nature-based solutions into multiple sectors, e.g. agriculture, urban planning and forestry. **CS3**: Having WEFE Nexus impact included in the ex-ante and ex-post evaluation	**Q: Are there any major roadblocks in the way knowledge co-creation is being carried out in the project? If so, what are they and which effect do you think these have on policy impact?** ▪ Limited participation of certain sectoral actors (i.e. energy) and high-level SHs --> leads to issues in the lack of data in knowledge to build the models but also to the implementation of change ▪ Issues with SH fatigue and overload, many SHs are being asked to interact in a series of research and/or development projects --> disengagement and discontinuous participation can lead to reduced knowledge co-creation as the process needs to be restarted with the new participants	**Q: What capacities do you think you/your institution/the consortium is missing to effectively implement policy shifts towards the Nexus? What capacities do you think are missing in your stakeholders?** ▪ Most CS leads institutions do not have the power or capacity to (a) make policy changes, (b) engage directly with high-level actors that make policy, or (c) sway high-level actors to interact with NXG. ▪ In addition, most SHs involved in NXG are not directly involved in policy making but rather in policy implementation. NXG and its SHs present the opportunity to (a) change and better policy implementation and (b) influence policy making, as the SHs superiors are often more directly involved in policy making

	procedures in policy making in all WEFE sectors, at all levels (EU, national, regional, local). **CS4:** Using the results of the NEPAT to guide the update of water-related policies for the Province of Trento, which is a specific user demand. This may be hampered by the lack of province specific data and information that renders the tool unspecific to the province-related specificities. **CS5**: Incorporation of the proposed policy packages (that form the best possible footprint) into immediate planning.	▪ Beyond its educational value, the project also has the potential to provide easy-to-use tools to facilitate nexus-based decision making for SH with different profiles and roles in each WEFE sector, as well as across sectors. ▪ The limitations of the models (e.g. a lack of monitoring / data collection of specific processes, lack of open access data / limited sharing of data) could be used to pinpoint the gaps and to identify the steps needed to achieve a more reliable SDM and consequently NEPAT tool.	▪ NXG consortium and nexus network alliances have the capacity to advocate to higher levels with a consolidated substantiation and strengthened motivation for action while at the same time empowering lower levels with increased awareness, education and easy to use tools to facilitate implementation processes.

Lessons learned from co- development

Findings from the late project engagement emerged for CS teams, many of which were integrated as recommendations into the final stretch of the project:

- **Success in early-stage engagement**
  - Activities related to **co-exploration** (information sharing) and **co-design** (consultation and involvement) were well implemented.
  - WS4 effectively demonstrated how SH inputs shaped project outputs (e.g., indicators, policy tool design).
- **Persistent challenges in co-development**
  - **Co-development and empowerment** were difficult, especially in engaging high-power, low-interest SHs.
  - Lack of budget and foresight for intensive outreach (e.g., one-on-one discussions) limited deep engagement.
  - Building or expanding nexus-focused networks or forums was considered valuable but remained underdeveloped due to lack of clarity and support.
- **Sustainability of SHE**
  - Only CS2 secured a mechanism for continuing engagement post-project (via another EU project).
  - Other CSs showed uncertainty or mixed optimism about sustaining dialogue.
- **Mixed and evolving modes of co-creation**

- Many CSs could not clearly categorize their co-creation mode using existing frameworks (e.g., Chambers et al. 2021), resulting in “undetermined” modes in this late project phase.
- Desired modes of co-creation sometimes aligned with SH views (e.g., CSs 1 and 5), but this was not consistent across CSs.

➢ **Insights from WSs and retreats**

- WS effectiveness varied; valuable insights were gathered on tailoring formats:
  - Avoid overloading agendas.
  - Avoid one-way presentations; ensure language accessibility.
  - Favor hybrid models where appropriate.
- SH fatigue and scheduling conflicts increasingly hindered participation.

➢ **Built trust as a critical asset**

- Despite challenges, trust between SHs and project teams—and among SHs—emerged as a key enabler of future collaboration.

As the project entered its final year, lessons from the late-stage engagement phase offered critical insights for maximizing impact and laying the groundwork for post-project sustainability. The final-year efforts needed, thus, to prioritize flexible, focused dialogues—such as one-on-one or small group sessions—that build on established trust and adapt to SH capacity and interest. This intended to help consolidate gains, formalize lessons into governance and communication tools, and empower SHs to carry forward the project’s vision in their own institutional and policy contexts.

Final engagement (summary from the month 42 - 46 evaluations)

For this final stage, at the very end of the project, no plan was generated but much happened that we reflected on (Figure 34~~Figure 34~~). Most CSs conducted one or two WS (WSs 5 and 6) and engaged in many one-on-one activities with specific SHs that were relevant either for the development of the governance roadmaps, the SH agreements, the further use of the NEPAT (for instance in higher education teaching and vocational training), or simply for SH sustainment and post-project activities. Final evaluations were conducted to help facilitate post-project activities and show SHs avenues for future interaction and give consortium members ideas for subsequent research projects.

Individual summaries of the final evaluation can be found in Part III:

- CS1: Nestos/Mesta
- CS2: Lielupe
- CS3: Jiu
- CS4: Adige
- CS5: IUWMA

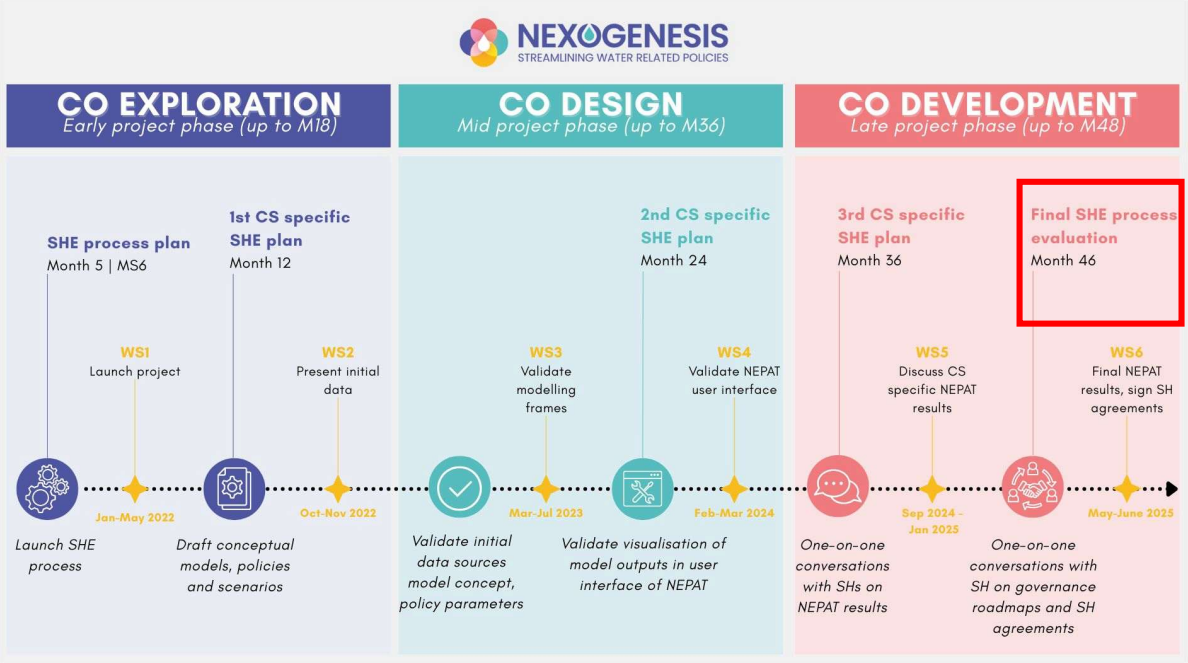


Figure 34: Temporal orientation of the placement of the final SHE evaluation in the project time frame

In the late phase of the project, the evaluation of the SH engagement was composed of surveys at the WSs (largely equivalent to the one implemented at the 3rd WS) as well as a WS activity on the preferred and experienced modes of co-creation as per Chambers et al. (2021) at those CSs where a final WS was held (Figure 35~~Figure 35~~). This activity also resembled the one conducted at the 3rd WS at each CS.

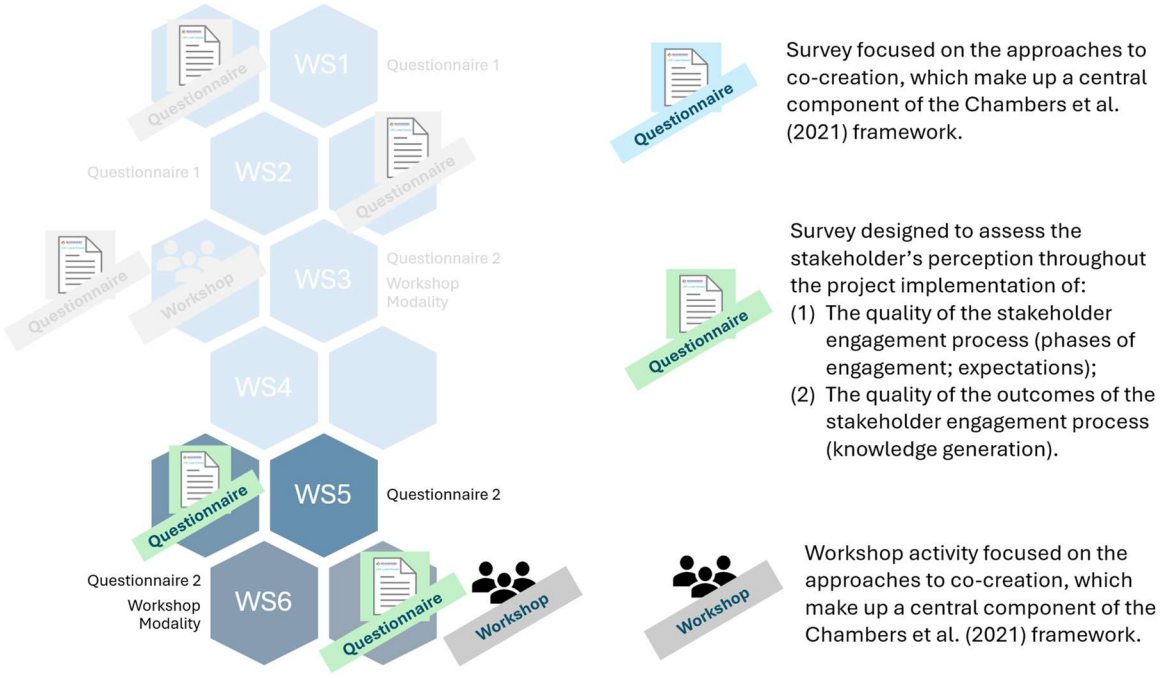


Figure 35: Basis for the evaluation material and change in the evaluation process – end-project

These assessments focused on four key dimensions: SHs' perceptions of process quality, the knowledge generated, delivery on expected outcomes, and alignment between intended and experienced modes of co-creation. The findings provided critical insight into how the project's participatory ambitions translated into practice and how SHs perceived its legacy at the point of closure.

Perception of Process Quality

Across the CSs, SHs reported high levels of satisfaction with the quality of the co-creation process. This was particularly evident at the WS level, where engagement was direct, outputs were tangible, and participants sometimes even expressed a sense of inclusion and ownership.

By contrast, engagement at the broader project level was often perceived as less immediate. While many felt actively involved in local WSs, they reported lower visibility or influence in the overall project trajectory. In some cases, where final activities had a broader or external focus, this contributed to a sense of detachment.

Perceived empowerment and collaboration tended to be somewhat lower than for consultation or information-sharing. These perceptions improved in some later WSs, particularly where facilitation focused on co-ownership and mutual decision-making.

Knowledge Generation

Knowledge generation was widely recognised as a strong outcome of the co-creation process. SHs across nearly all CSs reported substantive gains in understanding, particularly in areas related to water governance, cross-sectoral linkages, and nexus thinking.

In several contexts, participants reported acquiring more transformational knowledge, i.e., knowledge about how to enact change, than system knowledge, which relates to understanding current conditions. This suggests a strategic late-phase emphasis on implementation and future planning over reflective analyses.

However, there were variations in thematic coverage. In some cases, SHs reported lower knowledge gains in social and economic nexus dimensions compared to technical or environmental areas, possibly reflecting the focus or expertise within specific WSs.

Delivery on Expected Outcomes

SHs consistently rated all outcome categories as highly important, including knowledge production, process quality, equity, institutional strengthening, and enabling change. Delivery against these expectations was generally seen as positive but not uniform.

Knowledge production and process quality were widely viewed as having met expectations, particularly in CSs 1, 2 and 3. In contrast, institution building and, to a lesser extent, social equity, were seen as underdelivered in several contexts. CSs 1 and 2 both showed improved ratings in later WSs, but variation among SH responses persisted. The comparatively low level of met expectations regarding institution building and social equity is possibly also a consequence of them not being primary foci of the project, as per the CS aims identified (see Table 7~~Table 7~~).

In some sites, especially those with broader or more diverse participation in the final phase, evaluations revealed greater dispersion in outcome assessments, reflecting a wider range of priorities and experiences. This variation did not signal dissatisfaction overall but pointed to the challenge of maintaining alignment across evolving SH groups.

Modes of Co-Creation

SH reflections on modes of co-creation revealed a moderate but consistent divergence between preferred and experienced approaches. Many participants identified with inclusive, empowerment-oriented modes such as *“Empowering Voices”* or *“Navigating Differences”* (Chambers et al., 2021), which emphasise shared agency, trust-building, and inclusion of marginalised perspectives (Figure 36~~Figure 36~~).

In practice, SHs more often associated their experience with *“Researching Solutions”* or *“Brokering Power”*—modes focused on knowledge generation and engagement with influential actors. These were generally appreciated for their structure and relevance but were seen as offering less space for deeper relational or equity-focused engagement.

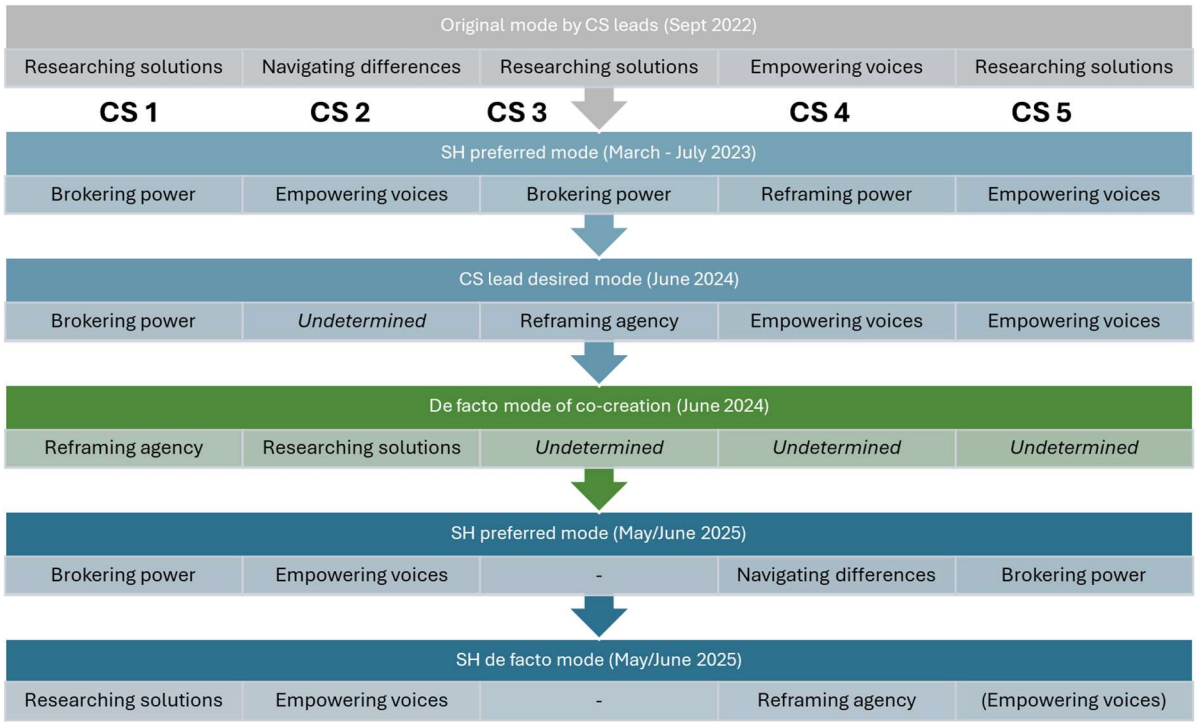


Figure 36: Changes of modes of co-creation over time including the stakeholder perceptions in the final evaluation.

Crucially, this mismatch was not perceived as a failure. SHs largely understood the trade-offs involved and often valued the project's responsiveness and technical support. In some contexts, co-creation practices appeared to adapt over time, shifting from expert-driven modes toward more deliberative or relational ones as trust and shared purpose grew.

Overall, the project's approach to co-creation was viewed as constructive and meaningful, even where it did not fully reflect SH aspirations. Reflections pointed more to areas for adjustment than to fundamental misalignment.

Reflections

The late-phase evaluations confirmed that the project successfully facilitated meaningful engagement, learning, and collaboration across a range of SH groups. The **positive experiences reported at the WS level** suggest that the co-creation processes were generally effective in building trust and generating momentum.

However, the project's ability to deliver **long-term change or systemic empowerment** appears to have been uneven. While some participants left the process with a sense of ownership and readiness to act, others voiced doubt about whether the structures and relationships formed would persist without continued support or political commitment.

Recommendations for post-project implementation thus revolved around the following:

1. Tailor and sustain engagement strategies

- Leverage **trusted relationships** to continue SH dialogue.
- Use **ambassadors/champions** from the existing SH core group to advocate for ongoing nexus discussions.
- Create **focused, manageable follow-up groups** rather than broad new forums.

2. Institutionalize learning

- Document **co-creation lessons and WS formats** to guide future projects.
- Adapt Chambers et al.'s categories for Nexus-specific settings, acknowledging the blurred and evolving nature of co-creation.

3. Support empowerment through local actions

- Encourage simple, tangible empowerment activities (e.g., river clean-ups, symbolic actions) that reinforce commitment and visibility.

4. Bridge gaps in governance

- Use NEPAT and governance roadmaps to initiate discussions with decision-makers at national/provincial levels.
- Ensure that final policy packages reflect **user validation** and are actionable within institutional constraints.

5. Address SH fatigue and enhance value proposition

- Provide clear, visible impact pathways for SH contributions.
- Emphasize how science-based tools (like NEPAT) can support SH goals to re-motivate engagement.

6. Enable continuity

- Where possible, **embed Nexus dialogue in ongoing projects** or programs (EU or local).
- Prepare handover strategies for SH networks or forums to local institutions or NGOs.

In conclusion, while the NXG project succeeded in fostering trust, dialogue, and meaningful co-creation across diverse SH groups, its long-term impact depends on how well these achievements are sustained beyond the project's lifecycle.

Conclusion

This last section is meant to reflect on the SHE process, its evolution, design, effectiveness and the lessons we can draw from this experience for future WEFE Nexus implementation. In general, we can say that the process was flexible and allowed for tailored activities that were pertinent to the respective context in terms of the stage of the projects and the type of CS. The extensive and sometimes challenging evaluation process allowed us to understand the needs of the SH in great detail and provide CS-specific recommendations for actions. In addition, the multiple instances for reflection within CS (diverse interviews with CS leads throughout the lifetime of the project, planned and unplanned) but also across CS (particularly the three-day meetings in year 3 in Berlin and 4 in Athens of the project) allowed for cross-fertilization and learning from each other. This does not mean that all challenges were overcome. Issues of SH fatigue, lack of access to certain SH groups (energy, high level decision-makers, etc.) remained a constant pressure throughout the project and had little to do with the project itself, but rather with the changing dynamics of meetings in the post-COVID years and mounting pressure on technical government officials to be present in a large number of research and development project events.

In summary, we can say that:

- ✓ The NXG project managed to attract the interest of a wide group of SHs (roughly 700 SHs in total in register) and retain and sustain the engagement of a solid set of 'official' SHs (150 consented SHs and about 20-30 SHs per CS with active involvement).
- ✓ The adopted process was intense and time-consuming but proved to allow for the necessary flexibility in time and space to adapt SHE activities to the needs of the CSs and project plan.
- ✓ While the evaluation process was cumbersome and complex, it provided valuable insight into SH perceptions and the knowledge co-production achieved.
- ✓ SHs overall felt well engaged and valued which resulted in a high level of trust in the knowledge produced and the usability of the outputs of the project.
- ✓ SH fatigue and challenges to engage with certain actor groups (energy and food sectorial actors and high power SHs) could not be fully avoided or overcome, resulting in varying degrees of adoption and potential impact of the uptake of the project outputs and outcomes.

Adapting to SH needs

The yearly development and implementation of the full SHE process from aims setting all the way through evaluation intended to support the tailoring of SHE strategies to the needs of CS and the consortium throughout the lifetime of the project and its specific context in time and space. Thus, changes occurred throughout the lifetime of the project but also differed between CSs.

The overall SHE was structured in three phases, namely co-exploration in the early phase of the project, co-design in the mid-phase of the project and co-development in the late stages of the project (Figure 3~~Figure 3~~). While co-exploration pursued the aim of understanding the

overall problem landscape and presenting the project to the identified SHs, co-design focused on working with the SHs in developing the tools that allowed the further understanding of system, target and transformational knowledge. As such the conceptual models that are fundamental for the design of the systems dynamic models were co-designed during WS2 and validated at WS3. Similarly, the WEFE nexus indicators for the WEFE Nexus Footprint and the policies and scenarios that were to drive the simulations in the NEPAT were identified, discussed and validated during WS2 and 3. Lastly, all the information that had been collected was fused into the first version of the NEPAT, whose user interface was validated by SHs in WS4 in its design, functionality and modality of use. In the final phase of the project, during co-development, the results of the simulations were discussed, validated and updated at WS5 and through one-on-one conversations with key SH. Similarly, the governance roadmaps that show how to update, change and improve implementation of the policies selected by SHs throughout the process as fundamental 'Nexus' policies, were discussed and validated with SHs at WS5 and through one-on-one conversations. Lastly, at WS6 the final NEPAT results were presented to a broad audience and SH agreements on the proposed governance roadmaps were confirmed and signed in some CSs, and the building blocks of such agreements established for other CSs.

What this section below intends to show is how the SHE changed over time and morphed from co-exploration approaches and strategies through co-design into a final, intense phase of co-development, and how these strategies were designed to be CS specific and pertinent.

(1) SHE aim

The SHE aims only changed slightly over time. In particular, in CS1 there were changes in the systems knowledge dimension with aims changing from understanding the (biophysical) problems towards making sure that the project solutions were fit-for-purpose. Interestingly the aims formulated by SHs as assessed through surveys at WS3, while present and deemed as relevant for the CS SHE plans, were not taken up by CS leads in the reformulation of the CS specific SHE aims in the late engagement phase.

(2) SH analysis

Stakeholder identification

Overall, the number of SHs as identified in the SH register increased throughout the lifetime of the project (Figure 37~~Figure 37~~). In many CSs, the numbers plateaued towards the final phase of the project showing that the maximum number of SHs had been identified. Reductions in the number of SHs in some of the cases are due to the fact that the register was revisited and revised in the second half of the project to reflect any changes in the SH composition and transfers of SHs to other posts. Overall, CS4 and 5 hold the largest number of SHs in their registers (160+), whereas CSs 1, 2 and 3 hold around 110 to 120 SHs in their registers.

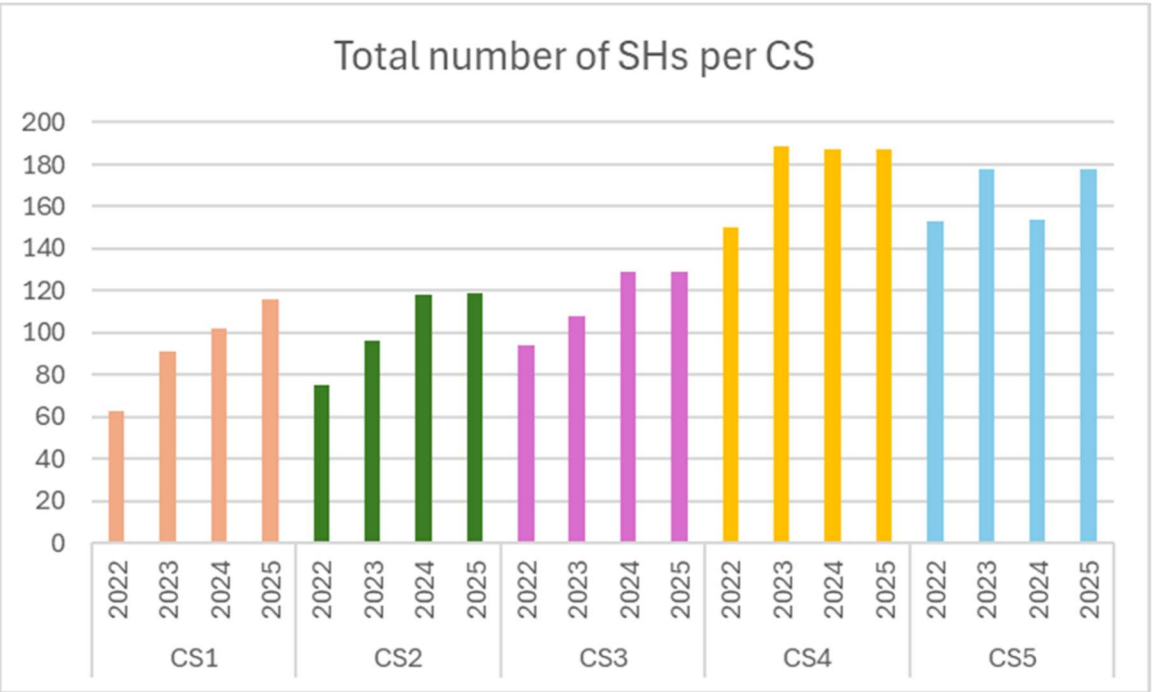


Figure 37: Evolution of identified SHs in the register in the different CSs over time.

Relative consent rates largely increased in the early phase of the project, as new SHs were actively asked to fill in the PPCF (Figure 38~~Figure 38~~). Later drops in the relative consent rate show that while SHs were added to the register, the CSs did not manage to reach relatively more SHs to actively fill in the PPCF, thus sustaining the overall number of consented SHs, but not the relative amount with respect to the overall SHs represented in the register. Overall, the percent of consented SHs reached 20 or more percent and the number of consented SHs plateaued around 30 in most CS (except for CS4 where it was lower). While consenting to the PPCF did not signify any commitment to the project itself, SHs sometimes perceived the filling in of the form as a such, which may have been a barrier for some of the SHs. Overall, the number of consented SHs is a relative representation of actors that showed a high interest in the project and, often, their engagement in WS. These aspects are discussed in more detail in Avellán et al. (2025).

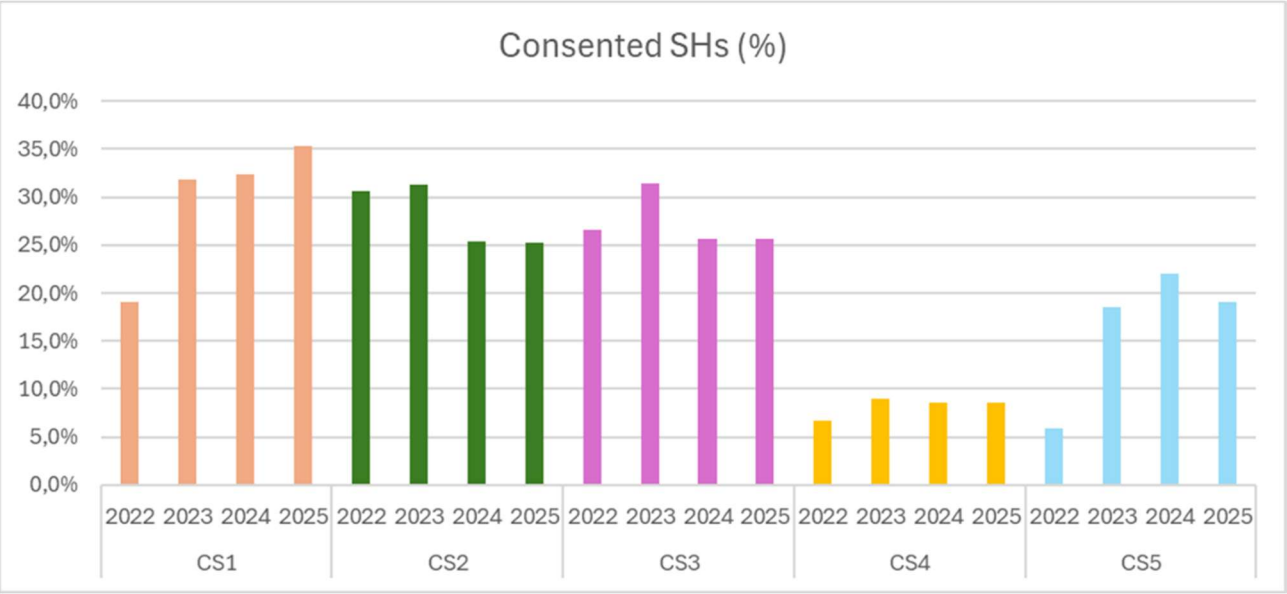


Figure 38: Relative amount of consented SHs in the case studies over time.

The distribution of SHs across the different WEFE sectors was dominated by water and ecosystems actors (Figure 39~~Figure 39~~). Mostly, their numbers increase in the early project phase and then plateau with the relative distribution across sectors changing very slightly at best. Reaching energy and food related actors was deemed difficult in all CSs.

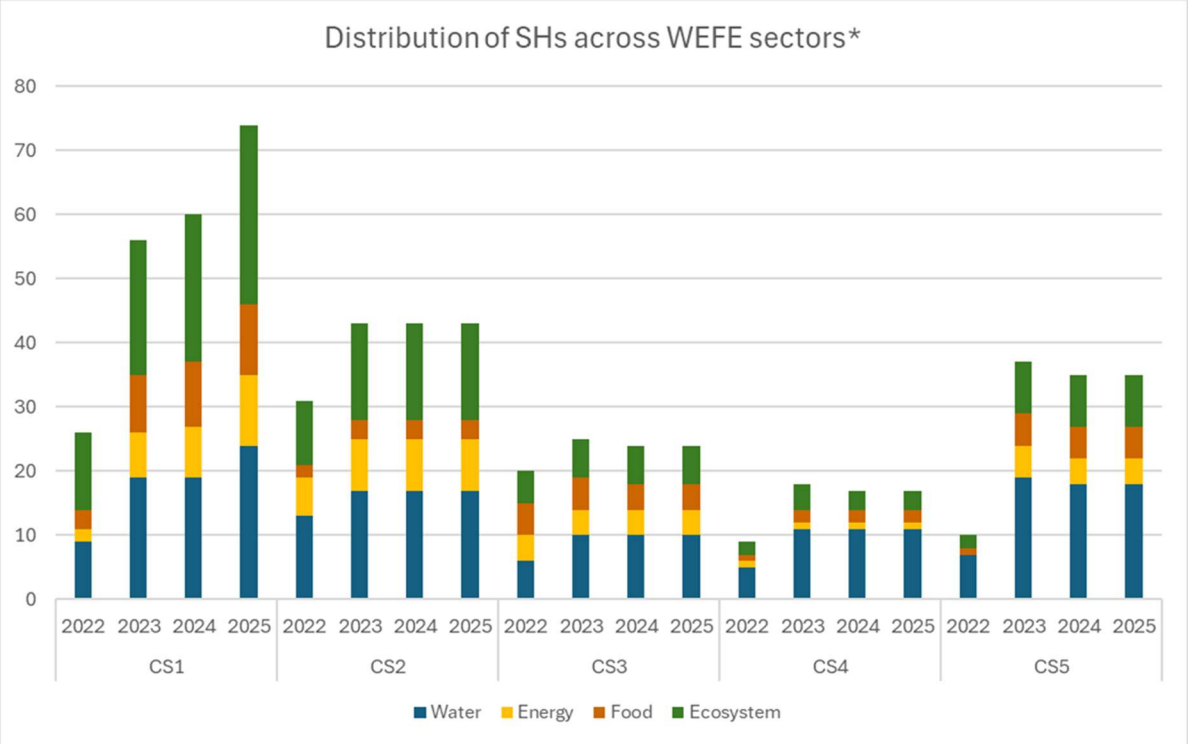


*Figure 39: Distribution of number of stakeholders across the WEFE nexus sectors in the case studies over time. *stakeholders could be assigned to more than one WEFE Nexus sector.*

In terms of gender distribution, a large disparity was observed across the CS, with CSs 2 and 3 having a positive bias towards women in their SH distribution, and CSs 1 and 4 having a strongly male dominated SH base, and almost parity in CS5 (Figure 40~~Figure 40~~). Throughout time, the female to male ratio did not significantly change after the early project phase if at all (Figure 41~~Figure 41~~). Thus, overall, we can say that the sex distribution across CSs and time was largely set from the beginning and changes to the SH identification and activities in the project had little to no effect on this. While we also asked for non-binary identification, no SHs fell into this category.

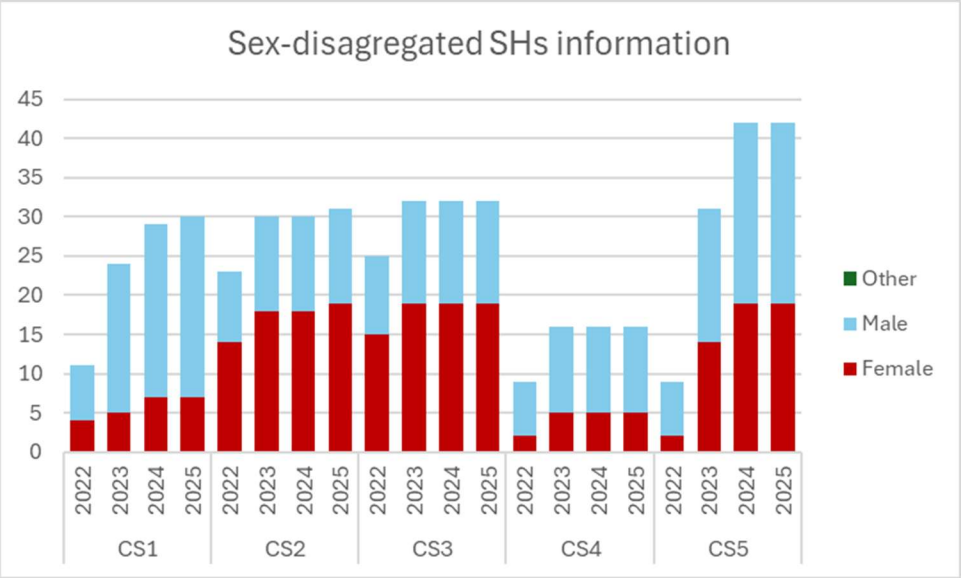


Figure 40: Relative distribution of male to female (and other) stakeholders across case studies and time.

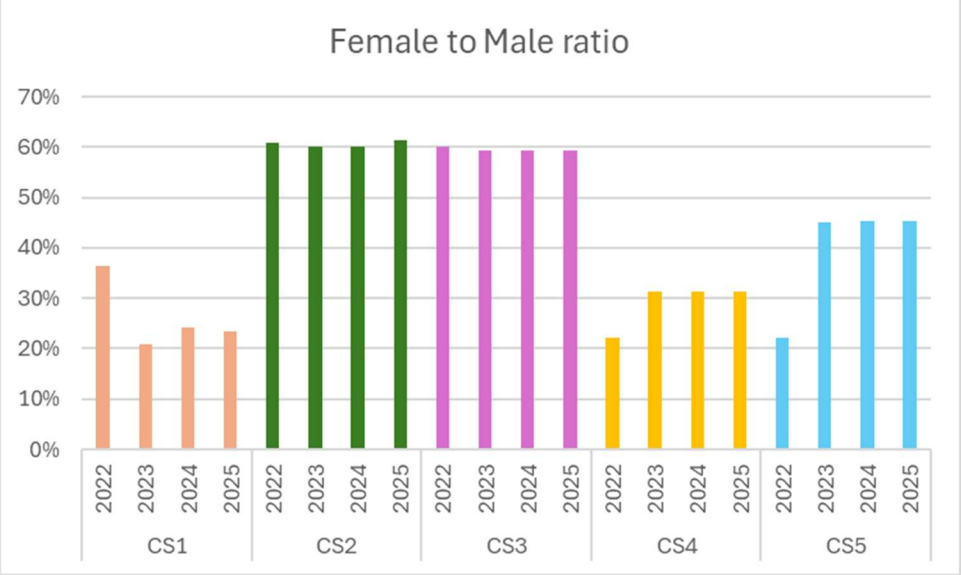


Figure 41: Relative female to male distribution of stakeholders across case studies and time.

Stakeholder differentiation and categorisation

SHs were largely high interest. This has, in part, to do with the fact that interest and power were only assessed and represented for consented SHs. As seen above, the motivation to consent was largely interest driven. Hence, there is an inherent bias in the power-interest maps of the SHE plans (see also Avellán et al., 2025) and the representation below (Figure 42~~Figure 42~~). Keeping this in mind, there are two interesting elements to reflect upon. First, there is a difference between CSs 1 and 2 when compared to CSs 3, 4 and 5, in the fact that the former (the frontrunners) exhibited a relatively high share of Low Power SHs (light blue) while the others showed a rather high share of High Power SHs (dark blue). Second, changes over time, were most prominent in CS1 (relative loss of high interest – high power SHs in favour of high interest- low power SHs), and in CS4 (loss of low interest – low power SHs). CS5 is the only CS that identified and retained low interest – high power SHs, which were deemed to be critical for all CSs, as these are often the (national) decision-making authorities. Given this challenge, all SHE plans insisted on the need for reaching out to low interest SHs (see Table 11~~Table 11~~, Table 16~~Table 16~~, and Table 22~~Table 22~~). Having said this, the adopted mode of analysis does not fully allow for the evaluation of the success of reaching low interest SHs.

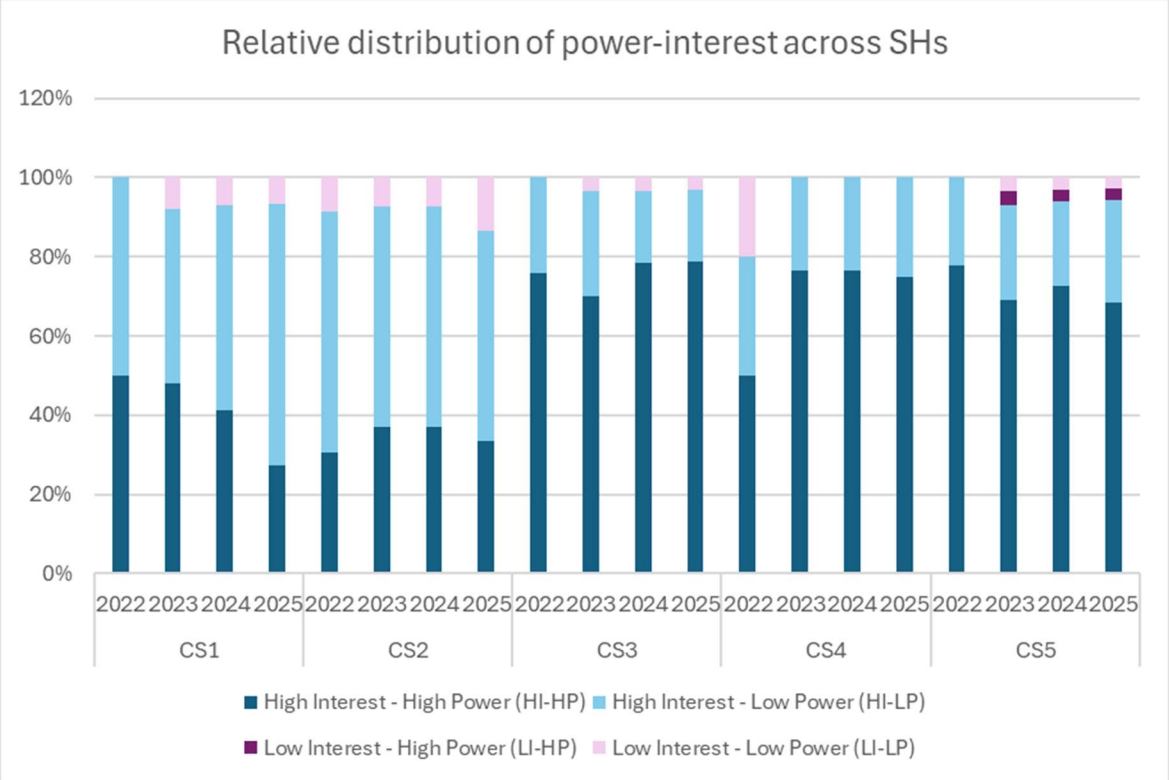


Figure 42: Relative distribution of power-interest levels of stakeholders across case studies and time.

Stakeholder relationships

A few interesting remarks follow from the analysis of the actor-linkage matrices over time and across cases (Figure 43~~Figure 43~~). First, CSs 3 and 5 showed high shares of cooperation and complementarity (green elements of the bars) of actors across time with virtually no non-existent relationships. However, as the project evolved, while CS3 managed to reduce the share of conflicting actor relationships, CS5 increased this share. That there were basically no

non-existent relationships identified in either CS probably has to do mostly with the fact that these were national, non-transboundary cases, where most actors interact with each other in one way or another, if at least in the respective river basin management organizations.

Second, CSs 1, 2 and 4 exhibit a large and increasing share of non-existent relationships. These were transboundary cases (in CS4 across different provinces with different legal frameworks). CS leads reported that many actors had not met prior to NXG. Even though, transboundary river basin agreements may exist, language and or culture barriers can lead to the fact that these agreements are not 'lived' at the local level. Agreements are rather designed at national level and govern aspects related to the Water Framework Directive and/or water allocation (e.g. releases of hydro-power dams) and have so far not made the involvement of local actors relevant or necessary.

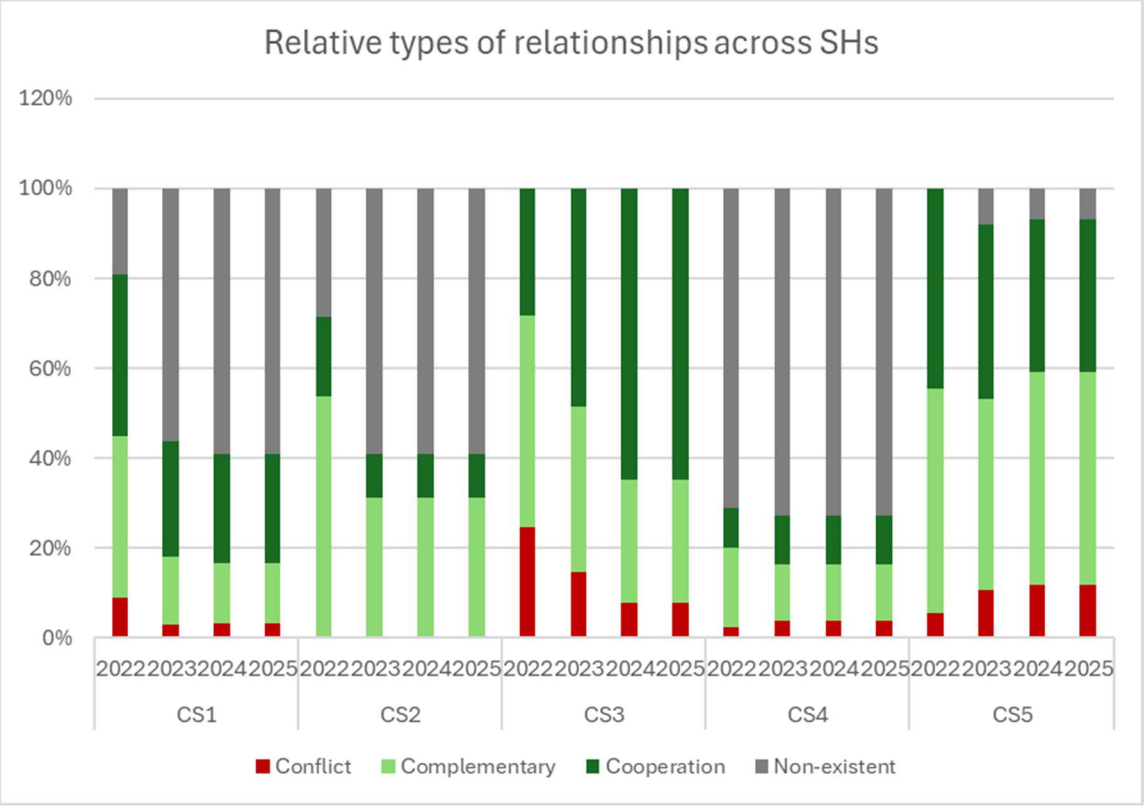


Figure 43: Relative distribution of the types of relationship of stakeholders across case studies and time.

(3) SH Engagement

Modes of co-creation and aims achievement

In Figure 36~~Figure 36~~ we showed how the perceived and desired modes of co-creation changed over time. In Table 24~~Table 24~~ we intend to understand if the modes of co-creation had any influence on the achievement of the SHE aims. We used the information in the Chambers et al. (2021) paper and distilled from this how they matched the aims of knowledge co-creation set for NXG. We then compared the early engagement aims with the perceived level of their achievement and looked if we could derive any qualitative correlations with the respective emphases that the modes of co-creation set on the attainment of respective aims. For instance, one would assume that if CS1 set out to achieve the system knowledge aim of

deepening and improving the understanding of the WEFE nexus problem through the mode of co-creation of 'researching solutions', one could hypothesise that a mild level of achievement (e.g.5 or 6) could be realistically achieved. This is due to the fact that 'researching solutions' only intends to mildly intend to address this aim (i.e. + high intent of outcome attainment).

Overall, aim achievement of system level aims was highest (average score of 5,9), followed by the target knowledge aims (5,3) and lastly by the transformation knowledge aims (4,4). CSs 1, 3 and 5 had all set out to achieve their SHE aims through the mode co-creation of *'Researching Solutions'*, which focuses strongly on system knowledge. All three achieved overall high system knowledge aims – higher than the other two cases that chose different modes. However, the same is true for target knowledge aims, whereas the modes of co-creation chosen by the other two CS, namely "*Navigating Differences"* and *"Empowering Voices"* would have been much more conducive to a higher level of attainment of target knowledge aims. In terms of transformation knowledge aims, the achievement offers a mixed image, with CSs 5, 1 and 2 offering the highest perceived levels of achievement, while following different modes of co-creation.

Thus, no clear evidence can be derived that the modes of co-creation had a strong effect on aims achievement. This is partly because when CS leads were asked to assess their perceived level of aims achievement some answered the achievement of goals that they had not set out to attain (grey numbers in the table). It is also because perceived and desired modes of co-creation changed over time, and overall, the methodology for determining a particular mode is rather challenging and very subjective. As such throughout the project some of the modes could not be categorized into any of the six modes described by Chambers et al. (2021).

A key feature of the evaluation was its use of the co-creation modes framework from Chambers et al. (2021). This enabled reflection not only on what was done but on how SHs understood their role in the process. Across the CSs, SHs expressed a preference for empowerment-oriented and relational modes such as *"Empowering Voices"* and *"Navigating Differences"*. These approaches emphasise inclusion, mutual learning, and recognition of marginalised actors. However, many SHs reported experiencing more instrumental modes, such as *"Researching Solutions"* or *"Brokering Power"*. These were not perceived negatively: many appreciated the structured knowledge outputs, but they were seen as offering less space for agency of less powerful SHs.

This divergence highlights a common tension in participatory projects: the trade-off between strategic reach and participatory depth**.** Where engagement focused heavily on technical outputs or institutional actors, local empowerment sometimes suffered. Conversely, deep relational engagement could risk limited policy traction if powerful actors were not effectively included. Some CSs tried to adapt to these dynamics. In CSs 1 and 5, with its wide spectrum of SH preferences, the CS-leads implemented layered engagement strategies, separating expert discussions from community-oriented dialogues. However, even in those CSs, low-power SHs still felt that the co-creation process did not empower their voices. In CS2, a more convergent set of priorities allowed for smoother facilitation. In CS3, concerns about disconnect with institutional actors led to efforts to enhance vertical integration.

Table 24: Qualitative comparison of early engagement aims with the perceived level of aims achievement and their relationship to the modes co-creation chosen to achieve the aims. (light grey numbers show aim achievement of aims that were originally not foreseen to be attained by CS leads)

Aims of co-creation per type of co-generated knowledge		Early Engagement Aims					Original modes of co-creation +++ very high, ++ medium high, + high, x neutral, - low, --medium low, ---very low intent of outcome attainment (based on color code of Chambers et al. 2021)					Perceived level of achievement (1=not at all achieved, 7=fully achieved)				
		CS1	CS2	CS3	CS4	CS5	CS1 Researching solutions	CS2 Navigating differences	CS3 Researching solutions	CS4 Empowering voices	CS5 Researching solutions	CS1	CS2	CS3	CS4	CS5
System knowledge	Deepen/improve understanding of the (state of) WEFE Nexus problems (e.g., river basin management, energy transition, water scarcity) and identify pressures	X	X	X	X		+	++	+	+	+	7	5	7	6	N/A
	Characterise (social, economic, ecological, and institutional) context		X	X		X	+++	x	+++	+++	+++	7	5	7	6	7
	Understand the institutional, organisational and political context and river basin management plans (incl. neighbouring countries)	X	X	X	X	X	-	++	-	-	-	6	6	7	6	5
	Identify conflicts/synergies between SHs as well as actions and strategies	X		X			---	++	---	+	---	6	N/A	7	5	N/A
	Get data for model development	X					+++	x	+++	+++	+++	3	6	7	4	N/A
	Average System Score = 5,9											***5,8***	***5,5***	***7***	***5,4***	***6***
Target knowled	Know about future expectations/perspectives (in general and for assessment tools)	X		X			+	++	+	++	+	7	6	6	3	N/A

	Determine solutions/systems (and their drivers) that balance sectors		X			X	-	+++	-	++	-	5	4	6	3	5
	Diffuse conflicts between sectors (e.g., through the use of a common language), moving towards cooperation and trust	X	X	X	X		+	++	+	++	+	6	4	7	3	N/A
	Raise awareness of water as a depleting resource			X			+	+++	+	+	+	7	N/A	7	6	N/A
	Gain knowledge on required infrastructural improvements					X	+++	x	+++	+++	+++	6	N/A	6	3	6
	Average Target Score = 5,3											***6,2***	***4,7***	***6,4***	***3,6***	***5,5***
Transformation knowledge	Develop and implement formal agreements and aligned policies for a coordinated river basin management	X	X		X	X	--	+++	--	++	--	4	5	1	1	4
	Design of pathways to enhance awareness of (water) resources management			X	X		+++	+	+++	++	+++	4	4	5	N/A	N/A
	(Co-)Design and (co-)validate NXG tools/platform (e.g., WEFE Footprint), and build capacity (e.g., to use the NXG tools)			X	X		+	-	+	++	+	5	4	7	3	N/A
	Identify relevant WEFE Nexus components and indicators			X		X	-	+	-	+	-	6	5	7	6	7
	Improve communication between SHs and break silos		X	X			+	+++	+	++	+	5	5	N/A	3	N/A
	Determine the requirements to invest in infrastructure					X	--	++	--	-	--	5	N/A	1	N/A	5
	Average Transformation Score = 4,4											***4,8***	***4,6***	***4,2***	***3,3***	***5,3***
	Overall Perceived Aims Achievement Score = 5,2											**5,6**	**4,9**	**5,9**	**4,1**	**5,6**

Participation at workshops[1]

CSs managed to hold and attract between 10 and 128 SHs to the WSs, with WSs with uneven number (WS1, 3 and 5) usually attracting more participants than those with even ones, irrespective of the WS modality selected (face-to-face, online or hybrid) (Figure 44~~Figure 44~~). This shows that the project was able to maintain a core group of participants on the one hand and also manage to spike interest for particularly salient project results every other WS, allowing for both the steady engagement with intermittent wider outreach.

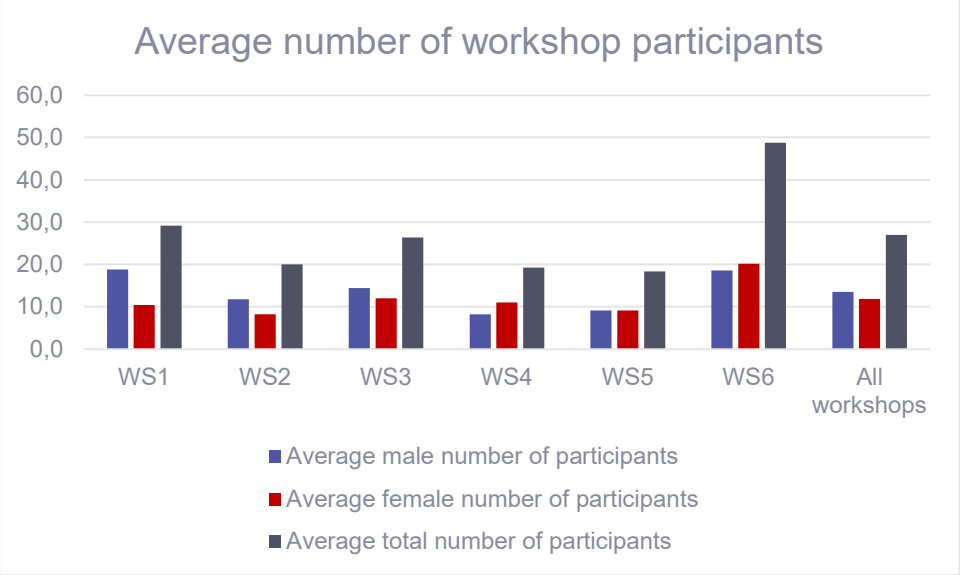


Figure 44: Average number of workshop participants across all case studies and workshops.

The gender balance, while still mostly male dominated, improved overall towards an almost equal share (Figure 45~~Figure 45~~). Some cases, in particular in the former Soviet countries, have a good gender balance, often with a higher proportion of female SHs. Reaching out and attracting female participation was, however, quite challenging to manage in some other contexts, due to the prevailing hierarchical and societal circumstances that make women in technical sectors less common and even more so in decision-making positions. Detailed information about participation at each of the WSs can be found in Annex 7: Overview of workshop participation~~Annex 7: Overview of workshop participation~~.

[1] A WS reporting template was created for CS leads to report on each of the WSs. The template can be found in Annex 6. All WS reports can be found in the project internal online repository (Surfdrive → Events, conferences, etc. → workshops). The findings in this section are, in part, based on the workshop reports.

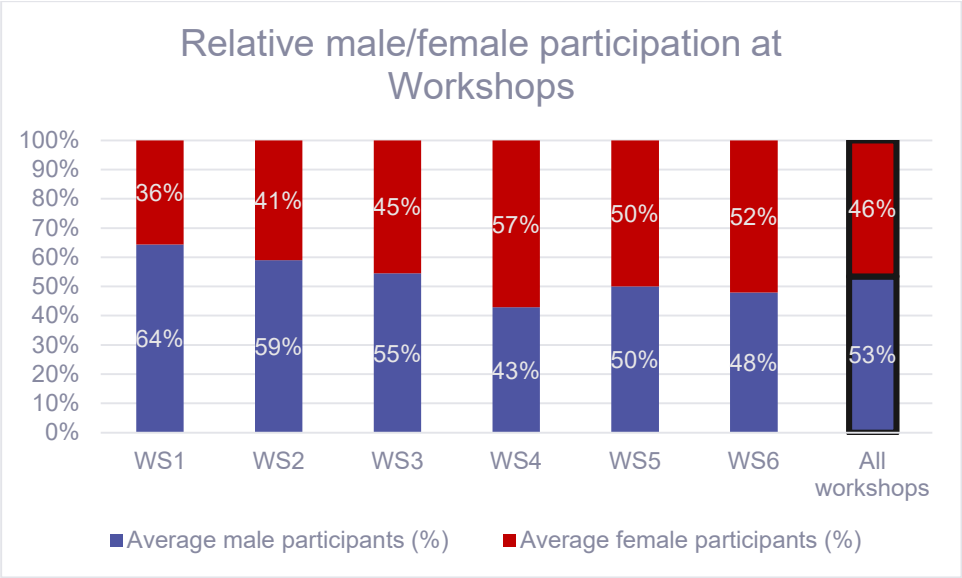


Figure 45: Overview of the average gender-distributed participation across all case studies and workshops.

This is also true for the diversity of actors that were reached (Figure 46~~Figure 46~~). While SHs where predominantly from the water and ecosystems sectors (allowing also for overlaps here, e.g. aquatic ecosystems specialists) at the early stages of the project, food and energy sector specific actors were present throughout the project albeit in general at lower numbers. The CS leads undertook significant efforts to reach out to all WEFE sector actors and to attract their interest in the project and the project WSs. Many interactions with the food, and particularly the more challenging energy sector SHs, where thus carried out through one-on-one interactions and are not reflects in the WS participation.

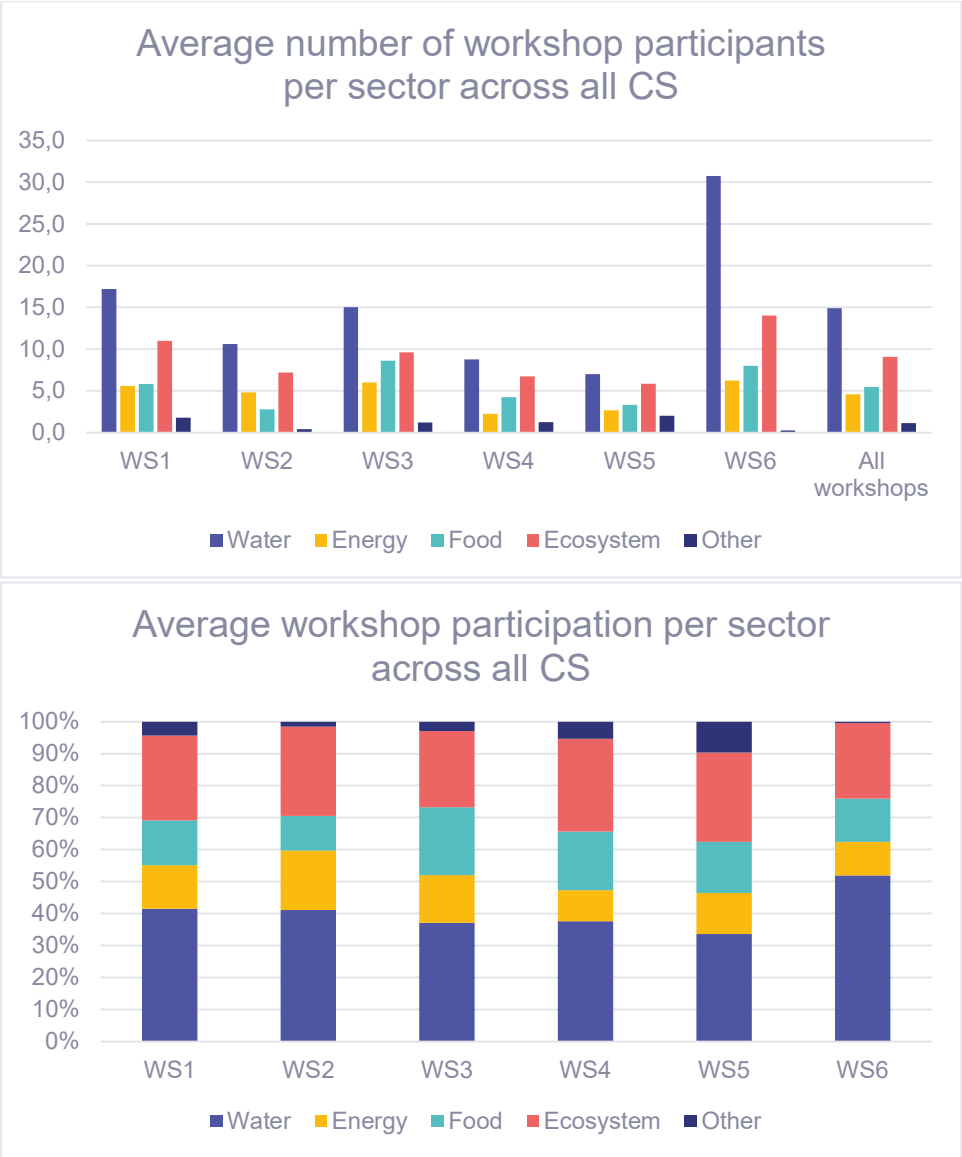


Figure 46: Sectoral workshop participation. The lower graph is normalized; stakeholders could self-identify as belonging to more than one sector. The full list of sectoral participation can be found in Annex 7.

(4) Management and sustainment

Management

In the **early phase** of the project the SHE plans were rather generic and provided similar recommendations to each of the CSs for the five levels of engagement, namely information sharing, consultation, involvement, collaboration and empowerment. This included activities such as incentivizing marginalized groups to be informed and provide evidence to SHs about how their input was included in the research methods and results to make them feel consulted and involved during the WSs. Activities regarding collaboration and empowerment revolved around suggestions on how to build trust and reduce identified conflicts amongst SHs through the planned WSs but also through one-on-one consultations and opportunities for peer exchange. Mediation was identified as a potential avenue of interaction for CSs 2, 4 and 5.

In the **mid-project phase**, the suggested activities become more tailored to the cases and start focusing more strongly on consultation, involvement and also collaboration. While in CS4 the focus of information sharing is limited to trying to reach more SHs by asking them to join the newsletter, the suggestions for CS3 are specifically on the need of providing SHs with more information on the existing system knowledge. In terms of consultation the focus is largely on upholding the scientific nature of the project, which was identified as a major source of trust in the project results by SHs. For CS5, the suggestion is specifically to start involving key SHs in the agenda setting of the upcoming WSs to start transferring ownership of the results to them. For CS3, working with high-level SHs and presenting the project results to them in a tailored fashion is suggested. Suggestion for involvement of SHs are geared towards fostering exchange amongst SHs focusing on topics that might bring transboundary SHs together, as was suggested for CS1. CS3 is asked to start conversing with high-level SHs about how to best make use of the project results and their translation into policy (processes). For collaborative activities, the plans propose activities that bring transboundary SHs together in CSs 1 and 2, and that pay special attention to the different needs of high-power versus low-power SHs. For CSs 3 and 5 the focus is on fostering networks that can induce changes in the policy-making process and allow for neutral spaces to address potential conflicts and barriers. For CS3, a clear call for facilitation is made for the upcoming WSs. Lastly, empowerment activities are suggested in a generic manner for CSs 2, 4 and 5, by using the WS and other discussion to work towards the SH agreements/river contracts.

For the **late project phase**, recommended activities are clearly tailored to the individual cases. In terms of information sharing, each CS has their own idea of how to tackle the WSs in the final year, either through a virtual event with a political inflection (CS5) or transboundary events (CSs 1 and 2) accompanied by the launch of the agreement or through a set of multiple activities (CSs 3 and 4) around particularly important days or projects. NEPAT demonstrations and training sessions are planned in all CS as consultative activities, which happened in the frame of WS5. Different suggestions for involvement also point towards the ideas of future SH sustainment, such as the creation of transboundary working groups or task forces, or meetings of existing platforms. Collaboration and empowerment activities are vaguer and point to ideas of post-project sustainment of activities, through regular events (‘clean the river’ days CS1) or regular meetings across researchers and WEFE Nexus SHs (CSs 4 and 5).

Sustainment

Sustaining the SH networks created during the project post-project is critical to be able to facilitate meaningful use of project results and induce impact but is often very hard to achieve. In NXG, we put a special emphasis on addressing the issue of SH sustainment very early on and made it consciously an integral part of the SHE process. As such ideas about sustainment were discussed with SH as early as WS3 and were put back on the table in WSs 5 and 6, and actively discussed amongst and with CS leads during the reflection meetings in Berlin (2024) and Athens (2025). Figure 47~~Figure 47~~ shows how ideas of SH sustainment changed over time with early reflections highlighting the idea of embedding the interactions in local institutions (e.g. river basin committees and authorities, or local groups). In the mid-project stage, a lack of clarity emerged. While the need and urgency of sustaining interactions was clear the connection to those larger entities and networks and how to 'place' the nexus there was felt with great uneasiness. Ultimately, in the late engagement phase, mostly 'placeholder' sustainments were found, mostly through new research projects which may fill the gap while looking for the ultimate placement in existing bodies and structures.

As such, for CSs 2, 4 and 5 (partial) SH sustainment is secured for the coming years through new research projects that will continue working on the Nexus approach and thus involve similar SHs, even if the focus may slightly change (e.g. on health in CS5 or only on a portion of the river in CS4). For CS 4, the partners further agreed that it would be good to have a large river basin-wide event again every 3 years to group multiple projects and their activities to revise the relevancy of needs and problems over time. For CS1, a clear intent for further collaboration was made in the agreement that was signed between the mayors of the municipalities of either side of the transboundary river basin. At the final WS6, both Greek and Bulgarian SHs showed willingness to participate in international meetings that may be organized in the future and discuss on how they can act together. For CS3, the Jiu River Basin Administration is basing their river basin planning on the results of the NEPAT and has now taken up the role for SH sustainment of nexus thinking. Thus, in this case, full transferral of the project results to the river basin authority has occurred.

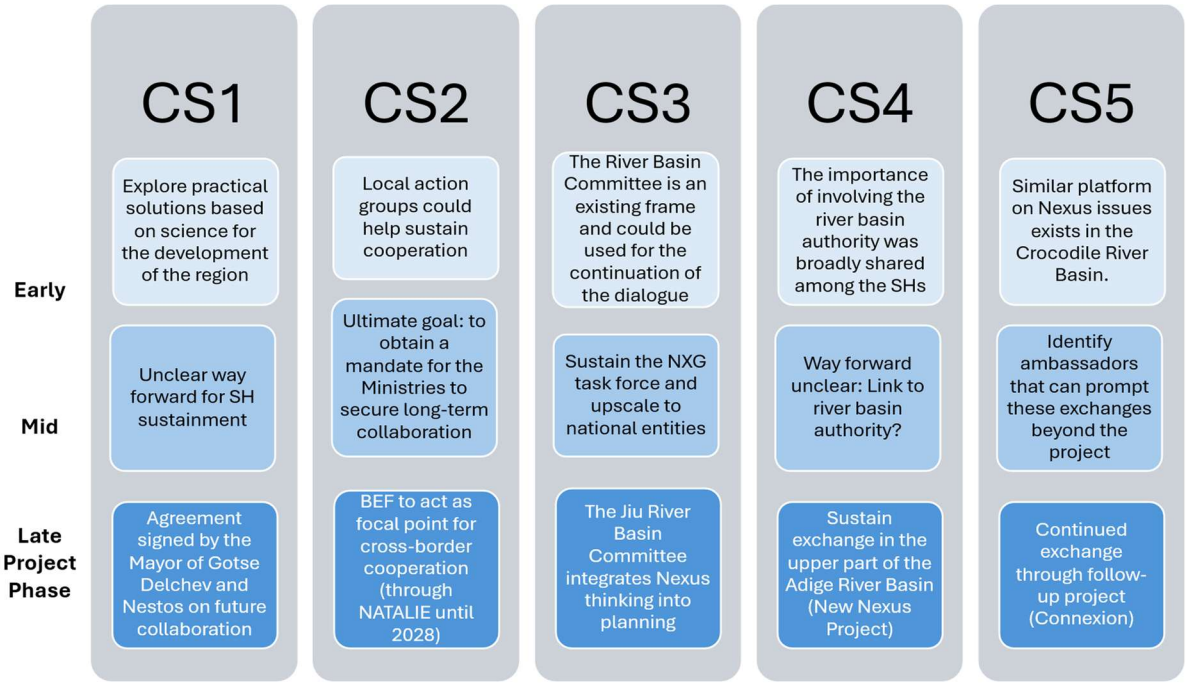


Figure 47: Evolution of ideas for stakeholder sustainment and post-project networks over time.

(5) Evaluation

The evaluation of the SHE process in NXG was conducted over the full duration of the project, across five CSs with highly diverse institutional and socio-political contexts. It aimed to assess the design and effectiveness of co-creation processes and draw lessons for future implementation of the WEFE Nexus.

The SHE evaluation adapted to changing project conditions and emerging learning needs:

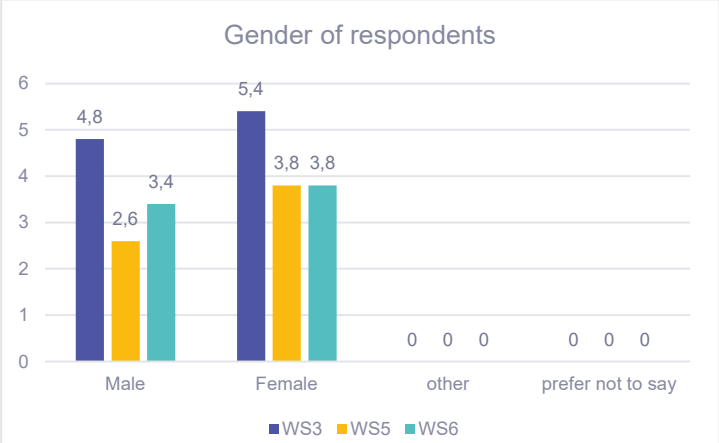
- **Early-phase evaluation** focused on understanding SH and CS-lead expectations, preferred co-creation modes, and desired outcomes. Surveys were conducted in CSs 1, 4, and 5. Initial data revealed diverging priorities between SHs and CS-leads, especially between "follower" cases favouring knowledge generation and SHs favouring relational or power-focused engagement.
- **Mid-phase evaluation** introduced revised tools combining survey-based engagement quality assessments with participatory WS activities. These captured perceptions of process inclusivity, shifts in knowledge, and changing engagement expectations.
- **Late-phase evaluation** focused on closure and reflection. Surveys and WS exercises explored how SHs rated the quality and results of the SHE process, what knowledge had been gained, and how their experienced co-creation modes compared to what they had hoped for.

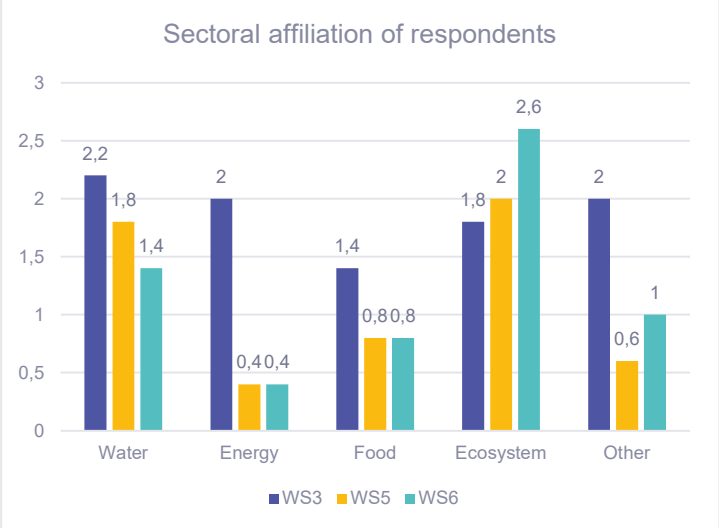
The evaluation was structured around four central dimensions: **process quality**, **knowledge generation**, **delivery on expected outcomes**, and **alignment between preferred and experienced modes of co-creation**. The evaluation process was challenged by several

practical constraints: **short WS durations to maintain SHE**, **competition for time with technical work packages**, and **survey fatigue**. Nevertheless, through the combination of methods and ongoing dialogue with CS teams, a robust body of evidence emerged. While not all CSs could implement the full evaluation at each stage, the iterative design enabled the collection of comparative and longitudinal insights. We offer below a summary of the large body of evidence collected.

General information

With the revised survey a standard from of assessment across all CSs and WSs was created. This allows some general analyses about the respondents (Figure 48~~Figure 48~~). As such, there were more female respondents than male across all cases, with a dominance of water and in particular ecosystem sector respondents. Respondents with a long professional trajectory prevailed. This shows that the project was able to target and keep high-end professionals engaged throughout the project. Overall, however, response rates dropped throughout time (from a total of 50 across all CSs in WS3 through 32 to 36 in WSs 5 and 6 respectively)





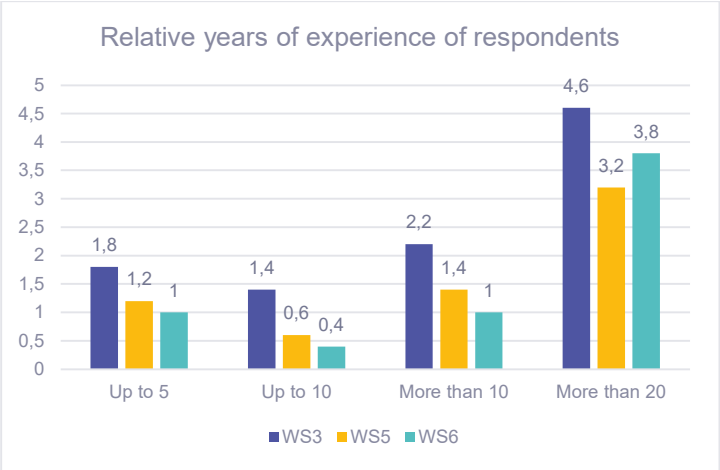


Figure 48: Overview over the average gender, sectoral affiliation and relative level of experience of the survey respondents across WSs 3, 5 and 6.

Engagement Quality Over Time

One major interest in conducting the survey was to assess the process quality, i.e. the ability of the project to effectively engage across the five areas of engagement with the SHs. For this, we asked SHs to determine their perceived degree of engagement in the respective WS but also in the project as a whole (Figure 49~~Figure 49~~). The latter assessment shows that overall, the consortium engaged SHs to a high degree and managed to obtain higher scores throughout the project evolution. SHs felt particularly well consulted and involved, followed by their perception of being well informed, collaborated with and empowered. SHs also felt more engaged in all areas as time progressed with high levels of involvement, consultation, information sharing and also empowerment that can be observed in WS6. Thus, the project strongly achieved its aim of working with and through SHs in a transdisciplinary manner of co-creation.

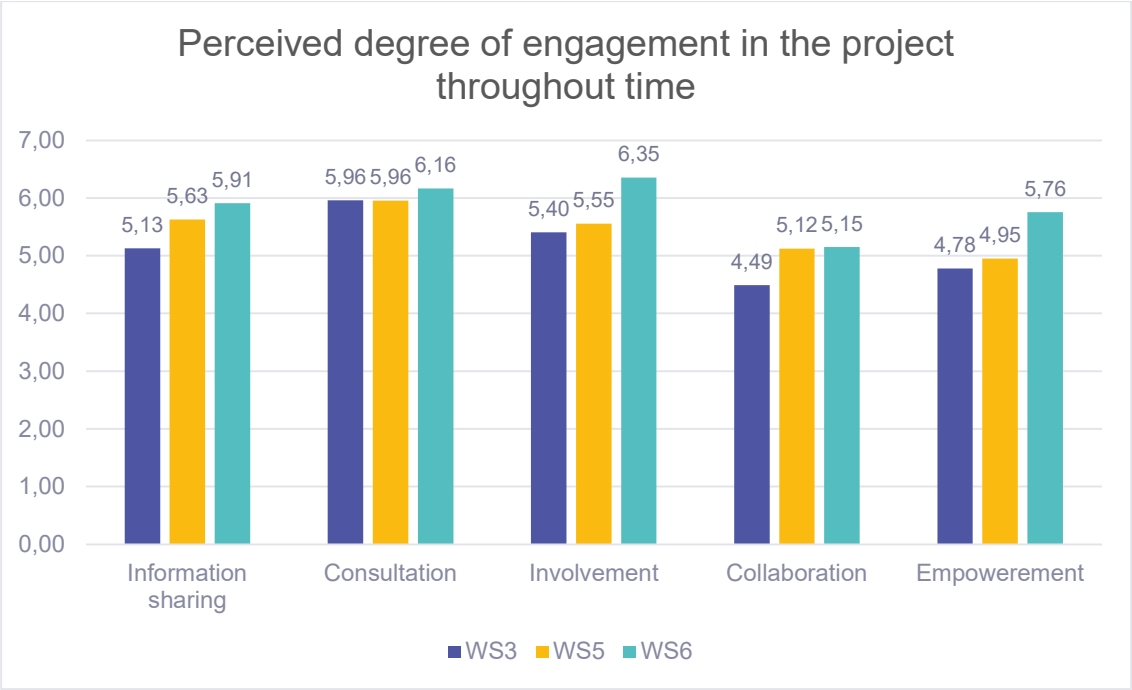


Figure 49: Results of the assessment of perceived degree of engagement (from 0 low to 7 high level of perceived engagement) in the project by caste study' stakeholders across time.

Across all phases, **WS-level engagement was rated more positively** than project-level engagement. SHs valued opportunities to participate in dialogue, co-design activities, and local planning. However, many participants continued to feel only "informed" or "consulted" rather than "empowered". By the mid and late phases, slight improvements were seen — especially where engagement culminated in co-signed agreements (e.g., CS1) or demonstrated responsiveness to SH feedback.

Still, the sense of shared ownership remained partial in most CSs. In CS2 and CS3, for example, SHs reported increasing involvement but still limited influence over key decisions. This reflects a broader challenge in transdisciplinary projects: **empowerment,** in the sense of shared decision-making or influence, is often constrained by time, scope, and project design.

Quality of the process – Process outcome quality

A critical consideration of the SHE was to make sure that the quality of the process is ensured. For this, systematic and continuous effort was made to provide all CSs with clear guidance on the one hand that follows a systematic approach – which is what the major part of this document intended to convey – but to also make sure that the process delivers on outcomes. Outcomes were defined in various and manifold manners:

1) Generating knowledge in the three levels of knowledge generation (system, target, transformation) as this is the basis for achieving the set CS specific aims.
2) Knowledge generation across the different nexus domains, such as interlinkages, polices, biophysical and socio-economic considerations, and policies as these are linked to the outcomes set in the project as a whole as described in the Grant Agreement.

SHs consistently acknowledged the value of knowledge generation throughout the project. In the early phase, **system knowledge** (understanding of Nexus interlinkages and institutional

complexity) was prioritised (Figure 50~~Figure 50~~). Midway through the project, attention shifted to **target knowledge** — specific solutions or interventions. By the late phase, **transformational knowledge** — the capacity to rethink governance roles, power relations, and change pathways — was recognised as important but was only partially achieved. In contrast, CS leads assessed their overall aims achievement in the respective knowledge generation areas lower in transformational knowledge than in the other knowledge generation areas and generally higher than SHs in system knowledge and lower than SHs in the other knowledge generation areas.

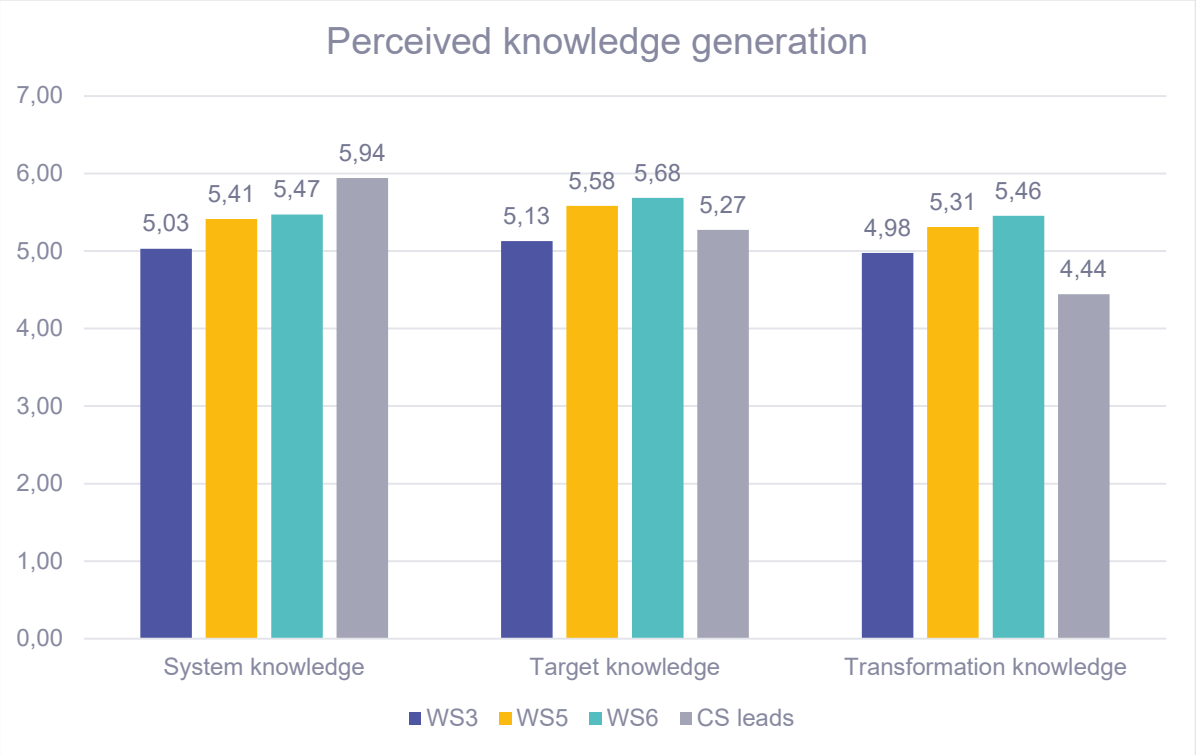


Figure 50: Perceived knowledge generation across the three areas of knowledge generation over time

Knowledge generation was also measured in different outcome domains that related to the biophysical and socio-economic system, expanded knowledge about the WEFE interlinkages, synergies and trade-offs, the SH landscape, conflicts and potential for collaboration, as well as WEFE Nexus policies. Some of these knowledge domains are directly related to the stipulated project objectives and outcomes. In the final survey, the SHs perception on goal attainment was also assessed. Figure 51~~Figure 51~~ below shows that knowledge generation in general increased over time, but that some knowledge areas remained more difficult to grasp than others, such as the effect of policies and how to change them, or the socio-economic system. Nonetheless, SHs perceived the overall achievement of the NXG outcomes in the different knowledge domains as rather high.

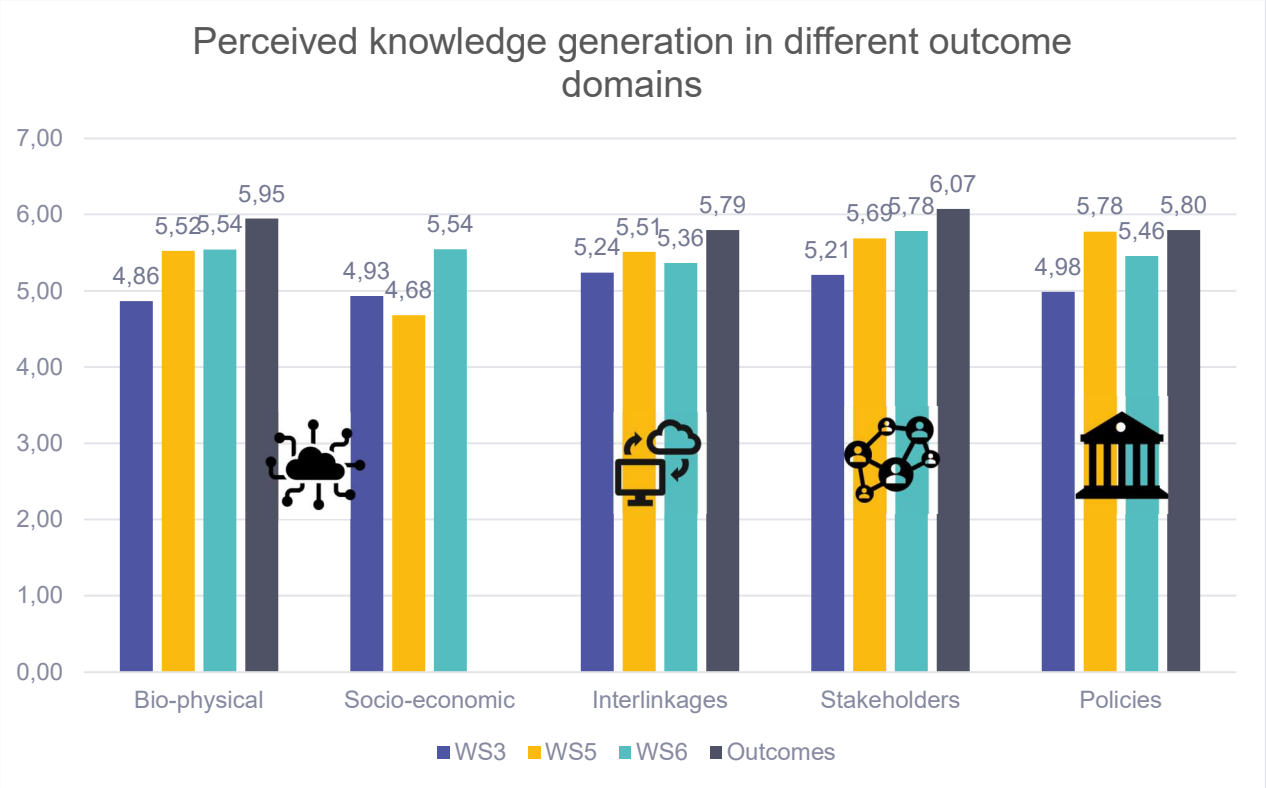


Figure 51: Perceived knowledge generation in different outcome domains and their relation to outcome achievement; symbols relate to the Objectives of NXG, relating to – from left to right – Objective 4, Objective 1, Objective 3 and Objective 2 (see full description of Objectives in Figure 2).

Across CSs, SHs rated capacity development, knowledge generation, and process quality as **highly important**, and these were generally seen as well-delivered. In contrast, **institution building** and **social equity** were frequently cited as comparatively **less successfully addressed** (albeit still generally positively addressed), even where recognised as relevant.

For example, in CSs 1 and 2, institutional alignment remained a stated goal but was not seen as fully achieved. In CS4, despite complex SH dynamics, equity was not prioritised by all participants, possibly due to a disconnect between normative values and perceived feasibility. In CS3, SHs valued knowledge tools but expressed doubt about whether these would gain traction with high-level actors, revealing a gap between technical outputs and policy integration.

The **gap between expected and perceived outcomes** widened slightly in the late phase, especially in CSs with increased participation. This may reflect a growing diversity of SHs' priorities or a sharpening of expectations as the project neared closure.

Challenges and opportunities - Lessons learnt

Throughout the three phases of the NXG project—co-exploration, co-design, and co-development—a series of important lessons emerged that shaped the evolution of SHE

strategies and informed project adaptation over time. In the **co-exploration phase**, the project laid a solid groundwork for mutual understanding and cross-sectoral dialogue by identifying key actors, mapping relationships, and surfacing differing expectations and capacities across the WEFE nexus. However, early engagement proved uneven, with strong representation from water and ecosystems sectors but limited involvement from energy and food, and challenges in sustaining consent and interest. Initial mapping also revealed gaps in relationships, particularly in CSs with limited prior nexus experience, underscoring the need to bridge disconnected actors and adapt engagement tools to diverse contexts and preferences.

Building on this foundation, the **co-design phase** brought greater focus to aligning SH expectations with project realities. Lessons from the mid-project engagement emphasized the importance of balancing diverse needs through flexible formats, such as separating technical WSs from deliberative dialogues. Communication was strengthened through clearer framing of goals and tailored materials, while efforts to clarify impact pathways—via policy briefs, modelling demonstrations, and strategic dialogue—sought to reinforce the relevance of project outputs. These adjustments demonstrated the necessity of adaptive engagement approaches that account for differing power dynamics, cultural contexts, and levels of trust. Relationship-building, especially in fragmented institutional settings, was seen as a cornerstone of sustained collaboration.

In the **co-development phase**, the project faced more persistent challenges. While co-exploration and co-design had built momentum and trust, deeper empowerment proved difficult—particularly with high-power, low-interest SHs. SH fatigue limited intensive outreach, and many CSs struggled to sustain or institutionalize engagement beyond the project's timeline. Co-creation modes remained fluid and often defied strict categorization, reflecting the need for flexible frameworks that accommodate evolving realities. Nonetheless, trust—between SHs, and between SHs and project teams—emerged as a key enabling factor for future cooperation. Final-phase reflections emphasized the importance of responsive WS formats, targeted small-group engagement, and clear post-project roadmaps to support continuity. To sustain the gains made, the project must embed its lessons into lasting governance structures, foster local empowerment through tangible actions, and ensure that tools remain relevant, accessible, and rooted in SH needs.

The experience of designing, implementing, and evaluating SHE in NXG has generated several valuable insights — not only about co-creation in sustainability governance but also about the realities of applying it in a multi-country, multi-sectoral research project. They include:

Balancing ambition with feasibility

Empowerment and institution building are laudable goals but difficult to achieve within the scope of a time-bound research project. While the project generated trust, insight, and tools for future action, the kinds of systemic transformation implied in the Nexus vision require **longer timelines, continuous funding, and institutional anchoring**. The SHE process of NXG effectively planted seeds, but full realisation of its ambitions lies beyond the project lifecycle.

Stakeholders have diverse priorities

The evaluation confirmed that SHs hold **divergent — and sometimes conflicting — preferences** for engagement. Some want to co-produce solutions, others seek influence, and others wish simply to be informed. These expectations can shift over time and vary within and between CSs. Successful engagement therefore requires **flexibility**, and a **deliberate management of pluralism**, not only in WS formats but also in communication strategies between WSs.

Depth vs. breadth in co-creation

One persistent tension is between **depth of inclusion** (fostering dialogue, building trust, empowering marginalised voices) and **breadth of reach** (ensuring relevance for decision-makers, institutions, and policy frameworks).

Methodological challenges in multi-site evaluation

The evaluation itself was shaped by real-world limitations. With five CSs, each under different pressures, maintaining **consistent timing and data quality** was a challenge. WS time was scarce and had to be shared with technical agenda items; surveys competed with multiple project tasks; and SH fatigue limited response rates. These constraints required a **pragmatic, iterative approach**, relying on triangulation and qualitative synthesis rather than strict comparability.

Despite these limitations, the phased structure and the combination of survey and participatory formats allowed meaningful insights to emerge — especially when CS-lead perspectives were integrated into the interpretation of results.

Co-creation legacies may lie beyond formal outputs

Ultimately, the most enduring impact of the SHE process may lie not in the technical tools produced, but in the capacities, relationships, and mutual understandings built. Although the data do not support definitive claims about long-term impacts, it is plausible that in contexts where SHs felt heard, equipped, and connected, the potential for continued collaboration and implementation will be stronger. Conversely, where co-creation felt fragmented or instrumental, the process may be remembered as consultative rather than truly transformative.

The SHE experience in NXG also emphasises a deeper governance dilemma: the need to balance engagement with high-level actors who may be politically powerful but institutionally distant with the inclusion of local actors who are directly affected but lack leverage**.** This balancing act is central to any future-oriented co-creation effort within the WEFE Nexus.

In conclusion, the SHE experience in NXG reveals both the promise and the limits of co-creation within a complex, multi-level, and time-bound research project. While the project successfully fostered trust, dialogue, and learning across diverse SH groups and geographies, it also encountered real constraints of time, resources, and institutional alignment that limited the depth and durability of empowerment outcomes. Nonetheless, the phased, adaptive approach allowed the project to remain responsive to evolving SH needs and contexts, generating valuable methodological, strategic, and relational insights. These lessons highlight that meaningful co-creation is less about perfect execution and more about cultivating the conditions for sustained collaboration: trust, flexibility, relevance, and inclusivity. As future

efforts build on learning from NXG, the emphasis should shift from producing outputs to nurturing the long-term capacities, networks, and governance pathways that can carry forward the Nexus vision beyond project boundaries.

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Annexes

PART III: Case study specific Stakeholder Engagement Plans

Early engagement (month 12 Stakeholder Engagement Plans)

CS1: Nestos/Mesta

The SHE plan is based on the data, information and perceptions provided and analysed by the CS-Leads and the AVA-Team by September 2022. The plan is updated on a yearly basis taking new SH information and evaluation results into account to allow for adaptive management.

Stakeholder engagement aim

Participatory actions have been broadly acknowledged as well-suited practices for engaging SHs to elicit valuable knowledge and explore their interests, preferences and means of power. SHs' engagement supports common understanding and establishes mutual confidence between them and decision makers. It also contributes to the transferability and dissemination of scientific knowledge and research outcomes. Therefore, SHs are expected to contribute by adding specific knowledge and expertise on issues related to water resources management, critical hot-spots, proactive actions, management of flood and drought risks, ecosystems maintenance, hydropower generation, agricultural practices, land uses, etc.

In the case of NXG project and the Nestos/Mesta CS, the aims of SHs' engagement are the following:

- To generate system knowledge:
  - Deepen into existing problems
  - Explore possible conflicts and synergies among stakeholders
  - Identify pressures in all sectors (water availability/quality, ecosystem, climate/storms, extreme events etc.)
  - Provide data for model development
  - Inform the research team about plans/projects that are in progress
- To generate target knowledge:
  - See which are their future expectations/perspectives
- To generate transformation knowledge:
  - Design suggestions and a river contract proposal
- To build a trustful relationship among project partners and local SHs

Moreover, SHs' engagement has the potential of offering added value to the project by: a) covering existing knowledge gaps, b) raising issues that researchers should consider regarding synergies and trade-offs when it comes to the implementation of policies and actions

aiming at nexus sectors management and resources allocation, c) assessing current practices and policies with respect to their effectiveness, and d) proposing future policy measures and means of actions that will reinforce resilience by taking into consideration climate change impacts. Under this framework, SHs' influence and interests will be identified, investigated, and mapped as well as, their role during the decision-making process and the organization and implementation of plans in case of emergency. Possible conflicts and synergies among them will be also explored. The overall purpose of such a process is strong ties to be built between researchers and SHs in order a rich knowledge stock to be created, collaborative actions to be encouraged and transferability of the projects' outcomes to be enhanced.

Stakeholder analysis

Stakeholder identification (Sept. 2022)

A total of 63 Greek and Bulgarian SHs were identified out of which 12 (19%) consented to be officially included in the SH register and participate in the NXG SHE (Table 25~~Table 25~~). In the remainder of the document SHs that consented to be included will be termed 'official stakeholders'.

Table 25: CS1-Nestos/Mesta summary information of stakeholder identification as of Sept. 2022

Item	Count
Preliminary listing of stakeholders	63
Stakeholders in registered officially	12
Percentage of consent [%]	19%

The official SHs belong mainly to the water and ecosystems sectors; being the energy and food sectors the least represented with two (16.7%) and three (25.0%) SHs, respectively (Figure 52~~Figure 52~~). All of the official SHs related to the ecosystems sector in some manner, indicating the interest and relevance of this sector for the Nestos/Mesta CS.

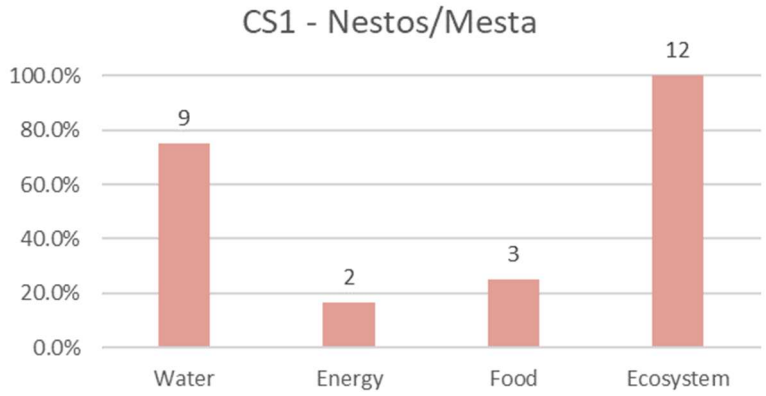

Figure 52: Distribution of stakeholders across the WEFE sectors for CS1 - Nestos/Mesta. One stakeholder can be assigned to one or more sectors.

In terms of gender, there is an almost 35/65% distribution across female and male genders (Figure 53~~Figure 53~~). All official SHs provided data about gender and one SH identified as both female and male

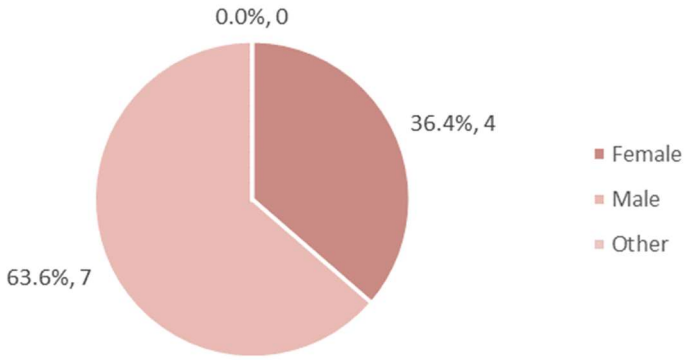

Figure 53: Gender distribution for CS1 - Nestos/Mesta. One stakeholder identified with both female and male.

Stakeholder differentiation and categorisation

The official SHs belong mainly to tiers 1 (six SHs) and 2 (five SHs), and mostly to the following categories (Figure 54~~Figure 54~~): "9. Environmental protection authorities and representatives" (33.3%), "3. Policy makers at local level/municipalities" (25.0%), and "12. Research and academia" (25.0%). A minor representation comes also from part of categories "5. Agricultural authorities and representatives" (8.3%) and "7. Water management authorities and representatives" (8.3%).

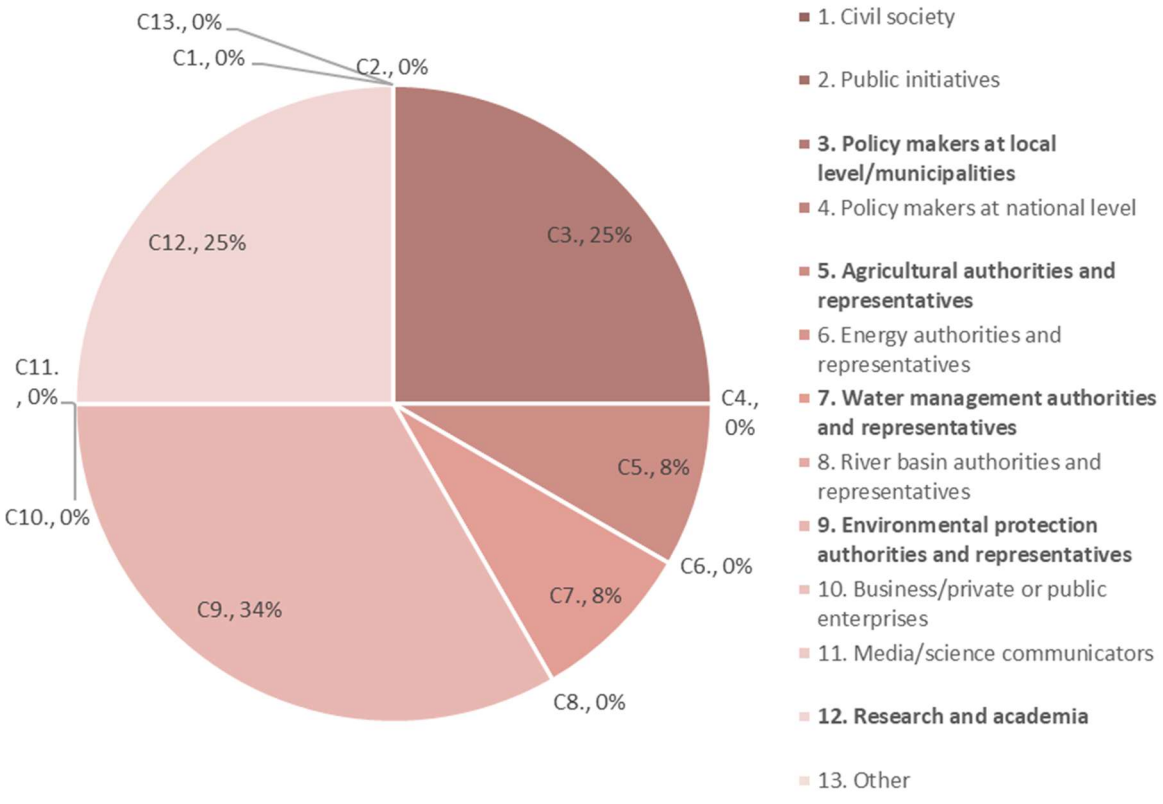

Figure 54: Distribution of stakeholders across categories for the case CS1 - Nestos/Mesta

From a Power-Interest perspectives, all official SHs were perceived as having high interest by CS-leads, with half of them being perceived as high power as well (Figure 55~~Figure 55~~). When comparing the perceived scoring of both the CS-Leads and the SHs themselves (as provided

in the PPCF) there are some differences, especially with SH-28 (from the category research and academia), whose own perception of power and interest was less than the one from CS-Leads.

Even though the upper right quadrant is considered as the key SH group, given the limited number of official SHs, all of them will be considered within the SHE plan.

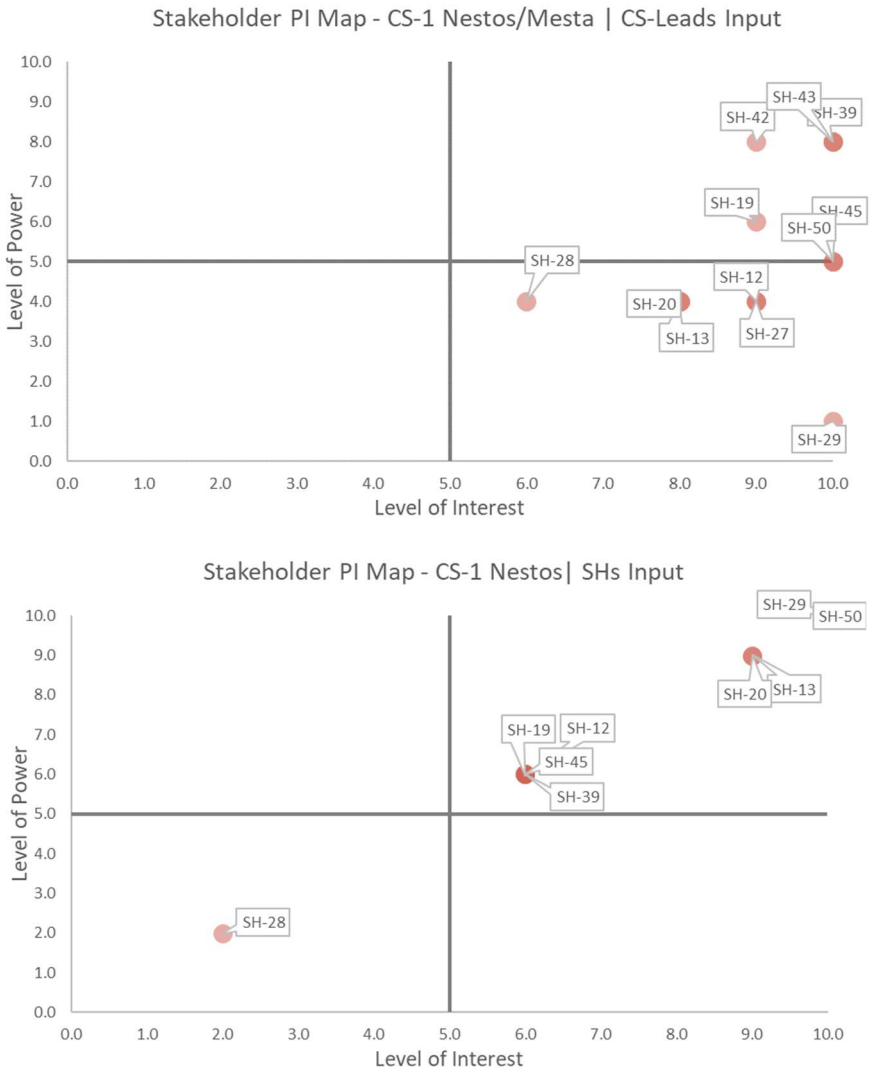

Figure 55: Power-Interest Map for CS1 - Nestos/Mesta. Above: based on the CS-Leads' perception; and below: based on the scoring provided by stakeholders in the PPCF (some stakeholders did not provide input)). For data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents.

Stakeholder relationships

The CS-Leads characterised – based on their perception – 78 relationships across the 12 SHs. The relationships correspond mainly to the complementary (Cm) and cooperation (Cp) types, 35.8% in both cases, followed by rather non-existent (NE) relationships between SHs (19.2%), and a lower share of conflicts (Cf) between some SHs (9.0%) (Figure 56~~Figure 56~~ and Figure 57~~Figure 57~~).

SH-ID	SH-12	SH-13	SH-19	SH-20	SH-28	SH-29	SH-27	SH-36	SH-39	SH-42	SH-43	SH-45	SH-50
SH-12		-	-	-	-	-	-	-	-	-	-	-	-
SH-13	Cm		-	-	-	-	-	-	-	-	-	-	-
SH-19	Cm	Cf		-	-	-	-	-	-	-	-	-	-
SH-20	Cm	Cp	Cf		-	-	-	-	-	-	-	-	-
SH-28	Cp	Cm	Cm	Cm		-	-	-	-	-	-	-	-
SH-29	Cm	Cm	Cm	Cm	Cm		-	-	-	-	-	-	-
SH-27	Cp	Cm	Cf	Cm	Cp	Cm		-	-	-	-	-	-
SH-36	Ne	Cm	Cf	Cm	Ne	Cp	Cp		-	-	-	-	-
SH-39	Ne	Cm	Cf	Cm	Ne	Cp	Ne	Cm		-	-	-	-
SH-42	Ne	Ne	Ne	Ne	Ne	Cp	Ne	Cm	Cp		-	-	-
SH-43	Ne	Cp	Cm	Cp	Ne	Cp	Cp	Cp	Cm	Cm		-	-
SH-45	Cp	Cp	Cf	Cp	Cp	Cp	Ne	Cm	Cm	Cm	Cp		-
SH-50	Cp	Cp	Cf	Cp	Cp	Cp	Ne	Cp	Cm	Cm	Cp	Cp	

Figure 56: Actor-Linkage Matrix for CS1-Nestos/Mesta. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent.

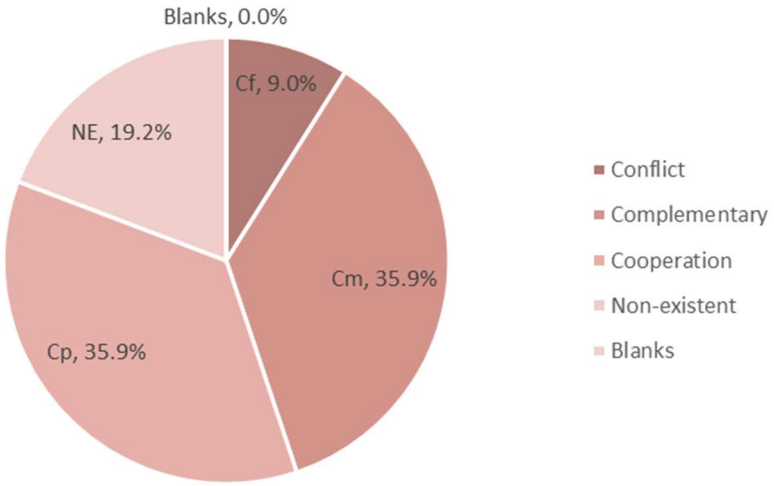

Figure 57: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads.

Stakeholder engagement plan for CS1 – Nestos/Mesta

The SHE plan provides a guidance to organise SHE and achieve the SHE aims considering the initial results of the SH analysis. These results show that the pool of SHs is originally rather limited involving mainly:

- the water and ecosystem sectors, with space for improving the consent rate and inclusion of the energy and food sectors.
- public authorities, policy makers at local level and research and academia.
- rather equal distribution of low- and high-power SHs and a predominance of high-interest SHs.
- relationships of complementarity and cooperation, with room to create new relationships and reduce conflicts.

Considering this background, CS-Leads scored the different co-creation approaches for the themes of purpose, power, politics, and pathways. The resulting figure (Figure 58~~Figure 58~~) was discussed with the CS-Leads, and after consideration of the aims, the analysis results, and the own CS-Leads' overview of the context, the fitting mode of co-creation is "Empowering voices".

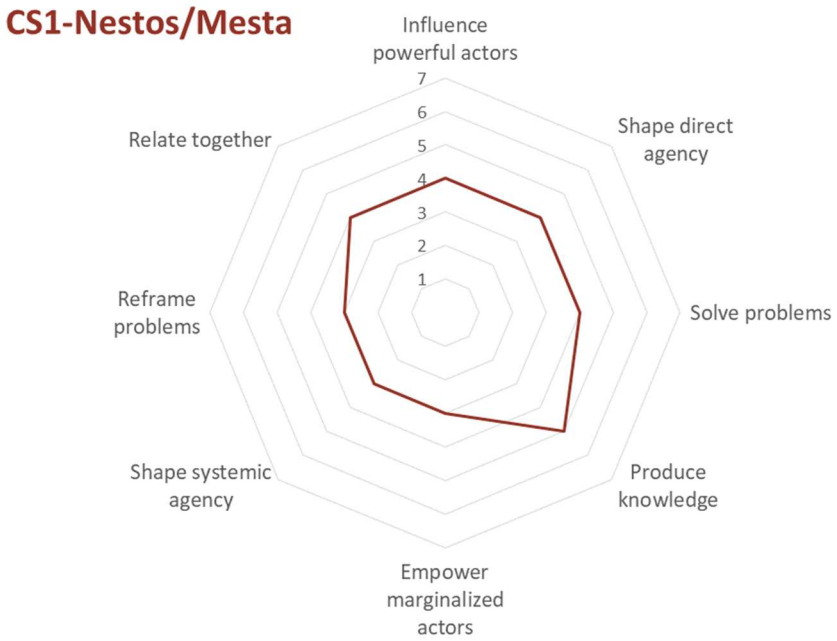

Figure 58: CS1-Nestos/Mesta scoring for co-creation approaches

This mode means that researchers and SHs from the community or the government co-create knowledge with a special intension of involving marginalised SHs and including a greater social diversity (Chambers et al., 2021[1]). It is important to mention that the scoring does not reflect a strong focus on empowering, but after the discussion with the CS-Leads about the mode

[1] Chambers, Josephine M., C. Wyborn, M.E. Ryan, R.S. Reid, M. Riechers, A. Serban, N.J. Bennett, et al. 2021. 'Six Modes of Co-Production for Sustainability'. *Nature Sustainability* 4 (11): 983–96. https://doi.org/10.1038/s41893-021-00755-x.

description and foci, the best fit was indeed Mode 2: “Empowering voices”. For this CS is very important to discuss with SHs the issues and the solutions, including the marginalised SHs.

The main focus of this CS is to find solutions to problems identified by the research team as well as the ones raised by SHs together with them. For a strong impact, this mode of co-production should have a strong engagement with authorities and policy-makers (ibid.) and while these groups already make up the larger shares of identified and official SHs, current high power-high interest SHs are mostly from the local authorities of one side of the river as well as from the agricultural or ecosystem sector. This mode links to the co-creation of solutions focusing on the process of engagement, with enhanced outcomes when prioritising learning and quality, and building partnerships and activities that evolve over time (ibid.). This focus shapes the eight co-creation approaches to support the achievement of the SHE aims of CS1 (Table 26~~Table 26~~) and leads the plan across all phases of SHE (information to empowerment) for CS1-Nestos/Mesta as presented below (Table 27~~Table 27~~). As the focus of this CS’s mode is on empowerment, less emphasis is made on the efforts towards co-design but rather on co-development.

Table 26: Description of approaches for CS1-Nestos/Mesta based on the scoring exercise done by CS-Leads and following Chambers et al. (2021).

Approach	Description
Purpose	
Solve problems	There is a set agenda where researchers and stakeholders explore different (potential) solutions: co-creating knowledge regarding policies and for the development of the NEPAT, and WEFE Footprint.
Reframe problems	The co-creation of knowledge offers substantial efforts to question current approaches to releasing pressures in the system by shifting towards a nexus perspective, fostering collaboration between stakeholders (identifying conflicts and building trust).
Power	
Shape direct agency	There is a general ambition to better understand the system, articulate a river contract (strategy), and support decision-making, by providing information.
Shape systemic agency	There is focus on building trust toward shifting relationships and institutional practices.
Politics	
Influence powerful actors	Currently identified stakeholders are high interest stakeholders. However, it is important to target all powerful stakeholders (high and low interest) to sit with low power stakeholder at the same table to move towards nexus solutions.
Empower marginalised actors	The engagement with stakeholders (both high- and low-power) will allow exploring their ideas and actions for the co-creation of knowledge and the co-development of the river contract.
Pathways	

Approach	Description
Produce knowledge	There is a strong focus on gathering data and information to understand the system and current problems for the design of a river contract.
Relate together	There are some spaces created to dialogue and build trust for the exploration of potential solutions in particular between stakeholders that currently seem to not have a relationship, overcoming current conflicts and deepening the trust between collaborating stakeholders.

Table 27: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS1-Nestos/Mesta. SH: Stakeholder.

	Co-exploration	Co-design		Co-development	
	Information	**Consultation**	**Involvement**	**Collaboration**	**Empowerment**
WHO? Stakeholder category	All categories should be properly informed. An effort to reaching out to marginalized groups such as the energy and food sectors and low interest stakeholders from both sides of the river is needed.	All categories can be consulted. Special attention needs to be placed on consulting stakeholders from all WEFE sectors. Care needs to be taken to avoid stakeholder fatigue, in particular in low interest-high power stakeholders.	All categories can be involved. Attention needs to be paid to involve stakeholders from all WEFE sectors. Special issues can be raised by and discussed with the sectoral authorities and potential users of the NEXOGENSIS tools.	All categories can collaborate, with particular focus on the sectoral authorities and the local policy-makers. An emphasis should be laid on fostering collaboration across all WEFE sectors – bringing in currently missing sectoral stakeholders (e.g., energy and food) – and across local (and national) policy makers from both countries to ensure power balance.	Empower research and academic sector together with some positions within the local municipality and policy-makers. The latter needs to be done in an equitable manner across both river banks/countries to avoid a power imbalance and empower the currently marginalized stakeholders.
WHY? PI and ALM	All quadrants of the PI map necessitate being informed with a particular emphasis on the low power – high interest category with the intent of empowering them and reaching out to low power – low interest stakeholders with the	Consultation of high power – low interest stakeholders needs to be targeted to their interest with the aim of maintaining or increasing it. Similarly, low power – high interest stakeholders should be consulted in their area of expertise and interest with the aim of empowering them.	Involvement of high power – high interest stakeholders is relevant for the discussion and the involvement of high power – low interest stakeholder should be sought. The engaging low power – high interest stakeholders in discussion and exchange with other	Collaboration between stakeholders that are identified as cooperating should be fostered, while non-existent relationships should be provided with a space to create cooperation. Conflicting relationships may need to be resolved in	Given the PI Map, high-power stakeholders (SH-19, 39, 42, 43, 45, 50) as well as low-power stakeholders (SH-12, 13, 20, 27, 29), should be included in these activities. In general, the aim is to empower low power stakeholders through co-development practices, thus moving these into high

	Co-exploration	Co-design		Co-development	
	intent of increasing their interest.	Consultation about conflicts may have to be avoided with stakeholders identified as in conflict, but maybe consulted upon with other stakeholders.	stakeholders is a good way to start paving towards empowerment. Discussion about conflicts may have to count with external moderation or guidance between stakeholders identified as in conflict, or maybe discussed upon with other stakeholders.	individual spaces under professional mediation.	power categories where their decision-making capabilities can then be used. At the same time, high power stakeholders need to be kept interested in the same purposes. Also, having high power stakeholders engaged in the empowerment process can support sustaining the empowerment after the project.
WHAT? CS focus: working on solutions and towards empowerment	Inform about coming events and results on solutions and the diversity of SHs with the intent of maintaining and increasing their interest and incentivising them to reach out to further related stakeholders (snowballing).	Consult about perception of current issues (e.g., what are pressing problems, competition and synergies between sectors), request for data according to the request of WPs, perception about potential conflicts and enhanced cooperation potential. Consult about missing/marginalized stakeholder (groups) and how to best reach out to them. Consult also about how to best maintain the	Involve stakeholders in discussions and exchanges with and between them about: framing sectorial and trust issues and their needs, the results of consultation activities (e.g., surveys, interviews). Discussion is necessary beyond validating the project outputs, focusing also on activities to frame the way towards collaboration and empowerment	Framing the issue and developing solution pathways. Collaboration activities should foster interaction between stakeholders towards a coordination that can be reflected in the transboundary river contract or facilitate its implementation.	Ensure that these stakeholders have space to provide their feedback, feel safe to expose their perceptions and discuss about conflicts and power dynamics in view of the river contract.

	Co-exploration	Co-design		Co-development	
		stakeholder's particular interest in the project.			
HOW? Activities	Think of incentives that might increase the interest of marginalized, low-interest stakeholders such as invitations to events, highlighting research results of interest to them or providing them with free access to results and findings. All SHs have consented to the newsletter, except SH-42. They should be invited to sign up for the newsletter in our website.	WP1 governance assessment interviews; surveys during or after each WS (e.g., WP1 and WP5); perception about the ALM and the shown conflicts and cooperation potential if appropriate. Show at each WS which advancements/decisions were made based on the stakeholders' inputs (feedback to the feedback or acknowledging their inputs).	Activities in all WSs with especial focus on WS2 and WS3 for the identification of needs and discussion on policy needs, interviews for WP1, and WP3; and focus on WS4 and WS5 for WP3 and WP4 outputs. Plan activities to share the outputs of the provided feedback and discuss about it.	WSs – activities to co-decide features and design of the tools (WS2 to WS6), focus groups (within or in between WS2 and WS3), role activities to build trust. 1-on-1 activities to reduce conflicts of conflicting stakeholders, but also to bring in marginalized current low-interest or uninformed stakeholders.	Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations) so that, the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded stakeholders. Frequent smaller conversations of transnational peer stakeholders may need to happen to allow for recognition of peers and for technical discussions about transboundary solutions (e.g. ecological low flows, abstraction needs, conservation measures, etc.). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.

Management and sustainment

Management

CS-Leads should not forget checking the expectations written by the official stakeholders in the Privacy Policy Consent Form.

The initial management plan considers different foci per year:

- **2023**: Actively look to increase the interest of other SHs while maintaining the interest of the current high interest SHs. Focusing away from high interest SHs towards low interest SHs may allow discovering currently missing marginalised SHs.
- **2024**: Maintain the interest of the engaged SHs and focus on the relationships between them, including power dynamics and building trust to enhance collaboration.
- **2025**: Focus on co-decision activities and further planning on sustainment of SHs as well as on the defined agreements.

With a higher tendency to shape direct agency, solve problem, and produce knowledge, this mode provides several opportunities, but is also linked to some risks (Chambers et al., 2021). Table 28~~Table 28~~ provides details of the opportunities and risks associated to the high-scoring approaches (Figure 58~~Figure 58~~) and also linked to the co-creation Mode 2 “Empowering voices”.

Table 28: Overview of opportunities and risk linked to Mode 2 "Empowering voices" and the approaches that ranked higher in CS1-Nestos/Mesta. Based on Chambers et al. (2021).

Approach	Opportunity	Risk
Shape direct agency	The focus on shaping direct agency and solving problems offers achieving specific goals, that could be considered, in this case, in the design of the river contract proposal.	- Directly low-power stakeholders accountable for current problems. - Superficially engaging with SHs because of neglecting the process and equitability of co-creation such as only creating space for conversations during WSs. - Legitimising current power relations and systems such as an imbalance across WEFE sectors and/or publica authorities from each of the countries.
Solve problems	Solving problems along with producing knowledge offer support for decision-makers by providing informed and justified policy changes. For instance, having models that provide necessary information for the river contract proposals.	- Challenges in engaging SHs of interest to influence due to prioritising the project’s interest on the solution (losing low interest stakeholders). - Reinforcing existing views on the system and problems, inhibiting reframing alternatives.
Produce knowledge	The focus on knowledge production and transfer, can help in advocating for policy changes, building capacity, and addressing specific CS’s needs. For instance, production and transfer on pressures in the WEFE sectors or data for model development.	- Echoing knowledge to create specific impacts. - Scientific knowledge overshadowing expertise and other ideas (watch for conflicts between stakeholders). - Focusing on budgeted activities only disregarding the pursuit of emerging goals.

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Approach	Opportunity	Risk
Shape systemic agency	Additional focus on shaping systemic agency can shift co-creation views towards more creativity and transformative outputs. These shifts should consider existing expectations and perspectives of the stakeholders.	- Having the feeling that the problem "is too big to handle" that creates a feeling of disempowerment. - Forgetting psychological aspects of changes in power (e.g., anxiety of losing power). - Forgetting identity conflicts and power differentials, resulting in echoing chambers of current dynamic. - Focusing on dialogue and falling into inaction.

Sustainment

[To be included as the project advances]

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Evaluation

The results below reflect the answers of SHs collected amongst Bulgarian and Greek SHs after the first round of WSs in the Nestos/Mesta river basin between May and September 2022. Importantly, the answers reflect the expectations and needs of SHs at the beginning of the co-creation process. They do not reflect how SHs have experienced the process, so far. These perspectives shall be collected in later iterations of the survey.

While there were in total 22 responses collected (18 on the Bulgarian and 4 on the Greek side), we deemed only 11 to be useful to determine the preferred modes of co-creation of SHs. The reason for exclusion were either of the following:

- An omission of all or nearly all survey questions, or;
- A consistent score across all survey questions (e.g., only scores of '4' as responses to all questions or alternating '5s' and 6s'), as it can be assumed that respondents did not truly engage with the questions (which is also evidenced by the unusually short time spent on the survey).

The 11 responses considered for this evaluation were provided by the following SHs:

- Four representatives from environmental authorities in Bulgaria;
- One local policy-maker from Bulgaria;
- One representative from a civil society organisation in Bulgaria;
- One person holding a business or representing the private sector from Bulgaria;
- One person preferring not to share their affiliation;
- Two researchers from Greece, and;
- One representative from environmental authorities in Greece.

In Figure 59~~Figure 59~~ we depict the approaches that SHs would prefer for the co-creation process in the Nestos/Mesta River basin. In Figure 60~~Figure 60~~ and Figure 61~~Figure 61~~ we group the responses according to the respectively desired modes of co-creation. The analysis below explores potential opportunities and risks for the co-creation process, including through contextualising the results with the answers of the CS-leads. If appropriate, the perspectives on 'approaches to co-creation' are given additional context with data collected elsewhere in the survey.

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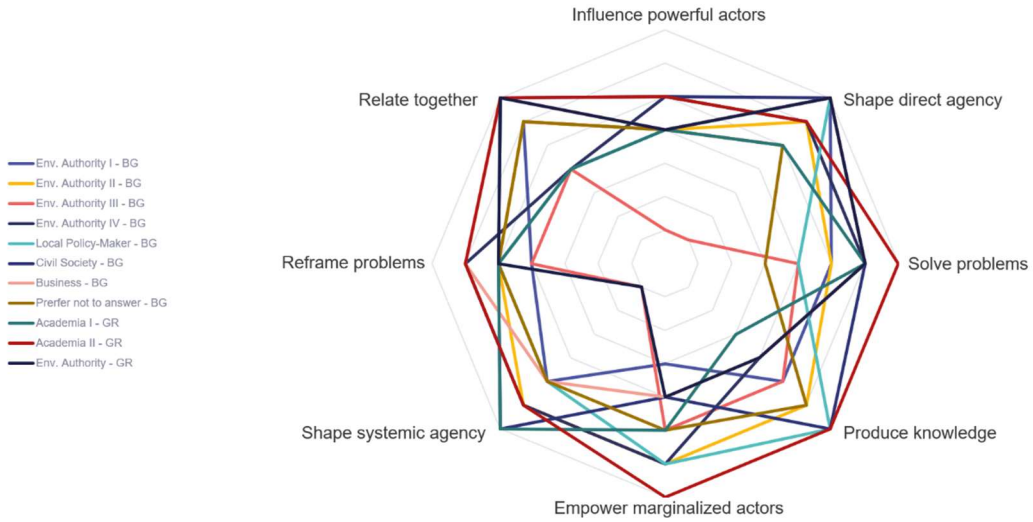

Figure 59: Preferred approaches to co-creation by stakeholders in the Nestos/Mesta river basin. The acronym BG stands for stakeholders from Bulgaria and GR for stakeholders from Greece.

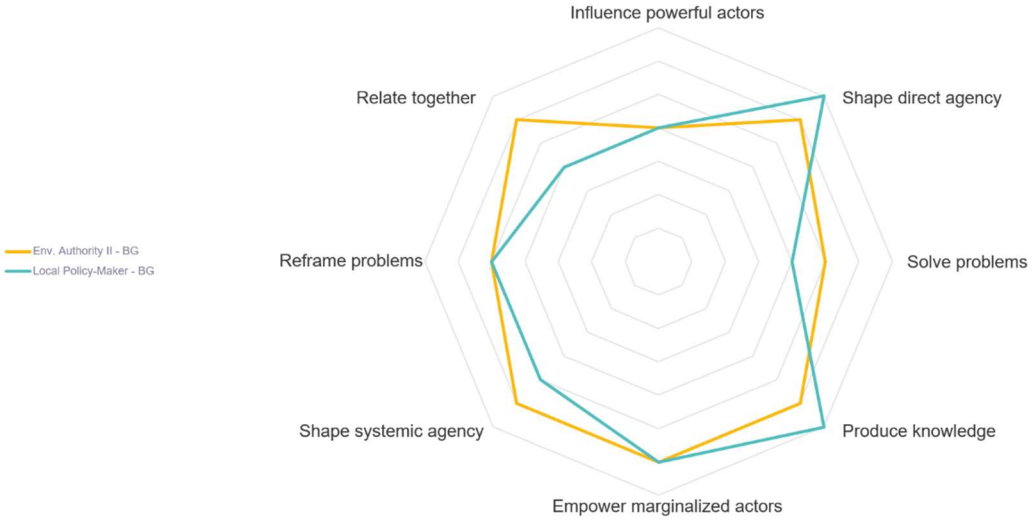

Figure 60: Stakeholders whose responses amount to the mode 'Empowering Voices'. The acronym BG stands for stakeholders from Bulgaria.

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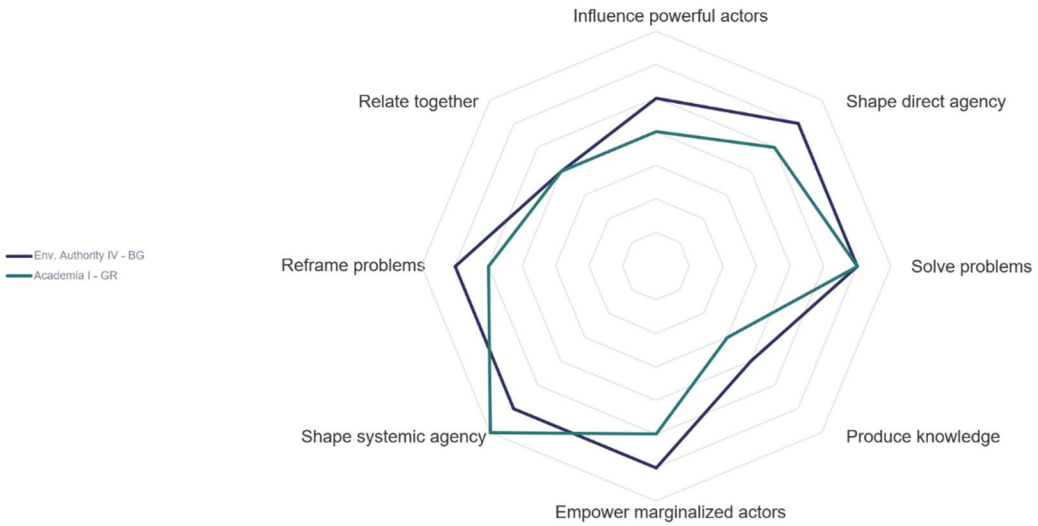

Figure 61: Stakeholders whose responses amount to the mode 'Reframing Power'. The acronym BG stands for stakeholders from Bulgaria and GR for stakeholders from Greece.

Figure 60~~Figure 60~~ shows that there are two SHs who align with the CS-leads' approach to co-creation – namely, 'empowering voices.' Interestingly, these SHs are both from Bulgaria, and one of them motivated their scoring as follows: "*Due to the treaty with Greece and linked limited possibilities, there are not many opportunities for development and water use in the Mesta basin*." Possibly, these SHs consider their views to be comparatively underrepresented in the current governance arrangements in the Nestos/Mesta river basin. In this context, the CS-leads should be wary to not simply legitimise existing power relations between SHs. CS-leads could consider emphasising 'empowering marginalised actors' more, making a point of featuring their views and needs more prominently at the upcoming WSs and the ultimate river contract. On other hand, it will also be key not to over-emphasise points of difference between SHs, as powerful actors may otherwise block a process that they perceive goes against their interest. Specifically, it is advisable to stay away from using 'blame narratives' that single out particular SHs as culprits for inequitable distributions of benefits and risks.

Relatedly, Figure 61~~Figure 61~~ shows that two SHs align most with the mode of 'reframing power.' For these SHs, compared to the ones that would like to see 'empowering voices', there is a stronger priority on 'shaping systemic agency' and 'reframing problems.' To satisfy their needs it would be important to provide space for discussions that can problematise power relations in the river basin and their implications as well as allow for different perspectives on the underlying problems of the basin to shared. CS-leads may however decide that this is not in the broader interest of the process, as it can come at the expense of 'building relationships' and 'producing knowledge', which had been identified by them as key for the Nestos/Mesta river basin. Additionally, one of the respondents belongs to the academic sector, therefore may be less powerful and ultimately not a key SH of the CS.

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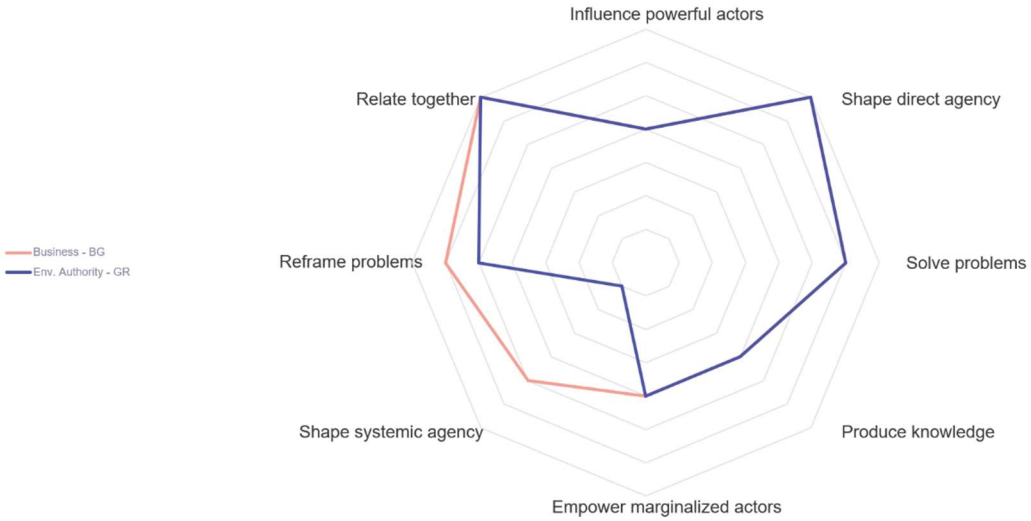

Figure 62: SHs whose responses amount to the mode 'Brokering Power'. The acronym BG stands for stakeholders from Bulgaria and GR for stakeholders from Greece.

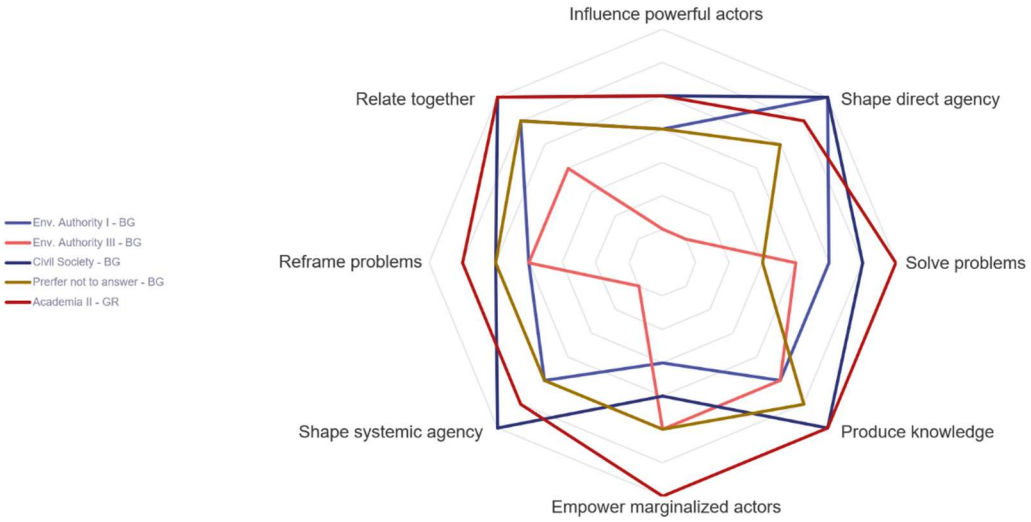

Figure 63: Stakeholders whose responses amount to no particular mode of co-creation. The acronym BG stands for stakeholders from Bulgaria and GR for stakeholders from Greece.

As shown in Figure 62~~Figure 62~~, two SHs would desire a mode that resembles more closely the mode ‘brokering power’. This mode usually emphasises dialogue between rather powerful actors based on existing knowledge, and focusing on agreeing on policy and management actions. This usually carries a risk that the achievement of tangible outcomes comes at the expense of elevating the voices of less powerful actors as well as producing new knowledge. One thing to note in this context is that one representative from a Greek environmental authority only wants to see an adaptation to changes in the basin (e.g. climate change) without any substantial changes to policy-making or policy goals (see: low score for ‘shaping systemic agency’), but stressing a need to build relationships: *“The exaggeration of each group's needs makes trust low between them. A great deal of effort will be required to reconcile all views."* The CS-leads should be aware that this does not align with their own objectives for the process.

Lastly, as depicted in Figure 63~~Figure 63~~, there are a number of SHs who cannot be assigned a particular mode.

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Beyond the modes of co-production, the survey also provided the option for respondents to share which outcomes of the engagement process they deem most important. While all outcomes were considered to be somehow important – none was scored on average below 5.26 out of 7, with 7 meaning highly relevant – 'capacity development', 'ecological outcomes', and 'social outcomes' were considered to be most important. 'Knowledge production', 'knowledge transfer', and 'institution building', on the other hand, were considered least important. It is important to note though that answers were scattered across the scale and differences on overage were marginal, and particular patterns according to SH group could not be identified yet. According to Chambers et al. (2021), the outcome 'capacity development' (e.g. increased ability to understand and/or manage challenges in the basin, use of new decision-making tool; ability to engage in policy processes) is considered to be positively correlated with the mode 'empowering voices', which would mean that the mode of co-production the CS-leads currently intend to pursue may also yield the outcome SHs deem to be most important.

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CS2: Lielupe

The SHE plan is based on the data, information and perceptions provided and analysed by the CS-Leads and the AVA-Team by September 2022. The plan is updated on a yearly basis taking new SH information and evaluation results into account to allow for adaptive management.

Stakeholder engagement aim

The Lielupe CS covers 2 neighbouring countries – Latvia and Lithuania. SHs from both countries that can be interested in participating will be approached. Potential interest in development of Lielupe River Basin can have SH groups (at national, regional, and local level) having direct or indirect impacts in the region. The CS will strive to involve SHs from national authorities (ministries, agencies), regional planning authorities and local municipalities having practical and direct link to the CS. SHs who work at various levels of involvement will be addressed as well e.g., developers of river basin management plans, research institutions/universities, professional associations, environmental NGOs, and business (large farms and enterprises) active in the region.

Involvement of SHs in the work of the Lielupe CS is of pivotal importance. The aim of involving a wide range of people is twofold: (i) it provides the ground for SHs to express their views and perceptions about the overall development of the Lielupe River Basin (needed in development of the project outcomes and results to serve best for application in their daily practices), and (ii) to obtain different types of knowledge to be accounted in Nexus assessment framework.

Part of the knowledge that is aimed to be generated refers to:

- System knowledge:
  - Characterise social, economic, ecological, and institutional contexts associated with regional development planning.
  - Improve understanding of the water quality issues (the status quo and targets).
  - Gain understanding of the river basin management plans between both countries.
- Target knowledge:
  - Determine what set of solutions that balances different sectors by their design and scale of applicability.
  - Knowledge on potential conflicts between the agricultural and ecological sectors.
  - Determine innovative systems for sustainable production.
- Transformation knowledge:
  - Gain understanding on how to improve communication between SHs as well as the requirements of an appropriate platform to do so.
  - Determine suitable pathways to design and implement formal agreements for the case of a transboundary river basin.
  - Design and implement suitable ways for a coordinated management between the countries.

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Stakeholder analysis

Stakeholder identification

A total of 75 Latvian and Lithuanian SHs were identified out of which 23 (30.7%) consented to be officially included in the SH register and participate in the NXG SHE (Table 29~~Table 29~~). In the remainder of the document SHs that consented to be included will be termed 'official stakeholders'.

Table 29 CS2-Lielupe summary information of stakeholder identification as of Sept. 2022

Item	Count
Preliminary listing of stakeholders	75
Stakeholders in registered officially	23
Percentage of consent [%]	30.7%

The official SHs belong mainly to the water (56.5%) and ecosystems (43.5%) sectors, followed by the energy (26.1%) and food (8.7%) sectors (Figure 64~~Figure 64~~). Comparing the proportions with the preliminary listing, the food sector is the only that has reduced its share.

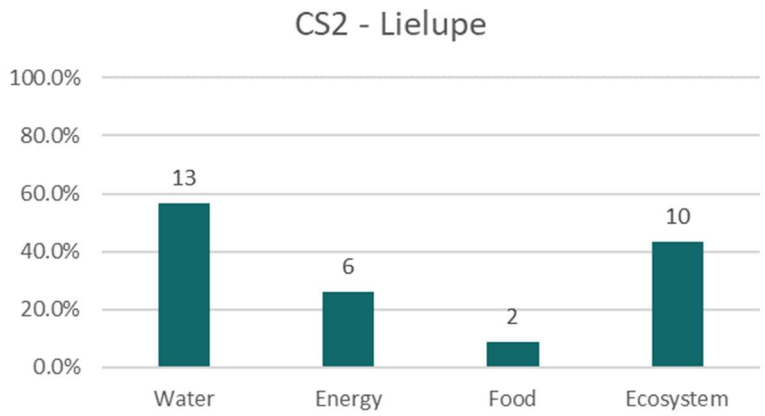

Figure 64: Distribution of stakeholders across the WEFE sectors for CS2 - Lielupe. One stakeholder can be assigned to one or more sectors.

In terms of gender, there is an almost 40/60 distribution across female and male genders (Figure 65~~Figure 65~~). All SHs provided data about gender.

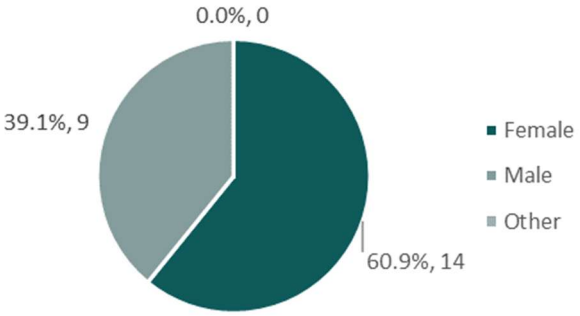

Figure 65: Gender distribution for CS2 – Lielupe

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Stakeholder differentiation and categorisation

The official SHs are distributed across tiers as follows in a descending order: tier 2 with 16 SHs; tier 3 with four SHs; tier 1 with three SHs. This means that SHs are perceived to be more interested in the application of the project's outputs, rather than with their development.

No further categorisation is available yet.

From a Power-Interest perspectives, all consenting SHs were perceived as having rather high interest, except SH-47 and SH-66. More than half of them (60.9%) were perceived as low power (Figure 66~~Figure 66~~). When comparing the perceived scoring of both the CS-Leads and the SHs themselves (as provided in the PPCF), SH-49 was perceived as having a higher interest than its own perception.

Even though the upper right section of the map should be considered as the key SH group, given the number of SHs, all of them will be considered for a closer engagement, as far as they are interested.

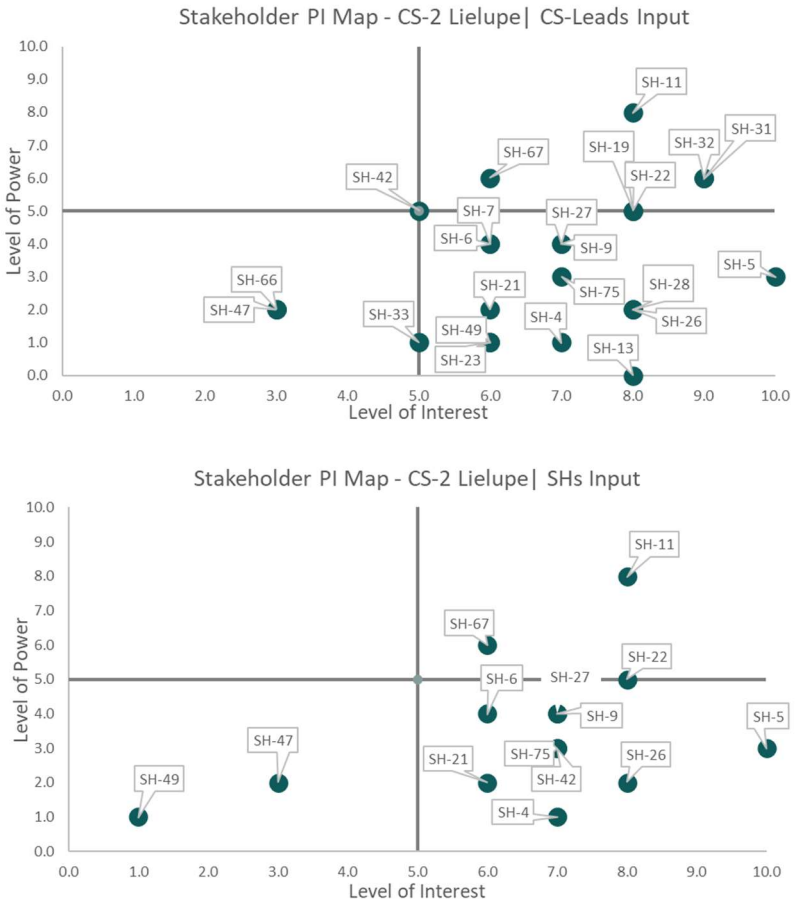

Figure 66: Power-Interest Map for CS2 - Lielupe. Above: based on the CS-Leads' perception; and below: based on the scoring provided by stakeholders in the PPCF (some stakeholders did not provide input)). For data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents.

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Stakeholder relationships

About the relationships among the official SHs, the CS-Leads characterised – based on their perception – 210 relationships. The relationships correspond mainly to the complementary (Cm) type, 53.8%, followed by rather non-existent (NE) relationships among SHs (28.6%), and a lower share of cooperation (Cp), 17.6%. No conflicts were identified, and thus the focus of this CS can be on relating together to reduce the NE share, and also build trust to move from Cm to Cp (Figure 67~~Figure 67~~ and Figure 68~~Figure 68~~).

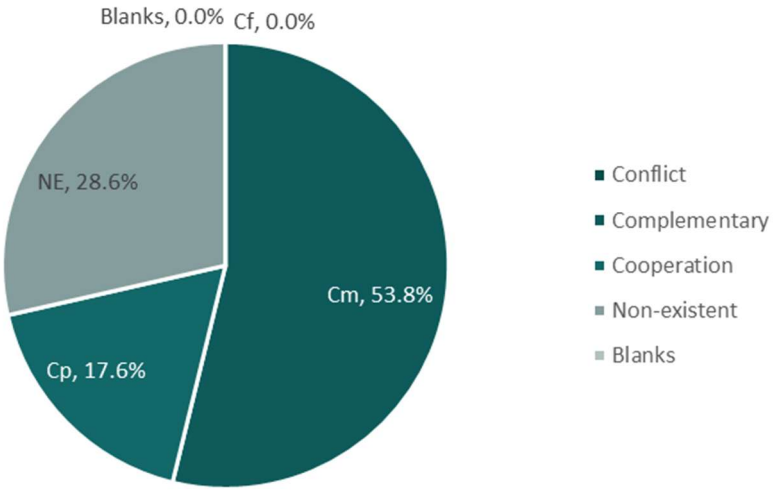

Figure 67: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads.

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SH-ID	SH-4	SH-5	SH-6	SH-7	SH-9	SH-11	SH-13	SH-19	SH-21	SH-22	SH-23	SH-26	SH-27	SH-28	SH-31	SH-32	SH-33	SH-47	SH-66	SH-67	SH-75
SH-4		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-5	CM		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-6	CM	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-7	CM	CP	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-9	CP	CM	CM	CM		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-11	CP	CM	CM	CM	CM		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-13	CM	CM	CM	CM	CM	CM		-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-19	CM	CM	CM	CM	CM	CM	CM		-	-	-	-	-	-	-	-	-	-	-	-	-
SH-21	CP	CM	CM	CM	Cm	CP	CM	CM		-	-	-	-	-	-	-	-	-	-	-	-
SH-22	CM	CM	CM	CM	CM	CM	CM	CM	CM		-	-	-	-	-	-	-	-	-	-	-
SH-23	CM	CM	CM	CM	CP	CM	CM	CM	CM	CM		-	-	-	-	-	-	-	-	-	-
SH-26	CM	CM	CM	CM	CM	CM	CM	CP	CM	CM	CP		-	-	-	-	-	-	-	-	-
SH-27	CM	CM	CM	CM	CM	CM	CM	CP	CM	CM	CP	CP		-	-	-	-	-	-	-	-
SH-28	CM	CM	CM	CM	CM	CM	CM	CP	CM	CM	CP	CP	CP		-	-	-	-	-	-	-
SH-31	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CP	CP	CP	CM		-	-	-	-	-	-
SH-32	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CP	CP	CP	CM	CP		-	-	-	-	-
SH-33	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CP	CP	CP	CM	CP	CP		-	-	-	-
SH-47	NE	CM	CM	CM	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE		-	-	-
SH-66	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CP		-	-
SH-67	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CP	CP		-
SH-75	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CP	CP	NE	CP	CP	CP	CM	CM	CM	

Figure 68: Actor-Linkage Matrix for CS2-Lielupe. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent.

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Stakeholder engagement plan for the CS2 - Lielupe

The SHE plan provides a guidance to organise SHE and achieve the SHE aims considering the initial results of the SH analysis. These results show that the pool of SHs involves mainly:

- the water and ecosystem sectors with a fair participation of the energy sector and room for increasing the participation of food-related SHs.
- SHs from tier 2, with interest in the project results and products. This analysis should be revised and updated based on the interest in being engaged in the project, and shift SHs accordingly to tier 1. SHs should also be categorised accordingly.
- high-interest SHs but perceived with a rather low level of power.
- relationships of complementarity or non-existent, allowing to advance towards building relationships and foster cooperation.

Considering this background, CS-Leads scored the different co-creation approaches for the themes of purpose, power, politics, and pathways (explained in Part I).The resulting figure (Figure 69~~Figure 69~~) was discussed with the CS-Leads, and after consideration of the aims, the analysis results, and the own CS-Leads' overview of the context, the fitting mode of co-creation is "Navigating difference". It is important to mention that this co-creation mode does not consider a high scoring for producing knowledge. However, as this is of particular relevance for the project and the CS, a focus on producing knowledge was considered in addition to the characteristics shaping the co-creation mode "Navigating differences".

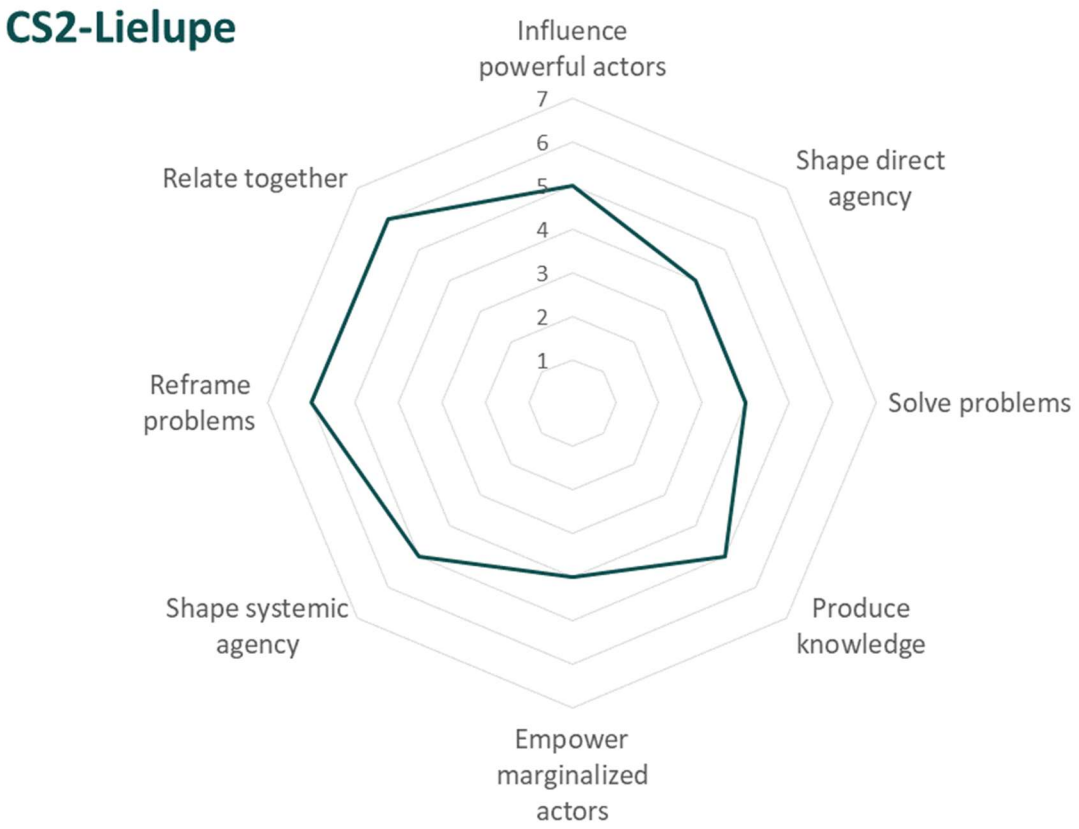

Figure 69: CS2-Lielupe scoring for co-creation approaches

This co-creation mode focuses on relating together and learning with some degree of empowerment, allowing for reframing current perspectives and practices (Chambers et al.,

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2021[1]). In this mode it is important to build trust across different power levels to avoid having high-power SHs completely drive the actions; and therefore, having at an early stage an interaction that focuses on reframing and explore current differences and even conflicts is useful to support the achievement and performance of policy and management outcomes (ibid.). The resulting mode's focus aligns with the SHE aims of achieving a target around existing conflicts and solutions that balance different sectors that consider a sustainable production, through improved communication, formal agreements, and coordinated management.

The production of knowledge adds a specific focus for this CS that will have to acknowledge the challenge in building relationships while producing knowledge. In general, there is a trade-off in achieving both or designing time to advance on both ends (ibid.). Such a trade-off can be tackled by planning collective engagement activities in which content is created via open but well moderated and guided discussion. This way SHs can express their views and interest to each other looking towards finding a conclusion or agreement by the end of the activity that is useful for the respective WP.

The foci of the co-creation mode and the additional interest in knowledge production shape the eight co-creation approaches to support the achievement of the SHE aims of CS1 (Table 30~~Table 30~~) and leads the plan across all phases of SHE (information to empowerment) for CS-Lielupe as presented below (Table 31~~Table 31~~).

It is important to mention that the engagement process for CS-Leads to consider that SHs may be participating in other parallel projects, and, thus, be aware of the time available of SHs to avoid any fatigue. Therefore, there needs to be regularly checking-up with SHs, their time availabilities, and potential overlapping of events – and even topics. If there is high overlap of time and topics, consider reaching out to the other projects and even collaborate via common events. As the focus of this CS's mode is on relating together, creating knowledge and empowerment, some emphasis is made on the efforts towards co-design but main efforts focus on co-development.

Table 30: Description of approaches for CS2-Lielupe based on the scoring exercise done by CS-Leads and following Chambers et al. (2021).

Approach	Description
Purpose	
Solve problems	There is a set agenda where researchers and SHs explore different (potential) solutions: co-creating knowledge regarding policies and for the development of the NEPAT, and WEFE Footprint.
Reframe problems	The co-creation activities moderately facilitate questioning current views of problems and solutions, for instance, by shifting to nexus perspective, fostering collaboration between stakeholders (identifying conflicts, building trust).
Power	

[1] Chambers, Josephine M., C. Wyborn, M.E. Ryan, R.S. Reid, M. Riechers, A. Serban, N.J. Bennett, et al. 2021. 'Six Modes of Co-Production for Sustainability'. *Nature Sustainability* 4 (11): 983–96. https://doi.org/10.1038/s41893-021-00755-x.

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Approach	Description
Shape direct agency	There is a search to strengthen collective and institutional abilities and capacities to pursue a coordinated management through formal agreements.
Shape systemic agency	There is an intention to shift relationships and practices of higher institutional scales, focusing on how to organise themselves. For instance, by fostering interaction between Latvian and Lithuanian policy makers and sectorial authorities.
Politics	
Influence powerful actors	This CS will engage mainly low-power SHs, who will have the chance of communicating their views to some high power official stakeholders. While high power – high interest stakeholders are crucial for the project, high power – low interest stakeholders need to be identified and targeted to reduce potentially unknown risks to the project.
Empower marginalised actors	The engagement with mainly low-power stakeholders will allow "making their voice visible" to the powerful stakeholders and their interests. Focusing away from high interest stakeholders towards low interest stakeholders may allow discovering currently missing marginalised stakeholders.
Pathways	
Produce knowledge	Strong focus on producing knowledge that guides the development and design of the NEPAT tool and WEFE Footprint, as well as knowledge on the governance context that supports working towards a river contract.
Relate together	Moderate focus on relating with and between stakeholders to build new relationships and trust that allows a coordinated management within the transboundary river basin.

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Table 31: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS2-Lielupe. SH: Stakeholder.

	Co-exploration	Co-design		Co-development	
	Information	**Consultation**	**Involvement**	**Collaboration**	**Empowerment**
WHO? Stakeholder category	All categories should be properly informed. An effort to reaching out to marginalized groups such as the energy and food sectors and low interest stakeholders from Latvia and Lithuania is needed.	All categories can be consulted for a broader and diverse scope of answers. Care needs to be taken to avoid stakeholder fatigue, in particular in high power – low interest stakeholders.	All categories can be involved. Attention needs to be paid to involve stakeholders from all WEFE sectors. Special issues can be raised by and discussed with the sectoral authorities and potential users of the NEXOGENSIS tools.	All categories can collaborate, with particular focus on the sectoral authorities and the local policy-makers. An emphasis should be laid on fostering collaboration across all WEFE sectors – bringing in currently missing sectoral stakeholders (e.g., energy and food) – and across local (and national) policy makers from both countries to ensure power balance.	Empower research and academic sector together with some positions within the local municipality and policy makers. The latter needs to be done in an equitable manner across both riverbanks/countries to avoid a power imbalance and empower the currently marginalized stakeholders.
WHY? PI and ALM	All quadrants of the PI map necessitate being informed with a particular emphasis on the low power – high interest category with the intent of empowering them and reaching out to low power – low interest stakeholders with the intent of increasing their interest.	Consultation of high power – low interest stakeholders needs to be targeted to their interest with the aim of maintaining their interest. Similarly, low power – high interest stakeholders should be consulted in their area of expertise and interest with the aim of empowering them.	Involvement of high power – high interest stakeholders is relevant for the discussion and the involvement of high power – low interest stakeholder should be sought. The engaging low power – high interest stakeholders in discussion and exchange with other stakeholders is a good	Collaboration between stakeholders that are identified as cooperation should be fostered, while non-existent relationships should be provided with a space to create cooperation. Conflicting relationships may need to be resolved in individual spaces under professional mediation.	Given the PI Map, most stakeholders, should be included in these activities, as they are mainly low power; but also involving high power stakeholders in the empowerment activities can help validating the process and support a sustainment of the empowerment after the duration of the project.

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	Co-exploration	Co-design		Co-development	
			way to start paving towards empowerment.		Therefore, it is important to keep the interest of high power stakeholders.
WHAT? CS focus: working on relating together along with producing knowledge	Inform about coming events, the diversity of SHs and advancements in agreements and networking, as well as in project findings. Also, inform with the intent of maintaining and increasing their interest and incentivising them to reach out to further related stakeholders (snowballing).	Consult about perception of networking, stakeholders' interests, roles, and potential conflicts and enhanced cooperation potential. Consult about missing/marginalized stakeholder (groups) and how to best reach out to them. Consult also about how to best maintain the stakeholder's particular interest in the project.	Involve stakeholders in discussions and exchanges with and between them about: ways of relating together, building trust, sectoral issues, the results of consultation activities (e.g., surveys, interviews). Discussion is necessary beyond validating the project outputs, focusing also on activities that support exploring exchange between stakeholders and the creation and transfer of knowledge.	Collaboration in terms of sharing knowledge to raise awareness of the current issues and great number of the interlinkages between sectors. Collaboration activities should foster interaction between stakeholders towards a coordination that can be reflected in the transboundary river contract or facilitate its implementation.	Ensure that these stakeholders have space to provide their feedback, feel safe to expose their perceptions and discuss about conflicts and power dynamics in view of the river contract.
HOW? Activities	Think of incentives that might increase the interest of marginalized, low interest stakeholders such as invitations to events, highlighting research results of	WP1 governance assessment interviews; surveys during or after each WS (e.g., WP1 and WP5); perception about the ALM and the shown non-existent and cooperation potential if appropriate.	Activities in all WSs with especial focus on WS2 and WS3 for the identification of needs and discussion on policy needs, interviews for WP1, and WP3; and focus on WS4 and WS5	WSs – activities to co-decide features and design of the tools (WS2 to WS6), focus groups (within or in between WS2 and WS3), role activities to build trust. 1-on-1 activities to bring in marginalized current low-	Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations). So that the final draft of a river contract includes clear roles and

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	Co-exploration	Co-design		Co-development	
	interest to them or providing them with free access to results and findings. All SHs have consented to the newsletter, except SH-49. They should be invited to sign up for the newsletter in our website.	Show at each WS which advancements/decisions were made based on the stakeholders' inputs (feedback to the feedback or acknowledging their inputs).	for WP3 and WP4 outputs. Additional activities that foster exchange between stakeholders from different sectors, categories, and countries are helpful. Plan activities to share the outputs of the provided feedback and discuss about it.	interest or uninformed stakeholders.	responsibilities that empower previously disregarded stakeholders. Frequent smaller conversations of transnational peer stakeholders may need to happen to allow for recognition of peers and for technical discussions about transboundary solutions (e.g., ecological low flows, abstraction needs, conservation measures, etc.). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.

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Management and sustainment

Management

CS-Leads should not forget checking the expectations written by the official SHs in the Privacy Policy Consent Form.

The initial management plan considers different foci per year:

- **2023**: Actively look to increase the interest of other SHs while maintaining the interest of the current high interest SHs. Focusing away from high interest SHs towards low interest SHs may allow discovering currently missing marginalised SHs.
- **2024**: Maintain the interest of the engaged SHs and focus on the relationships between them, including power dynamics and building trust to enhance collaboration.
- **2025**: Focus on co-decision activities and further planning on sustainment of SHs as well as on the defined agreements.

Leading a SHE process through a co-creation mode of “Navigating differences”, focused on relating together, reframing problems, and shaping systemic agency, while producing knowledge provides several opportunities, but is also linked to some risks. Table 32~~Table 32~~ provides details of the opportunities and risks associated to the high-scoring approaches (Figure 69~~Figure 69~~) and also linked to the co-creation Mode 5 “Navigating differences”.

Table 32: Overview of opportunities and risk linked to Mode 5 "Navigating differences" and the approaches that ranked higher in CS2-Lielupe. Based on Chambers et al. (2021).

Approach	Opportunity	Risk
Produce knowledge	The focus on knowledge production and transfer, can help in advocating for policy changes, building capacity, and addressing specific CS’s needs. For instance, production and transfer on pressures in the WEFE sectors or data for model development.	- Echoing knowledge to create specific impacts. - Scientific knowledge overshadowing expertise and other ideas. - Focusing on budgeted activities only disregarding the pursuit of emerging goals.
Shape systemic agency	Additional focus on shaping systemic agency can shift co-creation views towards more creativity and transformative outputs. For CS2-Lielupe, these shifts should focus on coordination across stakeholders, including improving communication and providing a platform for dialogue.	- Having the feeling that the problem “is too big to handle” that creates a feeling of disempowerment. - Forgetting psychological aspects of changes in power (e.g., anxiety of losing power). - Forgetting identity conflicts and power differentials, resulting in echoing chambers of current dynamic. - Focusing on dialogue and falling into inaction.
Reframe problems	Reframing problems as well as relating together offers the opportunity of building legitimate and flexible processes for tangible changes in perspectives, networks and policies and practices. Which in this case should involve less powerful actors and foster relationships and	- Low engagement of action/solution-oriented stakeholders. - Inhibiting the development of concrete actions. - Focusing on reframing only without triggering effective shifts in policies and practices. - Early emphasis on differences inhibits finding a common ground.

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Approach	Opportunity	Risk
Relate together	coordination between Latvian and Lithuanian stakeholders.	- If power dynamics are not properly managed, cooperation and consensus can result from subjugation of less powerful views and stakeholders. - If individual voluntary contributions are not valued properly, social inequalities may rise.

Sustainment

[To be included as the project advances]

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CS3: Jiu

The SHE plan is based on the data, information and perceptions provided and analysed by the CS-Leads and the AVA-Team by September 2022. The plan is updated on a yearly basis taking new SH information and evaluation results into account to allow for adaptive management.

Stakeholder engagement aim

To actively involve SHs and facilitate their engagement in co-creation and validation of a NEXUS WEFE approach to support improved policy-making for water management and sustainable development primarily focused on Jiu basin, while also assessing relevant interactions within the Lower Danube region. Additionally, we aim to promote CS results as a trustful and solid reference at a national level in Romania and in the region (in dialogue with other CS in NXG and sister projects under H2020-LC-CLA-2020-2, e.g., Rexus, GoNexus), for identifying common interests, potential conflicts, and areas of compromise between different profiles SHs in diverse economic and biodiversity contexts. Furthermore, we aim to contribute to dissemination of project results at various levels facilitating their effective use in assessment processes for water use requirements, evaluation of the vulnerabilities of current water systems and improved strategies and action plans towards achieving EU targets related to WEFE sectors (WFD, CAP, Green Deal, etc).

SHE also aims at generating the following knowledge:

- System knowledge:
  - Current state of the social, economic, institutional, and ecologic contexts that are relevant for a WEFE Nexus approach.
  - Increase understanding of the institutional and organisational structure, functions, and information flows.
  - Explore aspects related to the clean energy transition that are relevant to address for the WEFE Nexus in the region.
  - Understand existing conflicting actions and strategies regarding WEFE Nexus.
- Target knowledge:
  - Determine the appropriate level of public awareness of water as a depleting resources.
  - Determine expectations and requirements for an assessment and planning instrument including interface for communication and reporting instrument.
  - Build towards a common language to facilitate stakeholders' understanding of WEFE Nexus paving the reduction of the potential conflicts.
- Transformation knowledge:
  - Determine pathways to enhance awareness of water resources and its management.
  - Gain understanding on how to break silos based on an integrated view of the reality in the local context.
  - Tailor the design of the NXG platform to support communication and reporting of the status of water resources among stakeholders.
  - Build capacity and identify/select relevant indicators for monitoring WEFE Nexus in connection with strategic objectives for water management and sustainable development.

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Stakeholder analysis

Stakeholder identification

A total of 94 Romanian SHs were preliminarily identified out of which 25 (26.6%) consented to be officially included in the SH register and participate in the NXG SHE (Table 33~~Table 33~~).

Table 33: CS3-Jiu summary information of stakeholder identification as of Sept. 2022

Item	Count
Preliminary listing of stakeholders	94
Stakeholders in registered officially	25
Percentage of consent [%]	26.6%

Not all SHs belong to one WEFE sector, some SHs belong to other sectors (e.g., civil society, policy makers at national level) and not all of them were differentiated. Across the differentiated ones, there is a rather even distribution of the SHs across the WEFE sectors (Figure 70~~Figure 70~~). Comparing the proportions with the preliminary listing, the food sector is the only that has reduced its share.

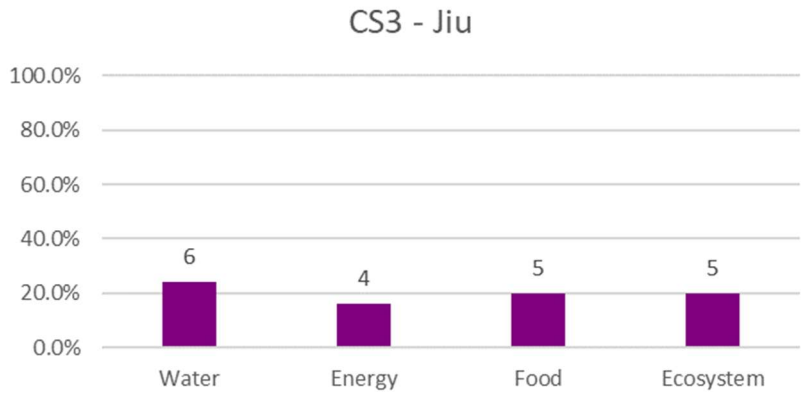

Figure 70: Distribution of stakeholders across the WEFE sectors for CS3 - Jiu. One stakeholder can be assigned to one or more sectors.

In terms of gender, there is a 60/40 distribution across female and male genders (Figure 71~~Figure 71~~). All SHs provided data about gender.

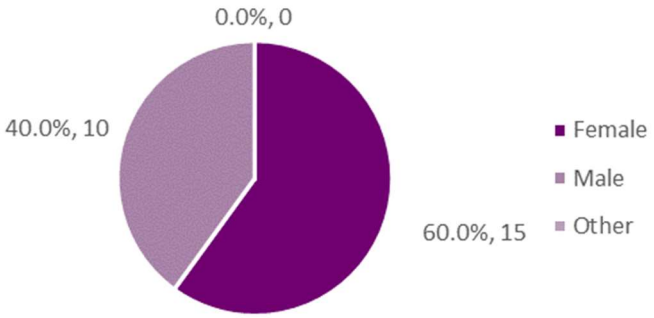

Figure 71: Gender distribution for CS3 – Jiu

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Stakeholder differentiation and categorisation

The 25 official SHs belong mainly to tier 2. This means that SHs are perceived to be more interested in with the application of the project's outputs, rather than with their development.

Additionally, these SHs were categorised mainly as "5. Agricultural authorities and representatives", "4. Policy makers at national level", and energy (category 6) and river basin (category 8) authorities and representatives (Figure 72~~Figure 72~~). This also reflects a rather balanced distribution of the SHs across the WEFE sectors.

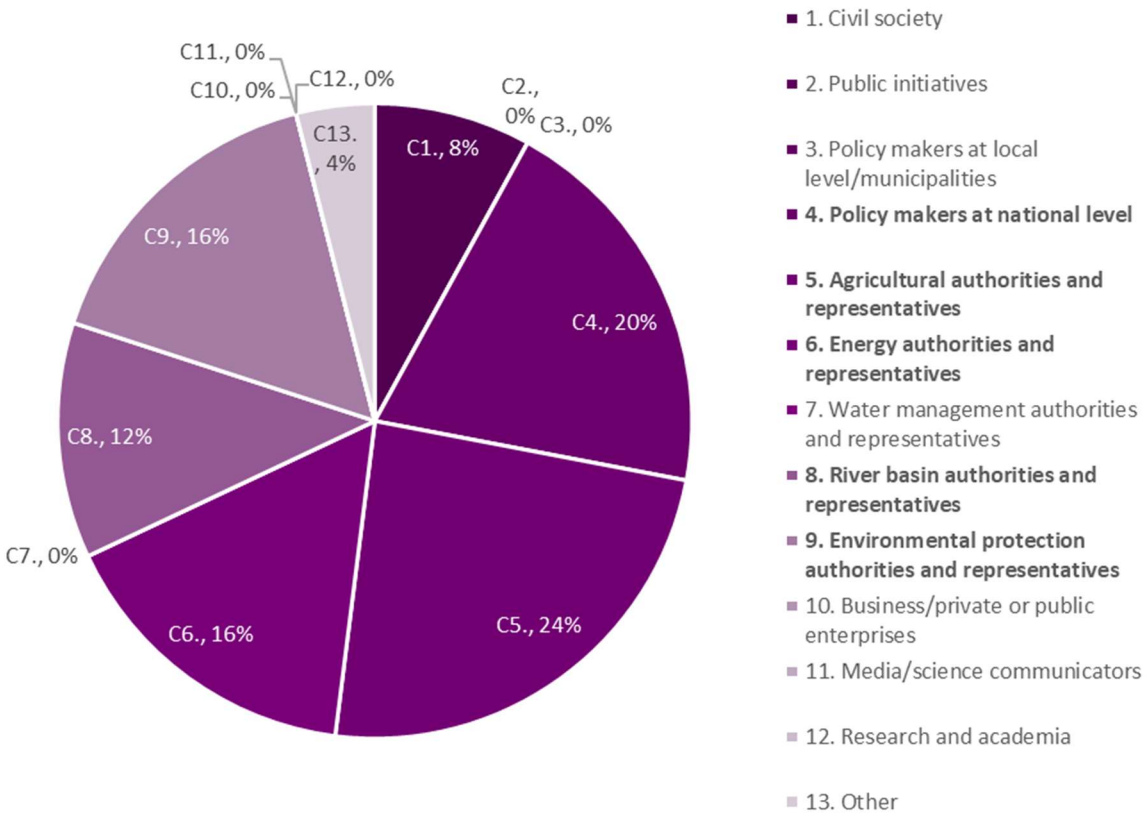

Figure 72: Distribution of stakeholders across categories for the case CS3 - Jiu.

From a Power-Interest perspectives, all consenting SHs were perceived as having mid to high interest with a majority (76%) of high power (Figure 73~~Figure 73~~). When comparing the perceived scoring of both the CS-Leads and the SHs themselves (as provided in the PPCF), SHs tended to score themselves as having higher power than the one perceived by the CS-Leads. The most powerful SHs, belong to civil organisations and the river basin authority along with authorities and representatives of the water and energy sectors (SH-3, 26, 31, 36, 57 and 72).

Even though the upper right section of the map should be considered as the key SH group, given the number of SHs, all of them will be considered for a closer engagement, as far as they are interested.

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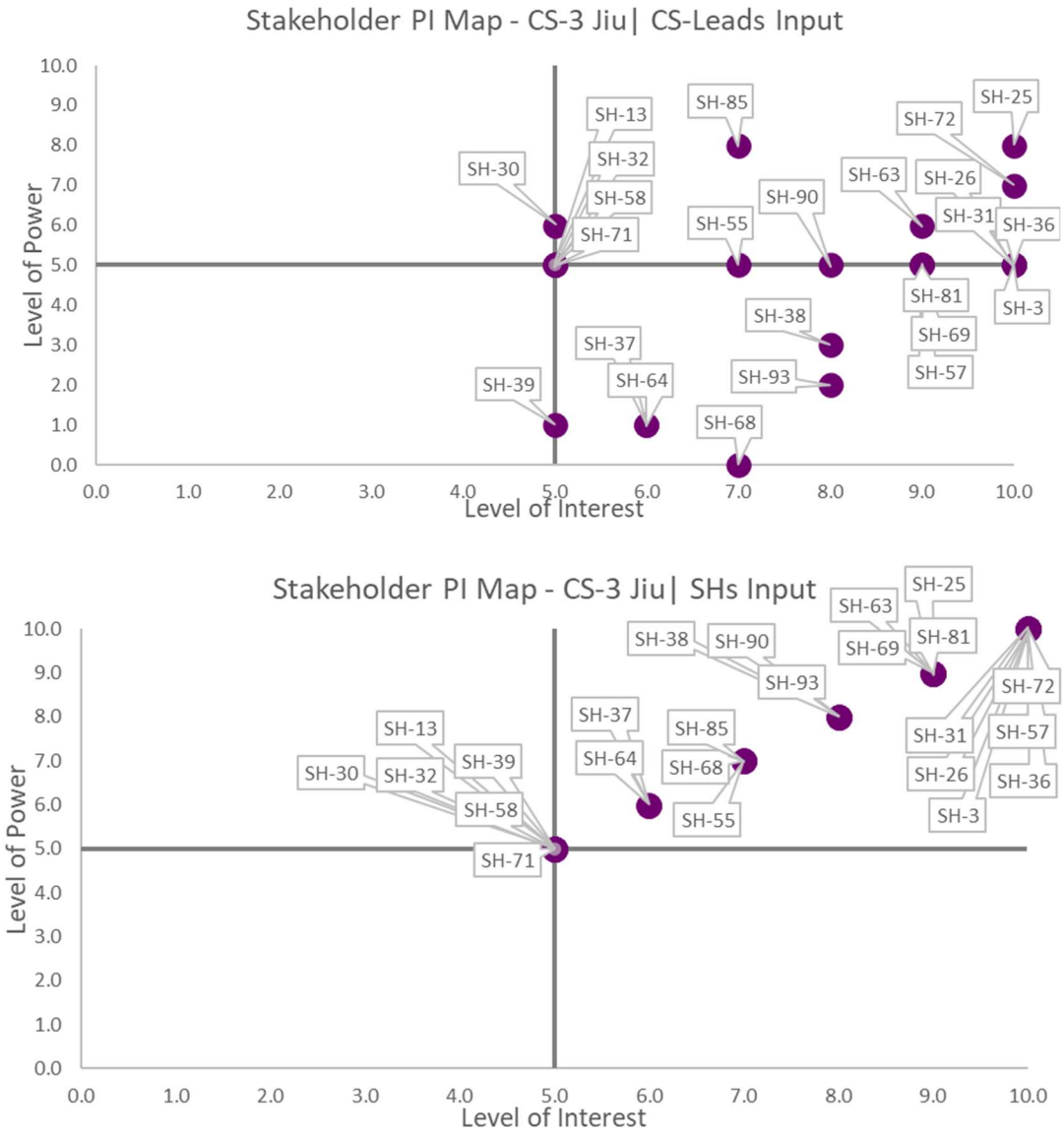

Figure 73: Power-Interest Map for CS3 - Jiu. Above: based on the CS-Leads' perception; and below: based on the scoring provided by stakeholders in the PPCF (some stakeholders did not provide input)). For data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents.

Stakeholder relationships

About the relationships among the SHs, the CS-Leads characterised – based on their perception – 300 relationships across the 25 SHs. The relationships correspond mainly to the complementary (Cm) type, 47.0%, followed by cooperation (Cp) relationships among SHs (28.3%), and a considerable share of conflicts (Cf), 24.7% (Figure 74~~Figure 74~~ and Figure 75~~Figure 75~~). This means that efforts in this CS need to focus on identifying and reducing conflicts.

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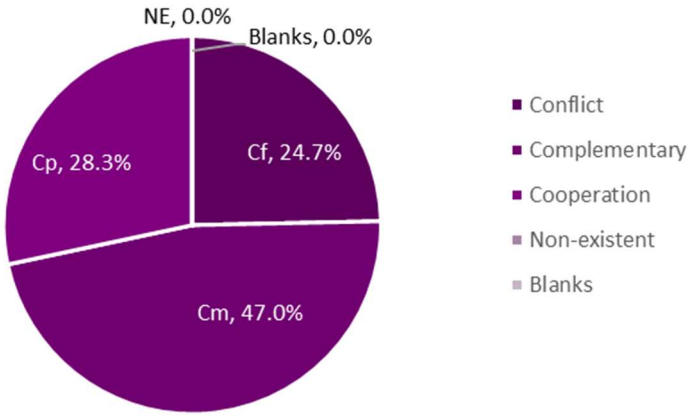

Figure 74: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads.

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SH-ID	SH-3	SH-13	SH-25	SH-26	SH-30	SH-31	SH-32	SH-36	SH-37	SH-38	SH-39	SH-55	SH-57	SH-58	SH-63	SH-64	SH-68	SH-69	SH-71	SH-72	SH-81	SH-85	SH-90	SH-93	SH-94
SH-3		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-13	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-25	CP	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-26	CP	CP	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-30	CP	CP	CP	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-31	CP	CP	CP	CP	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-32	CP	CP	CP	CP	CP	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-36	CF	CF	CF	CF	CF	CF	CF		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-37	CF	CF	CF	CF	CF	CF	CF	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-38	CF	CF	CF	CF	CF	CF	CF	CP	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-39	CF	CF	CF	CF	CF	CF	CF	CP	CP	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-55	CP	CP	CP	CP	CP	CP	CP	CM	CM	CM	CM		-	-	-	-	-	-	-	-	-	-	-	-	-
SH-57	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM		-	-	-	-	-	-	-	-	-	-	-	-
SH-58	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CP		-	-	-	-	-	-	-	-	-	-	-
SH-63	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF	CP	CM	CM		-	-	-	-	-	-	-	-	-	-
SH-64	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF	CP	CM	CM	CP		-	-	-	-	-	-	-	-	-
SH-68	CP	CP	CP	CP	CP	CP	CP	CF	CF	CF	CF	CP	CM	CM	CF	CF		-	-	-	-	-	-	-	-
SH-69	CP	CP	CP	CP	CP	CP	CP	CF	CF	CF	CF	CP	CM	CM	CF	CF	CP		-	-	-	-	-	-	-
SH-71	CP	CP	CP	CP	CP	CP	CP	CF	CF	CF	CF	CP	CM	CM	CF	CF	CP	CP		-	-	-	-	-	-
SH-72	CM	CM	CM	CM	CM	CM	CM	CF	CF	CF	CF	CM	CM	CM	CF	CF	CM	CM	CM		-	-	-	-	-
SH-81	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM		-	-	-	-
SH-85	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM		-	-	-
SH-90	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CP	CM	CM		-	-
SH-93	CP	CP	CP	CP	CP	CP	CP	CM	CM	CM	CM	CM	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CM		-
SH-94	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CP	CP	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	

Figure 75: Actor-Linkage Matrix for CS3-Jiu. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent.

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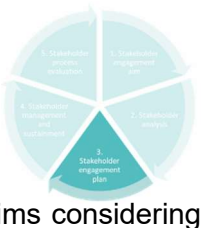

Stakeholder engagement plan for CS3 – Jiu

The SHE plan provides a guidance to organise SHE and achieve the SHE aims considering the initial results of the SH analysis. These results show that the pool of SHs involves:

- a balanced distribution across WEFE sectors.
- organisations of the civil society, policy makers, authorities and representatives of the water and energy sectors.
- mainly high-power SHs.
- relationships of complementarity followed by a similar share of cooperation and conflicts.

Considering this background, CS-Leads scored the different co-creation approaches for the themes of purpose, power, politics, and pathways. The resulting figure (Figure 76~~Figure 76~~) was discussed with the CS-Leads, and after consideration of the aims, the analysis results, and the own CS-Leads' overview of the context, the fitting mode of co-creation is **"Researching solutions".**

This mode focuses on the co-creation of knowledge to inform evidence-based decision-making, influencing policies and interventions (Chambers et al., 2021[1]). For a stronger impact, this mode of co-creation should be supported by an environment that fosters SHs to work on their relationships and questions current practices to adapt to policy changes (ibid.).

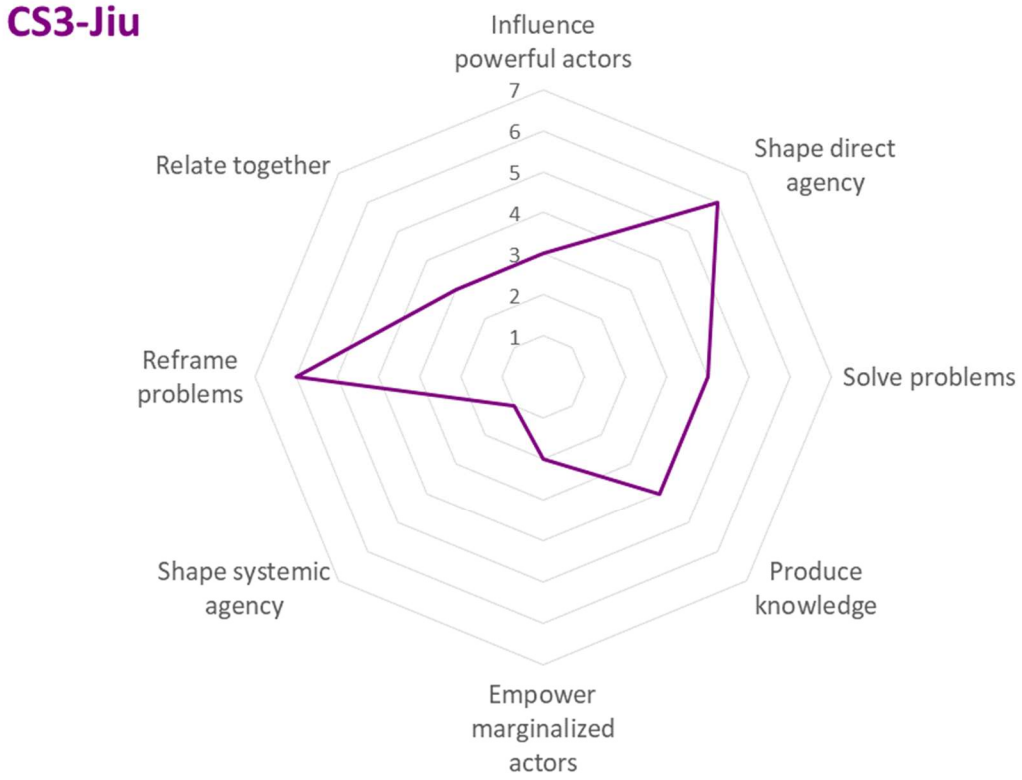

Figure 76: CS3-Jiu scoring for co-creation approaches

[1] Chambers, Josephine M., C. Wyborn, M.E. Ryan, R.S. Reid, M. Riechers, A. Serban, N.J. Bennett, et al. 2021. 'Six Modes of Co-Production for Sustainability'. *Nature Sustainability* 4 (11): 983–96. https://doi.org/10.1038/s41893-021-00755-x.

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It is important to mention that this mode was chosen after considering the main characteristics, but in comparison to the generic shape (Figure 76~~Figure 76~~) associated to this mode, there are two outlier points: CS3-Jiu presents a greater ambition on reframing problems and a lower intention of shaping systemic agency. In the first case, this might be, due to the use of the nexus approach to face the management withing the WEFE sectors in the Jiu River Basin, which inherently reframes current management ideas and practices; and for the second case, given the changing political context in the region, it is not of interest to shape systemic agency but focus on co-creating knowledge and providing information for evidence-based decision-making.

The focus on knowledge co-creation shapes the eight co-creation approaches to support the achievement of the SHE aims of CS3 (Table 34~~Table 34~~) and leads the plan across all phases of SHE (information to empowerment) for CS3-Jiu as presented below (Table 35~~Table 35~~).

Within the context CS3-Jiu, there are ongoing parallel research projects related to the nexus concept, engaging the same SHs to different degrees. This can lead to potential SH fatigue, and, thus, it is important to work towards having a regular and transparent communication with the other project managers as well as with SHs to check overlaps in timing of events and topics being addressed. In cases of overlap, consider organising common events with the other projects. As the focus of this CS's mode is on knowledge creation and transfer for evidence-based decision-making, less emphasis is made on the efforts towards co-development but rather on co-design.

Table 34: Description of approaches for CS3-Jiu based on the scoring exercise done by CS-Leads and following Chambers et al. (2021).

Approach	Description
Purpose	
Solve problems	There is a broad agenda where researchers and stakeholders explore different possible solutions. For instance, about how the WEFE nexus problem is conceptualised, which policies are involved, and what should the NEPAT and WEFE Footprint consider and how should they look like.
Reframe problems	The co-creation of knowledge moderately facilitates reframing of problems and solutions. For instance, via describing the CS's context through a Nexus perspective.
Power	
Shape direct agency	There is a general ambition to of increasing the agency of stakeholders directly linked to the river basin's WEFE problem(s).
Shape systemic agency	So far, the focus is to adapt to changes without necessarily influencing the root causes. This is especially chosen this way, given the changing context and focusing on working with the Nexus concept for the first time.
Politics	

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Approach	Description
Influence powerful actors	Based on the PI-Map, the engagement will engage rather high-power SHs, who will have the chance of communicating with each other and with some low-power SHs.
Empower marginalised actors	The engagement with stakeholders some low-power SHs will allow changing ideas guided by the external knowledge (e.g., conceptual system models).
Pathways	
Produce knowledge	There is a strong focus on knowledge transfer to achieve higher acceptance of the created knowledge.
Relate together	There are some spaces created to dialogue and build trust for the exploration of potential solutions.

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Table 35: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS3-Jiu.

	Co-exploration	Co-design		Co-development	
	Information	**Consultation**	**Involvement**	**Collaboration**	**Empowerment**
WHO? Stakeholder category	All categories should be properly informed. An effort to reaching out to marginalized groups such as the energy and food sectors and low interest stakeholders is needed.	All categories can be consulted. Care needs to be taken to avoid stakeholder fatigue, in particular in high power – low interest stakeholders.	All categories can be involved. Attention needs to be paid to involve stakeholders from all WEFE sectors. Special issues can be raised by and discussed with the sectoral authorities and potential users of the NEXOGENSIS tools.	All categories can collaborate, with particular focus on the sectoral authorities and the local policy makers. An emphasis should be laid on fostering collaboration across all WEFE sectors and across local (and national) policy makers.	Empower research and academic sector together with some positions within the local municipality and policy makers. The latter needs to be done in an equitable manner to avoid a power imbalance and empower the currently marginalized stakeholders.
WHY? PI and ALM	All quadrants of the PI map necessitate being informed with a particular emphasis on the low power – high interest category with the intent of empowering them and reaching out to low power – low interest stakeholders with the intent of increasing their interest.	Consultation of high power – low interest stakeholders needs to be targeted to their interest with the aim of maintaining their interest. Similarly, low power – high interest stakeholders should be consulted in their area of expertise and interest with the aim of empowering them. Consultation about conflicts may have to be avoided with stakeholders identified as in conflict, but maybe consulted upon with other stakeholders.	Involvement of high power – high interest stakeholders is relevant for the discussion and the involvement of high power – low interest stakeholder should be sought. The engaging low power – high interest stakeholders in discussion and exchange with other stakeholders is a good way to start paving towards empowerment. Discussion about conflicts may have to count with external	Cooperation between stakeholders that are identified as collaborating should be fostered, while complementary relationships should be provided with a space to create cooperation. Conflicting relationships may need to be resolved in individual spaces under professional mediation.	Given the PI Map, high-power stakeholders (SH-25, 63, 72, 85) as well as low-power stakeholders (SH-37, 38, 39, 64, 68, and 93), should be included in these activities. In general, the aim is to empower low power stakeholders through consultation and involvement/co-design practices, thus moving these into high power categories where their decision-making capabilities can then be used. At the same time, high power stakeholders need to

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	Co-exploration	Co-design		Co-development	
			moderation or guidance between stakeholders identified as in conflict, or maybe discussed upon with other stakeholders.		be kept interested in the same purposes. Also, having high power stakeholders engaged in the empowerment process can support sustaining the empowerment after the project.
WHAT? CS focus: knowledge creation and transfer	Inform about coming events and results on solutions and the diversity of SHs with the intent of maintaining and increasing their interest and incentivising them to reach out to further related stakeholders (snowballing).	Consult about perception of current issues (e.g., what are pressing problems, competition between sectors), request for data according to the request of WPs, perception about potential conflicts and enhanced cooperation potential. Consult about missing/marginalized stakeholder (groups) and how to best reach out to them. Consult also about how to best maintain the stakeholder's particular interest in the project.	Involve stakeholders in discussions and exchanges with and between them about: the results of consultation activities (e.g., surveys, interviews), strategies to raise awareness. Discussion is necessary beyond validating the project outputs, focusing also on activities that support exploring exchange between stakeholders and the creation and transfer of knowledge.	Framing the issue and developing solution pathways. Collaboration activities should foster interaction between stakeholders towards a coordination to raise awareness about water resources and that can be reflected in the river contract or facilitate its implementation.	Ensure that these stakeholders have space to provide their feedback, feel safe to expose their perceptions and discuss about conflicts and power dynamics in view of the river contract.
HOW? Activities	Think of incentives that might increase the interest of marginalized, low interest stakeholders	WP1 governance assessment interviews; surveys during or after each WS (e.g., WP1 and WP5); perception about the	Activities in all WSs with especial focus on WS2 and WS3 for the identification of needs and discussion on	WSs – activities to co-decide features and design of the tools (WS2 to WS6), focus groups (within or in between WS2 and WS3),	Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical

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	Co-exploration	Co-design		Co-development	
	such as invitations to events, highlighting research results of interest to them or providing them with free access to results and findings. All SHs have consented to the newsletter, except SH-38, 55, and 81. They should be invited to sign up for the newsletter in our website.	ALM and the shown conflicts and cooperation potential if appropriate. Show at the next WS which advancements/decisions were made based on the stakeholders' inputs (feedback to the feedback or acknowledging their inputs).	policy needs, interviews for WP1, and WP3; and focus on WS4 and WS5 for WP3 and WP4 outputs. Plan activities to share the outputs of the provided feedback and discuss about it.	role activities to build trust. 1-on-1 activities to reduce conflicts of conflicting stakeholders, but also to bring in marginalized current low-interest or uninformed stakeholders.	conversations) so that, the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded stakeholders. Frequent smaller conversations of peer stakeholders from different sectors may need to happen to allow for recognition of peers and for technical discussions about solutions (e.g., ecological low flows, abstraction needs, conservation measures, etc.). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.

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Management and sustainment

Management

CS-Leads should not forget checking the expectations written by the official SHs in the Privacy Policy Consent Form.

The initial management plan considers different foci per year:

- **2023**: Actively look to increase the interest of other SHs while maintaining the interest of the current high interest SHs. Focusing away from high interest SHs towards low interest SHs may allow discovering currently missing marginalised SHs.
- **2024**: Maintain the interest of the engaged SHs and focus on building trust, reducing conflicts, and inform decision-makers.
- **2025**: Focus on co-decision activities and further planning on sustainment of SHs as well as on how to continue evidence-based decision-making.

Leading a SHE process through a co-creation mode of "Researching solutions", focused on shaping direct agency, solving problems, and producing knowledge, while including efforts on reframing problems, provides several opportunities but is also linked to some risks. Table 36~~Table 36~~ provides details of the opportunities and risks associated to the high-scoring approaches (Figure 76~~Figure 76~~) and also linked to the co-creation Mode 1 "Researching solutions".

Table 36: Overview of opportunities and risk linked to Mode 1 "Researching solutions" and the approaches that ranked higher in CS3-Jiu. Based on Chambers et al. (2021).

Approach	Opportunity	Risk
Shape direct agency	The focus on shaping direct agency should foster achieving specific goals such as raising the awareness of water as a depleting resource, build a common language to facilitate the interaction between stakeholders.	- Risk of blaming less powerful stakeholders for the problems. - Risk of having superficial engagement with less powerful stakeholders. - Risk of legitimising current power dynamics.
Solve problems	Focusing on solving problems and transferring knowledge offers the opportunity of supporting evidence-based decision-making and justifying changes.	- Risk of facing challenges in engaging stakeholders that should be influenced due to prioritising the focus and advancing on the project's interest. - Risk of reinforcing existing dominant views on the nexus problem and possible solution, e.g., stick to sectorial view of the problem(s). - Risk of inhibiting the reframing potential.
Produce knowledge	The focus on knowledge production and transfer, can help in advocating for policy changes, building capacity, and addressing specific CS's needs. For instance, production and transfer on pressures in the WEFE sectors or data for model development.	- Echoing knowledge to create specific impacts. - Scientific knowledge overshadowing expertise and other ideas. - Focusing on budgeted activities only disregarding the pursuit of emerging goals.
Reframe problems	Focus on reframing problems can shift co-creation views towards more creativity and	- Low engagement of action/solution-oriented stakeholders.

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Approach	Opportunity	Risk
	transformative outputs. For CS3-Jiu, these shifts should focus on breaking silos, developing a platform that supports communication of information for resources management.	- Inhibiting the development of concrete actions. - Focusing on reframing only without triggering effective shifts in policies and practices. - Early emphasis on differences inhibits finding a common ground.
	Reframing problems as well as relating together offers the opportunity of building legitimate and flexible processes for tangible changes in perspectives, networks and policies and practices.	

Sustainment

[To be included as the project advances]

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CS4: Adige

The SHE plan is based on the data, information and perceptions provided and analysed by the CS-Leads and the AVA-Team by September 2022. The plan is updated on a yearly basis taking new SH information and evaluation results into account to allow for adaptive management.

Stakeholder engagement aim

Although being a single country river, the Adige River basin presents a complex institutional, socio-economic, and bio-physical context. This complexity cannot be grasped by simply adopting a data driven approach. Engaging SHs responsible for different fields of the WEFE nexus will be paramount to build a full picture of the current and future interconnections and challenges within the Nexus. On the one hand, engaging SHs will benefit the project by better understanding the WEFE nexus in the Adige CS and beyond and allow us to develop better tools. On the other hand, this knowledge will increase SHs' awareness to improve their decision making in the future.

In particular, the engagement of SHs within the Adige CS has the following aims:

- To improve system knowledge:
  - Explore the current state of the Nexus by improving modelling approaches related to water supply and demand, with a special focus on water scarcity and its implications on the other Nexus sectors
  - Increase understanding of the current institutional and political context that characterise the area, to identify existing and potential conflicts
- To generate target knowledge:
  - Determine the drivers of cooperation between SHs to share data and foster a coordinated management of water resources
- To generate transformation knowledge:
  - Enhancing SH awareness on water resources, their management and uses among different sectors
  - Co-develop, validate, and promote the use of the SNLAE and WEFE Footprint tools that the projects will develop to plan for future environmental and socio-economic conditions
  - Determine drivers for a cross-catchment dialogue that fosters a coordinated design and implementation of existing and future river contracts between up-stream and downstream areas of the river basin

In the process of achieving these goals, a special attention will be given to pinpointing the presence of a conflict hotspot(s) through a first-level screening. This will be an area of smaller dimensions within the river basin where different SHs of different sectors will be heard and brought together in a participative process. Moreover, given the size and complexity of the river basin it is not envisaged to develop a river contract within the framework of the NXG project.

Stakeholder analysis

Stakeholder identification

A total of 150 SHs were preliminarily identified out of which, so far, only 10 (6.7%) consented to be officially included in the SH register and participate in the NXG SHE (Table 37~~Table 37~~).

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This is expected to change in the future as more project activities involving SHs are carried out.

Table 37: CS4-Adige summary information of stakeholder identification as of Sept. 2022

Item	Count
Preliminary listing of stakeholders	150
Stakeholders in registered officially	10
Percentage of consent [%]	6.7%

Not all SHs have been categorised within the WEFE sector and some SHs may belong to other or cross-cutting sectors (e.g., civil society, policy makers at national level). Across the differentiated ones, there is a clear preponderance of SHs from the water sector over the other sectors (Figure 77~~Figure 77~~). Even though efforts should focus on increasing the overall interest of SHs in the project to improve the consent rate, especial attention should be placed on SHs of the energy, food and ecosystem sectors.

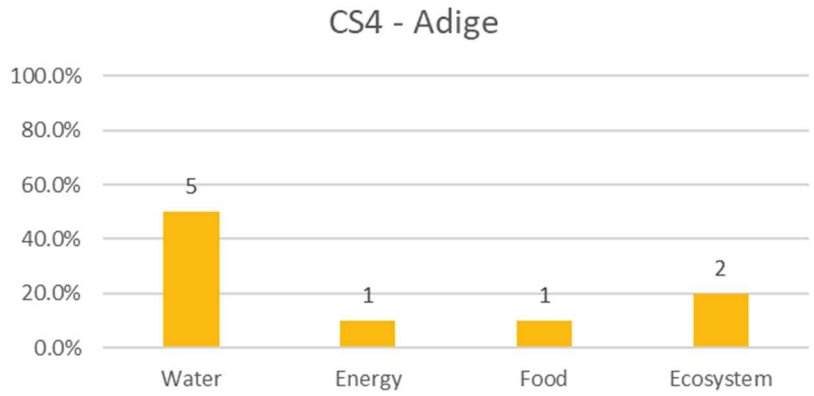

Figure 77: Distribution of stakeholders across the WEFE sectors for CS4 – Adige. One stakeholder can be assigned to one or more sectors.

In terms of gender, there is an almost 20/80 distribution across female and male genders. Not all SHs provided data about gender.

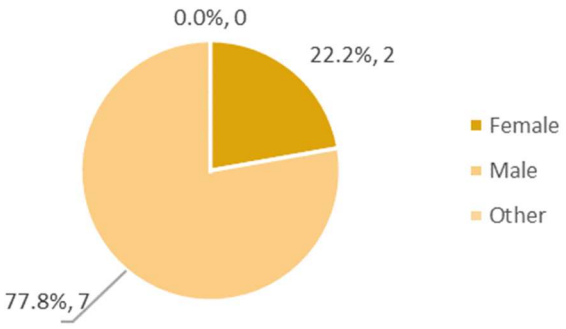

Figure 78: Gender distribution for CS4 – Adige.

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Stakeholder differentiation and categorisation

The SHs belong mainly to tier 1 – not all of them were differentiated and categorised. However, this means that, overall, SHs are perceived to be interested in being engaged in the development of the project's outputs.

Additionally, most of these SHs were categorised mainly as "1. Civil society", "4. Policy makers at national level" and "10. Business and private or public enterprises", with some participation of research, and water and environmental management authorities and representatives (Figure 79~~Figure 79~~).

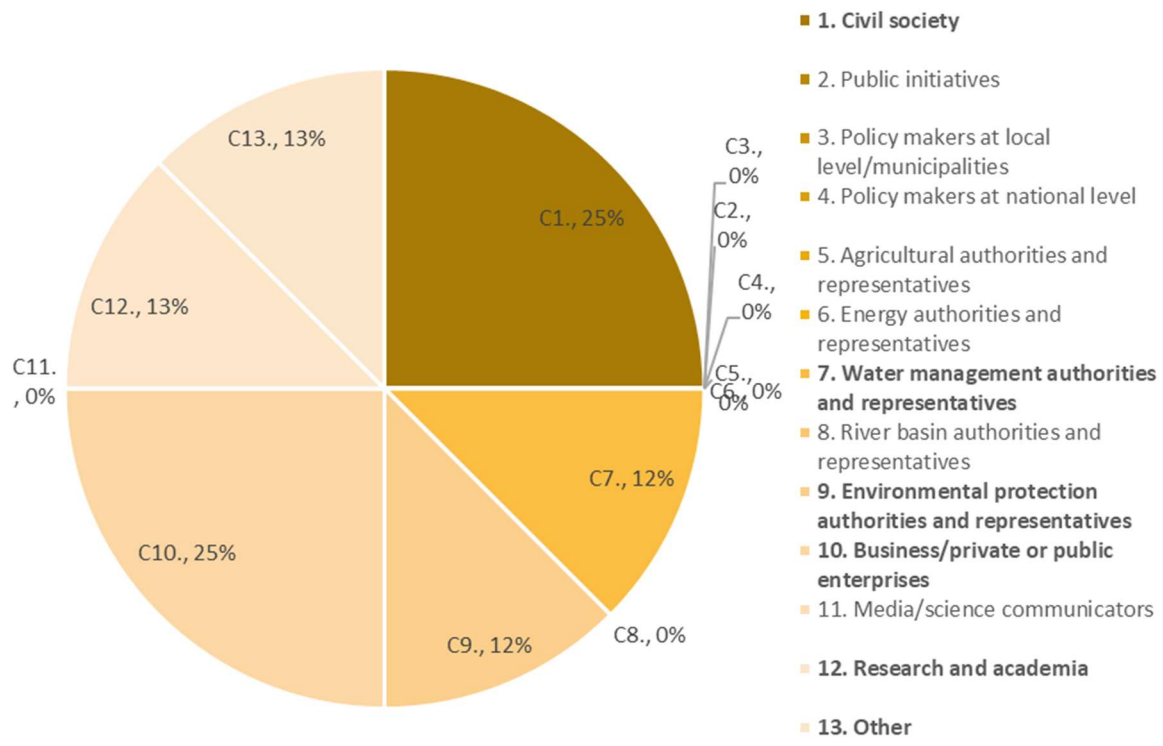

Figure 79: Distribution of stakeholders across categories for the case CS4 - Adige.

From a Power-Interest perspectives, most consenting SHs were perceived as having mid to high interest with a 50/50 distribution between high- and low-power (Figure 80~~Figure 80~~). When comparing the perceived scoring of both the CS-Leads and the SHs themselves (as provided in the PPCF), SHs tended to score themselves as having both higher interest and power than the one perceived by the CS-Leads. The most powerful SHs, belong to environmental and water management authorities and representatives with one actor categorised as "Other" (SH-18, 48, and 54).

Even though the upper right section of the map should be considered as the key SH group, given the number of SHs, all of them will be considered for a closer engagement, as far as they are interested.

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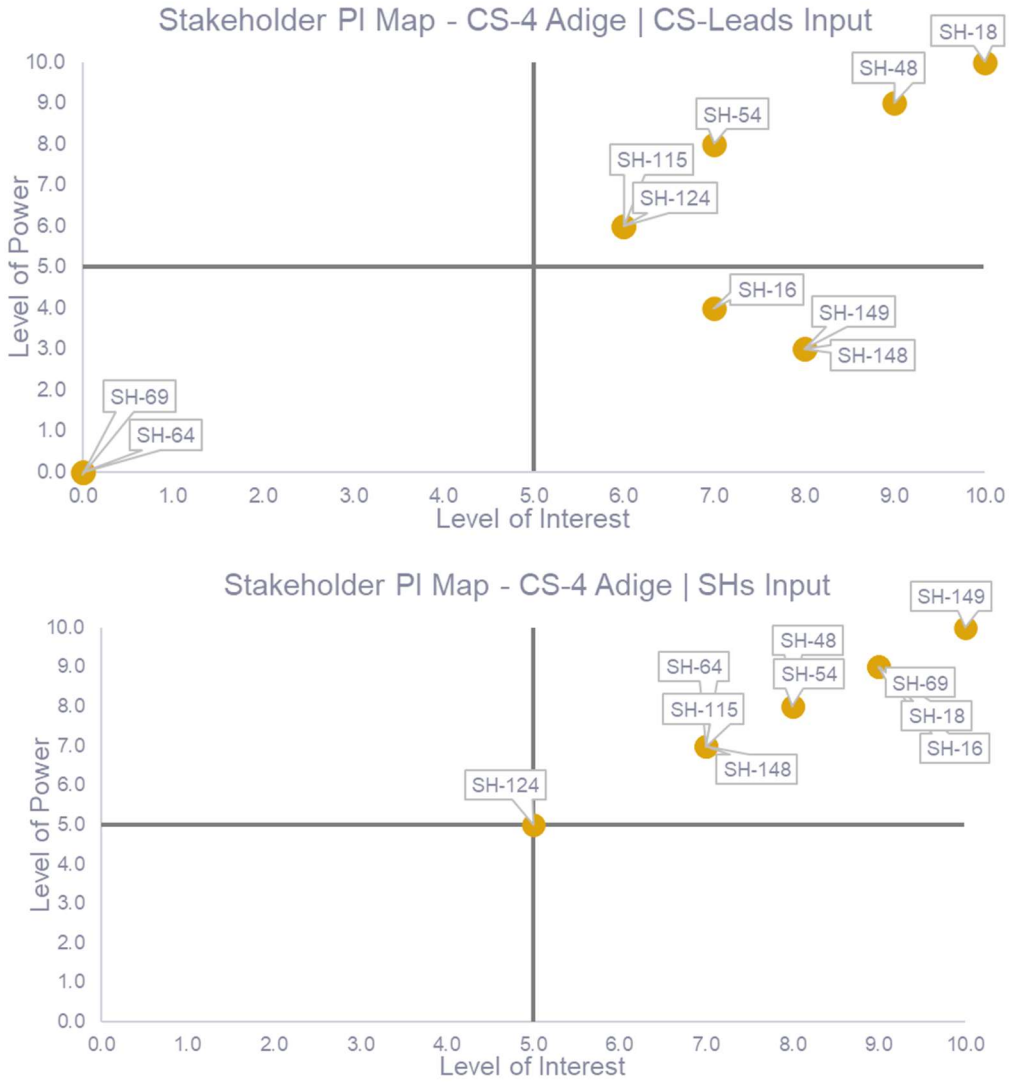

Figure 80: Power-Interest Map for CS4 – Adige. Above: based on the CS-Leads' perception – SH-64 and SH-69 were not rated; and below: based on the scoring provided by stakeholders in the PPCF (some stakeholders did not provide input)). For data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents.

Stakeholder relationships

About the relationships among the SHs, the CS-Leads characterised – based on their perception – 45 relationships across the 10 SHs. The relationships correspond mainly to the non-existent (NE) type, 71.1%, followed by complementary (Cm) relationships among SHs (17.8%), and a minor share of cooperation (Cp), 8.9% and conflicts (Cf), 2.2% (Figure 81~~Figure 81~~ and Figure 82~~Figure 82~~). This means that efforts in this CS need to focus on building relationships among the SHs, support the creation of networks and provide the platform for SHs to find their own ways of interacting in the future.

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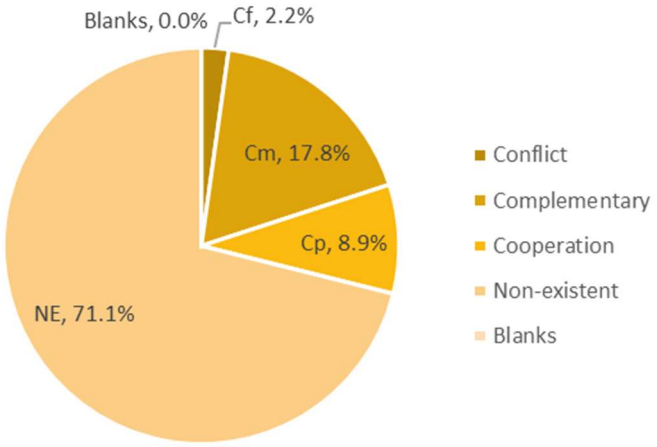

Figure 81: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads.

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SH-ID	SH-16	SH-18	SH-48	SH-54	SH-64	SH-69	SH-115	SH-124	SH-148	SH-149
SH-16		-	-	-	-	-	-	-	-	-
SH-18	Cm		-	-	-	-	-	-	-	-
SH-48	NE	Cm		-	-	-	-	-	-	-
SH-54	NE	Cm	Cp		-	-	-	-	-	-
SH-64	NE	Cm	Cp	Cp		-	-	-	-	-
SH-69	NE	Cm	Cm	NE	NE		-	-	-	-
SH-115	NE	NE	NE	NE	NE	NE		-	-	-
SH-124	NE	NE	NE	NE	NE	NE	Cf		-	-
SH-148	NE	Cm	NE	NE	NE	NE	NE	NE		-
SH-149	NE	Cp	NE	NE	NE	NE	NE	NE	Cm	

Figure 82: Actor-Linkage Matrix for CS4-Adige. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent.

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Stakeholder engagement plan for CS4 – Adige

The SHE plan provides a guidance to organise SHE and achieve the SHE aims considering the initial results of the SH analysis. These results show that the pool of SHs is:

- rather small, having to put efforts on increasing the interest of SHs in being engaged in the project.
- involving mainly SHs from the water sector, along with civil society, research and academia, and private and public enterprises.
- including mainly high-power SHs.
- composed by mainly non-existent relationships, and, thus, there should be a focus on networking between SHs.

Considering this background, CS-Leads scored the different co-creation approaches for the themes of purpose, power, politics, and pathways. The resulting figure (Figure 83~~Figure 83~~) was discussed with the CS-Leads, and after consideration of the aims, the analysis results, and the own CS-Leads' overview of the context, the fitting mode of co-creation is "Researching solutions".

This mode focuses on the co-creation of knowledge to inform evidence-based decision-making, influencing policies and interventions (Chambers et al., 2021[1]). For a stronger impact, this mode of co-creation should be supported by an environment that fosters SHs to work on their relationships and questions current practices to adapt to policy changes (ibid.).

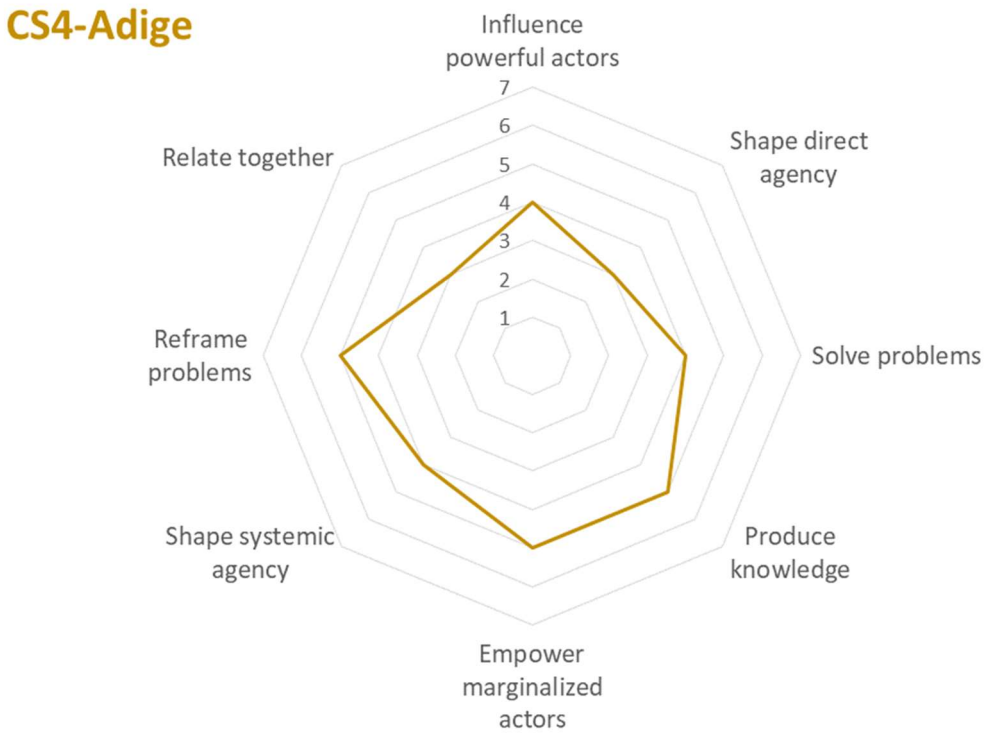

Figure 83: CS4-Adige scoring for co-creation approaches

[1] Chambers, Josephine M., C. Wyborn, M.E. Ryan, R.S. Reid, M. Riechers, A. Serban, N.J. Bennett, et al. 2021. 'Six Modes of Co-Production for Sustainability'. *Nature Sustainability* 4 (11): 983–96. https://doi.org/10.1038/s41893-021-00755-x.

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It is important to mention that this mode was chosen after considering the main characteristics, but when comparing the obtained radar plot of the scoring (Figure 83~~Figure 83~~) with the generic shape associated to this mode (ibid.), there are three outlier points: CS4-Adige presents a greater ambition to empower less powerful (marginalised) SHs and a lower intention on relating together and shaping direct agency. In the first case, the intention is to bring together all the different SHs across the sectors and the regions of the river basin. For the latter cases, even though it is an intention to increase work on relating together and shaping direct agency, the current focus is on producing knowledge and reframing problems. Also, a lower rate in shaping direct agency results from considering the overall view on the river basin, as there are differences in the interaction with and between SHs across the administrative sections within the basin. This does not mean that the output of the current focus will not be used in the future to build relationships and shape direct agency.

The focus on knowledge co-creation shapes the eight co-creation approaches to support the achievement of the SHE aims of CS4 (Table 38~~Table 38~~) and leads the plan across all phases of SHE (information to empowerment) for CS4-Adige as presented below (Table 39~~Table 39~~). As the focus of this CS's mode is on knowledge creation and transfer for evidence-based decision-making, less emphasis is made on the efforts towards co-development but rather on co-design

Table 38: Description of approaches for CS4-Adige based on the scoring exercise done by CS-Leads and following Chambers et al. (2021).

Approach	Description
Purpose	
Solve problems	There is a broad agenda where researchers and stakeholders explore different possible solutions. It relates to the first aim of CS4-Adige for stakeholder engagement, in the exploration of modelling approaches and also with the aim of "*co-develop[ing], validat[ing] and promot[ing] the use of the NEPAT and WEFE Footprint tools*".
Reframe problems	There is some space to question current frames and perspectives. For instance, via describing the CS's context through a Nexus perspective and the aim of "*increas[ing] the understanding of the current institutional and political context*".
Power	
Shape direct agency	There is space to explore how stakeholders perceive their agency and work collectively. Given that stakeholders have been just recently identified and are starting to interact with each other, this CS is at an exploration level.
Shape systemic agency	The aim is to change relationships and practices at a lower institutional level, building new networks and developing relationships within and across the different river basin sections.
Politics	
Influence powerful actors	Based on the PI-Map, CS4-Adige will engage high-power SHs together with low-power SHs to work together on changes in the management within the WFEE sector.

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Approach	Description
Empower marginalised actors	The engagement with stakeholders offers low-power SHs “ä seat at the table” with powerful stakeholders to co-create knowledge and “*foster a coordinated management of water resources*”.
Pathways	
Produce knowledge	There is a strong focus on knowledge creation and social learning with the aim of providing a space to “put together different piece” and “think out of the box”
Relate together	There are some spaces created to dialogue and build trust for the exploration of potential solutions. A stronger score on this dimension is the ambition, but given the geography and the current status, it is challenging to focus on this and the production of knowledge simultaneously.

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Table 39: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS4-Adige. SH: Stakeholder.

	Co-exploration	Co-design		Co-development	
	Information	**Consultation**	**Involvement**	**Collaboration**	**Empowerment**
WHO? Stakeholder category	All categories should be properly informed. An effort to reaching out to marginalized groups such as the energy and food sectors and low interest stakeholders from both sides of the river is needed.	All categories can be consulted. Care needs to be taken to avoid stakeholder fatigue, in particular in high power – low interest stakeholders.	All categories can be involved. Attention needs to be paid to involve stakeholders from all WEFE sectors. Special issues can be raised by and discussed with the sectoral authorities and potential users of the NEXOGENSIS tools.	All categories can collaborate, with particular focus on the sectoral authorities and the local policy makers. An emphasis should be laid on fostering collaboration across all WEFE sectors – bringing in currently missing sectoral stakeholders (e.g., energy and food) – and across local (and national) policy makers from the different regions of the river basin area to ensure power balance.	Empower research and academic sector together with some positions within the local municipalities and policy makers. The latter needs to be done in an equitable manner across the regions within the river basin to avoid a power imbalance and empower the currently marginalized stakeholders.
WHY? PI and ALM	All quadrants of the PI map necessitate being informed with a particular emphasis on the low power – high interest category with the intent of empowering them and reaching out to low power – low interest stakeholders with the	Consultation of high power – low interest stakeholders needs to be targeted to their interest with the aim of maintaining their interest. Similarly, low power – high interest stakeholders should be consulted in their area of expertise and interest with the aim of empowering them.	Involvement of high power – high interest stakeholders is relevant for the discussion and the involvement of high power – low interest stakeholder should be sought. The engaging low power – high interest stakeholders in discussion and exchange with other stakeholders is a good	Collaboration between stakeholders that are identified as cooperating should be fostered, while complementary relationships should be developed with a space to create cooperation, as well as providing space to build relationships to reduce the share of non-existent. Conflicting relationships may need to be resolved in	Given the PI Map, high-power stakeholders (SH-16, 18, 48, 69, and 149) as well as low-power stakeholders (SH-12, 13, 20, 27, 29), should be included in these activities. In general, the aim is to empower low power stakeholders through consultation and involvement/co-design

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	Co-exploration	Co-design		Co-development	
	intent of increasing their interest.	Consultation about conflicts may have to be avoided with stakeholders identified as in conflict, but maybe consulted upon with other stakeholders.	way to start paving towards empowerment. Discussion about conflicts may have to count with external moderation or guidance between stakeholders identified as in conflict, or maybe discussed upon with other stakeholders.	individual spaces under professional mediation.	practices, thus moving these into high power categories where their decision-making capabilities can then be used. At the same time, high power stakeholders need to be kept interested in the same purposes. Also, having high power stakeholders engaged in the empowerment process can support sustaining the empowerment after the project.
WHAT? CS focus: knowledge creation and transfer, and networking	Inform about coming events and results on solutions and the diversity of SHs with the intent of maintaining and increasing their interest and incentivising them to reach out to further related stakeholders (snowballing).	Consult about perception of current issues (e.g., institutional and political context, drivers for dialogue, awareness of water resources), request for data according to the request of WPs, perception about potential conflicts and enhanced cooperation potential. Consult about missing/marginalized stakeholder (groups) and how to best reach out to them. Consult also about how to best maintain the stakeholder's particular interest in the project.	Involve stakeholders in discussions and exchanges with and between them about: the results of consultation activities (e.g., surveys, interviews), roles and responsibilities of the upstream and downstream regions of the river basin. Discussion is necessary beyond validating the project outputs, focusing also on activities that support exploring exchange between	Framing the issue and developing solution pathways. Collaboration activities should foster interaction between stakeholders towards a coordination that can be reflected in the cooperation agreements reaches by the stakeholders.	Ensure that these stakeholders have space to provide their feedback, feel safe to expose their perceptions and discuss about conflicts and power dynamics in view of cooperation agreements.

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	Co-exploration	Co-design		Co-development	
			stakeholders to build networks and the creation and transfer of knowledge.		
HOW? Activities	Think of incentives that might increase the interest of marginalized, low interest stakeholders such as invitations to events, highlighting research results of interest to them or providing them with free access to results and findings. All SHs have consented to the newsletter. They should be invited to sign up for the newsletter in our website.	WP1 governance assessment interviews; surveys during or after each WS (e.g., WP1 and WP5); perception about the ALM and the shown non-existent relationships and the cooperation potential if appropriate. Show at the next WS which advancements/decisions were made based on the stakeholders' inputs (feedback to the feedback or acknowledging their inputs).	Activities in all WSs with especial focus on WS2 and WS3 for the identification of needs and discussion on policy needs, interviews for WP1, and WP3; and focus on WS4 and WS5 for WP3 and WP4 outputs. Additional activities that foster exchange between stakeholders from different sectors, categories, and regions of the river basin are helpful. Plan activities to share the outputs of the provided feedback and discuss about it.	WSs – activities to co-decide features and design of the tools (WS2 to WS6), focus groups (within or in between WS2 and WS3), role activities to build trust. 1-on-1 activities to reduce conflicts of conflicting stakeholders, but also to bring in marginalized current low-interest or uninformed stakeholders.	Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations) so that, the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded stakeholders. Frequent smaller conversations of peer stakeholders across different regions may need to happen to allow for recognition of peers and for technical discussions about transboundary solutions (e.g. ecological low flows, abstraction needs, conservation measures, etc.). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.

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Management and sustainment

Management

CS-Leads should not forget checking the expectations written by the official stakeholders in the Privacy Policy Consent Form.

The initial management plan considers different foci per year:

- **2023**: Actively look to increase the interest of other SHs while maintaining the interest of the current high interest SHs. Focusing away from high interest SHs towards low interest SHs may allow discovering currently missing marginalised SHs.
- **2024**: Maintain the interest of the engaged SHs and focus on networking and building trust.
- **2025**: Focus on co-decision activities and further planning on sustainment of SHs as well as on the defined agreements.

Leading a SHE process through a co-creation mode of “Researching solutions”, focused on solving problems and producing knowledge, while placing considerable efforts on reframing problems and empowering less powerful SHs, provides several opportunities, but is also linked to some risks. Table 40~~Table 40~~ provides details of the opportunities and risks associated to the high-scoring approaches (Figure 83~~Figure 83~~) and also linked to the co-creation Mode 1 “Researching solutions”.

Table 40: Overview of opportunities and risk linked to Mode 1 "Researching solutions" and the approaches that ranked higher in CS4-Adige. Based on Chambers et al. (2021).

Approach	Opportunity	Risk
Produce knowledge	Focusing creating and transferring knowledge offers the opportunity of supporting evidence-based decision-making and justifying changes.	- Echoing knowledge to create specific impacts. - Scientific knowledge overshadowing expertise and other ideas. - Focusing on budgeted activities only disregarding the pursuit of emerging goals.
Empower marginalised actors	The focus on knowledge production and transfer, can help in advocating for policy changes, building capacity, and addressing specific CS’s needs. For instance, production and transfer on pressures in the WEFE sectors or data sharing for a coordinated management.	- Risk of blind devotion to speaking “truth” to powerful stakeholders to shift views and policies. - Empowering certain views can inhibit effort on reframing problems. - Risk of using “blame narratives” that result in a defensive attitude of powerful stakeholders, tending to block advancements. - Risk of overlooking imbalances and politics in powers at a local scale.
Reframe problems	Focus on reframing problems can shift co-creation views towards more creativity and transformative outputs. For CS4-Adige, these shifts should focus on creating a cross-catchment dialogue for a coordinated management. This includes raising awareness about water resources and their use across different sectors.	- Low engagement of action/solution-oriented stakeholders. - Inhibiting the development of concrete actions. - Focusing on reframing only without triggering effective shifts in policies and practices.

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Approach	Opportunity	Risk
	Reframing problems as well as relating together offers the opportunity of building legitimate and flexible processes for tangible changes in perspectives, networks and policies and practices.	- Early emphasis on differences inhibits finding a common ground.

Sustainment

[To be included as the project advances]

Evaluation

The results below reflect the answers of SHs collected after the first and second round of WSs in the Adige River basin between June and October 2022. Importantly, the answers reflect expectations and needs of SHs at the beginning of the co-creation process. They do not reflect how SHs have experienced the process, so far. These perspectives shall be collected in later iterations of the survey.

There were 10 responses collected. The 10 responses considered were provided by the following SHs:

- One person from an academic institution;
- Three members of civil society organisations;
- Two representatives from energy authorities;
- One person belonging to the media, and;
- Three representatives from water authorities.

In Figure 8 we show all answers from SHs regarding the approaches of co-production. In the Figures 9 and 10 we group them into different modes of co-creation. The analysis below explores opportunities and risks for the co-creation process, including through contextualising the results with the answers of the CS-leads. If appropriate, the answers are given additional context with data collected elsewhere in the survey.

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CS5: IUWMA

The SHE plan is based on the data, information and perceptions provided and analysed by the CS-Leads and the AVA-Team by September 2022. The plan is updated on a yearly basis taking new SH information and evaluation results into account to allow for adaptive management.

Stakeholder engagement aim

The main aim of SHE for the South African CS is to obtain input from a wide range of representative SHs to inform the development of the Inkomati-Usuthu CS, WEFE Nexus Footprint, NEPAT, and associated policies.

The Mpumalanga Province in South Africa, of which the Inkomati-Usuthu river system is a crucial component, is vital to South Africa's development in terms of energy security (coal-fired power stations), food security (almost half of the country's high potential agricultural land) and water security (numerous competing water users). This study area contains conservation areas, including the southern portion of the Kruger National Park. Inequalities still exist in the South African society, and livelihoods must be incorporated into any nexus assessment, which is crucial to the aim of SHE. In an attempt to address these challenges, WEFE nexus policies will be developed that are relevant to the IUWMA with a focus on integrated water management, taking cognisance of forestry, mining, conservation, tourism, irrigation, and livelihoods aspects.

SHs from all decision-making levels will be identified, including national- and local government departments, relevant municipalities, national electricity providers, water management agencies, prominent land users in the area of interest, academics and researchers, as well as the general public.

Critical information that will inform various outcomes of the NXG project will be obtained from these SHs. Most importantly, SHs will be crucial in providing perspectives and opinions on the current situation in the area of interest (being the Inkomati-Usuthu catchment). Their views will also be obtained on the desired state within the CS and how to reach that state.

These policies that will be developed will consider input from various SHs that will be continuously identified and engaged by means of SH WSs, as well as email- and telephonic correspondence.

Overall, the SHE aims at obtaining input in form of the following knowledge areas:

- System knowledge:
    - Gain knowledge about the social, economic, institutional, and ecologic contexts of the area, with special emphasis on spatial scales of social and economic data (available at a provincial scale).
    - Gain general, qualitative knowledge, e.g., at a national level, of the neighbouring countries (Mozambique and Eswatini) that share part of the river basin to complement the information of the South African portion of the basin (focus of this cases study).
- Target knowledge:
    - Determine drivers for sustainable development in the area, e.g., economic growth, jobs, socio-economic equality.
    - Gain knowledge on the required infrastructural improvements.

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- Determine criteria that characterise a balance between tourism activities and nature conservation.

- Transformation knowledge:
  - Determine requirements to invest in infrastructure.
  - Gain knowledge on the transition to renewable energy, including the re-skilling of workers and transfer of jobs.
  - Identify and understand relevant components for nature conservation and their relation to the WEFE Nexus.
  - Identify and understand main aspects that support the alignment of policies or the design and implementation of aligned policies.

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Stakeholder analysis

Stakeholder identification

A total of 153 SHs were preliminarily identified out of which, so far, only 9 (6.7%) consented to be officially included in the SH register and participate in the NXG SHE (Table 41~~Table 41~~). This is expected to change in the future as more project activities involving SHs are carried out.

Table 41: CS4-Adige summary information of stakeholder identification as of Sept. 2022

Item	Count
Preliminary listing of stakeholders	153
Stakeholders in registered officially	9
Percentage of consent [%]	5.9%

SHs have been categorised within the WEFE sector where one SH can belong to more than one sector. Across the differentiated ones, there is a clear preponderance of SHs from the water sector over the other sectors (Figure 84~~Figure 84~~). Even though efforts should focus on increasing the overall interest of SHs in the project to improve the consent rate, especial attention should be placed on SHs of the energy and food sectors.

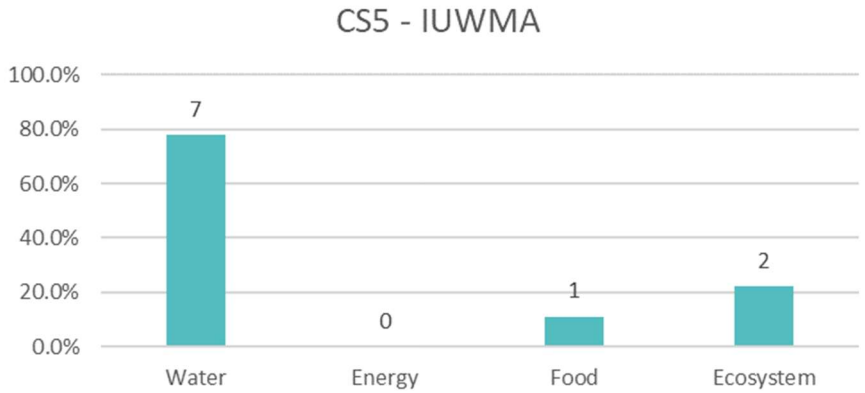

Figure 84: Distribution of stakeholders across the WEFE sectors for CS5 – IUWMA. One stakeholder can be assigned to one or more sectors.

In terms of gender, there is an almost 20/80 distribution across female and male genders. All SHs provided data about gender.

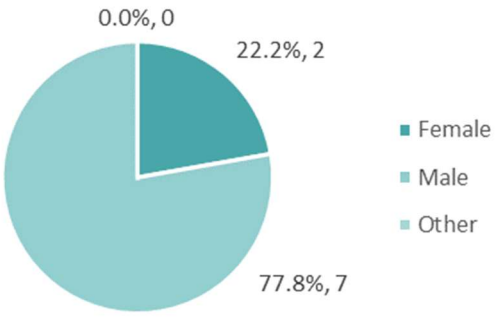

Figure 85: Gender distribution for CS5 – IUWMA.

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Stakeholder differentiation and categorisation

The SHs belong mainly to tier 1. This means that, overall, SHs are perceived to be interested in being engaged in the development of the project's outputs.

No further categorisation is available yet.

From a Power-Interest perspectives, most consenting SHs were perceived as having mid to high interest with an almost 80/20 distribution between high- and low-power (Figure 86~~Figure 86~~). When comparing the perceived scoring of both the CS-Leads and the SHs themselves (as provided in the PPCF), SHs tended to score themselves as having both lower interest and power than the one perceived by the CS-Leads.

Even though the upper right section of the map should be considered as the key SH group, given the number of SHs, all of them will be considered for a closer engagement, as far as they are interested.

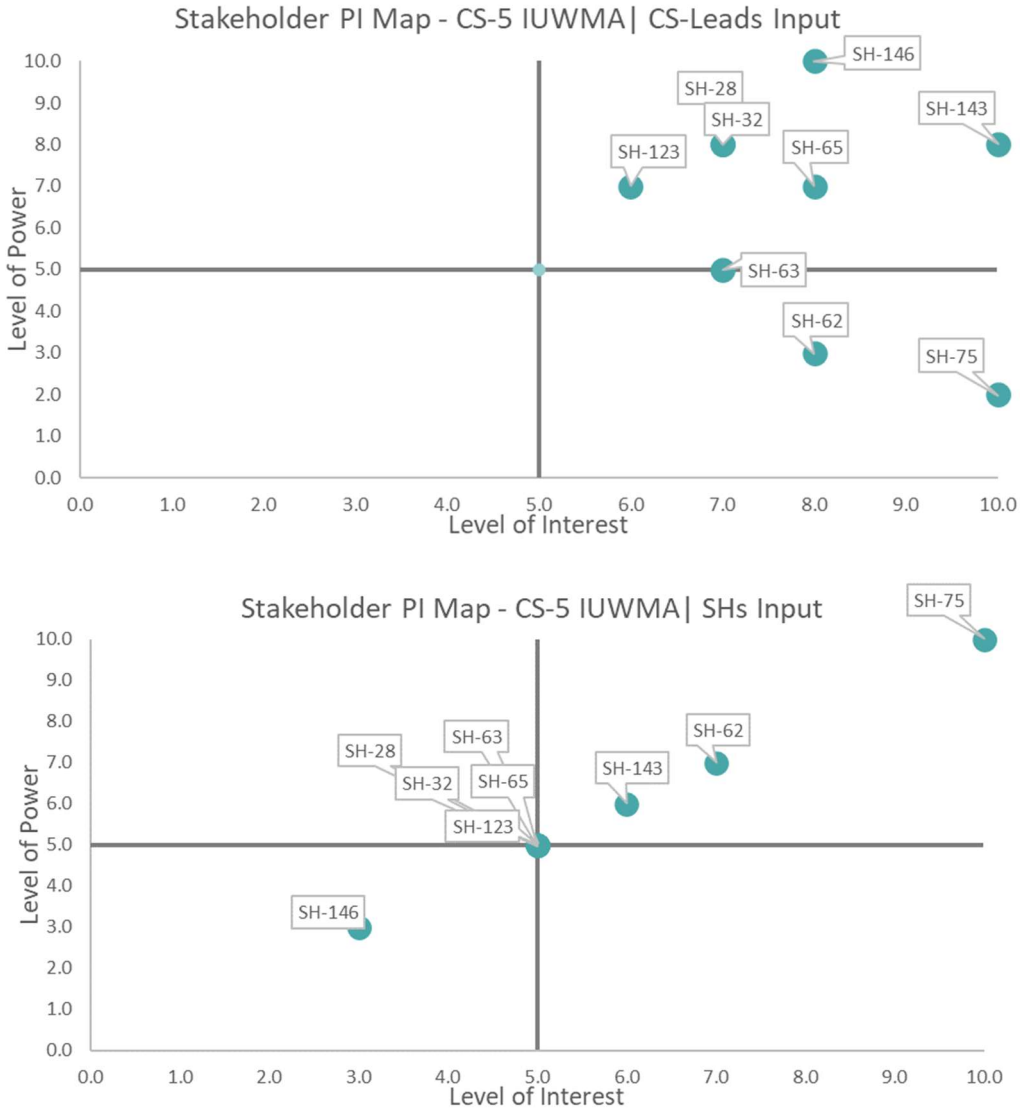

Figure 86: Power-Interest Map for CS5 – IUWMA. Above: based on the CS-Leads' perception; and below: based on the scoring provided by stakeholders in the PPCF (some stakeholders did not provide input)). For data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents.

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Stakeholder relationships

About the relationships among the SHs, the CS-Leads characterised – based on their perception – 36 relationships across the 9 SHs. The relationships correspond mainly complementary (Cm) and cooperation (Cp) (50.0% and 44.4%, respectively), and a minor conflicts (Cf), 5.6% (Figure 87~~Figure 87~~ and Figure 88~~Figure 88~~). This means that efforts in this CS need to focus on increasing the share of cooperation by providing the platform for SHs to find their own ways of interacting in the future and building trust as well as clear ways to negotiate trad-offs between sectors to reduce conflicts.

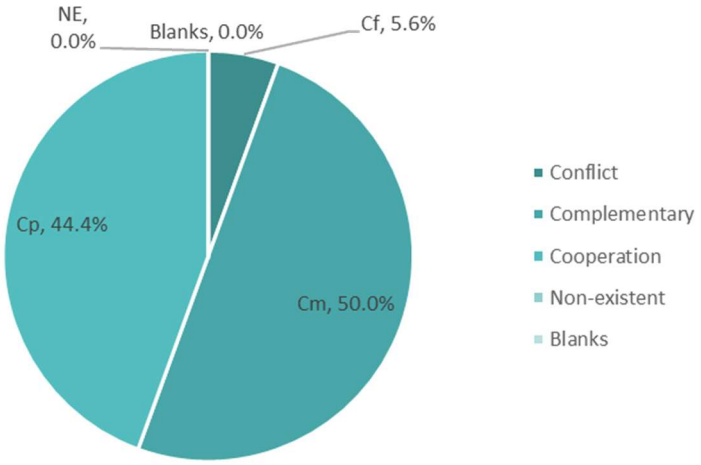

Figure 87: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads.

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SH-ID	SH-146	SH-28	SH-32	SH-62	SH-65	SH-75	SH-123	SH-143	SH-63
SH-146		-	-	-	-	-	-	-	-
SH-28	Cp		-	-	-	-	-	-	-
SH-32	Cp	Cp		-	-	-	-	-	-
SH-62	Cm	Cm	Cm		-	-	-	-	-
SH-65	Cm	Cm	Cm	Cf		-	-	-	-
SH-75	Cm	Cm	Cm	Cf	Cp		-	-	-
SH-123	Cp	Cp	Cp	Cm	Cm	Cm		-	-
SH-143	Cp	Cp	Cp	Cm	Cm	Cm	Cp		-
SH-63	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	

Figure 88: Actor-Linkage Matrix for CS5-IUWMA. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent.

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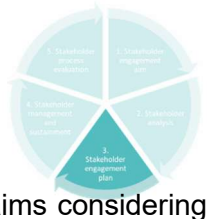

Stakeholder engagement plan for CS5 – IUWMA

The SHE plan provides a guidance to organise SHE and achieve the SHE aims considering the initial results of the SH analysis. These results show that the pool of SHs is:

- rather small, having to put efforts on increasing the interest of SHs in being engaged in the project.
- involving mainly SHs from the water sector, along with civil society, research and academia, and private and public enterprises.
- including mainly high-power SHs.
- composed by mainly non-existent relationships, and, thus, there should be a focus on networking between SHs.

Considering this background, CS-Leads scored the different co-creation approaches for the themes of purpose, power, politics, and pathways. The resulting figure (Figure 89~~Figure 89~~) was discussed with the CS-Leads, and after consideration of the aims, the analysis results, and the own CS-Leads' overview of the context, the fitting mode of co-creation is "Researching solutions".

This mode focuses on the co-creation of knowledge to inform evidence-based decision-making, influencing policies and interventions (Chambers et al., 2021[1]). For a stronger impact, this mode of co-creation should be supported by an environment that fosters SHs to work on their relationships and questions current practices to adapt to policy changes (ibid.).

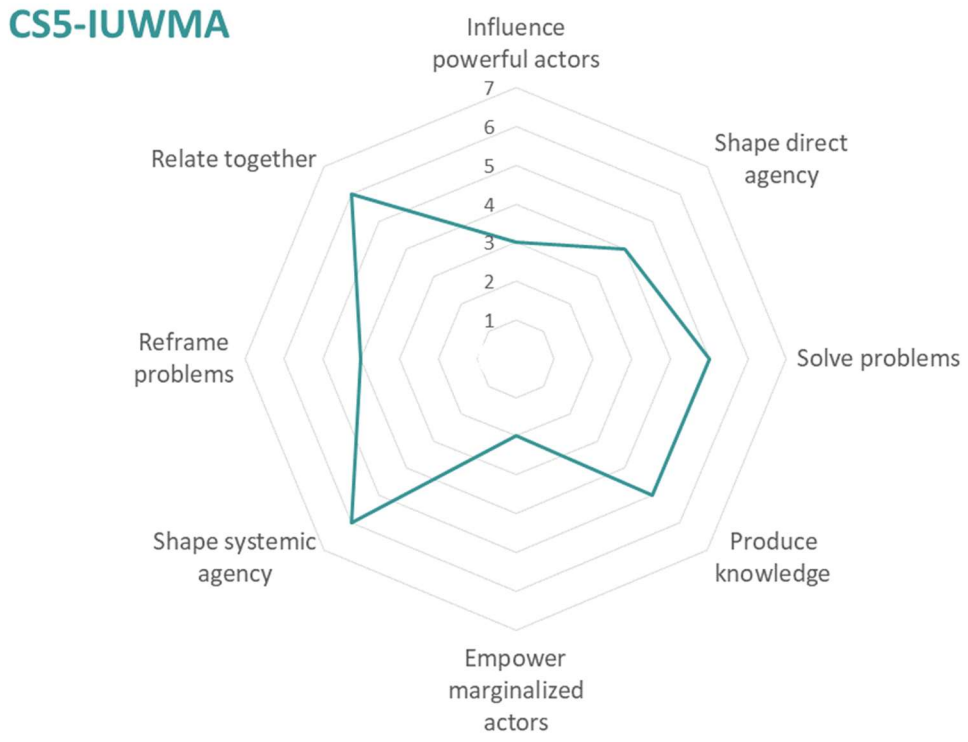

Figure 89: CS5-IUWMA scoring for co-creation approaches

[1] Chambers, Josephine M., C. Wyborn, M.E. Ryan, R.S. Reid, M. Riechers, A. Serban, N.J. Bennett, et al. 2021. 'Six Modes of Co-Production for Sustainability'. *Nature Sustainability* 4 (11): 983–96. https://doi.org/10.1038/s41893-021-00755-x.

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CS5-IUWMA intends to bring SHs together and provide a different set of data, looking at policies from an integration perspective to propose suggestions for changes in resources management. The idea is to provide new information and complement the current conversations around the sectorial management.

The focus on knowledge co-creation shapes the eight co-creation approaches to support the achievement of the SHE aims of CS4 (Table 42~~Table 42~~) and leads the plan across all phases of SHE (information to empowerment) for CS5-IUWMA as presented below (Table 43~~Table 43~~). As the focus of this CS's mode is on knowledge creation and transfer for evidence-based decision-making, less emphasis is made on the efforts towards co-development but rather on co-design.

Table 42: Description of approaches for CS5-IUWMA based on the scoring exercise done by CS-Leads and following Chambers et al. (2021).

Approach	Description
Purpose	
Solve problems	The stakeholder engagement process should promote solving problems by negotiating conflicting solutions. For instance, by finding what characterises "*a balance between tourism activities and nature conservation*" or what are drivers for sustainable development.
Reframe problems	Reframing revolves around negotiation between rather fixed views on how resources should be managed.
Power	
Shape direct agency	The aim is to find ways to strengthen collective and institutional agency, supporting building relationships between stakeholders to pursue common goals. For CS5-IUWMA this means increasing cooperation.
Shape systemic agency	The aim is to challenge current paradigms and goals at low-scale governance level. CS-IUWMA aims to communicate the role of stakeholders within the stakeholder pool.
Politics	
Influence powerful actors	Based on the PI-Map, CS5-IUWMA will engage mainly high-power stakeholders with the participation of some low-power stakeholders, who will be able to communicate their views on the management within the WFEE sector.
Empower marginalised actors	Given the PI Map, low power stakeholders will be engaged mainly for consultation, and thus the aim can be to change some ideas or actions but guided by external knowledge.
Pathways	
Produce knowledge	There is a strong focus on knowledge creation and social learning with the aim of addressing problems and filling gaps to guide the conversation towards solutions.
Relate together	There is some focus on creating new relationships and form alliances or cooperation dynamics between the stakeholders through an open dialogue.

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Table 43: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS5-IUWMA.

	Co-exploration	Co-design		Co-development	
	Information	**Consultation**	**Involvement**	**Collaboration**	**Empowerment**
WHO? Stakeholder category	All categories should be properly informed. An effort to reaching out to marginalized groups such as the energy and agricultural sector and low interest stakeholders is needed.	All categories can be consulted. Care needs to be taken to avoid stakeholder fatigue, in particular in high power – low interest stakeholders.	All categories can be involved. Attention needs to be paid to involve stakeholders from all WEFE sectors. Special issues can be raised by and discussed with the sectoral authorities and potential users of the NEXOGENSIS tools.	All categories can collaborate, with particular focus on the sectoral authorities and the local policy makers. An emphasis should be laid on fostering collaboration across all WEFE sectors – bringing in currently missing sectoral stakeholders (energy and food) – and across local (and national) policy makers from the IUWMA.	Empower research and academic sector together with some positions within the local municipality(ies) and policy makers. The latter needs to be done in an equitable manner to avoid a power imbalance and empower the currently marginalized stakeholders.
WHY? PI and ALM	All quadrants of the PI map necessitate being informed with a particular emphasis on the low power – high interest category with the intent of empowering them and reaching out to low power-low interest stakeholders with the intent of increasing their interest.	Consultation of high power – low interest stakeholders needs to be targeted to their interest with the aim of maintaining their interest. Similarly, low power – high interest stakeholders should be consulted in their area of expertise and interest with the aim of empowering them. Consultation about conflicts may have to be avoided with stakeholders	Involvement of high power – high interest stakeholders is relevant for the discussion and the involvement of high power – low interest stakeholder should be sought. The engaging low power – high interest stakeholders in discussion and exchange with other stakeholders is a good way to start paving towards empowerment.	Collaboration between stakeholders that are identified as collaborating should be fostered, while non-existent relationships should be provided with a space to create collaboration. Conflicting relationships may need to be resolved in individual spaces under professional mediation.	Given the PI Map, high-power stakeholders (SH-28, 32, 143, 146) as well as low-power stakeholders (SH-12, 13, 20, 27, 29), should be included in these activities. In general, the aim is to empower low power stakeholders through consultation and involvement/co-design practices, thus moving these into high power categories where their decision-making capabilities can then be

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	Co-exploration	Co-design		Co-development	
		identified as in conflict, but maybe consulted upon with other stakeholders.	Discussion about conflicts may have to count with external moderation or guidance between stakeholders identified as in conflict, or maybe discussed upon with other stakeholders.		used. At the same time, high power stakeholders need to be kept interested in the same purposes. Also, having high power stakeholders engaged in the empowerment process can support sustaining the empowerment after the project.
WHAT? CS focus: knowledge co-creation and transfer	Inform about coming events and results on solutions and the diversity of SHs with the intent of maintaining and increasing their interest and incentivising them to reach out to further related stakeholders (snowballing).	Consult about perception of current issues (e.g., what are pressing problems, current context), required infrastructural improvements, request for data according to the request of WPs, perception about potential conflicts and enhanced cooperation potential. Consult about missing/marginalized stakeholder (groups) and how to best reach out to them. Consult also about how to best maintain the stakeholder's particular interest in the project.	Involve stakeholders in discussions and exchanges with and between them about: the results of consultation activities (e.g., surveys, interviews), new perspectives on the co-created knowledge and ways of transferring it into practice. Discussion is necessary beyond validating the project outputs, focusing also on activities that support exploring exchange between stakeholders to build networks and the creation and transfer of knowledge.	Framing the issue and developing solution pathways. Collaboration activities should foster interaction between stakeholders towards a coordination that can be reflected in the river contract or facilitate its implementation.	Ensure that these stakeholders have space to provide their feedback, feel safe to expose their perceptions and discuss about conflicts and power dynamics in view of the river contract.
HOW? Activities	Think of incentives that might increase	WP1 governance assessment interviews;	Activities in all WSs with especial focus on WS2	WSs – activities to co-decide features and design	Participation in WSs, activities for dialogue and

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	Co-exploration	Co-design		Co-development	
	the interest of marginalized, low-interest stakeholders such as invitations to events, highlighting research results of interest to them or providing them with free access to results and findings. All SHs have consented to the newsletter, except SH-32, 65, and 146. They should be invited to sign up for the newsletter in our website.	surveys during or after each WS (e.g., WP1 and WP5); perception about the ALM and the shown conflicts and cooperation potential if appropriate. Show at each WS which advancements/decisions were made based on the stakeholders' inputs (feedback to the feedback or acknowledging their inputs). Have focussed sessions with stakeholder groups prior to the WSs to get specific data.	and WS3 for the identification of needs and discussion on policy needs, interviews for WP1, and WP3; and focus on WS4 and WS5 for WP3 and WP4 outputs. Additional activities that foster exchange between stakeholders from different sectors, categories are helpful. Plan activities to share the outputs of the provided feedback and discuss about it.	of the tools (WS2 to WS6), focus groups (within or in between WS2 and WS3), role activities to build trust. 1-on-1 activities to reduce conflicts of conflicting stakeholders, but also to bring in marginalized current low-interest or uninformed stakeholders. Provide a roadmap or plan with the activities of next year to crosscheck time availability and ensure participation.	trust building (1-on-1, small group discussions, national vs. transnational topical conversations) so that, the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded stakeholders. Frequent smaller conversations of sectoral peer stakeholders may need to happen to allow for recognition of peers and for technical discussions about solutions (e.g., ecological low flows, conservation measures, tourism activities). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.

*Overall, consider having WSs in hybrid modality to facilitate the participation of more stakeholders (check the WS checklist).

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Management and sustainment

Management

CS-Leads should not forget checking the expectations written by the official stakeholders in the Privacy Policy Consent Form.

The initial management plan considers different foci per year:

- **2023**: Actively look to increase the interest of other SHs while maintaining the interest of the current high interest SHs. Focusing away from high interest SHs towards low interest SHs may allow discovering currently missing marginalised SHs.
- **2024**: Maintain the interest of the engaged SHs and focus on networking and building trust to enhance collaboration and reduce conflicts.
- **2025**: Focus on co-decision activities and further planning on sustainment of SHs as well as on the defined agreements.

Opportunities and risks

Leading a SHE process through a co-creation mode of "Researching solutions", focused on solving problems and producing knowledge, while placing considerable efforts on reframing problems and empowering less powerful SHs, provides several opportunities, but is also linked to some risks. Table 44~~Table 44~~ provides details of the opportunities and risks associated to the high-scoring approaches and also linked to the co-creation Mode 1 "Researching solutions".

Table 44: Overview of opportunities and risk linked to Mode 1 "Researching solutions" and the approaches that ranked higher in CS5-IUWMA. Based on Chambers et al. (2021).

Approach	Opportunity	Risk
Solve problems	The focus on solving problems should foster achieving specific goals, such as, determining drivers for sustainable development in the area, required infrastructural improvements and criteria to balance tourism activities and nature conservation.	- Risk of facing challenges in engaging stakeholders that should be influenced due to prioritising the focus and advancing on the project's interest. - Risk of reinforcing existing dominant views on the nexus problem and possible solution, e.g., stick to sectorial view of the problem(s). - Risk of inhibiting the reframing potential.
Produce knowledge	Focusing on solving problems and creating and transferring knowledge offers the opportunity of supporting evidence-based decision-making and justifying changes.	- Echoing knowledge to create specific impacts. - Scientific knowledge overshadowing expertise and other ideas. - Focusing on budgeted activities only disregarding the pursuit of emerging goals.
	The focus on knowledge production and transfer, can help in advocating for policy changes, building capacity, and addressing specific CS's needs. For instance, knowledge on production and transfer on social, economic, institutional, and ecological contexts; transition to renewable energies.	

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Approach	Opportunity	Risk
Shape systemic agency	Shaping systemic agency can shift views for creative and transformative solutions that, in this case, can support a balance between different sectors, find new drivers for sustainable development and find innovative ways of fulfilling infrastructural requirements.	- Risk of disempowering stakeholders if the boundaries of the problem frame are not defined properly – leaving the feeling of problem "too big to handle". - Risk of losing effectiveness if emotional aspects related to power and anxiety are forgotten. - Risk of creating echo chambers if more attention is placed on few identity conflicts and power differentials. - Risk of ending up with much talking and little action.
Relate together	Relating together offers the opportunity of building legitimate and flexible processes that foster tangible changes; for instance changes in the implementation of aligned policies.	- Risk of having an apparent cooperation or consensus (illusion of consensus) if power and dialogue/discussion dynamics are not managed properly. - Risk of increasing social inequalities derived from not valuing properly voluntary contributions that each stakeholder makes.

Sustainment

[To be included as the project advances]

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Evaluation

The results below reflect the answers of SHs collected after the first and second round of WSs in the Inkomati-Usuthu river basin between June and October 2022. Importantly, the answers reflect expectations and needs of SHs at the beginning of the co-creation process. They do not reflect how SHs have experienced the process, so far. These perspectives shall be collected in later iterations of the survey.

There were 12 responses collected, while two of those were scored by the evaluation team itself after interviews with the respective SHs: The 10 responses considered were provided by the following SHs:

- Each one representative from agricultural and energy authorities;
- Two representatives from environmental authorities;
- Two local policy-makers, and;
- Six representatives from water authorities.

In Figure 90~~Figure 90~~ we show all answers from SHs regarding approaches of co-production and group them into different modes of co-creation. The analysis below explores opportunities and risks for the co-creation process, including through contextualising the results with the answers of the CS-leads. If appropriate, the answers are given additional context with data collected elsewhere in the survey or through interviews.

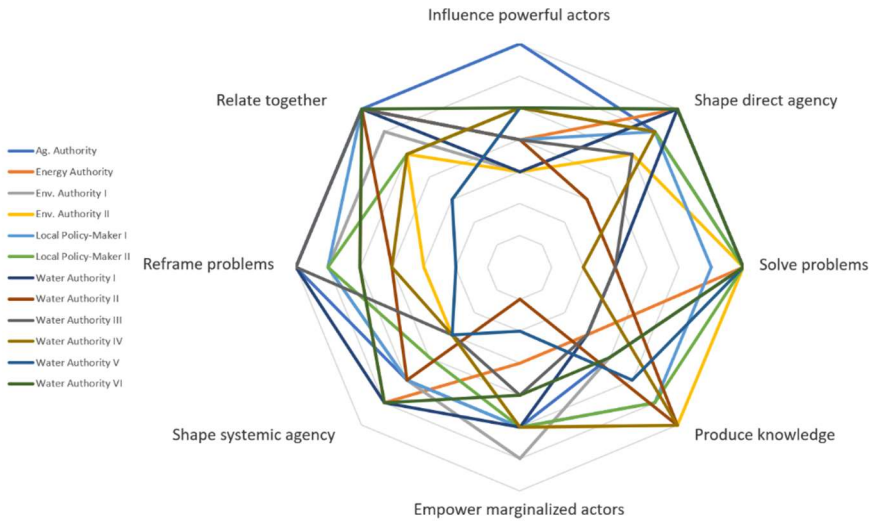

Figure 90: Preferred approaches to co-creation by stakeholders in the Inkomati-Usuthu river basin.

The Figure 91~~Figure 91~~ depict the modes 'researching solutions', 'empowering voices', and 'brokering power', which are similar, and yet distinct in their priorities. In this set of SHs most of them put high hopes in the project to produce a model that can optimise the integration of sectors in the basin. However, only one SH aligns with the mode of the CS-leads '**researching solutions.**' This SH was mostly concerned with improving the evidence base and to find solutions based on the better integration of data and perspectives from different sectors. It very closely aligns with the CS-leads' objective to provide new information and complement the current conversations around the sectorial management.

Meanwhile, SHs that more closely align with the mode '**empowering voices**' likewise look for the project to make suggestions for solutions, but wish for an inclusion of actors that do not

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belong to the public authorities or academia. One SH, for example, stated: "*Of utmost importance is that we have the local representatives come in […], so that we do not miss some important information from the community. The next thing that we should do is to have local chiefs present in the meeting, so that we can get their perspective, as they are some of the users of the resource*." If CS-leads decided this was valuable, they should consider though that this process needs to be carefully managed, in order not to alienate powerful SHs whose support will be needed to implement any envisaged policy changes. One particular risk is the use of 'blame narratives' that marginalised SHs may employ.

Beyond that, there is a set of SHs that considers the current knowledge base sufficient to move forward (e.g., one mentioned that many strategies have been developed), but are concerned that without support from higher-level SHs no progress will be made. One SH from an environmental authority emphasised: "*The main concern is ensuring that this project receives buy-in from relevant authorities so that the resulting product and/or information is used, implemented, and integrated with existing initiatives*." Additionally, the mode of '**brokering power**' can come along with discussions regarding what foundational problems and possible solutions are, but the representative from an energy authority felt that currently the process is characterised by "*preconceived solutions and perceptions*" with insufficient time for SH exchanges. Perhaps this sentiment emanates from the CS-leads' focus on 'researching solutions' as it comes with risks of reinforcing existing views on the nexus problem. Interestingly, two of the SHs in this group perceived the level of conflict between WEFE-sectors the highest as well as solidarity and trust the lowest.

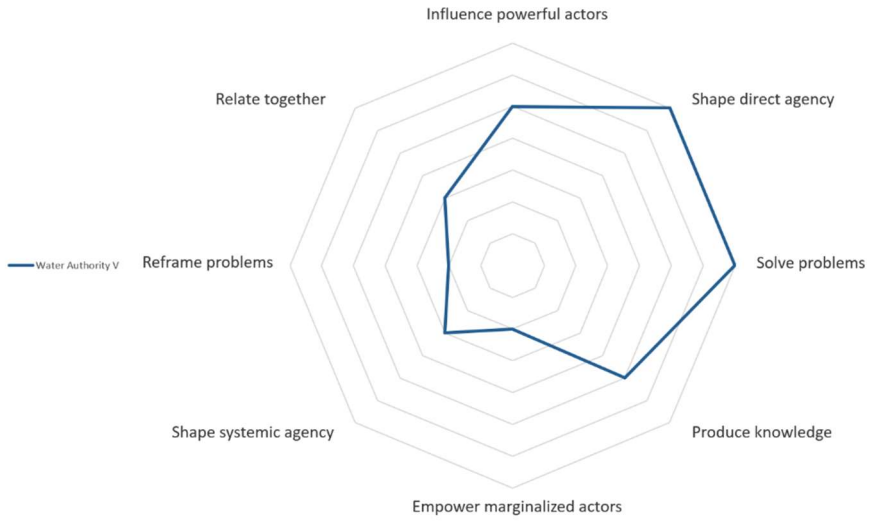

Figure 91: Stakeholder whose response amounts to the mode 'Researching Solutions'.

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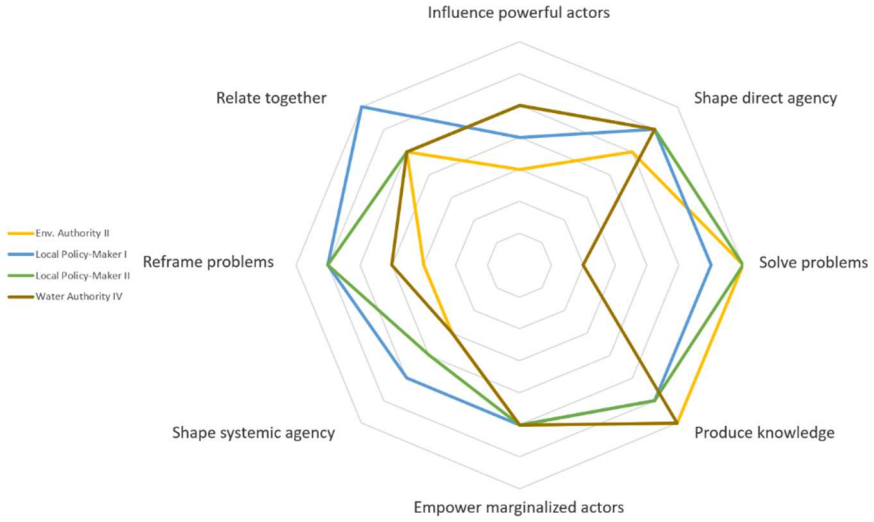

Figure 92: Stakeholders whose responses amount to the mode 'Empowering Voices'.

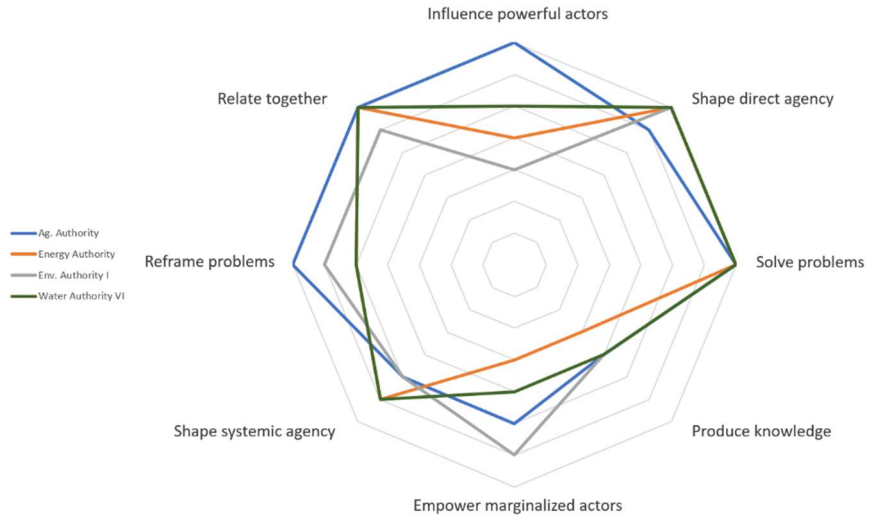

Figure 93: Stakeholders whose responses amount to the mode 'Brokering Power'.

A fourth set of SHs can be grouped under the mode '**navigating differences'**, as depicted in Figure 94~~Figure 94~~. Their views are very similar to the ones favouring 'brokering power' – with one key difference: they hardly emphasise 'solving problems' compared to relationship building and reframing. One of the SHs expressed a hope that the WEFE-Nexus could be a gateway to building institutions that govern water resources holistically and across sectors. The SH suggested to use any outputs of NXG as a starting point for ministerial discussions across sectors, with the project already working toward that objective. Otherwise – that is the concern – any work may become a paper tiger: "*In the project you are talking about policy changes. If you want to do that, you need to investigate what policy is not considering this Nexus. Then you can start looking: "How are we going to change these policies?" But also: "Who must change it?" You can send it to me and my boss will just laugh at me. How is this going to be taken to the champions for WEFE? […] It's my experience that you can have the technical people involved during the development phase, but long before you actually sign off, you need to have some process where you actually look at the real people with the power*." This process would require a lot of resources however that might take away from the project's focus on enhancing the knowledge base and recommend tangible actions.

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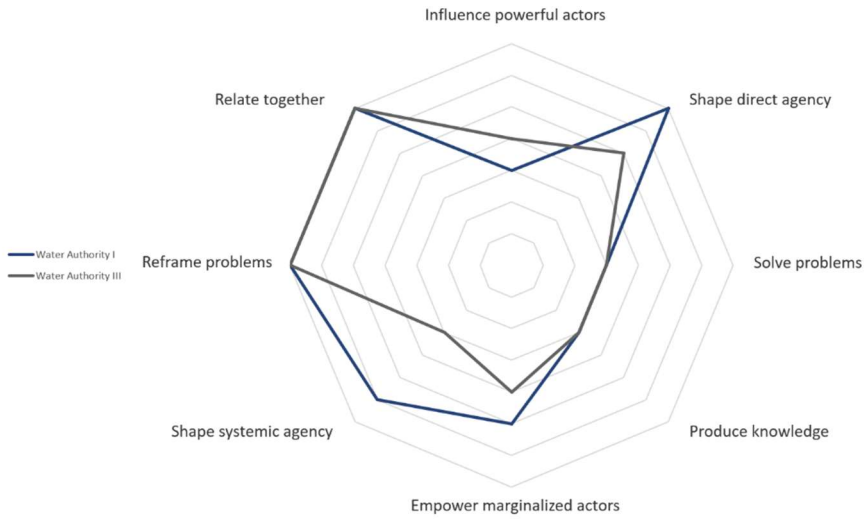

Figure 94: Stakeholders whose responses amount to 'Navigating Differences'.

Figure 95~~Figure 95~~ shows the responses of a SH that could not be allocated to any mode.

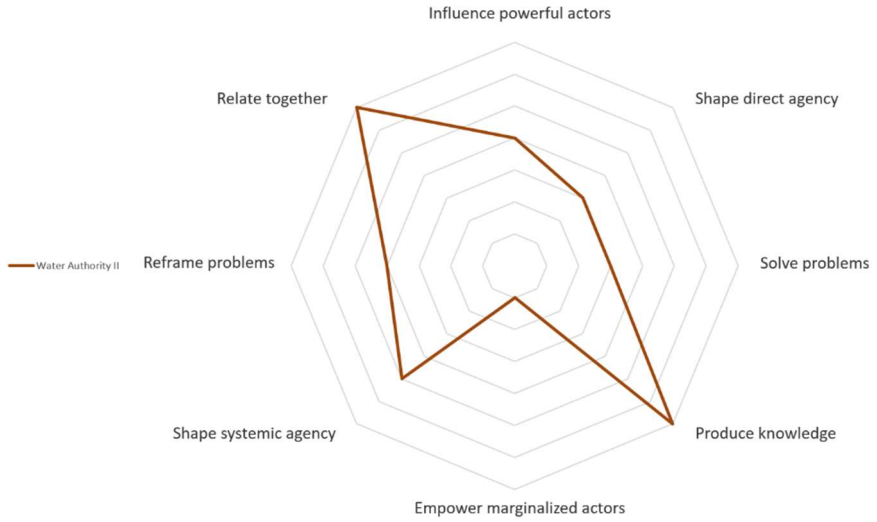

Figure 95: Stakeholder whose response amounts to no particular mode of co-creation.

In Figure 96~~Figure 96~~ we show what outcomes for the engagement process SHs find desirable. At first glance, the finding that 'knowledge production' ranks highly here might seem like a contradiction to the relatively low priority that some of the SHs put on 'producing knowledge' in the radar plots depicted above. However, importantly the question relevant for the radar plots asked about *pathways to generate impact*, which may indicate that some SHs think that additional knowledge is 'nice to have', but not the main way to initiate change. Additionally, it is important to note that two of the SHs grouped under the mode 'brokering power' did score the outcome 'knowledge production' lower than their peers. Meanwhile, the relatively low score for 'social equitability' can be reflective of the fact that only a few SHs desire a systemic shift in how resources are governed. Likewise, the inclusion of powerful actors was usually related to 'moving things forward' and the empowerment of marginalised actors linked to strengthening representation rather than a complete overhaul of how water-related risks and benefits are distributed.

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Figure 96: List of outcomes desired by stakeholders. Outcomes coloured in green were scored >6.0 on average, while the ones in red were scored <5.5 on average.

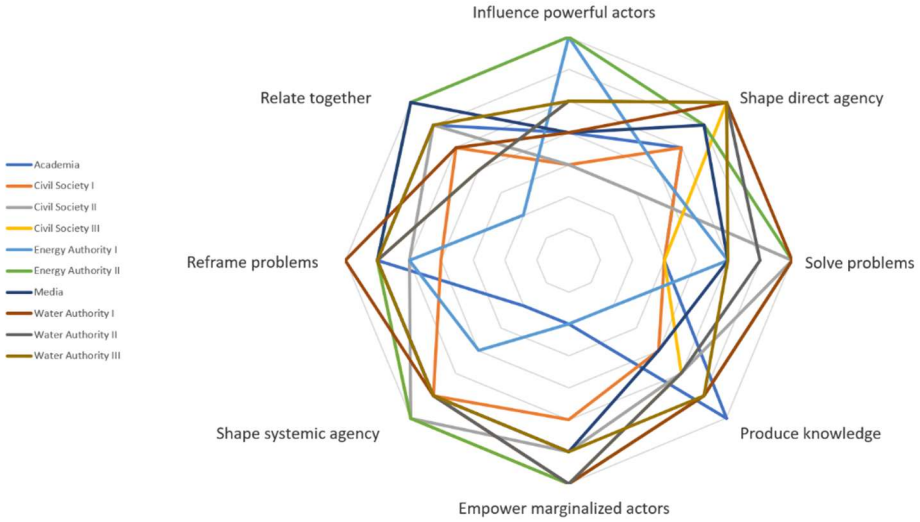

Figure 97: Preferred approaches to co-creation by stakeholders in the Adige river basin.

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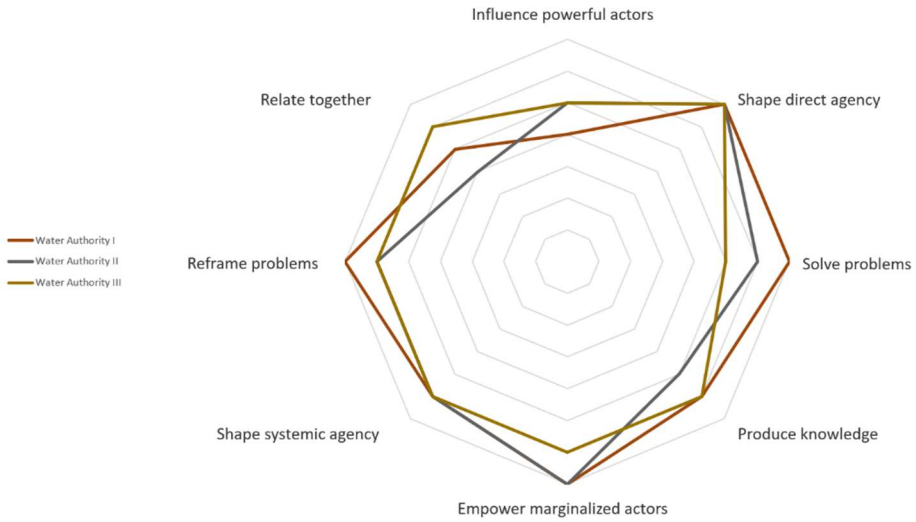

Figure 98: Stakeholders whose responses amount to the mode 'Empowering Voices'.

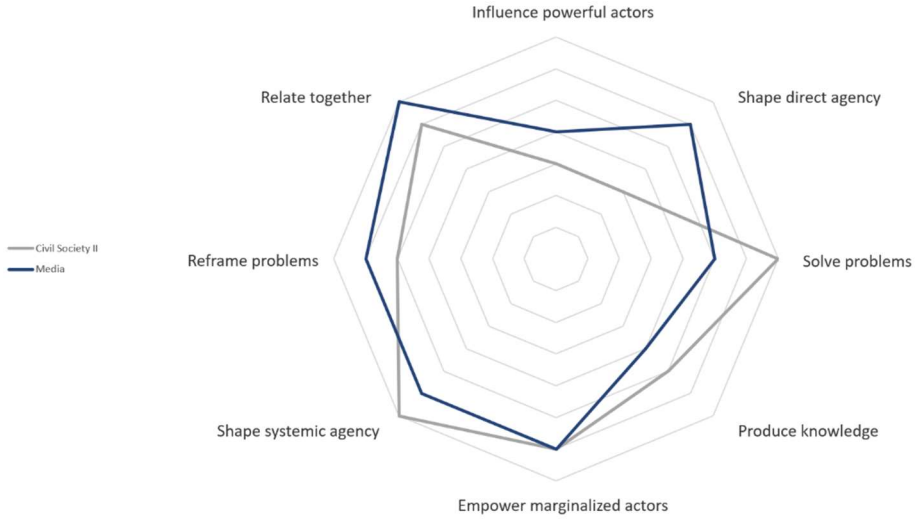

Figure 99: Stakeholders whose responses amount to the mode 'Navigating Differences'.

There are three SHs that align most with the mode **'empowering voices**'. Incidentally, all representatives from water authorities who responded to the survey fall into this category. Also, all these SHs rated the level of conflict in the river basin with a six out of seven. To a large extent this mode is similar with the CS-leads' preferred mode of 'researching solutions.' However, the SHs here emphasise the empowerment of marginalised SHs, reiterating the need for CS-leads to ensure that the engagement process provides enough space for high-interest and low-power SHs to share their views and expertise in open discussions. Ideally, these discussions should not be characterised by 'blame narratives' in order not to alienate more powerful SHs.

Another set of SHs aligns mostly with the mode '**navigating differences**.' In this CS, differences compared to the SHs grouped under 'empowering voices' are marginal, but this group of SHs believes that 'producing knowledge' is less important to generate impact than 'relating together.' This sentiment is also reflected in the relatively high scores for the perceived level of conflict in the river basin. Given that the relationships between many SHs are currently non-existent, a consideration of relationship-building may be advisable. However, a greater

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focus on this aspect may also come with a number of risks, of which to are especially relevant in the context of this CS: Firstly, if power imbalances between SHs are not carefully considered apparent cooperation and consensus can be the result of subjugation. Secondly, a focus on critically engaging with power structures and relations between SHs may lead to 'talk shops' that do not generate action. Thereby, this mode presents a larger diversion from the mode 'researching solutions' that CS-leads prefer and may counteract the project's objectives. Ultimately, it may be advisable to consider whether the SHs preferring this mode are deemed important enough to shift focus.

In Figure 100~~Figure 100~~ we display the SH that could not be grouped under any particular mode of co-production a particular pattern did not emerge either, unfortunately. But further evaluation may show shifting priorities throughout the process, which applies especially to SHs who rated most categories either particularly high (see Energy Authority II) or low (see Civil Society I). These SHs may identify for themselves over time what contributions from the project they would value the most.

In Figure 102~~Figure 102~~ we show to what extent SHs desire various outcomes. All outcomes were deemed important (with all receiving at least a 5.43 out of 7 points), but ecological outcomes and capacity development were deemed the most and social equitability the least important. The latter is surprising given that many SHs deem 'empowering marginalised actors' to be key. This oddity cannot be further explained at this point. What is striking though is that 'knowledge production' also ranks low in the list of desired outcomes, possibly underlining that many SHs rather value building relationships. The image is still blurry here though.

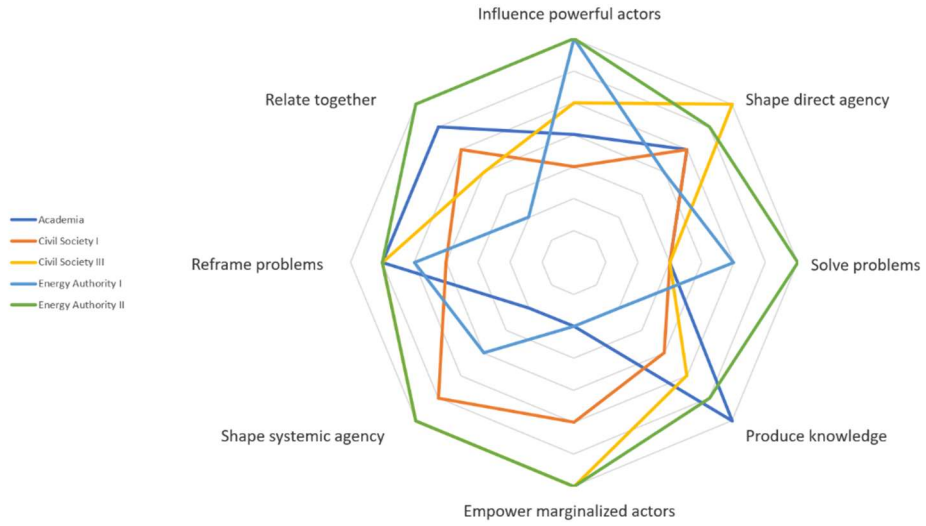

Figure 100: Stakeholders whose answers did not amount to any mode of co-production.

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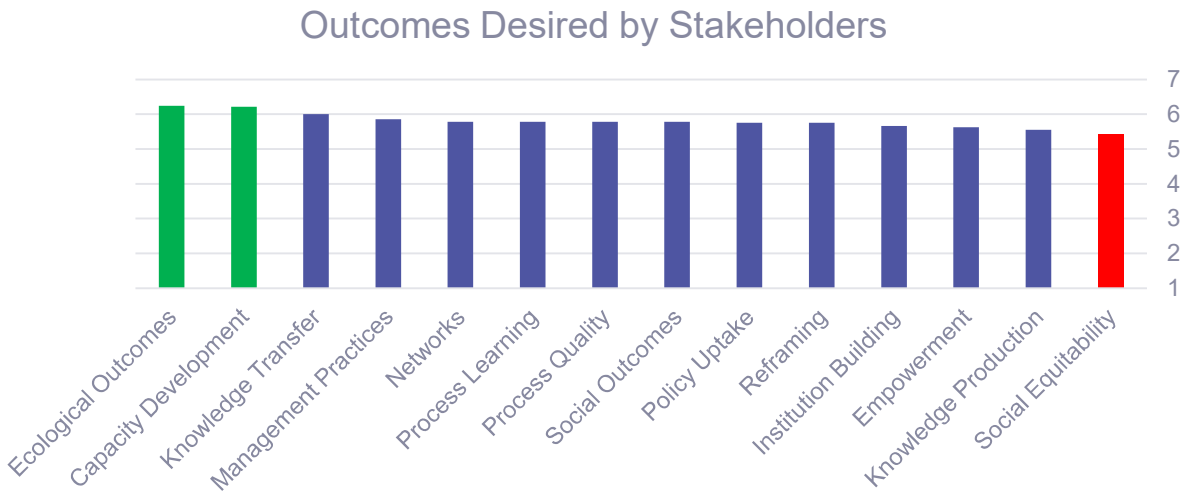

Figure 101: List of outcomes desired by stakeholders. Outcomes coloured in green were scored >6.0 on average, while the ones in red were scored <5.5 on average.

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Mid-project engagement (Month 24 Stakeholder Engagement Plans)

CS1: Nestos/Mesta

The SHE plan is based on the data, information and perceptions provided and analysed by the CS-Leads, the CS SHs and the AVA- and UU-Team by August/September 2023. The plan is updated on a yearly basis taking new SH information and evaluation results into account to allow for adaptive management.

Evaluation

An initial evaluation approach that had been set up was not yielding sufficient results to provide meaningful insight into the SHE process. Thus, towards the end of 2022 and early 2023 a new strategy was developed between AVA, UU and the CS-leads with the aim of assessing:

- The quality of the process (the delivery of the plan)
- The quality of the outcome of the process (the results of the plan = i.e. fulfilling the aims)
- The intention of the quality vs the perception of the quality (at both levels above)

This resulted in a revised survey (see Annex) which was translated into the respective local languages, and a WS activity at the 3rd WS which showcased the SH landscape to the SHs and asked these to reflect on the modes of co-creation by Chambers et al. 2021. For the Nestos/Mesta case, the 3rd WS was held in the Town hall of Chrysoupoli, Kavala, on 28 and 29 March 2023 where 37 SHs from both countries attended. The aim of the event was to introduce findings from the governance assessment in Greece and Bulgaria, to present and validate policy packages, to discuss SHE considerations and to promote networking and exchange of information on ongoing activities in the Nestos/Mesta River Basin.

Results from the stakeholder survey

Overall, SHs are very satisfied with the process quality and the process outcomes. Participants trust the outcomes of NXG as it is based on science. Of the 37 participants at this WS 12 filled in the survey.

(1) Most respondents were male (7), four were female, and 1 participant chose not to answer. Five respondents chose not to disclose their SH background. The remainder were mostly policymakers at local level (4), from the agricultural sector (2), the environment authority (1= or from the civil society (1). An almost equal split of respondents from Greece (6) and Bulgaria (5) answered the survey. The larger share of respondents had more than 20 years of experience (6).

(2) In general, respondents felt better engaged at the WS level than at the project level (light bars higher than dark bars) (Figure 102~~Figure 102~~). However, overall respondents felt well engaged (responses higher than 4,5 on average). Responses for co-development were generally lower which is to be expected since little activities were undertaken to engage SHs to that degree. It is interesting to note that although the project did not undertake significant efforts to co-develop the project with SHs these still have a rather high perception of engagement at that level.

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(3) Overall, participants rate all outcomes as highly important (average above 5) with outcomes such as institution building, policy uptake and management practices ranking the lowest, and social equitability, process quality and capacity development ranking the highest (Figure 103~~Figure 103~~). However, the results also show that expectations aren't necessarily met by the project as of yet. Differences are particularly high in social equitability, networks and management practices.

(4) In general, participants indicated to have acquired knowledge in all areas (average above 4.5) (Figure 104~~Figure 104~~). Most knowledge seems to have been acquired in the dimension of target knowledge (yellow bars, average of 5.43) and herein on the WEFE-Nexus interlinkage and the policy landscape. Understanding of the biophysical and socio-economic system was low in all three knowledge areas. Transformational knowledge (green bars, average 5.0) was only slightly less than system knowledge (blue bars, average 5.05). This is surprising since transformational knowledge is usually perceived as the most challenging – the knowledge of how to do transformation.

Figure 102: Degree of perceived engagement by WS3 participants in the project (dark bars) and the workshop (light bars)

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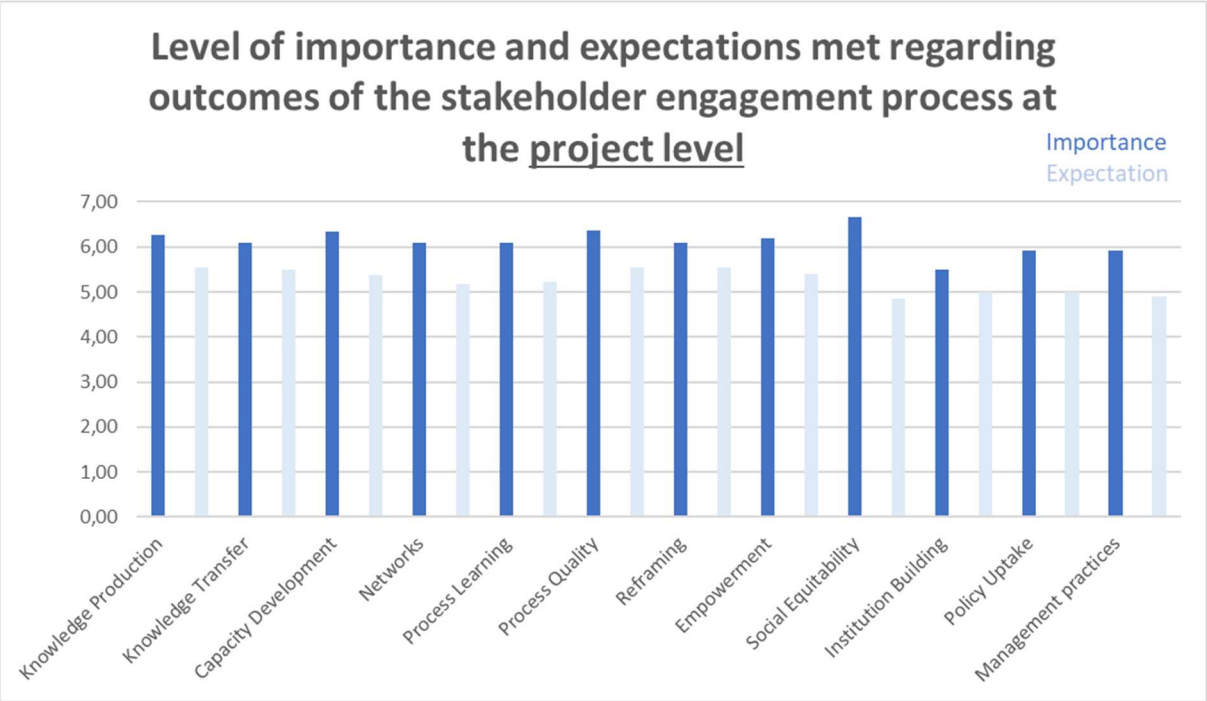

Figure 103: Level of importance and expectations per outcomes of the SHE process at WS3.

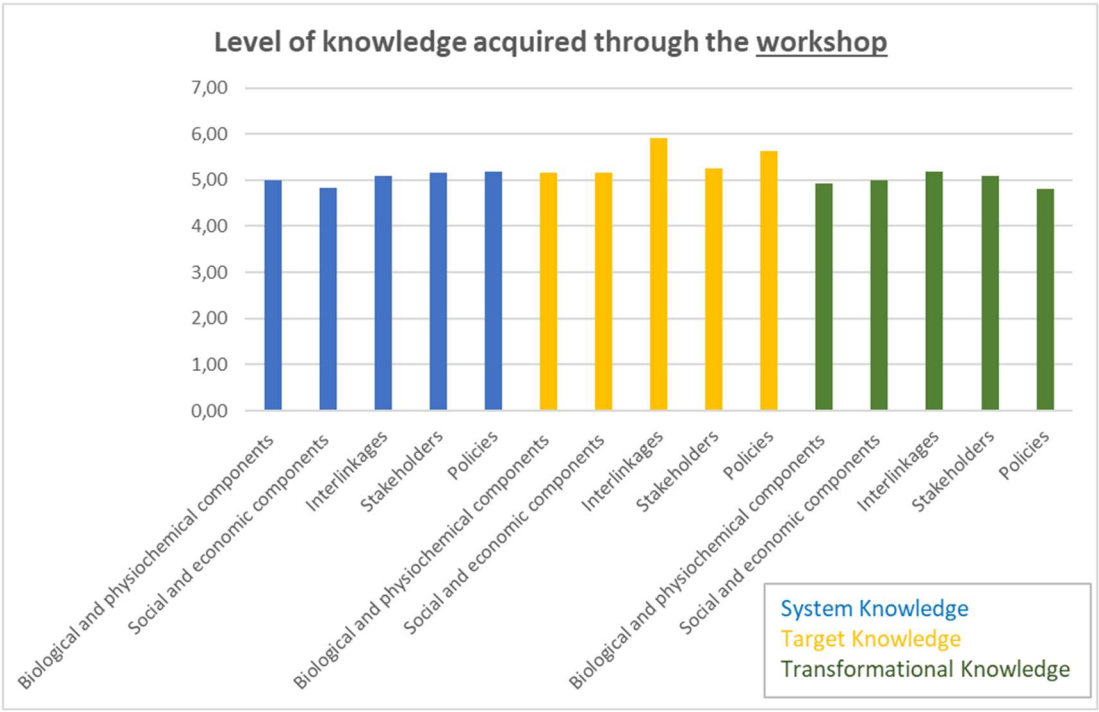

Figure 104: Knowledge generated in WS3 in different NXG areas.

The main recommendations drawn from the results for SHE are:

- ➔ Improve gender balance of participants/respondents.
- ➔ Better inform SHs about updates and processes at the project level which may allow for further instances to co-design.
- ➔ Pay more attention to marginalized SHs and strengthen their networks.

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- ➔ Provide SH with system knowledge, i.e. providing them with easily understandable results of the biophysical and socio-economic modelling and what this means to the WEFE Nexus.
- ➔ Specifically invite and target the SHs mentioned at the end of the survey (national authorities, water authority/basin directorate, etc.).

Desired mode of co-creation

At the end of a session focused on the SH landscape and SHE at the third WS, a plenary discussion was held on the approaches to co-creation that together yield the modes of co-creation (see Chambers et al. 2021). For this purpose, the approaches to co-creation were briefly introduced as well as common risks and opportunities associated with them. Afterwards, SHs were encouraged to reflect on which degree of focus on the respective approaches is suitable for their CS. These modalities for the WS activity were chosen in response to previous experiences gathered throughout the evaluation process, which indicated that SHs were overwhelmed by being surveyed in written form on the original set of statements in the framework by Chambers et al. (2022).

The SHs' answers in session were scored along the respective scales of the approaches to co-creation, as per the framework by Chambers et al. (2021). The answers from the session were supplemented with insights from the WS minutes to add further nuance to the analysis. Together, the values did not yield one clear mode of co-creation but aligned most closely with the mode '**Brokering Power**' (Figure 105~~Figure 105~~). In this particular case, however, reframing problems has an unusually low and empowering marginalised SHs an unusually high score for this particular mode of co-creation.

The answers were closest to those given by a SH from the business sector from Bulgaria and by a representative from a Greek environmental authority, when the evaluation was still conducted on an individual basis at the second WS. In addition, even those answers that did not yield the mode 'brokering power' back then, by and large, supported a greater involvement of high-power SHs.

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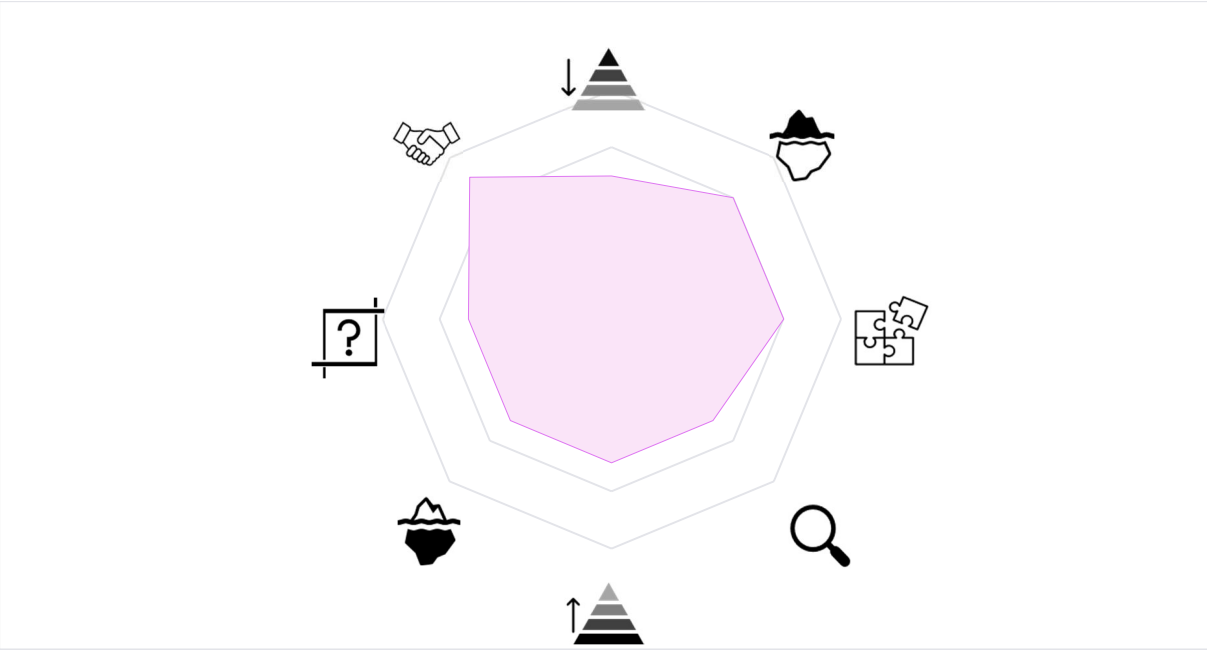

Figure 105: SH perspective on the desired approaches to co-creation – together yielding the mode 'Brokering Power'. *Legend (in clockwise order from the top): 1) Influence powerful actors; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together*

The SHs desire a stronger involvement of powerful and high-level SHs in the co-creation process. In their eyes, it is key that dialogue is initiated and possibly even new institutions formed. Only then, they see an opportunity for the implementation of agreed actions. Importantly, an exclusive focus on engaging powerful SHs can further marginalise less powerful SHs. Therefore, it is key to consider possible forms of engagement that guarantee that the interests of less powerful SHs are also heard.

Specific recommendations for SHE are therefore:

- ➔ It is important that high-level decision makers are made aware of the project and are on board with taking up identified solutions into policies.
- ➔ Ensure that the outputs of the project represent the concerns and ideas of less powerful SHs.
- ➔ Lobby powerful SHs with a synthesis of acquired knowledge, working with them toward specific actions. It has proven effective to focus on one particular issue where there is shared interest amongst SHs, and then formulate actions to address it. Possibly start with an issue that matters to high-level decision-makers in both riparian states (i.e. Greece and Bulgaria).
- ➔ To satisfy both the needs of marginalised SHs and be able to engage with powerful SHs one may consider one of the following options: a) gather inputs from marginalised SHs and convey them to powerful SHs, b) manage to bring everybody to the same table and provide a platform for common dialogue, or c) have two events with one focusing on technical aspects and local-level networks and another one on high-level dialogue and 'signing off' on actions to be taken.

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Stakeholder engagement aim

Participatory actions have been broadly acknowledged as well-suited practices for engaging SHs to elicit valuable knowledge and explore their interests, preferences and means of power. SHs' engagement supports common understanding and establishes mutual confidence between them and decision makers. It also contributes to the transferability and dissemination of scientific knowledge and research outcomes. Therefore, SHs are expected to contribute by adding specific knowledge and expertise on issues related to water resources management, critical hot-spots, proactive actions, management of flood and drought risks, ecosystems maintenance, hydropower generation, agricultural practices, land uses, etc.

In the past year, the Nestos/Mesta CS saw the varying engagement of SHs and a clear call for the inclusion of further SHs. Suggestions for other SH were provided during the 3rd WS as well as through the survey that was administered then. Below are the responses from the SHs on further SHs to involve:

- " The water agency - responsible for water resources management at regional level
- 1.Dam management (PPC) - Water consumer 2. Water Directorate of the Region of AMTH - Water Manager 3. Municipalities of Topiros/Xanthi - Users
- institutions at the national level
- At the national level
- Environmental Directorates and ets.
- Government
- Basin Directorate, all ministries and political persons at national level

Involvement of SHs in the work of the Nestos/Mesta CS is of pivotal importance. In the case of NXG project and the Nestos/Mesta CS, the aims of SHs' engagement are the following:

- To generate system knowledge:
  - Deepen into existing problems
  - Explore possible conflicts and synergies among stakeholders
  - Identify pressures in all sectors (water availability/quality, ecosystem, climate/storms, extreme events etc.)
  - Provide data for model development
  - Inform the research team about plans/projects that are in progress
- To generate target knowledge:
  - See which are their future expectations/perspectives
- To generate transformation knowledge:
  - Design suggestions and a river contract proposal
- To build a trustful relationship among project partners and local SHs

Based on the conversations during the General Assembly meeting in Tours (Parallel Session 6) from 19-21 September, the following aims will be prioritized over the remaining two years:

- To generate system knowledge:
  - Explore possible conflicts and synergies among stakeholders
  - Inform the research team about plans/projects that are in progress
  - Assessment of NEPAT results – Do they correspond to local needs?

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    - Hot-spots and establishment of (local)-scale collaborations among stakeholders
- To generate target knowledge:
    - Assessment of policy impacts – NEPAT
    - Focus on common interests that may foster future collaborations
- To generate transformation knowledge:
    - Design suggestions and a river contract proposal
    - Re-design solutions (if needed) based on NEPAT outcomes
    - To build a trustful relationship among project partners and local SHs

Moreover, SHs' engagement has the potential of offering added value to the project by: a) covering existing knowledge gaps, b) raising issues that researchers should consider regarding synergies and trade-offs when it comes to the implementation of policies and actions aiming at nexus sectors management and resources allocation, c) assessing current practices and policies with respect to their effectiveness, and d) proposing future policy measures and means of actions that will reinforce resilience by taking into consideration climate change impacts. Under this framework, SHs' influence and interests will be identified, investigated, and mapped as well as, their role during the decision-making process and the organization and implementation of plans in case of emergency. Possible conflicts and synergies among them will be also explored. The overall purpose of such a process is strong ties to be built between researchers and SHs in order a rich knowledge stock to be created, collaborative actions to be encouraged and transferability of the projects' outcomes to be enhanced.

Meanwhile, gauging from the desired SHE outcomes, we derived likely aims as seen from the SHs' view:

- Possible system aims:
    - Deepen/improve understanding of the current (state of) WEFE Nexus problems (e.g., river basin management, energy transition, water scarcity) and identify pressures
    - Get data for model development
    - Gain/increase understanding of the institutional, organisational and political context and (current) river basin management plans (including neighbouring countries)
- Possible target aims:
    - *Determine solutions/systems (and their drivers) that balance sectors for a sustainable production*
    - *Shift power and resources toward less influential stakeholders to increase social equitability*
    - *Empower stakeholders to implement the project's outcomes*
- Possible transformation aims:
    - *(Co-)Design and (co-)validated of NXG tools/platform (e.g., NEPAT, WEFE Footprint), and build capacity (e.g., to use the NXG tools, to transition to renewable energy)*
    - *Identify relevant WEFE Nexus components and indicators*

The system knowledge aims are aligned with the ones of the CS team. However, there is a divergence when it comes to the target and transformation knowledge aims. Specifically, the

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SHs likely expect project outputs that help them on a day-to-day level (e.g., models, tools) that however also allow less powerful SHs to better make their concerns and ideas represented in policy discussions. To enhance social equitability is, in fact, the SHs' main priority and, from the SHs' perspective, the CS is still underachieving in that regard.

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Stakeholder analysis

Stakeholder identification

In the past year the SH register has changed. A total of 91 (instead of 63 in 2022) Greek and Bulgarian SHs were identified out of which 29 (31,9%) (instead of 12; 19%) consented to be officially included in the SH register and participate in the NXG SHE (Table 45~~Table 45~~). In the remainder of the document SHs that consented to be included will be termed 'official stakeholders'.

Table 45: CS1-Nestos/Mesta summary information of stakeholder identification as of Sept. 2023

Item	Count 2022	Count 2023
Preliminary listing of stakeholders	63	91
Stakeholders in registered officially	12	29
Percentage of consent [%]	19%	31,9%

To move forward with a GDPR compliant SH base the issue of contest was discussed at the General Assembly meeting in Tours from 19-21 September 2023. The following was agreed:

1) Most information on SH is taken from public sources → mark SHs where information was taken from public sources (add a P if taken from public source in the new column B of your CS tab in the SH dashboard)
2) Double check current names and organizations and update SHs and affiliations accordingly. Some SH may have changed jobs, retired, etc.
3) Mark all high power or high interest SH in the register. These are people you most likely may want to keep. Write to them individually and ask them to consent to the PPCF; threaten with removal if needed. Remove them from the register if the information obtained on them is not from public sources.
4) Add new SHs based on the needs outlined in the management plan below. Lay a particular focus on moving from technical SH to more political SH that could help you understand where legislation on the suggested policy packages currently stands. This will help you get into the policy cycle better. Ideally source their contact information from public sources.

The official SHs still belong mainly to the water and ecosystems sectors; and while the energy and food sector are still the least represented ones, SH numbers have increased manyfold here (Figure 106~~Figure 106~~).

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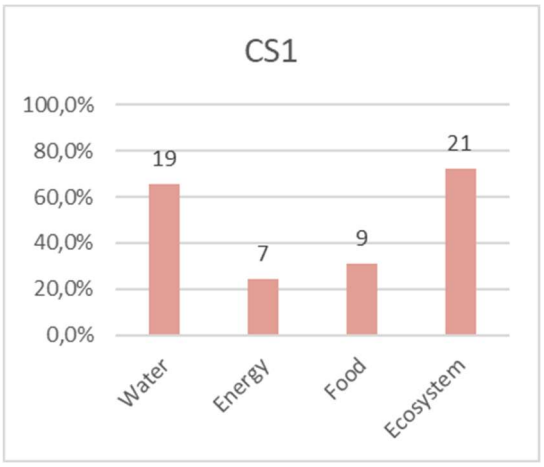

Figure 106: Distribution of stakeholders across the WEFE sectors for CS1 - Nestos/Mesta. One stakeholder can be assigned to one or more sectors.

In terms of gender, there is a 20/80% distribution across female and male genders (Figure 107~~Figure 107~~). Gender balance is an issue here, but due to the nature of positions and the way society is organized little can be done here. Reaching out to women's societies in the NGO sector may bring more female SHs to the table.

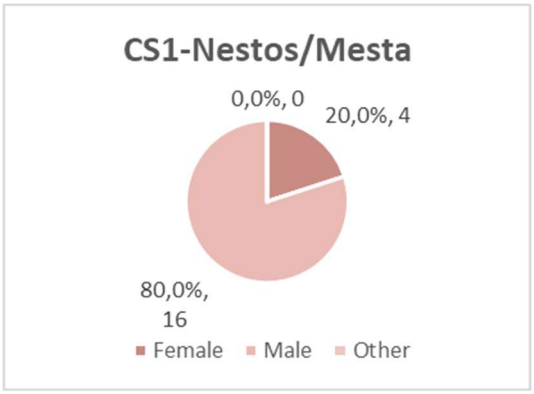

Figure 107: Gender distribution for CS1 - Nestos/Mesta. One stakeholder identified with both female and male.

Stakeholder differentiation and categorisation

The official SHs belong now largely to tier 2 SHs (13) followed by Tier 1 (9) and Tier 3 SH (7) whereas in the last analysis in 2022 the mainly belonged to tiers 1 (six SHs) and 2 (five SHs). In terms of categorization, this hasn't changed much in the overall distribution, however more local level policy makers have come forward (Figure 108~~Figure 108~~).

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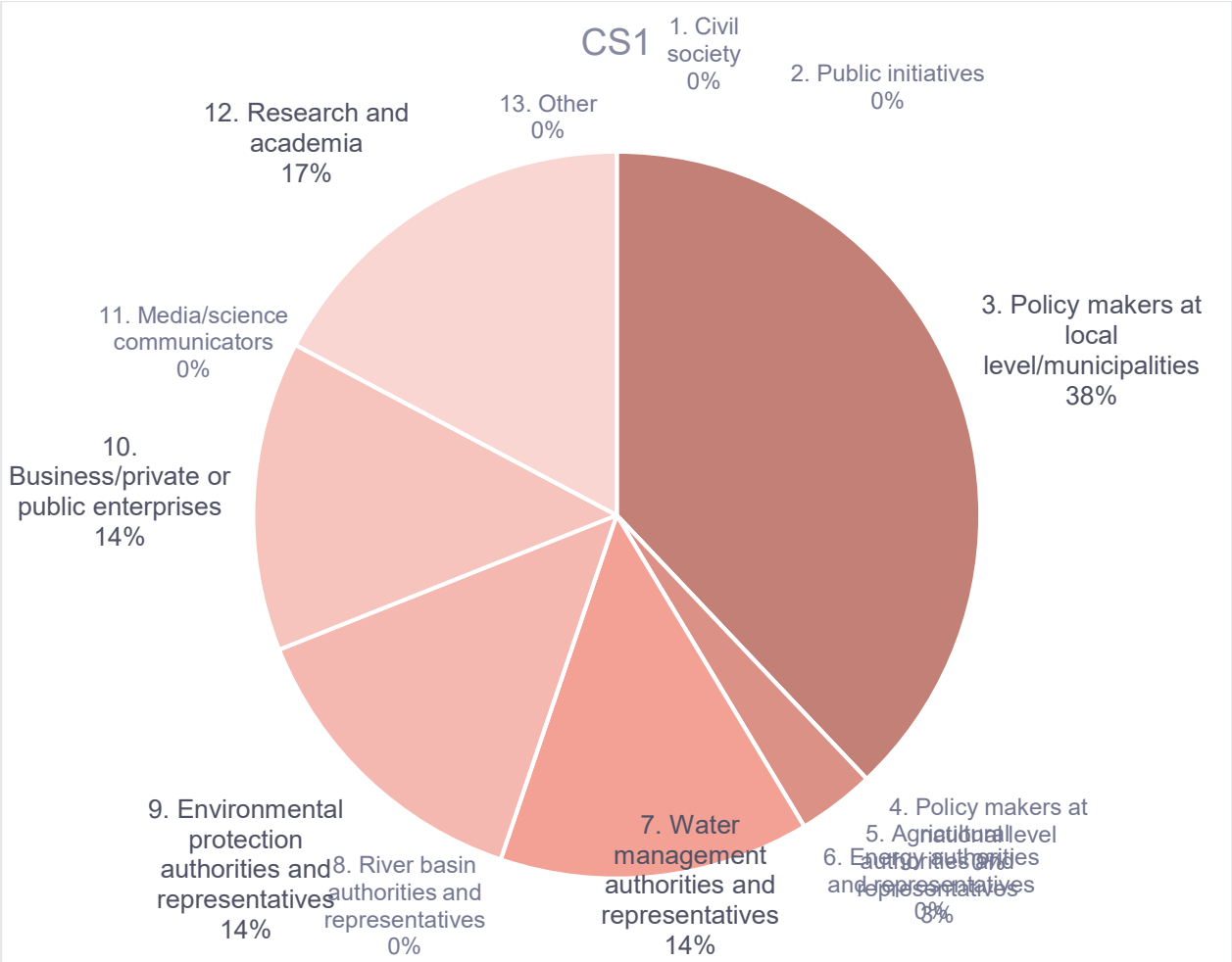

Figure 108: Distribution of stakeholders across categories for the case CS1 - Nestos/Mesta

From a Power-Interest perspectives, official SHs were mostly perceived as having high interest by CS-leads, with 2 new low interest-low power SH. The remaining SHs are almost equally split across being perceived as high interest-high power and high interest-low power (Figure 109~~Figure 109~~).

Low interest – High Power actors are completely missing in this register. Emphasis should be laid on seeking out these actors, as they may be able to move the project forward. Particular care should be placed on grooming the 12 high interest – low power actors (which include those that are on the edges of the quadrant).

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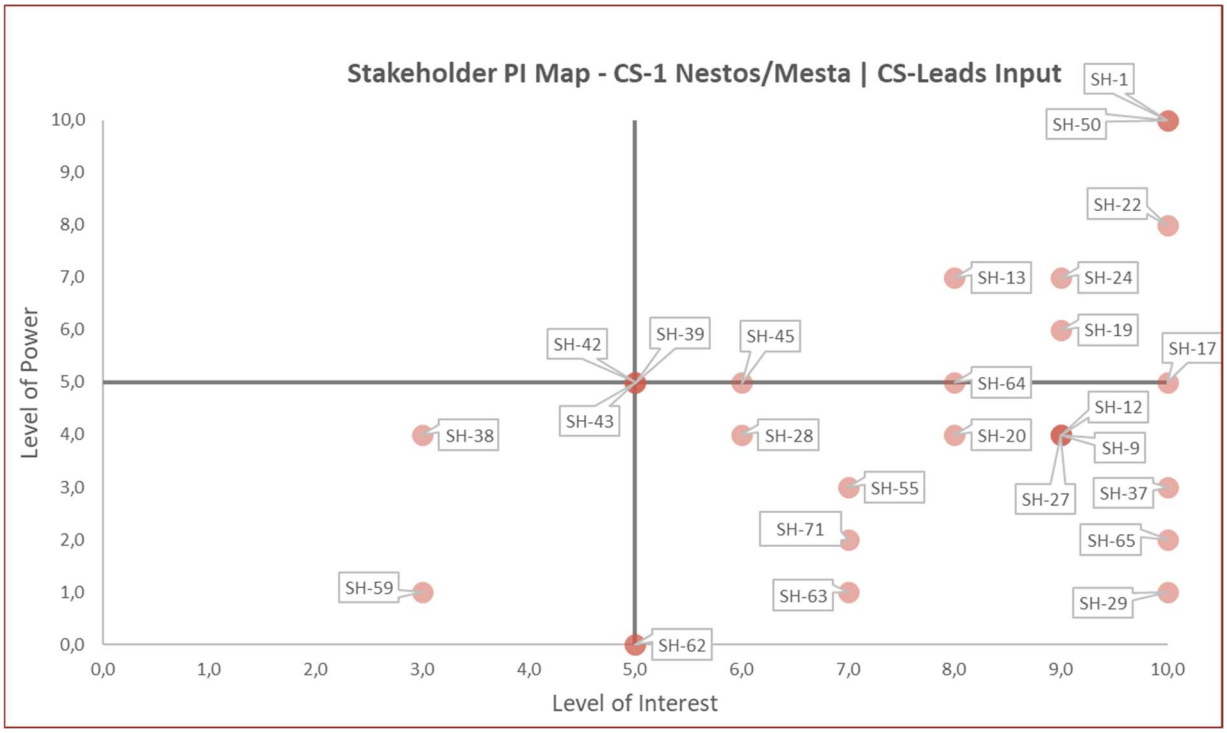

Figure 109: Power-Interest Map for CS1 - Nestos/Mesta. based on the CS-Leads' perceptionFor data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents.

Stakeholder relationships

The CS-Leads characterised – based on their perception – 378 relationships (up from 78 in 2022). The relationships correspond mainly to the non-existent (NE) relationships between SHs (31.0%) followed by rather complementary (Cm) (10.3%) and cooperation (Cp) types (16.7%), and a very low share of conflicts (Cf) between some SHs (0.8%) (Figure 110~~Figure 110~~ and Figure 111~~Figure 111~~). At the time of the writing of this plan 41% of the relationships have not been characterised and mostly correspond to Bulgarian SH.

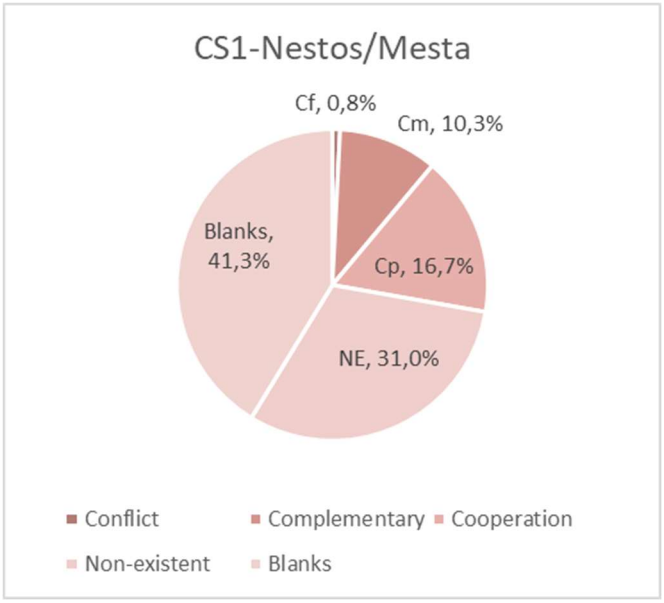

Figure 110: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads.

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SH-ID	SH-12	SH-13	SH-19	SH-20	SH-28	SH-29	SH-27	SH-36	SH-39	SH-42	SH-43	SH-45	SH-50	SH-1	SH-17	SH-24	SH-37	SH-55	SH-59	SH-60	SH-62	SH-63	SH-64	SH-65	SH-71	SH-22	SH-85	SH-9
SH-12		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-13	Cm		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-19	Cm	Cf		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-20	Cm	Cp	Cf		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-28	Cp	Cm	Cm	Cm		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-29	Cm	Cm	Cm	Cm	Cm		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-27	Cp	Cm	Cf	Cm	Cp	Cm		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-36	Ne	Ne	Ne	Ne	Ne	Ne	Ne		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-39	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cm		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-42	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cm	Cp		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-43	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cm	Cm		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-45	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cm	Cm	Cm	Cp		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-50	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cm	Cm	Cp	Cp		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-1	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Ne	Ne	Ne	Ne	Ne	Ne		-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-17	Cp	Cp	Cp	Cp	Cp	Cm	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Cm		-	-	-	-	-	-	-	-	-	-	-	-	-
SH-24	Cp	Cp	Cp	Cp	Cp	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cp		-	-	-	-	-	-	-	-	-	-	-	-
SH-37	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here		-	-	-	-	-	-	-	-	-	-	-
SH-55	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here		-	-	-	-	-	-	-	-	-	-
SH-59	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here		-	-	-	-	-	-	-	-	-
SH-60	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here		-	-	-	-	-	-	-	-
SH-62	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here		-	-	-	-	-	-	-
SH-63	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here		-	-	-	-	-	-
SH-64	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here		-	-	-	-	-
SH-65	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here	Enter here		-	-	-	-
SH-71	Cp	Cp	Cp	Cp	Cp	Cm	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cp	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne		-	-	-
SH-22	Cp	Cp	Cp	Cp	Cp	Cm	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cp	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cm		-	-
SH-85	Cm	Cm	Cm	Cm	Cp	Cm	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cp	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cp		-
SH-9	Cm	Cm	Cm	Cm	Cp	Cm	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cp	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cp	Cm	

Figure 111: Actor-Linkage Matrix for CS1-Nestos/Mesta. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent.

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Stakeholder engagement plan for CS1 – Nestos/Mesta

The SHE plan provides a guidance to organise SHE and achieve the SHE aims considering the findings from the SHE evaluation and the updated results of the SH analysis. These results show that:

- The SH list and consent has grown but SH distribution has stayed similar. However, a significant increase was observed in the total amount of energy and food SHs.
- Gender distribution is an issue and highly male dominant.
- The distribution across categories is similar, however an increase in the business/private or public enterprise sector can be seen, and a reduction in the agricultural sector.
- The predominance of high interest SH continues, however also more low power- high interest SH have been added.
- Most relationships are considered as non-existent. This is a result from the transboundary nature of the project and provides an opportunity for cross-border fertilization.

During the previous cycle of the SHE plans, the CS leads identified “Empowering voices" as their preferred mode of co-creation. This mode means that researchers and SHs co-create knowledge with a special intension of involving marginalised SHs and including a greater social diversity (Chambers et al., 2021[1]). For a strong impact, this mode of co-creation should be coupled with a strong engagement with authorities and policy-makers to work toward multi-scalar partnerships for implementation (ibid.).

Overall, the SHs’ preferences are not diametrically opposed to the ones of the CS team, as the SHs likewise value the empowerment of less powerful SHs. However, the SHs emphasise more the lobbying of high-level decision-makers that can actually facilitate the implementation of agreed actions. Also, the SHs would like to see relationship building prioritised more.

Based on these insights, it would be advisable to specifically consider:

- ➔ Make a conscious effort to convince high-power (esp. high-level) SHs of the value of the project.
- ➔ Try to bring together high-power (esp. high-level) SHs from both riparian countries in a safe space, without disregarding opinions of low-power SHs.
- ➔ Ensure that the actions agreed upon by low-power SHs can be implemented.

[1] Chambers, Josephine M., C. Wyborn, M.E. Ryan, R.S. Reid, M. Riechers, A. Serban, N.J. Bennett, et al. 2021. ‘Six Modes of Co-Production for Sustainability’. *Nature Sustainability* 4 (11): 983–96. https://doi.org/10.1038/s41893-021-00755-x.

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Table 46: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS1-Nestos/Mesta.

	Co-exploration	Co-design		Co-development	
	Information	**Consultation**	**Involvement**	**Collaboration**	**Empowerment**
WHO? Stakeholder category	All categories should be properly informed. Make a conscious effort to convince high-power (esp. high-level) stakeholders of the value of the project. Specifically invite and target the stakeholders mentioned at the end of the survey (national authorities, water authority/basin directorate, etc.).	All categories can be consulted. Pay more attention to marginalized stakeholders and strengthen their networks. Reaching out to women's societies in the NGO sector may bring more female stakeholders to the table.	All categories can be involved. Lobby powerful stakeholders with a synthesis of acquired knowledge, working with them toward specific actions.	All categories can collaborate. Aim to satisfy both the needs of marginalised stakeholders and be able to engage with powerful stakeholders.	Ensure that the actions agreed upon by low-power stakeholders can be implemented.
WHY? PI and ALM	It is important that high-level decision makers are made aware of the project and are on board with taking up identified solutions into policies.	Ensure that the outputs of the project represent the concerns and ideas of less powerful stakeholders.	It is important that high-level decision makers are made aware of the project and are on board with taking up identified solutions into policies.	Try to bring together high-power (esp. high-level) stakeholders from both riparian countries in a safe space, without disregarding opinions of low-power stakeholders.	If solutions that are developed by low-power SHs are not taken up it undermines their willingness to provide their view and lessens their power.

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	Co-exploration	Co-design		Co-development	
HOW? Activities	Better inform stakeholders about updates and processes at the project level which may allow for further instances to co-design.	Provide SH with system knowledge, i.e. providing them with easily understandable results of the biophysical and socio-economic modelling and what this means to the WEFE Nexus.	It has proven effective to focus on one particular issue where there is shared interest amongst stakeholders, and then formulate actions to address it. Possibly start with an issue that matters to high-level decision-makers in both riparian states (i.e. Greece and Bulgaria).	Consider one of the following options: a) gather inputs from marginalised stakeholders and convey them to powerful stakeholders, b) manage to bring everybody to the same table and provide a platform for common dialogue, or c) have two events with one focusing on technical aspects and local-level networks and another one on high-level dialogue and 'signing off' on actions to be taken.	Consider one of the following options: a) gather inputs from marginalised stakeholders and convey them to powerful stakeholders, b) manage to bring everybody to the same table and provide a platform for common dialogue, or c) have two events with one focusing on technical aspects and local-level networks and another one on high-level dialogue and 'signing off' on actions to be taken.

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Management and sustainment

Management

CS-Leads should not forget checking the expectations written by the official stakeholders in the Privacy Policy Consent Form.

The initial management plan considered different foci per year**.** The table below looks at how these were accomplished and what do to change based on the findings of the past year.

Foci	From 2022 Plan	2023 Plan
2023	Actively look to increase the interest of other stakeholders while maintaining the interest of the current high interest stakeholders. Focusing away from high interest stakeholders towards low interest stakeholders may allow discovering currently missing marginalised stakeholders.	The SH register was expanded and new SH categories, like the business sector were added. A larger SH of low power – low interest SH was established. However, the gender distribution and the lack of high power- low interest SH is still an issue.
2024	Maintain the interest of the engaged stakeholders and focus on the relationships between them, including power dynamics and building trust to enhance collaboration.	Better inform stakeholders about updates and processes at the project level which may allow for further instances to co-design. Provide SH with system knowledge, i.e. providing them with easily understandable results of the biophysical and socio-economic modelling and what this means to the WEFE Nexus. It has proven effective to focus on one particular issue where there is shared interest amongst stakeholders, and then formulate actions to address it. Possibly start with an issue that matters to high-level decision-makers in both riparian states (i.e. Greece and Bulgaria). Consider one of the following options: a) gather inputs from marginalised stakeholders and convey them to powerful stakeholders, b) manage to bring everybody to the same table and provide a platform for common dialogue, or c) have two events with one focusing on technical aspects and local-level networks and another one on high-level dialogue and 'signing off' on actions to be taken.
2025	Focus on co-decision activities and further planning on sustainment of stakeholders as well as on the defined agreements.	Stay focused on providing evidence base and the results from the research. This is your largest asset. Work with policy makers to integrate policy suggestion from the NEPAT.

Table 28~~Table 28~~ provides details of the opportunities and risks associated to the high-scoring approaches Table 47~~Table 47~~ and also linked to the co-creation Mode 2 "Empowering voices". Considering the recommendations derived from the SHs' likely desired outcomes and desired co-creation approaches, it is advisable to particularly look out for the following risks:

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- ➔ Legitimising current power relations and systems such as an imbalance across WEFE sectors and/or public authorities from each of the countries;
- ➔ Challenges in engaging SHs of interest to influence due to prioritising the project's interest on the solution: and,
- ➔ High-power actors may block processes that are against their interests.

Table 47: Overview of opportunities and risk linked to Mode 2 "Empowering voices" and the approaches that ranked higher in CS1-Nestos/Mesta. Based on Chambers et al. (2021).

Approach	Opportunity	Risk
Shape direct agency	The focus on shaping direct agency and solving problems offers achieving specific goals, that could be considered, in this case, in the design of the river contract proposal.	- Directly low-power stakeholders accountable for current problems. - Superficially engaging with SHs because of neglecting the process and equitability of co-creation such as only creating space for conversations during WSs. - Legitimising current power relations and systems such as an imbalance across WEFE sectors and/or public authorities from each of the countries.
Solve problems	Solving problems along with producing knowledge offer support for decision-makers by providing informed and justified policy changes. For instance, having models that provide necessary information for the river contract proposals.	- Challenges in engaging SHs of interest to influence due to prioritising the project's interest on the solution (losing low interest stakeholders). - Reinforcing existing views on the system and problems, inhibiting reframing alternatives.
Produce knowledge		- Echoing knowledge to create specific impacts. - Scientific knowledge overshadowing expertise and other ideas (watch for conflicts between stakeholders). - Focusing on budgeted activities only disregarding the pursuit of emerging goals.
Empowering marginalised	The focus on knowledge production and transfer, can help in advocating for policy changes, building capacity, and addressing specific CS's needs. For instance, production and transfer on pressures in the WEFE sectors or data for model development.	- May fetishize the role of speaking 'truth' to power to shift higher level views and policies - Efforts to empower particular views can inhibit possibilities for reframing perspectives - Powerful actors may block processes that are against their interests - May overlook power imbalances and politics occurring within local settings
Shape systemic agency	Additional focus on shaping systemic agency can shift co-creation views towards more creativity and transformative outputs. These	- Having the feeling that the problem "is too big to handle" that creates a feeling of disempowerment.

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Approach	Opportunity	Risk
	shifts should consider existing expectations and perspectives of the stakeholders.	- Forgetting psychological aspects of changes in power (e.g., anxiety of losing power). - Forgetting identity conflicts and power differentials, resulting in echoing chambers of current dynamic. - Focusing on dialogue and falling into inaction.

Sustainment

As part of the 3rd WS a presentation concerning the SHs' engagement process was provided and the question about SH sustainment was asked. The slides prepared by Tamara Avellan and Simon Ryfisch were presented by Chrysaida Papadopoulou. A plenary discussion followed the main points of which are:

- SHs appreciate our efforts to co-design and co-decide with them the future of "their" region.
- They are willing to participate in the WSs but they said that their voice is not "heard" by the higher decision making levels – They express their views and opinions but this is not taken into consideration when it comes to decision making.
- It is very important that all SHs involved in the WEFE nexus management, participate in these WSs, especially DEI which is our Public Power Corporation and the operator of the dams, the Regional Directorate (NUTS 2 level), relevant ministries, etc.
- There should be a constructive and serious dialogue with the Central/National Governments.
- They prefer plenary discussions and open dialogue as they feel more comfortable to express their opinion and listen to the views of the other participants.
- They would like another international WS between the two countries to be organized where the project outcomes will be presented and their implementation in the Nestos/Mesta river basin will be discussed along with all the key players/SHs of the region and of the WEFE nexus sectors.
- They are very positive to take advantage of the scientific outcomes of the project and explore practical solutions that can be implemented for the future development of the Nestos/Mesta river basin.

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CS2: Lielupe

The SHE plan is based on the data, information and perceptions provided and analysed by the CS-Leads, the CS SHs and the AVA- and UU-Team by August/September 2023. The plan is updated on a yearly basis taking new SH information and evaluation results into account to allow for adaptive management.

Evaluation

An initial evaluation approach that had been set up was not yielding sufficient results to provide meaningful insight into the SHE process. Thus, towards the end of 2022 and early 2023 a new strategy was developed between AVA, UU and the CS-leads with the aim of assessing:

- The quality of the process (the delivery of the plan)
- The quality of the outcome of the process (the results of the plan = i.e. fulfilling the aims)
- The intention of the quality vs the perception of the quality (at both levels above)

This resulted in a revised survey (see Annex) which was translated into the respective local languages, and a WS activity at the 3rd WS which showcased the SH landscape to the SHs and asked these to reflect on the modes of co-creation by Chambers et al. 2021. For the Lielupe case, the 3rd WS "*Water-energy-food-ecosystem Nexus governance, policies and SHE in the Lielupe River Basin*" was held in Vilnius, Lithuania, on 15 June 2023 where 10 SHs from both countries attended. The aim of the event was to introduce findings from the governance assessment in Latvia and Lithuania, to present and validate policy packages, to discuss SHE considerations and to promote networking and exchange of information on ongoing activities in the Lielupe River Basin.

Results from the SH survey

Overall, SHs are very satisfied with the process quality and the process outcomes. Participants trust the outcomes of NXG as it is based on science. Of the 10 participants at this WS 10 filled in the survey.

(1) Participants were almost equally male (4) and female (6). Respondents came from almost all sectors (except for agriculture). An almost equal split of respondents from Latvia (6) and Lithuania (4) answered the survey. Participants had both less than 10 years of experience (5) and more (5).

(2) Participants feel well involved in the project and in the WS (Figure 112~~Figure 112~~). Participants felt particularly empowered by the WS and in the project. Well done. However, they did not feel consulted well enough in the WS (~2) or collaborated within the project (~4.5). They feel well informed about the project and the WS.

(3) Overall, participants rate all outcomes as highly important (average above 4) with outcomes such as institution building, empowerment and social equitability ranking the lowest, and process quality, networks and management practices ranking the highest (Figure 113~~Figure 113~~). However, the results also show that expectations aren't necessarily met by the project as of yet. Differences are particularly high in policy uptake and knowledge transfer. Expectations are met in relation to empowerment and institution building (almost no or no difference between perceived importance and expectation).

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(4) In general, participants indicated to have acquired knowledge in all areas (average above 4) (Figure 114~~Figure 114~~). Most knowledge seems to have been acquired in the dimension of target knowledge (yellow bars, average of 4.46) and herein on the SH and the policy landscape. Understanding of the biophysical and socio-economic system was low in all three knowledge areas. Transformational knowledge (green bars, average 4.41) was slightly higher than system knowledge (blue bars, average 4.43). This is surprising since transformational knowledge is usually perceived as the most challenging – the knowledge of how to do transformation. Knowledge uptake on policies was low in the system (4.63) and transformational knowledge (4.38) domains compared to its counterpart in the target knowledge area (5.25).

Figure 112: Degree of perceived engagement by WS3 participants in the project (dark bars) and the workshop (light bars)

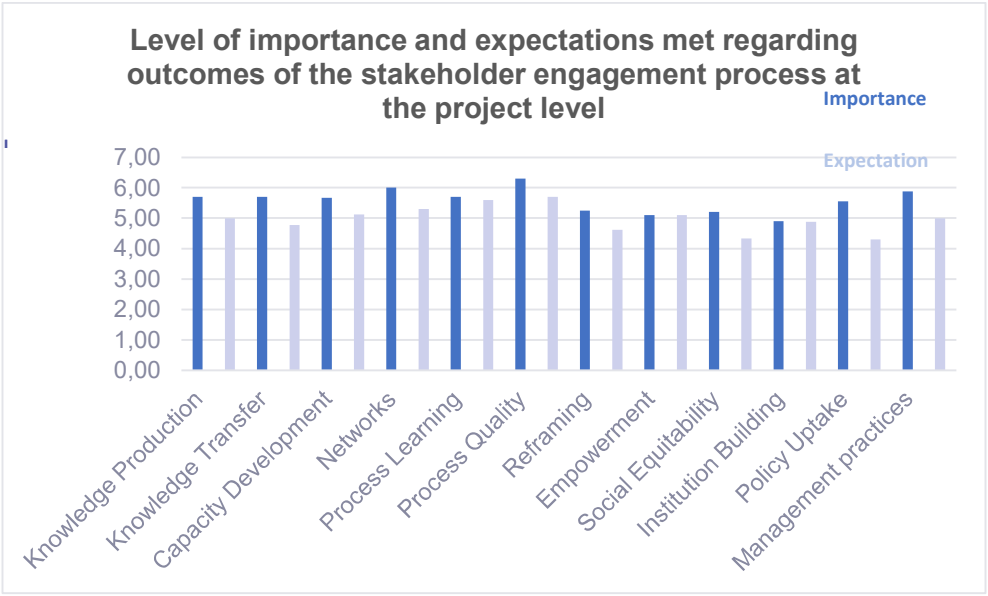

Figure 113: Level of importance and expectations per outcomes of the SHE process at WS3.

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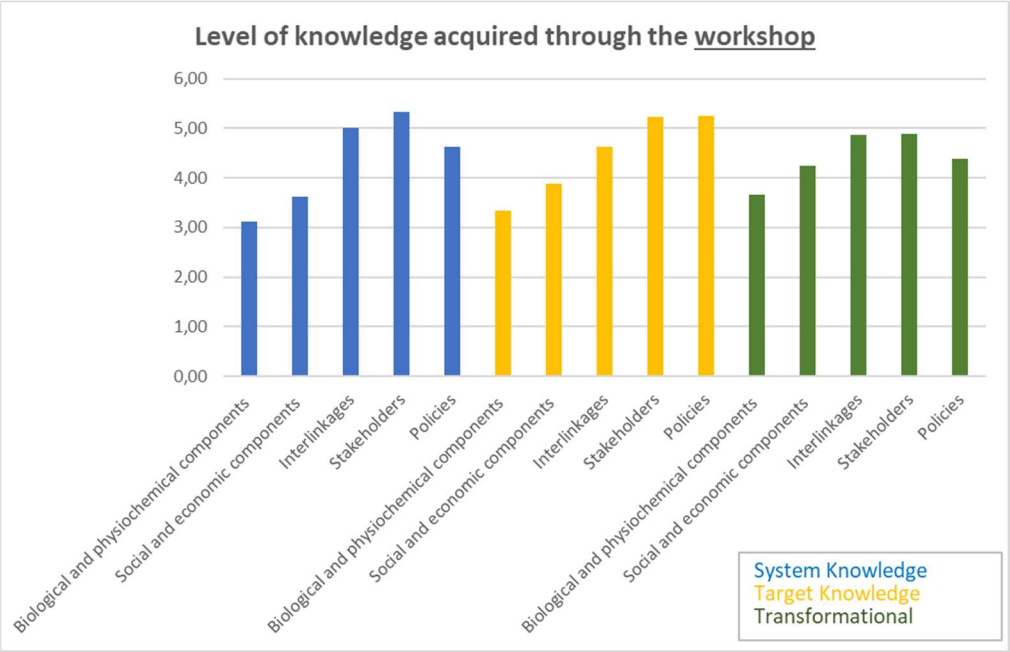

Figure 114: Knowledge generated in WS3 in different NXG areas.

The main recommendations drawn from the results for SHE are:

- ➔ Make an extra effort of working with a wider range of SHs. You are currently working with a low number of key SHs that feel very well involved, engaged and even empowered. But you may not be reaching other critical SHs to induce meaningful change in perceptions.
- ➔ You are working with a small number of key SHs that feel highly involved, collaborated with and empowered. Moving forward you may want to CONSULT with your SHs on the design of the WS agenda. E.g. SHs are not so happy with the knowledge transfer about the bio-physical and socio-economic system knowledge. How about you ask them what they would like to see? You can then check with the technical WPs if any of those demands can be fulfilled during the co-creation meetings.
- ➔ Strengthen networks and focus on knowledge transfer for improved process quality and processes for policy uptake.
- ➔ Provide SH with system knowledge, i.e. providing them with easily understandable results of the biophysical and socio-economic modelling and what this means to policy changes.
- ➔ Your main asset is the credibility of unbiased research. I suggest sharing as much scientific evidence with the SH as possible (even if they may not understand the scientific papers).

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Desired modes of co-creation

At the end of a session focused on the SH landscape and SHE at the third WS, SHs participated in a break-out activity on the modes of co-creation (see Chambers et al. 2021). For this purpose, SHs were each given small stickers according to their governance level (i.e. national, regional, local, and separately NGO/other) and were asked to score the eight approaches to co-creation from Chambers et al. (2021) along a scale (see pictures in Annex). The statements indicating different degrees of prioritisation of said approaches were simplified for the purpose of the exercise and the number of statements slightly reduced. This was in response to previous experiences gathered throughout the evaluation process, which indicated that SHs were overwhelmed by the original full set of statements in their original, more academic phrasing.

The figures (4 and 5) below present the answers of SHs, forming one preferred mode of co-creation based on the prioritisation indicated for each of the approaches to co-creation. Since most groups consisted of more than one SH, the answers below have to be understood as an aggregate. Where a score was unclear, answers in the survey were consulted to assign one.

For all SH groups but one, the desired approaches to co-creation yield the mode of co-creation '**Empowering Voices**' (Figure 115~~Figure 115~~). The only difference to the prototypical mode 'empowering voices' is that the SH groups are also to some extent prioritising relationship building as a pathway to impacts. The one SH group not desiring 'empowering voices' is the group of local SHs (Figure 116~~Figure 116~~). Furthermore, no particular mode of co-creation could be assigned to this group. The group does share the desired emphasis on relationship building with the others however.

Figure 115: SH perspective on the desired approaches to co-creation – together yielding the mode 'Empowering Voices. Legend (in clockwise order from the top): 1) Influence powerful actors; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together.

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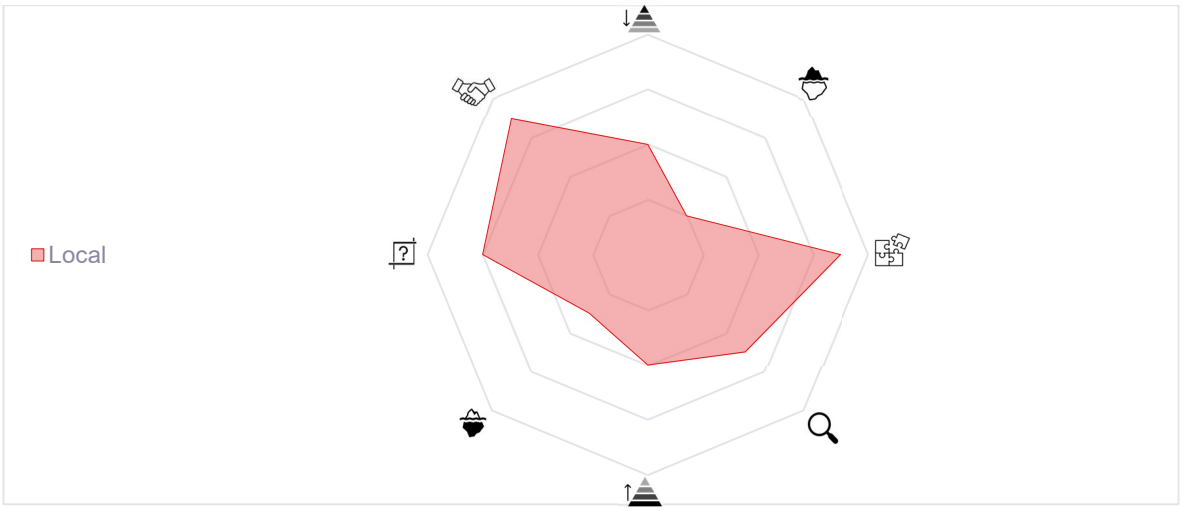

Figure 116: SH perspective on the desired approaches to co-creation. Legend (in clockwise order from the top): 1) Influence powerful actors; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together.

Other co-creation processes focused on 'empowering voices' have created meaningful solutions for local actors based on the produced knowledge in the project. However, the strong emphasis on producing and empowering particular knowledge forms constrained possibilities for reframing. In addition, the knowledge could also be ignored by high-level decision makers if not deeply involved along the way. Positive outcomes (i.e. policy uptake, change in management actions, empowerment, etc.) were enhanced for cases that prioritized process learning and quality, fulfilled capacity needs, and planted the seed for multi-scalar partnerships and joint actions.

These aspects considered (and the general desire for relationship building), it may advisable to carefully bring SHs with different levels of power and from different levels of governance together, while being mindful of the effects of power dynamics between them.

Specific recommendations for SHE are therefore:

- ➔ Strengthen networks and knowledge transfer for improved process quality and processes for policy uptake. The project could 'plant the seeds' for cooperation across governance sectors and levels to increase the likelihood of outcomes being put into action.
- ➔ Lean in on the idea of producing knowledge, but while doing so, it may also be useful to create a space for less powerful SH to share their knowledge and concerns try to ensure that less powerful SHs can contribute here.
- ➔ It is important that high-level decision makers are made aware of the project and are on board with taking up identified solutions into policies.
- ➔ For the CS team it is potentially relevant to know that 'reframing' (i.e. the deeper questioning of what problems and legitimate solutions are) is only desired by local SHs. Therefore, this could be made less of a focus, so that energy is rather channelled toward formulating specific actions.

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Stakeholder engagement aim

The Lielupe CS covers 2 neighbouring countries – Latvia and Lithuania. SHs from both countries that can be interested in participating will be approached. Potential interest in development of Lielupe River Basin can have SH groups (at national, regional, and local level) having direct or indirect impacts in the region. The CS will strive to involve SHs from national authorities (ministries, agencies), regional planning authorities and local municipalities having practical and direct link to the CS. SHs who work at various levels of involvement will be addressed as well e.g., developers of river basin management plans, research institutions/universities, professional associations, environmental NGOs, and business (large farms and enterprises) active in the region.

In the past year, the Lielupe CS saw the engagement of about a dozen key SHs from both countries. While these SHs are highly engaged, a wider net of SHs may be needed to arrive at active change. Suggestions for other SH were provided during the 3rd WS as well as through the survey that was administered then. Below are the responses from the SHs on further SHs to involve:

- "Agriculture, as the main polluter, has and must give a lot of attention. As long as the government of LRV prioritizes climate and biodiversity."
- Municipalities, local associations, communities of residents, representatives of other sectors, other regions (share results)
- R&D
- Vairāk NVO un biznesa pārstāvju.// More NGOs and business representatives.
- Uzņēmēji reģionā, kas tiek skarti, radot projekta iznākumu, kas ietekmēs tehnoloģiski, birokrātiski vai jebkurā citā veidā.//Entrepreneurs in the region that are affected by the project outcome that will affect technologically, bureaucratically or in any other way.
- vietējās kopienas - lai palielinātu vietējo iedzīvotāju izpratni par ūdens resursiem, piesārņojumu un risinājumiem //local communities - to raise awareness among local people about water resources, pollution and solutions
- VARAM, kā politikas veidotājus// VARAM, as policy makers
- VARAM

Involvement of SHs in the work of the Lielupe CS is of pivotal importance. The original aim of SHE was twofold: (i) it provides the ground for SHs to express their views and perceptions about the overall development of the Lielupe River Basin (needed in development of the project outcomes and results to serve best for application in their daily practices), and (ii) to obtain different types of knowledge to be accounted in Nexus assessment framework.

Part of the knowledge that is aimed to be generated refers to:

- System knowledge:
  - Characterise social, economic, ecological, and institutional contexts associated with regional development planning.
  - Improve understanding of the water quality issues (the status quo and targets).
  - Gain understanding of the river basin management plans between both countries.

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- Target knowledge:
    - Determine what set of solutions that balances different sectors by their design and scale of applicability.
    - Knowledge on potential conflicts between the agricultural and ecological sectors.
    - Determine innovative systems for sustainable production.
- Transformation knowledge:
    - Gain understanding on how to improve communication between SHs as well as the requirements of an appropriate platform to do so.
    - Determine suitable pathways to design and implement formal agreements for the case of a transboundary river basin.
    - Design and implement suitable ways for a coordinated management between the countries.

Based on the conversations during the General Assembly meeting in Tours (Parallel Session 6) from 19-21 September, the following aims will be prioritized over the remaining two years:

- System knowledge:
    - Characterise social, economic, ecological, and institutional contexts associated with regional development planning.
    - Improve understanding of the water quality issues (the status quo and targets).
    - Gain understanding of the river basin management plans between both countries.
- Target knowledge:
    - Determine what set of solutions that balances different sectors by their design and scale of applicability.
    - Knowledge on potential conflicts between the agricultural and ecological sectors.
    - Determine innovative systems for sustainable production.
- Transformation knowledge:
    - Gain understanding on how to improve communication between stakeholders as well as the requirements of an appropriate platform to do so.
    - Determine suitable pathways to design and implement formal agreements for the case of a transboundary river basin.
    - Design and implement suitable ways for a coordinated management between the countries.

Meanwhile, gauging from the desired SHE outcomes, we derived likely aims as seen from the SHs' view:

- Possible system aims:
    - Deepen/improve understanding of the current (state of) WEFE Nexus problems (e.g., river basin management, energy transition, water scarcity) and identify pressures
- Possible target aims:

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  - Determine solutions/systems (and their drivers) that balance sectors for a sustainable production
  - Gain knowledge on potential conflicts between sectors and how to reduce them (e.g., through the use of a common language), moving towards cooperation and trust.

- Possible transformation aims:
  - Develop and implement formal agreements and aligned policies for a coordinated river basin management
  - *(Co-)Design and (co-)validated of NXG tools/platform (e.g., NEPAT, WEFE Footprint), and build capacity (e.g., to use the NXG tools, to transition to renewable energy)*
  - *Identify relevant WEFE Nexus components and indicators*
  - Improve communication between SHs and break silos

The aims are largely aligned with the ones of the CS team. However, there are slightly different 'transformation aims', with SHs likely being more focused on developing specific, tangible tools that can also be used for knowledge transfer to/communication with higher-level SHs. Incidentally, for SHs, 'knowledge transfer' is both a high-priority outcome and one where there is still a large discrepancy between expectations and experience.

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Stakeholder analysis

Stakeholder identification

In the past year the SH register has changed. A total of 93 (instead of 75) Latvian and Lithuanian SHs were identified out of which 30 (31,6%) (instead of 23; 30,75) consented to be officially included in the SH register and participate in the NXG SHE (Table 48~~Table 48~~). In the remainder of the document SHs that consented to be included will be termed 'official stakeholders'.

Table 48: CS2-Lielupe summary information of stakeholder identification as of Sept. 2023

Item	Count 2022	Count 2023
Preliminary listing of stakeholders	75	95
Stakeholders in registered officially	23	30
Percentage of consent [%]	30.7%	31,6%

To move forward with a GDPR compliant SH base the issue of contest was discussed at the General Assembly meeting in Tours from 19-21 September 2023. The following was agreed:

5) Most information on SH is taken from public sources → mark SHs where information was taken from public sources (add a P if taken from public source in the new column B of your CS tab in the SH dashboard)
6) Double check current names and organizations and update SHs and affiliations accordingly. Some SH may have changed jobs, retired, etc.
7) Mark all high power or high interest SH in the register. These are people you most likely may want to keep. Write to them individually and ask them to consent to the PPCF; threaten with removal if needed. Remove them from the register if the information obtained on them is not from public sources.
8) Add new SHs based on the needs outlined in the management plan below. Lay a particular focus on moving from technical SH to more political SH that could help you understand where legislation on the suggested policy packages currently stands. This will help you get into the policy cycle better. Ideally source their contact information from public sources.

The official SHs belong mainly to the water (56.7%) and ecosystems (50%) sectors, followed by the energy (26.7%) and food (10%) sectors (Figure 117~~Figure 117~~). Comparing the proportions with the preliminary listing, the food sector is the only that has reduced its share.

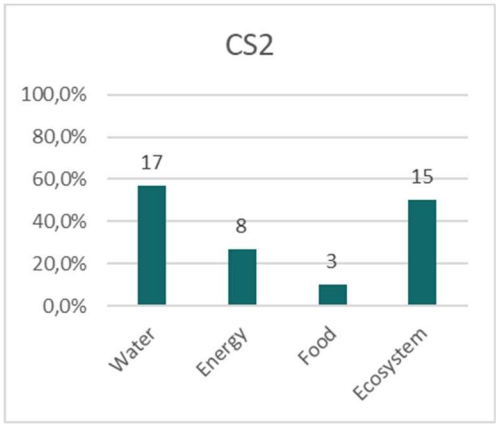

Figure 117: Distribution of stakeholders across the WEFE sectors for CS2 - Lielupe. One stakeholder can be assigned to one or more sectors.

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In terms of gender, there is an almost 40/60 distribution across female and male genders (Figure 118~~Figure 118~~). All SHs provided data about gender.

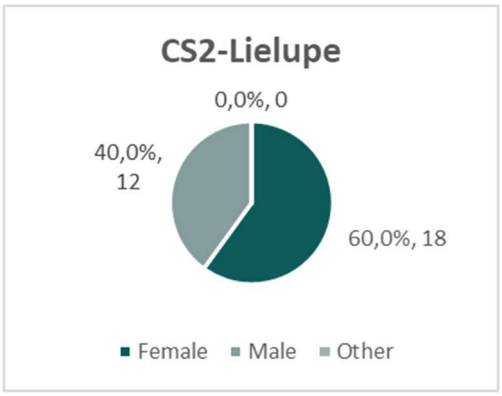

Figure 118: Gender distribution for CS2 – Lielupe

Stakeholder differentiation and categorisation

The official SHs are distributed across tiers as follows in a descending order: tier 2 with 18 SHs; tier 1 with seven SHs; tier 3 with five SHs. This means that SHs are perceived to be more interested in the application of the project's outputs, rather than with their development.

From a Power-Interest perspectives, all consenting SHs were perceived as having rather high interest, except SH-77 and SH-92 (and SH33 and SH53). More than half of them were perceived as low power (Figure 119~~Figure 119~~).

Low interest – High Power actors are completely missing in this register. Emphasis should be laid on seeking out these actors, as they may be able to move the project forward. Particular care should be placed on grooming the 10 high interest – low power actors.

Even though the upper right section of the map should be considered as the key SH group, given the number of SHs, all of them will be considered for a closer engagement, as far as they are interested.

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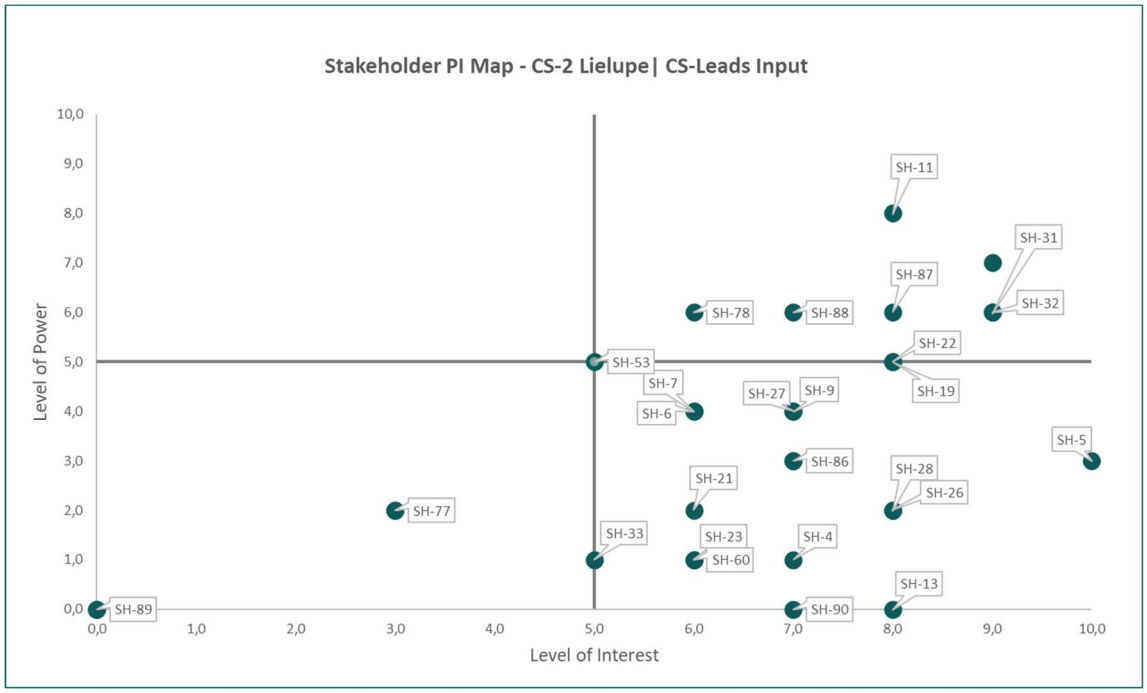

Figure 119: Power-Interest Map for CS2 - Lielupe. based on the CS-Leads' perception; For data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents.

Stakeholder relationships

About the relationships among the official SHs, the CS-Leads characterised – based on their perception – 435 (210 in 2022) relationships. The relationships correspond mainly to the non-existent category (257, 59,1%) followed by complementary (Cm) type, 31,3% and a very low share of cooperation (Cp), 9,7% (Figure 120~~Figure 120~~ and Figure 121~~Figure 121~~). The large number of non-existent relationships is due to the international nature of the transboundary basin. Many SH are coming together in this project that have not had a need to interact before. This is therefore an opportunity to foster new relationships that may become the basis for transboundary cooperation.

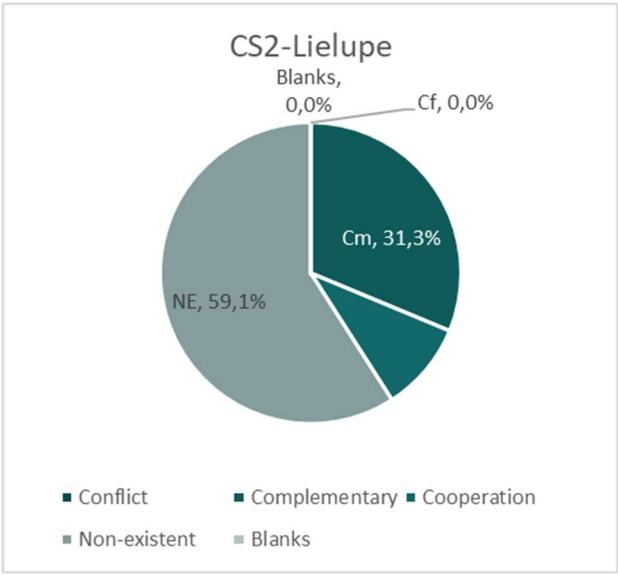

Figure 120: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads.

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SH-ID	SH-4	SH-5	SH-6	SH-7	SH-9	SH-11	SH-13	SH-19	SH-21	SH-22	SH-23	SH-26	SH-27	SH-28	SH-31	SH-32	SH-33	SH-58	SH-77	SH-78	SH-86	SH-60	SH-53	SH-87	SH-88	SH-89	SH-90	SH-91	SH-92	SH-93
SH-4																														
SH-5	CM																													
SH-6	CM	CP																												
SH-7	CM	CP	CP																											
SH-9	CP	CM	CM	CM																										
SH-11	CP	CM	CM	CM	CM																									
SH-13	CM	CM	CM	CM	CM	CM																								
SH-19	CM	CM	CM	CM	CM	CM	CM																							
SH-21	CP	CM	CM	CM	Cm	CP	CM	CM																						
SH-22	CM	CM	CM	CM	CM	CM	CM	CM	CM																					
SH-23	CM	CM	CM	CM	CP	CM	CM	CM	CM	CM																				
SH-26	CM	CM	CM	CM	CM	CM	CM	CP	CM	CM	CP																			
SH-27	CM	CM	CM	CM	CM	CM	CM	CP	CM	CM	CP	CP																		
SH-28	CM	CM	CM	CM	CM	CM	CM	CP	CM	CM	CP	CP	CP																	
SH-31	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CP	CP	CP	CM																
SH-32	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CP	CP	CP	CM	CP															
SH-33	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CP	CP	CP	CM	CP	CP														
SH-58	NE	CM	CM	CM	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE													
SH-77	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CM												
SH-78	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CM	CP											
SH-86	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CP	CP	NE	CP	CP	CP	CM	CM	CM										
SH-60	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE									
SH-53	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE								
SH-87	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CM	CM	CM	CM	NE	NE							
SH-88	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CP	CM	CM	NE	CM	CM	Cm						
SH-89	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CM	NE	NE					
SH-90	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CP	NE	NE	CM	NE				
SH-91	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CP	NE	CM	CM	CM	CM	NE	CP	NE	CM			
SH-92	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CP	NE	NE	NE	CM	NE	NE	CP	NE	CM	CP		
SH-93	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CM	NE	CM	NE	NE	CM	NE	

Figure 121: Actor-Linkage Matrix for CS2-Lielupe. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent.

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Stakeholder engagement plan for the CS2 - Lielupe

The SHE plan (Table 49~~Table 49~~) provides guidance to organise SHE and achieve the SHE aims considering the findings from the SHE evaluation and the updated results of the SH analysis. These results show that:

- The SH list has grown but consent and SH distribution has stayed similar.
- The pool of SHs involves mainly the water and ecosystem sectors with a fair participation of the energy sector and room for increasing the participation of food-related SHs.
- Only a reduced set of key SHs is attending the WSs. These are highly engaged and feel empowered, but WSs aren't reaching a wider audience.
- Consented SHs are largely high interest - low power, often which large technical knowledge but little political power. Moving into this second phase of the project more political actors may be needed to induce the wanted policy changes.
- As new SHs were added to the register more non-existent connections were apparent. This presents an opportunity for connecting actors and fostering new networks that may be needed to foster change.

Overall, the SHs' preferences seem to be aligned with the ones of the CS team. During the last cycle of the SHE plans, the CS leads identified 'navigating differences' as their preferred mode of co-creation. Three of the four SH groups (*national*, *regional*, local, *NGOs/other*) meanwhile identified 'empowering voices' as their preferred mode. These modes are similar, but 'empowering voices' has a significantly higher focus on identifying specific actions that inter alia address the needs of comparatively less powerful SHs.

There is not nearly as large an interest amongst most SHs in 'reframing' as amongst the CS team. This can emanate from two things: Either there is no interest in 'nexus-thinking' or it is already internalized. Rather there is a desire amongst SHs to 'solve problems' by articulating specific implementable actions. To advance implementation, the SHs though see a significant need for 'relationship building', which is a priority the SHs share with the CS team.

Specific things to consider include:

- Provide space for low-power SHs to share their view, even with high-power SHs in the room;
- Ensure that there are actionable outcomes at the end of the process, which can be considered by high-power SHs;
- Try to bring together high-power SHs from both riparian countries, without disregarding opinions of low-power SHs.

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Table 49: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS2-Lielupe.

	Co-exploration	Co-design		Co-development	
	Information	**Consultation**	**Involvement**	**Collaboration**	**Empowerment**
WHO? Stakeholder category	Consented stakeholders are largely high interest - low power, often which large technical knowledge but little political power. Moving into this second phase of the project more political actors may be needed to induce the wanted policy changes	All categories can be consulted for a broader and diverse scope of answers. Care needs to be taken to avoid stakeholder fatigue, in particular in high power – low interest stakeholders. Events (seminars, conferences, working groups, River basin consultative boards) organised by other projects/initiatives could be a good platform where to meet stakeholders, to get their viewpoints and to introduce NXG results.	Provide space for low-power SHs to share their view, even with high-power SHs in the room. It is important that high-level decision makers are made aware of the project and are on board with taking up identified solutions into policies	Ensure that there are actionable outcomes at the end of the process, which can be considered by high-power stakeholders; 'reframing' (i.e. the deeper questioning of what problems and legitimate solutions are) is only desired by local SHs. Therefore, this could be made less of a focus, so that energy is rather channelled toward formulating specific actions.	Try to bring together high-power stakeholders from both riparian countries, without disregarding opinions of low-power SHs
WHY? PI and ALM	All quadrants of the PI map necessitate being informed with a particular emphasis on the low power – high interest category with the intent of empowering them and reaching out to low power –	Consultation of high power – low interest stakeholders needs to be targeted to their interest with the aim of maintaining their interest. Similarly, low power – high interest stakeholders should be consulted in their area of expertise and interest with	Involvement of high power – high interest stakeholders is relevant for the discussion and the involvement of high power – low interest stakeholder should be sought. The engaging low power – high interest stakeholders in	Collaboration between stakeholders that are identified as cooperation should be fostered, while non-existent relationships should be provided with a space to create cooperation. Conflicting relationships may need to be resolved in individual	Given the PI Map, most stakeholders, should be included in these activities, as they are mainly low power; but also involving high power stakeholders in the empowerment activities can help validating the process and support a sustainment of the

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	Co-exploration	Co-design		Co-development	
	low interest stakeholders with the intent of increasing their interest.	the aim of empowering them.	discussion and exchange with other stakeholders is a good way to start paving towards empowerment.	spaces under professional mediation.	empowerment after the duration of the project. Therefore, it is important to keep the interest of high power stakeholders.
HOW? Activities	Think of incentives that might increase the interest of marginalized, low interest stakeholders such as invitations to events, highlighting research results of interest to them or providing them with free access to results and findings. Share as much scientific evidence with the SH as possible (even if they may not understand the scientific papers).	Show results of the modelling and specific biophysical and socio-economic results. Show at each WS which advancements/decisions were made based on the stakeholders' inputs (feedback to the feedback or acknowledging their inputs).	Plan activities to share the outputs of the provided feedback and discuss about it. Consider organizing a high-power event for (political) SH from both countries to allow for awareness raising on the Nexus and floating the idea of an inter-ministerial cross-country working group.	WSs – activities to co-decide features and design of the tools (WS2 to WS6), focus groups (within or in between WS2 and WS3), role activities to build trust. 1-on-1 activities to bring in marginalized current low-interest or uninformed stakeholders.	Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations). So that the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded stakeholders. Frequent smaller conversations of transnational peer stakeholders may need to happen to allow for recognition of peers and for technical discussions about transboundary solutions (e.g., ecological low flows, abstraction needs, conservation measures, etc.). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.

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Management and sustainment

Management

CS-Leads should not forget checking the expectations written by the official SHs in the Privacy Policy Consent Form.

The initial management plan considered different foci per year**.** The table below looks at how these were accomplished and what to change based on the findings of the past year.

Foci	From 2022 Plan	2023 Plan
2023	Look to increase the interest of other stakeholders while maintaining the interest of current high interest stakeholders. Focusing away from high interest stakeholders may allow discovering missing marginalised stakeholders.	While the stakeholder register was expanded, the distribution remained the same as in 2022.Mostly high-interest stakeholders are present in the current SH register.
2024	Maintain the interest of the engaged stakeholders and focus on the relationships between them, including power dynamics and building trust to enhance collaboration.	The results from the survey point to the need of further expanding towards high power stakeholders that have true political power (rather than technical expertise), to achieve meaningful change. The vast number of non-existent relationships between the current actor base presents an opportunity for the creation of new networks focusing on knowledge transfer for improved process quality and processes for policy uptake. At the same time, the current base of key stakeholder should be CONSULTED in the development of the 2023/2024 WSs and their agendas. This is particularly important when it comes to the knowledge generation for biophysical and socio-economic systems. Share as much scientific evidence with the SH as possible (even if they may not understand the scientific papers). Events (seminars, conferences, working groups, River basin consultative boards) organised by other projects/initiatives could be a good platform where to meet stakeholders, to get their viewpoints and to introduce NXG results. Consider organizing a high-power event for (political) SH from both countries to allow for awareness raising on the Nexus and floating the idea of an inter-ministerial cross-country working group.
2025	Focus on co-decision activities and further planning on sustainment of stakeholders as well as on the defined agreements.	Stay focused on providing evidence base and the results from the research. This is your largest asset.

Leading a stakeholder engagement process through a co-creation mode of “Navigating differences”, focused on relating together, reframing problems, and shaping systemic agency, while producing knowledge provides several opportunities, but is also linked to some risks.

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Table 50~~Table 50~~ provides details of the opportunities and risks associated to the high-scoring approaches (Figure 115~~Figure 115~~) and also linked to the co-creation Mode 5 "Navigating differences".

Considering the recommendations derived from the SHs' likely desired outcomes and desired co-creation approaches, it is advisable to particularly look out for the following risks:

- ➔ Focusing on dialogue and falling into inaction;
- ➔ Inhibiting the development of concrete actions;
- ➔ Focusing on reframing only without triggering effective shifts in policies and practices; and,
- ➔ If power dynamics are not properly managed, cooperation and consensus can result from subjugation of less powerful views and SHs.

Table 50: Overview of opportunities and risk linked to Mode 5 "Navigating differences" and the approaches that ranked higher in CS2-Lielupe. Based on Chambers et al. (2021).

Approach	Opportunity	Risk
Produce knowledge	The focus on knowledge production and transfer, can help in advocating for policy changes, building capacity, and addressing specific CS's needs. For instance, production and transfer on pressures in the WEFE sectors or data for model development.	- Echoing knowledge to create specific impacts. - Scientific knowledge overshadowing expertise and other ideas. - Focusing on budgeted activities only disregarding the pursuit of emerging goals.
Shape systemic agency	Additional focus on shaping systemic agency can shift co-creation views towards more creativity and transformative outputs. For CS2-Lielupe, these shifts should focus on coordination across stakeholders, including improving communication and providing a platform for dialogue.	- Having the feeling that the problem "is too big to handle" that creates a feeling of disempowerment. - Forgetting psychological aspects of changes in power (e.g., anxiety of losing power). - Forgetting identity conflicts and power differentials, resulting in echoing chambers of current dynamic. - Focusing on dialogue and falling into inaction.
Reframe problems	Reframing problems as well as relating together offers the opportunity of building legitimate and flexible processes for tangible changes in perspectives, networks and policies and practices. Which in this case should involve less powerful actors and foster relationships and coordination between Latvian and Lithuanian stakeholders.	- Low engagement of action/solution-oriented stakeholders. - Inhibiting the development of concrete actions. - Focusing on reframing only without triggering effective shifts in policies and practices. - Early emphasis on differences inhibits finding a common ground.
Relate together		- If power dynamics are not properly managed, cooperation and consensus can result from subjugation of less powerful views and stakeholders. - If individual voluntary contributions are not valued properly, social inequalities may rise.

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Sustainment

Starting the session on SH involvement, a presentation on "SHE process and SH landscape in the Lielupe CS was presented by WP5 team (Tamara Avellan, AVA and Simon Ryfisch, Uppsala University). The presentation was followed by interactive discussion on how SHs would wish to continue the cooperation:

- Participants confirmed their interest to participate at the events and willingness for cooperation although there should be someone who initiates, leads, and facilitates the cooperation process e.g., organising joint events, etc.
- Local action groups could help to sustain such cooperation – as being most interested in gathering all relevant parties at a round table (such experience comes from the LIFE IP GoodWAter project). Cooperation can continue in frame of follow-up projects.
- Signing of an official after-project cooperation agreement on a regional level on exact responsibilities and commitments might be problematic from administrative perspective.
- A business representative from Latvia admitted the benefit of having Zemgale Planning Region that informs SH on various projects and initiatives that might have an impact on further business development, thus it is important for them to take part in such events.
- SH in Lithuania also admitted their interest in cooperation with SH in Latvia (there are joint working groups with Poland established) – there could be a working group or a committee coming together once a quarter or once a year.
- SH in Latvia reflected that water quality issues need to be brought up on a higher agenda in Lithuania to trigger the cooperation in real life and improve the water quality in the whole Lielupe River basin.
- Cooperation on expert level is not enough, there should be a political will to take a decision for cooperation. River basin management plan is elaborated and approved by the Ministry of Environment and not by the government, thus the political influence of this plan is rather low.
- At local level maintenance of cooperation is hindered by scarce resources allocated for such activities. Funding should be allocated for such cooperation activities. It would be good to start with cross-border joint planning of activities especially when elaborating local /regional development plans to coordinate actions for the whole river basin. There are transboundary cooperation examples available e.g., in South Africa there is a cooperation established – river basin commission at ministerial level for a transboundary river basin between *Malawi–Tanzania. In South America. Cooperation could be stimulated if the issue on transboundary pollution is actualised, as it has been in Uruguay* and *Argentina because of a court case related to installation of paper-pulp production mills.*
- *In Europe cooperation between countries can be stimulated if an infringement procedure has been started by the European commission against Member States. It is recommended that cross-ministerial working groups are established for dealing with issues related to water management and transboundary cooperation.*
- There is a need to identify a specific committee/body to take up the issue. Otherwise we need a mandate from the Ministry to carry on with activities.

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CS3: Jiu

The SHE plan is based on the data, information and perceptions provided and analysed by the CS-Leads, the CS SHs and the AVA- and UU-Team by August/September 2023. The plan is updated on a yearly basis taking new SH information and evaluation results into account to allow for adaptive management.

Evaluation

An initial evaluation approach that had been set up was not yielding sufficient results to provide meaningful insight into the SHE process. Thus, towards the end of 2022 and early 2023 a new strategy was developed between AVA, UU and the CS-leads with the aim of assessing:

- The quality of the process (the delivery of the plan)
- The quality of the outcome of the process (the results of the plan = i.e. fulfilling the aims)
- The intention of the quality vs the perception of the quality (at both levels above)

This resulted in a revised survey (see Annex) which was translated into the respective local languages, and a WS activity at the 3rd WS which showcased the SH landscape to the SHs and asked these to reflect on the modes of co-creation by Chambers et al. 2021. For the Jiu case, the 3rd WS was held in the River Basin Administration Jiu, Craiova and online, on 23 May 2023 where 21 SHs attended. The third NXG WS in the CS Jiu aimed to update the SH on project progress with focus on sharing CS specific information and consolidating SHE by direct involvement in the validation of the governance and policy coherence assessments, the inventory of relevant policy instruments for the CS context as well as getting their direct input for the preliminary modelling of WEFE interlinkages performed by NXG team. The SHs targeted by invitation to the WS where generally the tier 1 and tier 2 SH in the NXG register, including but not restricting to the ones that had consented being placed in the NXG SH register aiming at using the opportunity to involve and commit additional parties to WEFE dialogue and the NXG processes.

Results from the SH survey

Overall, SHs are very satisfied with the process quality and the process outcomes. Participants trust the outcomes of NXG as it is based on science. Of the 21 participants at this WS 13 filled in the survey.

(1) Most respondents were female (11), two were male – this is an unusual gender balance favoring women. One respondent chose not to disclose their SH background. There was representation from all WEFE sectors and from policy makers at local and national level. Respondents were from Romania, with two from other non-NXG countries. The larger share of respondents had more than 20 years of experience (7).

(2) In general, respondents felt better engaged at the WS level than at the project level (light bars higher than dark bars) (Figure 122~~Figure 122~~). However, overall respondents felt very well engaged (responses higher than 5 on average). Responses for co-development were generally lower which is to be expected since little activities were undertaken to engage SHs to that degree. It is interesting to note that although

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the project did not undertake significant efforts to co-develop the project with SHs these still have a rather high perception of engagement at that level.

(3) Overall, participants rate all outcomes as highly important (average above 5) with outcomes such as institution building, social equitability, networks and policy uptake ranking the lowest, and knowledge production, knowledge development, process learning, process quality and reframing ranking the highest (Figure 123~~Figure 123~~). However, the results also show that expectations aren't necessarily met by the project as of yet. Differences are particularly high in management practices, policy uptake and reframing. Expectations are more than met for knowledge production (well done!).

(4) In general, participants indicated to have acquired high levels of knowledge in all areas (average above 5) (also congruent with their statement above about knowledge co-creation) (Figure 124~~Figure 124~~). Most knowledge seems to have been acquired in the dimension of target knowledge (yellow bars, average of 5.96) and herein on the WEFE-Nexus interlinkage and the SHs. Understanding of the socio-economic system and policies was low in all three knowledge areas. Transformational knowledge (green bars, average 5.56) was less than system knowledge (blue bars, average 5.79) and lowest overall which is to be expected, as transformational knowledge is usually the hardest to be understood and acquired.

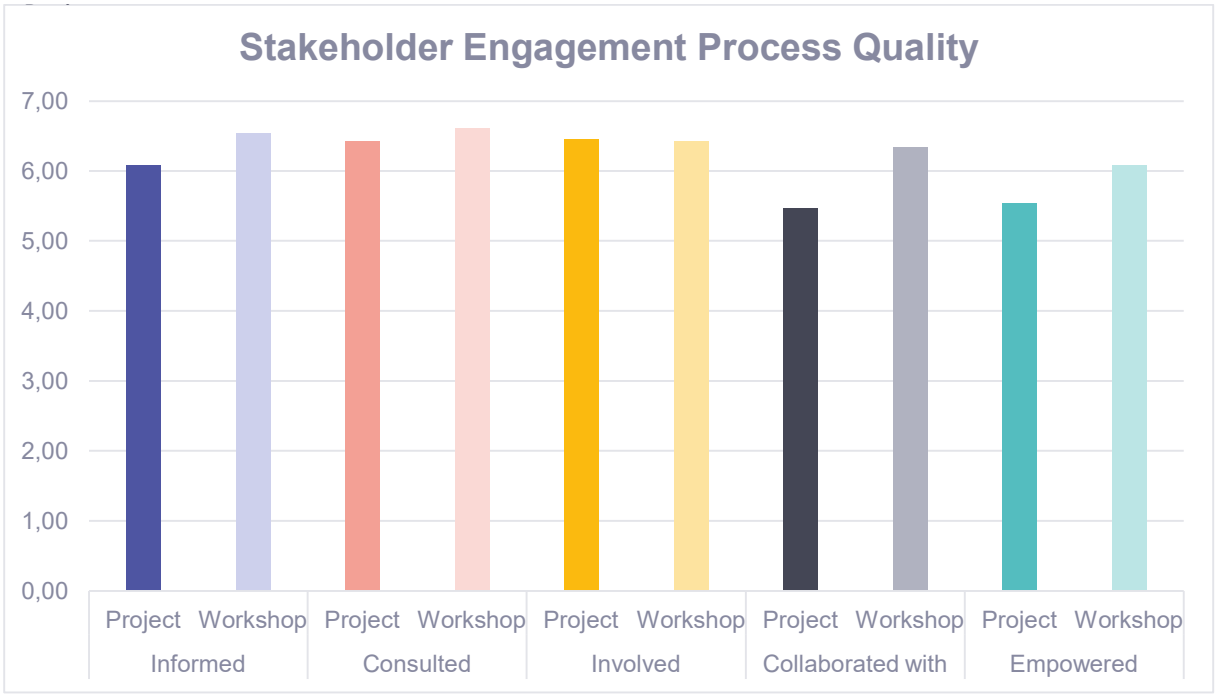

Figure 122: Degree of perceived engagement by WS3 participants in the project (dark bars) and the workshop (light bars)

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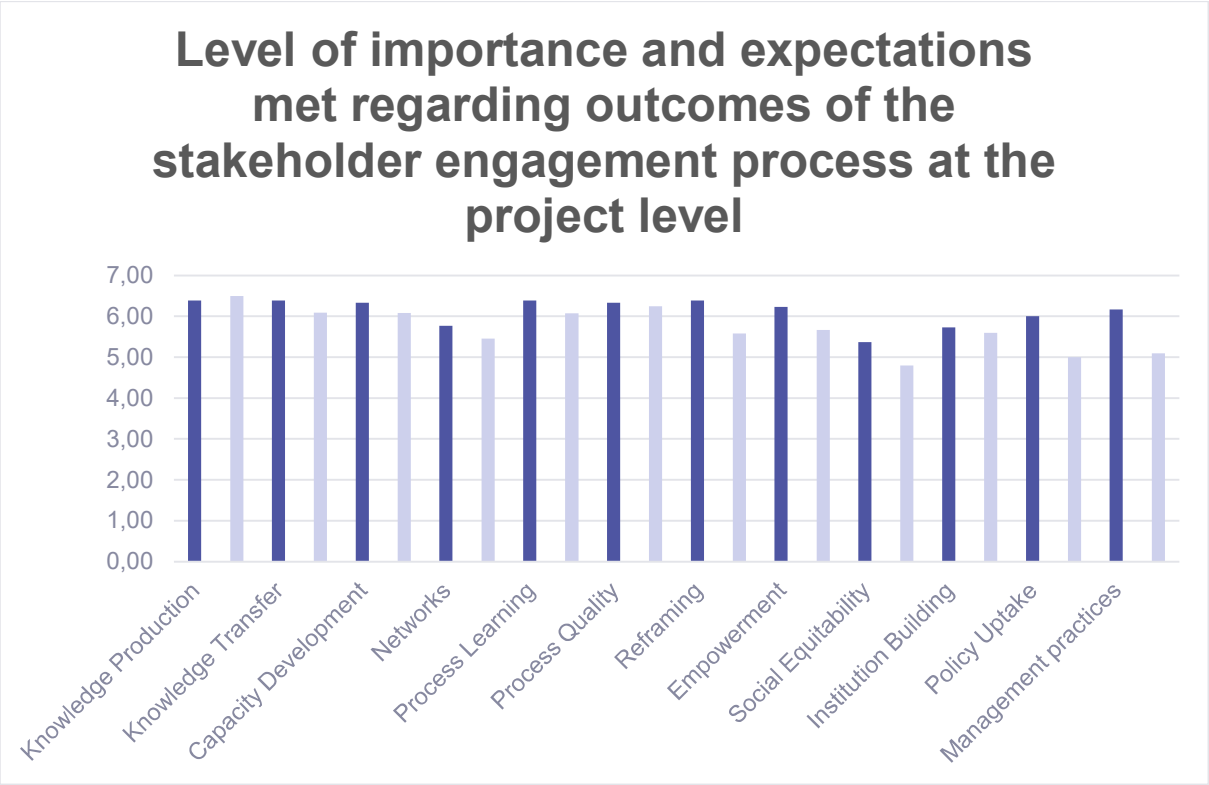

Figure 123: Level of importance and expectations per outcomes of the SHE process at WS3.

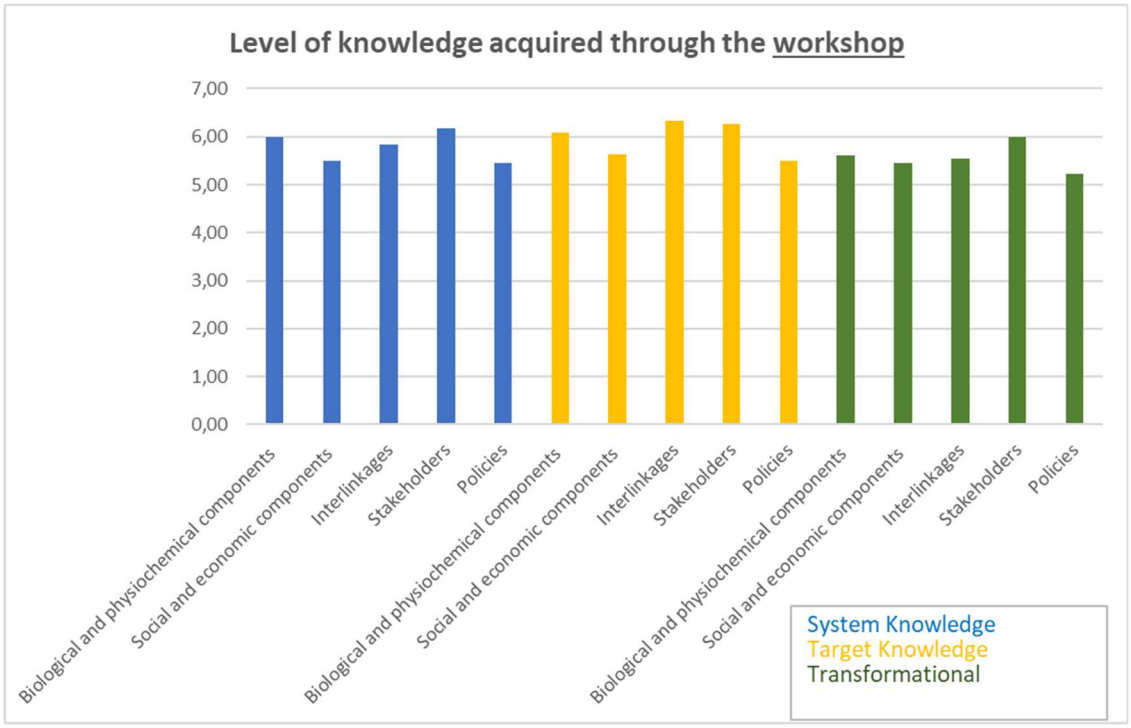

Figure 124: Knowledge generated in WS3 in different NXG areas.

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The main recommendations drawn from the results for SHE are:

- ➔ Check if gender imbalance towards women is indicating a lack in powerful actors or if this is due to the historic legacy of communist era (it looks like the latter, since most SH have longstanding experience).
- ➔ Continue the ways in which the CS lead is communicating and engaging the SHs. The results indicate that SHs are very satisfied with the chosen engagement strategies.
- ➔ Find better ways for transferring tools for reframing since it seems to be important to SHs, but their expectations are not being met. Reframing may be particularly interesting to be done for policy uptake and management practices.
- ➔ Provide SH with system knowledge, i.e. providing them with easily understandable results of the (biophysical and) socio-economic modelling and what this means to the WEFE Nexus and particularly to policies.
  Focus on transformation knowledge to help SH reframe and target policy uptake and management practices (see above).
  Specifically invite and target the SHs mentioned at the end of the survey (county level representatives, national authorities, regional development entities, etc.).

Desired mode of co-creation

At the end of a session focused on the SH landscape and SHE at the third WS, a plenary discussion was held on the approaches to co-creation that together yield the modes of co-creation (see Chambers et al. 2021). For this purpose, the approaches to co-creation (that together yield the modes of co-creation, depending on the emphasis put on each approach) were briefly introduced as well as common risks and opportunities associated with them. Afterwards, SHs were encouraged to reflect on which degree of focus on the respective approaches is suitable for their CS. These modalities for the WS activity were chosen in response to previous experiences gathered throughout the evaluation process, which indicated that SHs were overwhelmed by being surveyed in written form on the original set of statements in the framework by Chambers et al. (2021).

The WS minutes, and in particular the comments from SHs in the session on the desired approaches to co-creation were scored along the respective scales of the approaches to co-creation, as per the framework by Chambers et al. (2021). The values yield one clear mode of co-creation, namely '**Brokering Power**' (Figure 125~~Figure 125~~).

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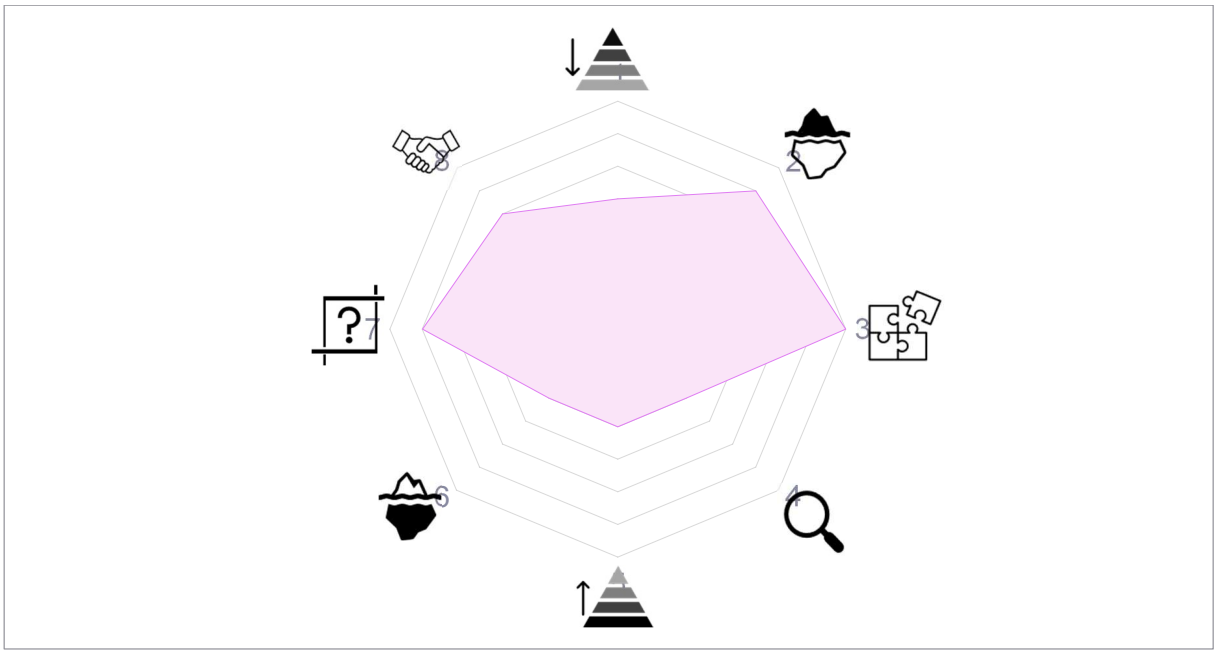

Figure 125**:** SH perspective on the desired approaches to co-creation – together yielding the mode 'Brokering Power'. *Legend (in clockwise order from the top): 1) Influence powerful actors; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together*

The SHs desire a strong involvement of powerful and high-level SHs in the co-creation process. Similar co-creation processes with this mode have in the past tried to lobby powerful SHs with a synthesis of acquired knowledge, working with them toward specific actions. Therefore, it may be useful to continue with the work of building connections with higher level SHs and trying to find pathways to integrate the results into ongoing policy processes. Also, it may be helpful to use the remaining WSs on more strategic discussion with high-level SHs on how to integrate the WEFE sectors and their policies with each other, also in light of NXG results.

Importantly, an exclusive focus on engaging powerful SHs can further marginalise less powerful SHs. Therefore, it is to also be mindful of the interests of less powerful SHs.

Specific recommendations for SHE are therefore:

- ➔ Lobby powerful SHs with a synthesis of acquired knowledge, working with them toward specific actions. It has proven effective to focus on one particular issue where there is shared interest amongst SHs, and then formulate actions to address it.
- ➔ Possibly shift focus at the remaining WSs, focusing on how NXG results can be specifically fed into the policy-making process.

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Stakeholder engagement aim

To actively involve SHs and facilitate their engagement in co-creation and validation of a NEXUS WEFE approach to support improved policymaking for water management and sustainable development primarily focused on Jiu basin, while also assessing relevant interactions within the Lower Danube region. Additionally, we aim to promote CS results as a trustful and solid reference at a national level in Romania and in the region (in dialogue with other CS in NXG and sister projects under H2020-LC-CLA-2020-2, e.g., Rexus, GoNexus), for identifying common interests, potential conflicts, and areas of compromise between different profiles SHs in diverse economic and biodiversity contexts. Furthermore, we aim to contribute to dissemination of project results at various levels facilitating their effective use in assessment processes for water use requirements, evaluation of the vulnerabilities of current water systems and improved strategies and action plans towards achieving EU targets related to WEFE sectors (WFD, CAP, Green Deal, etc).

In the past year, the Jiu CS saw the varying engagement of SHs and a clear call for the inclusion of further SHs. Suggestions for other SH were provided during the 3rd WS as well as through the survey that was administered then. Below are the responses from the SHs on further SHs to involve:

- Decisional SHs - from Prefect Institutions and Municipalities from the project region
- County Councils Dolj, and Gorj
- Faculties from Dolj an Gorj counties that includes Environment in the curricula
- Ministry of Environment, Waters and Forests
- "Organization of water users (OUAI)
- ANIF (National Agency for Land Improvement) - discussions about irrigation systems"
- Representatives if the ministries (Ministry of Environment, Waters and Forests, Ministry of Agriculture and Rural Development, Ministry of Energy)
- Ministry of Environment, Waters and Forests - it is the authority responsible for elaboration of policies and regulations in this sector
- Local authorities. Especially in the rural area they could raise a high interest
- Regional Development Agencies. I think that they are relevant because the finance projects which should be based on respecting WFE interlinkages.

Involvement of SHs in the work of the Jiu CS is of pivotal importance. In the case of NXG project and the Jiu CS, the aims of SHs' engagement are the following:

System knowledge:

  - Current state of the social, economic, institutional, and ecologic contexts that are relevant for a WEFE Nexus approach.
  - Increase understanding of the institutional and organisational structure, functions, and information flows.
  - Explore aspects related to the clean energy transition that are relevant to address for the WEFE Nexus in the region.
  - Understand existing conflicting actions and strategies regarding WEFE Nexus.
- Target knowledge:

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  - Determine the appropriate level of public awareness of water as a depleting resources.
  - Determine expectations and requirements for an assessment and planning instrument including interface for communication and reporting instrument.
  - Build towards a common language to facilitate stakeholders' understanding of WEFE Nexus paving the reduction of the potential conflicts.
- Transformation knowledge:
  - Determine pathways to enhance awareness of water resources and its management.
  - Gain understanding on how to break silos based on an integrated view of the reality in the local context.
  - Tailor the design of the NXG platform to support communication and reporting of the status of water resources among stakeholders.
  - Build capacity and identify/select relevant indicators for monitoring WEFE Nexus in connection with strategic objectives for water management and sustainable development.

Based on the conversations during the General Assembly meeting in Tours (Parallel Session 6) from 19-21 September, the following aims will be prioritized over the remaining two years:

System knowledge:

  - Current state of the social, economic, institutional, and ecologic contexts that are relevant for a WEFE Nexus approach.
  - Increase understanding of the institutional and organisational structure, functions, and information flows.
  - Explore aspects related to the clean energy transition that are relevant to address for the WEFE Nexus in the region.
  - Understand existing conflicting actions and strategies regarding WEFE Nexus.
- Target knowledge:
  - Determine the appropriate level of public awareness of water as a depleting resources.
  - Determine expectations and requirements for an assessment and planning instrument including interface for communication and reporting instrument.
  - Build towards a common language to facilitate stakeholders' understanding of WEFE Nexus paving the reduction of the potential conflicts.
- Transformation knowledge:
  - Determine pathways to enhance awareness of water resources and its management.
  - Gain understanding on how to break silos based on an integrated view of the reality in the local context.
  - Tailor the design of the NXG platform to support communication and reporting of the status of water resources among stakeholders.
  - Build capacity and identify/select relevant indicators for monitoring WEFE Nexus in connection with strategic objectives for water management and sustainable development.

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Meanwhile, gauging from the desired SHE outcomes, we derived likely aims as seen from the SHs' view:

- Possible system aims:
  - Deepen/improve understanding of the current (state of) WEFE Nexus problems (e.g., river basin management, energy transition, water scarcity) and identify pressures
  - Gain/increase understanding of the institutional, organisational and political context and (current) river basin management plans (including neighbouring countries)
  - *Get data for model development*
- Possible target aims:
  - Know about future expectations/perspectives (in general and for assessment tools)
  - *Determine solutions/systems (and their drivers) that balance sectors for a sustainable production*
  - *Gain knowledge on potential conflicts between sectors and how to reduce them (e.g., through the use of a common language), moving towards cooperation and trust.*
  - Awareness of water as a depleting resource
- Possible transformation aims:
  - Design of pathways to enhance awareness of (water) resources management
  - (Co-)Design and (co-)validated of NXG tools/platform (e.g., NEPAT, WEFE Footprint), and build capacity (e.g., to use the NXG tools, to transition to renewable energy)
  - Identify relevant WEFE Nexus components and indicators
  - Improve communication between SHs and break silos

The SHs' aims for the engagement process are likely aligned with the ones of the CS-leads. However, SHs rate 'reframing' (i.e. changed beliefs/priorities of SHs) as an important outcome, but the CS is not meeting the SHs' expectations in this regard, yet. Therefore, there might be a risk to not fulfil the aims pertaining to changing awareness and the way policies are made (e.g., breaking down silos).

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Stakeholder analysis

Stakeholder identification

In the past year the SH register has changed. A total of 108 (instead of 94 in 2022) Romanian SHs were identified out of which 34 (31.5%) (instead of 25; 26,6%) consented to be officially included in the SH register and participate in the NXG SHE (Table 51). In the remainder of the document SHs that consented to be included will be termed 'official stakeholders'.

Table 51: CS3-Jiu summary information of stakeholder identification as of Sept. 2022

Item	Count 2022	Count 2023
Preliminary listing of stakeholders	94	108
Stakeholders in registered officially	25	34
Percentage of consent [%]	26.6%	25.0%

To move forward with a GDPR compliant SH base the issue of contest was discussed at the General Assembly meeting in Tours from 19-21 September 2023. The following was agreed:

9) Most information on SH is taken from public sources → mark SHs where information was taken from public sources (add a P if taken from public source in the new column B of your CS tab in the SH dashboard)
10) Double check current names and organizations and update SHs and affiliations accordingly. Some SH may have changed jobs, retired, etc.
11) Mark all high power or high interest SH in the register. These are people you most likely may want to keep. Write to them individually and ask them to consent to the PPCF; threaten with removal if needed. Remove them from the register if the information obtained on them is not from public sources.
12) Add new SHs based on the needs outlined in the management plan below. Lay a particular focus on moving from technical SH to more political SH that could help you understand where legislation on the suggested policy packages currently stands. This will help you get into the policy cycle better. Ideally source their contact information from public sources.

Not all SHs belong to one WEFE sector, some SHs belong to other sectors (e.g., civil society, policy makers at national level) and not all of them were differentiated. Across the differentiated ones, there is a rather even distribution of the SHs across the WEFE sectors (Figure 126). Comparing the proportions with the preliminary listing, the food sector is the only that has reduced its share.

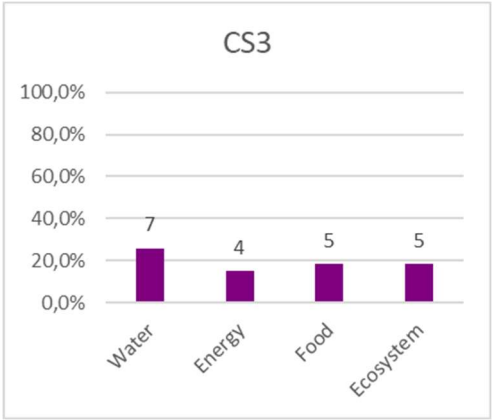

Figure 126: Distribution of stakeholders across the WEFE sectors for CS3 - Jiu. One stakeholder can be assigned to one or more sectors.

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In terms of gender, there is a 60/40 distribution across female and male genders (Figure 127). All SHs provided data about gender.

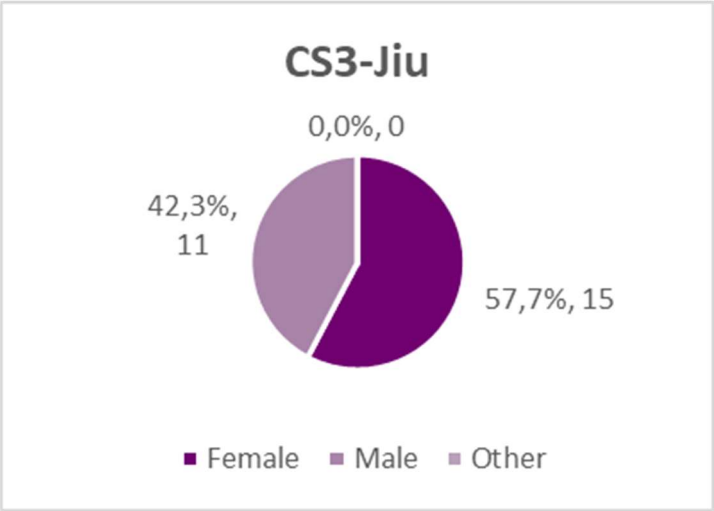

Figure 127: Gender distribution for CS3 – Jiu

Stakeholder differentiation and categorisation

The 27 official SHs belong mainly to tier 2. This means that SHs are perceived to be more interested in the application of the project's outputs, rather than with their development.

Additionally, these SHs were categorised mainly as "5. Agricultural authorities and representatives", "4. Policy makers at national level", and energy (category 6) and river basin (category 8) authorities and representatives (Figure 128). This also reflects a rather balanced distribution of the SHs across the WEFE sectors.

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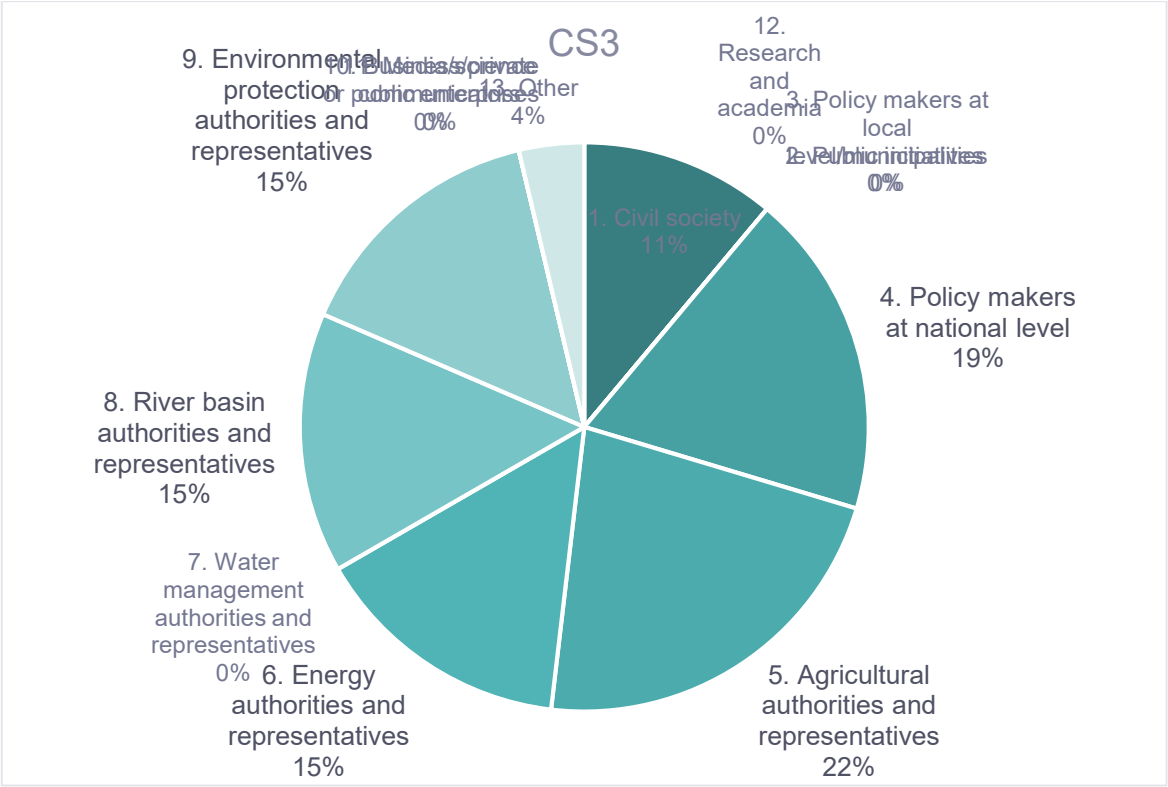

Figure 128: Distribution of stakeholders across categories for the case CS3 - Jiu.

From a Power-Interest perspectives, most, except one SH, were perceived as high interest SH with being HI-HP SH (72,7%) (Figure 129). Thus, few low interest SH were added in the past year and the challenge of targeting LI-HP SH remain, as these are most likely SHs that are difficult to reach.

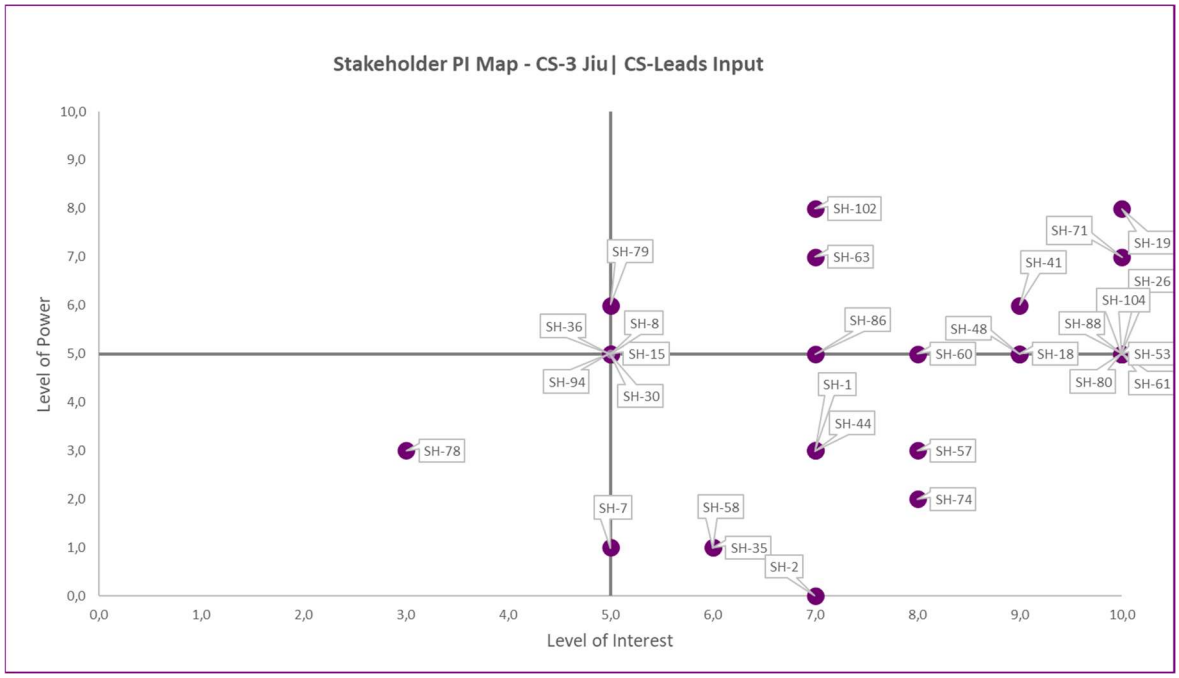

Figure 129: Power-Interest Map for CS3 - Jiu. Above: based on the CS-Leads' perception. For data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents.

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Stakeholder relationships

About the relationships among the SHs, the CS-Leads characterised – based on their perception – 561 relationships across the 34 SHs. The relationships correspond mainly to the cooperative (Cp) type, 48.5%, followed by complementary (Cm) relationships among SHs (36.9%), and a significant but reduced relative share of conflicts (Cf), 14.6% (Figure 130 and Figure 131). In contrast to other CS, there are no non-existent relationships amongst the SH identified in the case. Thus, either the selection of SHs is too narrow or the Romanian SH base is already more accustomed to working across silos.

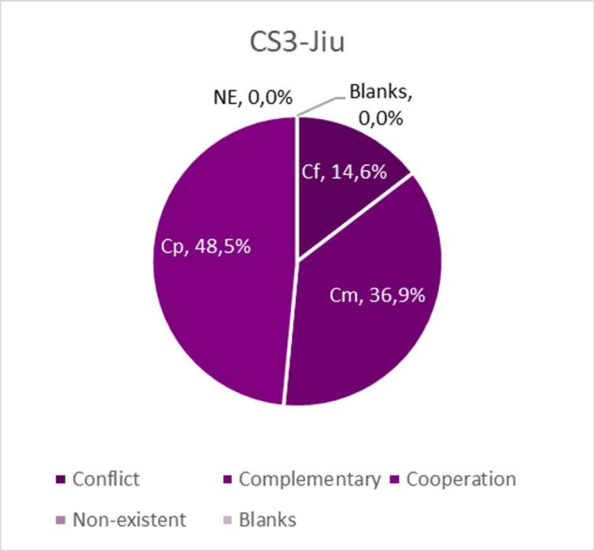

Figure 130: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads.

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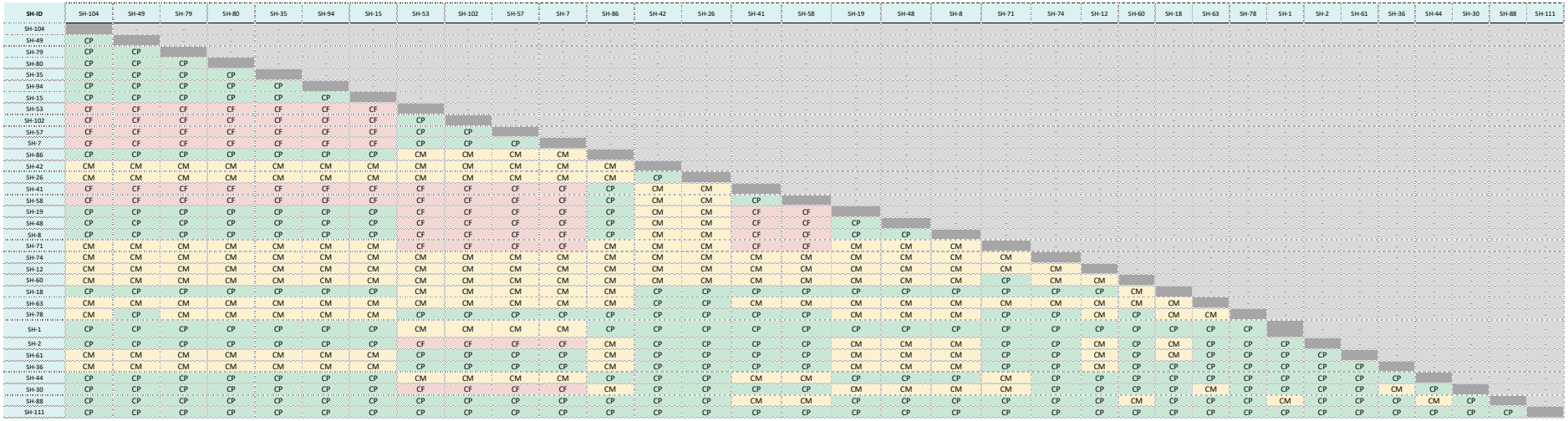

SH-ID	SH-104	SH-49	SH-79	SH-80	SH-35	SH-94	SH-15	SH-53	SH-102	SH-57	SH-7	SH-86	SH-42	SH-26	SH-41	SH-58	SH-19	SH-48	SH-8	SH-71	SH-74	SH-12	SH-60	SH-18	SH-63	SH-78	SH-1	SH-2	SH-61	SH-36	SH-44	SH-30	SH-88	SH-111
SH-104		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-49	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-79	CP	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-80	CP	CP	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-35	CP	CP	CP	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-94	CP	CP	CP	CP	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-15	CP	CP	CP	CP	CP	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-53	CF	CF	CF	CF	CF	CF	CF		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-102	CF	CF	CF	CF	CF	CF	CF	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-57	CF	CF	CF	CF	CF	CF	CF	CP	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-7	CF	CF	CF	CF	CF	CF	CF	CP	CP	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-86	CP	CP	CP	CP	CP	CP	CP	CM	CM	CM	CM		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-42	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-26	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-41	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF	CP	CM	CM		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-58	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF	CP	CM	CM	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-19	CP	CP	CP	CP	CP	CP	CP	CF	CF	CF	CF	CP	CM	CM	CF	CF		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-48	CP	CP	CP	CP	CP	CP	CP	CF	CF	CF	CF	CP	CM	CM	CF	CF	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-8	CP	CP	CP	CP	CP	CP	CP	CF	CF	CF	CF	CP	CM	CM	CF	CF	CP	CP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-71	CM	CM	CM	CM	CM	CM	CM	CF	CF	CF	CF	CM	CM	CM	CF	CF	CM	CM	CM		-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-74	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM		-	-	-	-	-	-	-	-	-	-	-	-	-
SH-12	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM		-	-	-	-	-	-	-	-	-	-	-	-
SH-60	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CP	CM	CM		-	-	-	-	-	-	-	-	-	-	-
SH-18	CP	CP	CP	CP	CP	CP	CP	CM	CM	CM	CM	CM	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CM		-	-	-	-	-	-	-	-	-	-
SH-63	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CP	CP	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM		-	-	-	-	-	-	-	-	-
SH-78	CM	CP	CM	CM	CM	CM	CM	CP	CP	CP	CP	CP	CP	CP	CP	CP	CM	CM	CM	CP	CP	CM	CP	CM	CM		-	-	-	-	-	-	-	-
SH-1	CP	CP	CP	CP	CP	CP	CP	CM	CM	CM	CM	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP		-	-	-	-	-	-	-
SH-2	CP	CP	CP	CP	CP	CP	CP	CF	CF	CF	CF	CM	CP	CP	CP	CP	CM	CM	CM	CP	CP	CM	CP	CM	CP	CP	CP		-	-	-	-	-	-
SH-61	CM	CM	CM	CM	CM	CM	CM	CP	CP	CP	CP	CM	CP	CP	CP	CP	CM	CM	CM	CP	CP	CM	CP	CM	CP	CP	CP	CP		-	-	-	-	-
SH-36	CM	CM	CM	CM	CM	CM	CM	CP	CP	CP	CP	CM	CP	CP	CP	CP	CM	CM	CM	CP	CP	CM	CP	CP	CP	CP	CP	CP	CP		-	-	-	-
SH-44	CP	CP	CP	CP	CP	CP	CP	CM	CM	CM	CM	CP	CP	CP	CM	CM	CP	CP	CP	CM	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP		-	-	-
SH-30	CP	CP	CP	CP	CP	CP	CP	CF	CF	CF	CF	CM	CP	CP	CP	CP	CM	CM	CM	CM	CP	CP	CP	CP	CM	CP	CP	CP	CP	CM	CP		-	-
SH-88	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CM	CM	CP	CP	CP	CP	CP	CP	CM	CP	CP	CP	CM	CP	CP	CP	CM	CP		-
SH-111	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	CP	

Figure 131: Actor-Linkage Matrix for CS3-Jiu. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent.

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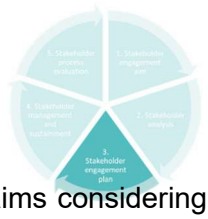

Stakeholder engagement plan for CS3 – Jiu

The SHE plan provides a guidance to organise SHE and achieve the SHE aims considering the findings from the SHE evaluation and the updated results of the SH analysis. These results show that:

- There continues to be a balanced distribution across WEFE sectors.
- Gender distribution is rather balanced with a slant towards more women.
- The distribution across Tiers and categories has stayed largely the same.
- No significant changes were made in the power/interest distribution or across the relationships between actors.

After consideration of the aims, the analysis results, and the CS-Leads' overview of the context, the CS-leads identified "**Researching solutions**" as their fitting mode of co-creation. This mode focuses on the co-creation of knowledge to inform evidence-based decision-making, influencing policies and interventions (Chambers et al., 2021[1]). For a stronger impact, this mode of co-creation should be supported by an environment that fosters SHs to work on their relationships and questions current practices to adapt to policy changes (ibid.).

It is important to mention that there is one outlier compared to the usual mode of 'researching solutions': CS3-Jiu presents a greater ambition on reframing problems. This might be due to the use of the nexus approach to face the management within the WEFE sectors in the Jiu River Basin, which inherently reframes current management ideas and practices.

The focus on knowledge co-creation shapes the eight co-creation approaches to support the achievement of the SHE aims of CS3 (Figure 132: CS3-Jiu scoring for co-creation approaches~~Figure 132: CS3-Jiu scoring for co-creation approaches~~) and leads the plan across all phases of SHE (information to empowerment) for CS3-Jiu as presented below (Table 52).

[1] Chambers, Josephine M., C. Wyborn, M.E. Ryan, R.S. Reid, M. Riechers, A. Serban, N.J. Bennett, et al. 2021. 'Six Modes of Co-Production for Sustainability'. *Nature Sustainability* 4 (11): 983–96. https://doi.org/10.1038/s41893-021-00755-x.

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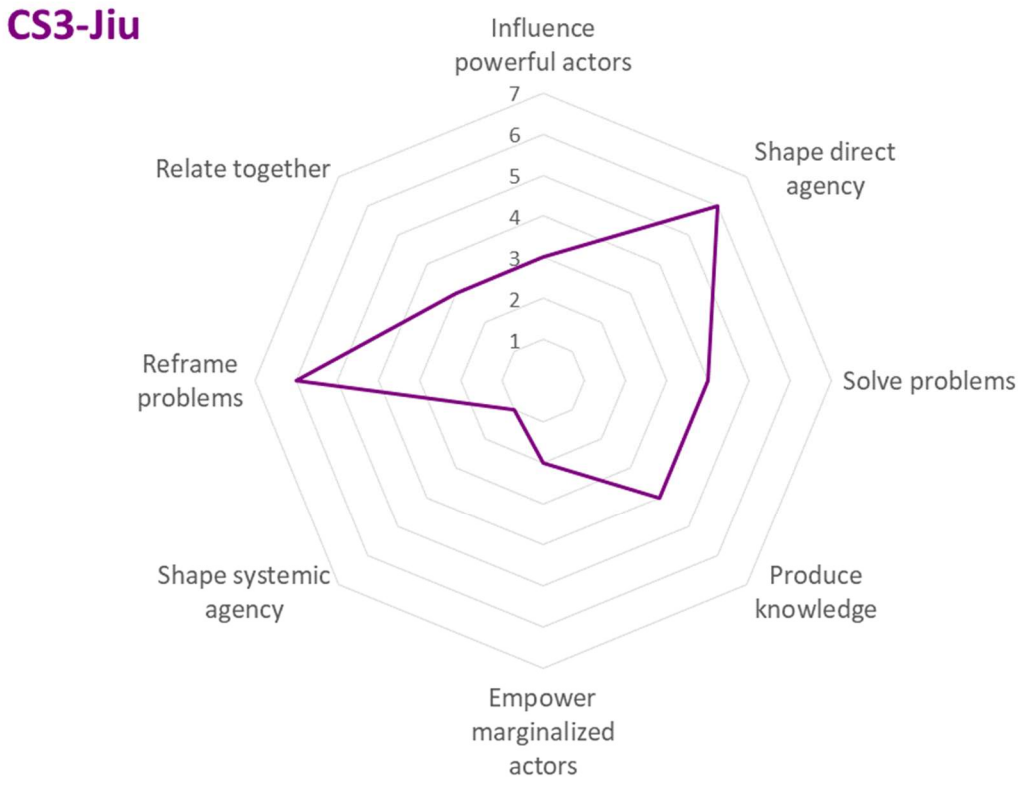

Figure 132: CS3-Jiu scoring for co-creation approaches

As seen in Figure 132, the SH's share a propensity for combining reframing with a solution-oriented outputs. These two priorities are often difficult to coalesce (Chambers et al. 2021). This would also explain why SHs feel that a change in management practices, policy uptake of project outputs, and reframing are outcome dimensions in which the project is not meeting SH expectations, yet. Meanwhile, the SHs are very satisfied with the degree and quality of knowledge produced in the process, so far. Therefore, moving forward, it would be specifically advisable to consider:

- ➔ Emphasise presenting project results to high-power SHs, trying to instil a Nexus-thinking amongst them.
- ➔ Discuss with high-power SHs how project outputs can be specifically integrated/translated into policies.

Within the context CS3-Jiu, there are ongoing parallel research projects related to the nexus concept, engaging the same SHs to different degrees. This can lead to potential SH fatigue, and, thus, it is important to work towards having a regular and transparent communication with the other project managers as well as with SHs to check overlaps in timing of events and topics being addressed. In cases of overlap, consider organising common events with the other projects. As the focus of this CS's mode is on knowledge creation and transfer for evidence-based decision-making, less emphasis is made on the efforts towards co-development but rather on co-design.

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Table 52: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS3-Jiu.

	Co-exploration	Co-design		Co-development	
	Information	**Consultation**	**Involvement**	**Collaboration**	**Empowerment**
WHO? Stakeholder category	All categories should be properly informed. Check if gender imbalance towards women is indicating a lack in powerful actors or if this is due to the historic legacy of communist era (it looks like the latter, since most SH have longstanding experience). Specifically invite and target the stakeholders mentioned at the end of the survey (county level representatives, national authorities, regional development entities, etc.).	All categories can be consulted. Continue the ways in which the CS lead is communicating and engaging the stakeholders. The results indicate that SHs are very satisfied with the chosen engagement strategies.	All categories can be involved. Lobby powerful stakeholders with a synthesis of acquired knowledge, working with them toward specific actions.	All categories can collaborate. Lobby powerful stakeholders with a synthesis of acquired knowledge, working with them toward specific actions.	Lobby powerful stakeholders with a synthesis of acquired knowledge, working with them toward specific actions.
WHY? PI and ALM	LI-HP SH are still missing in the register.	The results indicate that SHs are very satisfied with the chosen engagement strategies.	Find better ways for transferring tools for reframing since it seems to be important to stakeholders, but their expectations are not being met.	It has proven effective to focus on one particular issue where there is shared interest amongst stakeholders, and then formulate actions to address it.	It has proven effective to focus on one particular issue where there is shared interest amongst stakeholders, and then formulate actions to address it.

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	Co-exploration	Co-design		Co-development	
			Reframing may be particularly interesting to be done for policy uptake and management practices.		
HOW? Activities	Provide SH with system knowledge, i.e. providing them with easily understandable results of the (biophysical and) socio-economic modelling and what this means to the WEFE Nexus and particularly to policies.	Emphasise presenting project results to high-power stakeholders, trying to instil a Nexus-thinking amongst them.	Discuss with high-power stakeholders how project outputs can be specifically integrated/translated into policies.	Focus on transformation knowledge to help SH reframe and target policy uptake and management practices.	Possibly shift focus at the remaining WSs, focusing on how NXG results can be specifically fed into the policy-making process.

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Management and sustainment

Management

CS-Leads should not forget checking the expectations written by the official stakeholders in the Privacy Policy Consent Form.

The initial management plan considered different foci per year**.** The table below looks at how these were accomplished and what to change based on the findings of the past year.

Foci	From 2022 Plan	2023 Plan
2023	Actively look to increase the interest of other stakeholders while maintaining the interest of the current high interest stakeholders. Focusing away from high interest stakeholders towards low interest stakeholders may allow discovering currently missing marginalised stakeholders.	The SH register was slightly expanded but distributions stayed mostly the same. SH are happy with the way the project is interacting with them.
2024	Maintain the interest of the engaged stakeholders and focus on the relationships between them, including power dynamics and building trust to enhance collaboration.	Provide SH with system knowledge, i.e. providing them with easily understandable results of the (biophysical and) socio-economic modelling and what this means to the WEFE Nexus and particularly to policies. Emphasise presenting project results to high-power stakeholders, trying to instil a Nexus-thinking amongst them. Discuss with high-power stakeholders how project outputs can be specifically integrated/translated into policies. Focus on transformation knowledge to help SH reframe and target policy uptake and management practices. Possibly shift focus at the remaining WSs, focusing on how NXG results can be specifically fed into the policy-making process.
2025	Focus on co-decision activities and further planning on sustainment of stakeholders as well as on the defined agreements.	Stay focused on providing evidence base and the results from the research. This is your largest asset.

Table 53 provides details of the opportunities and risks associated to the high-scoring approaches and also linked to the co-creation mode “Researching solutions”. Considering these opportunities and risks, as well as the SHs’ preferred mode of co-creation and likely aims for the engagement process, it is advisable to particularly look out for the following risks:

- ➔ Risk of inhibiting the reframing potential;
- ➔ Focusing on budgeted activities only disregarding the pursuit of emerging goals; and,
- ➔ Missing to trigger effective shifts in policies and practices.

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Table 53: Overview of opportunities and risk linked to Mode 1 "Researching solutions" and the approaches that ranked higher in CS3-Jiu. Based on Chambers et al. (2021).

Approach	Opportunity	Risk
Shape direct agency	The focus on shaping direct agency should foster achieving specific goals such as raising the awareness of water as a depleting resource, build a common language to facilitate the interaction between stakeholders.	- Risk of blaming less powerful stakeholders for the problems. - Risk of having superficial engagement with less powerful stakeholders. - Risk of legitimising current power dynamics.
Solve problems	Focusing on solving problems and transferring knowledge offers the opportunity of supporting evidence-based decision-making and justifying changes.	- Risk of facing challenges in engaging stakeholders that should be influenced due to prioritising the focus and advancing on the project's interest. - Risk of reinforcing existing dominant views on the nexus problem and possible solution, e.g., stick to sectorial view of the problem(s). - Risk of inhibiting the reframing potential.
Produce knowledge	The focus on knowledge production and transfer, can help in advocating for policy changes, building capacity, and addressing specific CS's needs. For instance, production and transfer on pressures in the WEFE sectors or data for model development.	- Echoing knowledge to create specific impacts. - Scientific knowledge overshadowing expertise and other ideas. - Focusing on budgeted activities only disregarding the pursuit of emerging goals.
Reframe problems	Focus on reframing problems can shift co-creation views towards more creativity and transformative outputs. For CS3-Jiu, these shifts should focus on breaking silos, developing a platform that supports communication of information for resources management. Reframing problems as well as relating together offers the opportunity of building legitimate and flexible processes for tangible changes in perspectives, networks and policies and practices.	- Low engagement of action/solution-oriented stakeholders. - Inhibiting the development of concrete actions. - Focusing on reframing only without triggering effective shifts in policies and practices. - Early emphasis on differences inhibits finding a common ground.

Sustainment

Starting the session on SH involvement, a presentation on "Stakeholder Engagement process and SH landscape in the Lielupe CS" was presented by WP5 team (Tamara Avellan, AVA and Simon Ryfisch, Uppsala University). During this presentation SHs were invited to express their opinion on SH sustainment. They agreed for a successful engagement the face-to-face dialog is very important. Sharing information and results on a virtual platform is good but not enough to support the needed change. The River Basin Committee is an existing frame and could be used for the continuation of the dialogue. Other parties can join

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(such as environment profiled NGO). Implementing a project together could also keep the WEFE SH connected.

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CS4: Adige

The SHE plan is based on the data, information and perceptions provided and analysed by the CS-Leads, the CS SHs and the AVA- and UU-Team by August/September 2023. The plan is updated on a yearly basis taking new SH information and evaluation results into account to allow for adaptive management.

Evaluation

An initial evaluation approach that had been set up was not yielding sufficient results to provide meaningful insight into the SHE process. Thus, towards the end of 2022 and early 2023 a new strategy was developed between AVA, UU and the CS-leads with the aim of assessing:

- The quality of the process (the delivery of the plan)
- The quality of the outcome of the process (the results of the plan = i.e. fulfilling the aims)
- The intention of the quality vs the perception of the quality (at both levels above)

This resulted in a revised survey (see Annex) which was translated into the respective local languages, and a WS activity at the 3rd WS which showcased the SH landscape to the SHs and asked these to reflect on the modes of co-creation by Chambers et al. 2021[1]. For the Adige case, the 3rd WS was held online through MS Teams on 30 July 2023 where 27 SHs from various provinces attended. The aim of the event was to present the governance assessment results and asking SHs for feedback, validate the policy packages for the WEFE sectors, bringing the opinions of upstream and downstream SHs together, present and discuss the application of the hydrological model and understand SH perspectives regarding the SHE process.

Results from the stakeholder survey

Overall, SHs are fairly satisfied with the process quality and the process outcomes. Participants largely trust the outcomes of NXG. Of the 27 participants at this WS 5 filled in the survey. This response rate needs to be increased significantly in future WSs to provide a better picture of the state of mind of SHs. The results here are not representative of the SHs.

(1) Respondents were 100% male (5). Respondents came from the environment sector (2), the water authority (3) or the business sector (1). Participants were exclusively from Italy, but one participant did not provide an answer to this question. Participants had both less than 10 years of experience (2) and more (3).

(2) Respondents feel well consulted and involved in the project and in the WS (Figure 133~~Figure 133~~). And while participants felt well informed with respect to the WS, they feel poorly informed about the project (one participant even did not answer this question, and the max score given here was a 5 out of 7). The respondents feel poorly collaborated with or empowered at either the WS or the project.

(3) Overall, participants rate all outcomes as highly important (average above 4) with outcomes such as knowledge transfer, empowerment, capacity development and

[1] Chambers, Josephine M., C. Wyborn, M.E. Ryan, R.S. Reid, M. Riechers, A. Serban, N.J. Bennett, et al. 2021. 'Six Modes of Co-Production for Sustainability'. *Nature Sustainability* 4 (11): 983–96. https://doi.org/10.1038/s41893-021-00755-x.

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networks ranking the lowest, and policy uptake, knowledge production, reframing and management practices ranking the highest (Figure 134~~Figure 134~~). However, the results also show that expectations aren't necessarily met by the project as of yet. Differences are particularly high in policy uptake and management practices, but also in networks. Expectations are overachieved in relation to knowledge transfer, social equitability and institution building (perceived expectation higher than perceived importance). Note that this may however rather be due to context factors outside of the project.

(4) In general, participants indicated to have acquired knowledge in all areas (average above 4) (Figure 135~~Figure 135~~). Knowledge uptake was almost equal across all three knowledge domains (4,52 for system, 4,40 for target, 4,40 for transformational). Only slight differences in knowledge generation between the different NXG areas exist with policies being mostly the weakest. This may however be biased results based on the background of the respondents.

Figure 133: Degree of perceived engagement by WS3 participants in the project (dark bars) and the WS (light bars)

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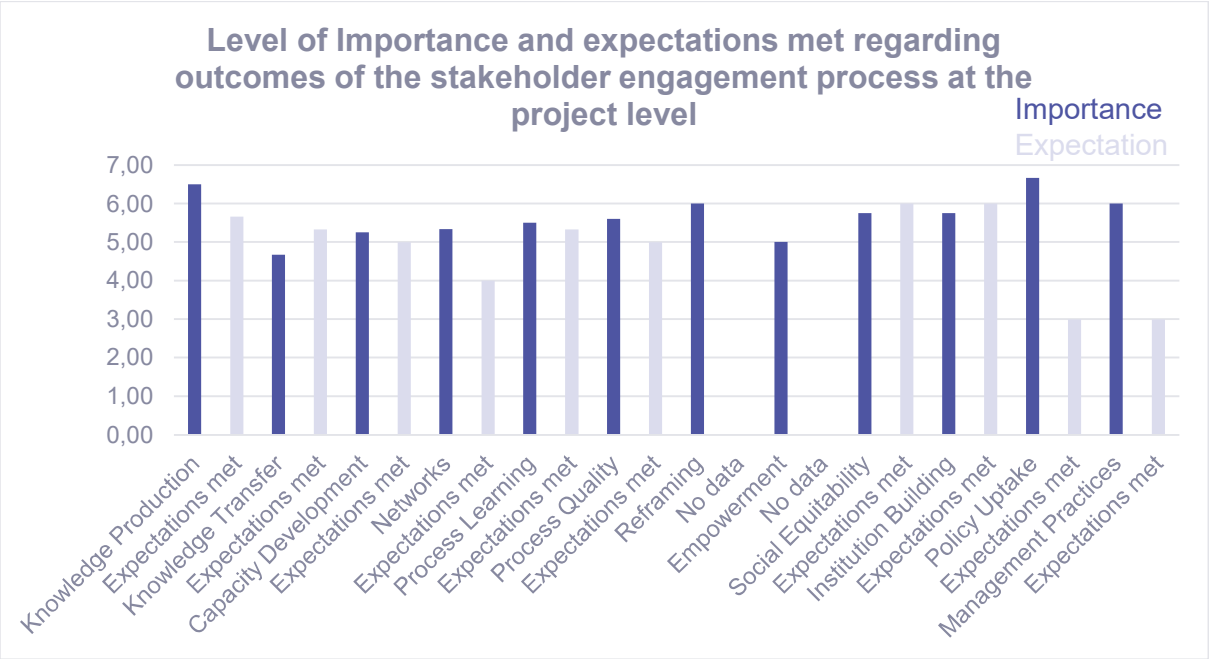

Figure 134: Level of importance and expectations per outcomes of the SHE process at WS3.

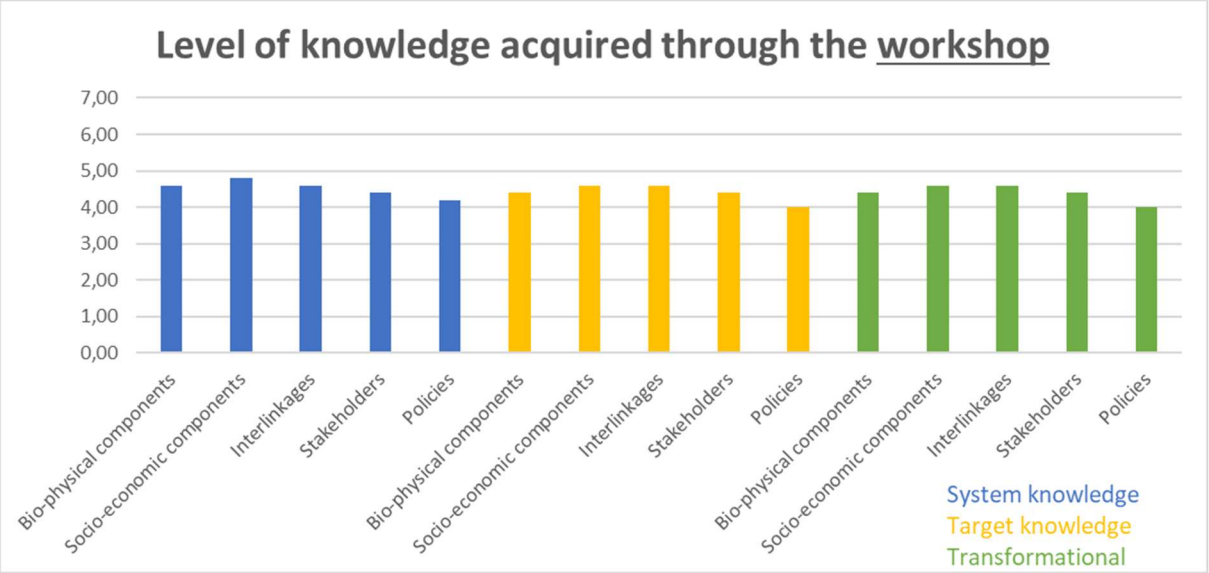

Figure 135: Knowledge generated in WS3 in different NXG areas.

The main recommendations drawn from these results for SHE are:

- ➔ The selection of SH that responded is not representative, highly male, and only from a small range of SH categories. Make an effort to engage more SHs to respond here.
- ➔ You may need to make a larger effort to INFORM SHs about the overarching aims of the project, its achievements so far and how this project may be useful to the SHs. Ask the SHs to join the newsletter for instance or to follow us on social media.
- ➔ You may want to focus on networks for knowledge exchange on policy (uptake) and management practices. It seems like SHs would like a politically neutral space to talk about changes (maybe at policy level) to improve their management practices.

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- ➔ Knowledge generation may need to be improved over the coming months in order to increase uptake in particular in the area of policies.
- ➔ There are some great recommendations from the respondents about how to make the results and process of the project more meaningful, namely:
  - it will be necessary to investigate in depth the relationships between the historical water regulation in Veneto and the development of the environment, territory and agrosystems of Veneto.
  - It is not easy to put together the technical/numerical aspects with the decisional ones. It would be important that the results of this day are presented to the district to improve the management of the meetings.
  - influence changes in how discussions and conflicts are managed within the DAO observatory table.

Desired mode of co-creation

At the end of a session focused on the SH landscape and SHE at the third WS, a plenary discussion was held on the approaches to co-creation that together yield the modes of co-creation (see Chambers et al. 2021). For this purpose, the approaches to co-creation were briefly introduced as well as common risks and opportunities associated with them. Afterwards, SHs were asked to score their preferences with the help of an interactive online survey. Results were afterwards briefly discussed in the plenary. These modalities for the WS activity were chosen in response to previous experiences gathered throughout the evaluation process, which indicated that SHs were overwhelmed by being surveyed in written form on the original set of statements in the framework by Chambers et al. (2021).

The SHs' answers in session were scored along the respective scales of the approaches to co-creation, as per the framework by Chambers et al. (2021). The answers from the session were supplemented with insights from the WS minutes to add further nuance to the analysis. Together, the values aligned most closely with the mode '**Reframing Power**' (Figure 136~~Figure 136~~). In this particular case, however, solving problems has an unusually high score for this particular mode of co-creation.

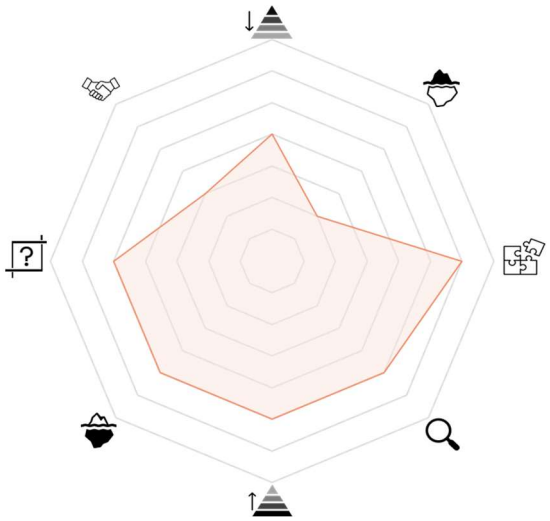

Figure 136: SH perspective on the desired approaches to co-creation – together yielding the mode 'Reframing Power'. Legend (in clockwise order from the top): 1) Influence powerful actors; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together

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The results indicate that there should be a space for both relatively powerful and marginalised SHs to meet – with the objective to question policy goals and the data that underlies decision-making. Solutions are desirable if they produce outcomes that support social equitability. Some cases that strive to 'reframe power' struggle to create the safe spaces to do so. Short timelines of research projects and the focus on producing knowledge usually stand in the way. It can be helpful to build on existing networks or institutions.

Specific recommendations for future SHE are therefore:

- ➔ Find professional support for WS facilitation.
- ➔ Double-check whether all SHs are truly on board with the policies proposed by the project.
- ➔ Try to 'market' the WSs as part of or integrate the WS into the proceedings of other institutions (e.g., the river basin authority).

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Stakeholder engagement aim

Although being a single country river, the Adige River basin presents a complex institutional, socio-economic, and bio-physical context. This complexity cannot be grasped by simply adopting a data driven approach. Engaging SHs responsible for different fields of the WEFE nexus will be paramount to build a full picture of the current and future interconnections and challenges within the Nexus. On the one hand, engaging SHs will benefit the project by better understanding the WEFE nexus in the Adige CS and beyond and allow us to develop better tools. On the other hand, this knowledge will increase SHs' awareness to improve their decision making in the future.

In particular, the engagement of SHs within the Adige CS has the following aims:

- To improve system knowledge:
  - Explore the current state of the Nexus by improving modelling approaches related to water supply and demand, with a special focus on water scarcity and its implications on the other Nexus sectors
  - Increase understanding of the current institutional and political context that characterise the area, to identify existing and potential conflicts
- To generate target knowledge:
  - Determine the drivers of cooperation between stakeholders to share data and foster a coordinated management of water resources
- To generate transformation knowledge:
  - Enhancing stakeholder awareness on water resources, their management and uses among different sectors
  - Co-develop, validate, and promote the use of the SNLAE and WEFE Footprint tools that the projects will develop to plan for future environmental and socio-economic conditions
  - Determine drivers for a cross-catchment dialogue that fosters a coordinated design and implementation of existing and future river contracts between up-stream and downstream areas of the river basin

In the process of achieving these goals, a special attention will be given to pinpointing the presence of a conflict hotspot(s) through a first-level screening. This will be an area of smaller dimensions within the river basin where different SHs of different sectors will be heard and brought together in a participative process. Moreover, given the size and complexity of the river basin it is not envisaged to develop a river contract within the framework of the NXG project.

While in other CS the perspective of SHs about what aims they would like to be involved in was also assessed, this could not be done in the Adige case, as not enough SHs answered the survey to be able to derive this information. Thus, it is not clear if a mismatch between the suggested aims of the CS leads, and the SH exists which may be also causing SH fatigue.

Based on the conversations during the General Assembly meeting in Tours (Parallel Session 6) from 19-21 September, the following aims will be prioritized over the remaining two years:

- To improve system knowledge:
  - Explore the current state of the Nexus by improving modelling approaches related to water supply and demand, with a special focus on water scarcity and its implications on the other Nexus sectors

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  - Increase understanding of the current institutional and political context that characterise the area, to identify existing and potential conflicts
- To generate target knowledge:
  - Determine the drivers of cooperation between stakeholders to share data and foster a coordinated management of water resources
- To generate transformation knowledge:
  - Enhancing stakeholder awareness on water resources, their management and uses among different sectors
  - Co-develop, validate, and promote the use of the SNLAE and WEFE Footprint tools that the projects will develop to plan for future environmental and socio-economic conditions
  - Determine drivers for a cross-catchment dialogue that fosters a coordinated design and implementation of existing and future river contracts between up-stream and downstream areas of the river basin

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Stakeholder analysis

Stakeholder identification

A total of 189 (150 in 2022) SHs were preliminarily identified out of which, still, only 17 (9%) consented to be officially included in the SH register and participate in the NXG SHE (Table 54~~Table 54~~). While the consent rate increased, the overall consent rate in this case is far below the average consent rate across all cases both in absolute and relative values. Significant efforts need to be undertaken to encourage SH to consent to be able to meaningfully engage with them.

Table 54: CS4-Adige summary information of stakeholder identification as of Sept. 2022 and updated in September 2023

Item	Count 2022	Count 2023
Preliminary listing of stakeholders	150	189
Stakeholders in registered officially	10	17
Percentage of consent [%]	6.7%	9.0%

To move forward with a GDPR compliant SH base the issue of contest was discussed at the General Assembly meeting in Tours from 19-21 September 2023. The following was agreed:

1) Most information on SH is taken from public sources → mark SHs where information was taken from public sources (add a P if taken from public source in the new column B of your CS tab in the SH dashboard)
2) Double check current names and organizations and update SHs and affiliations accordingly. Some SH may have changed jobs, retired, etc.
3) Mark all high power or high interest SH in the register. These are people you most likely may want to keep. Write to them individually and ask them to consent to the PPCF; threaten with removal if needed. Remove them from the register if the information obtained on them is not from public sources.
4) Add new SHs based on the needs outlined in the management plan below. Lay a particular focus on moving from technical SH to more political SH that could help you understand where legislation on the suggested policy packages currently stands. This will help you get into the policy cycle better. Ideally source their contact information from public sources.

Not all SHs have been categorised within the WEFE sector and some SHs may belong to other or cross-cutting sectors (e.g., civil society, policy makers at national level). Across the differentiated ones, there is a clear preponderance of SHs from the water sector over the other sectors (Figure 137~~Figure 137~~). Even though efforts should focus on increasing the overall interest of SHs in the project to improve the consent rate, especial attention should be placed on SHs of the energy, food and ecosystem sectors.

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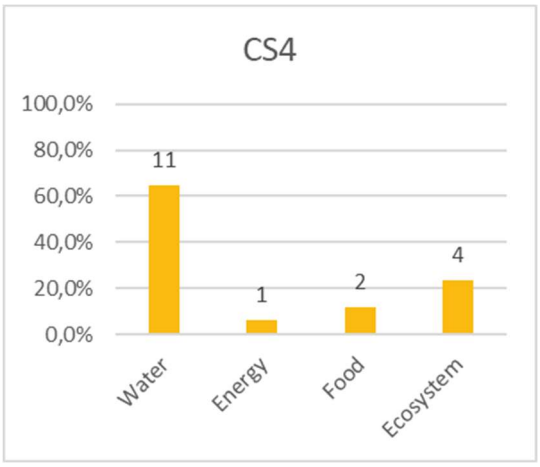

Figure 137: Distribution of stakeholders across the WEFE sectors for CS4 – Adige. One stakeholder can be assigned to one or more sectors.

In terms of gender, there is a slight decrease in imbalance from a 20/80 to a 30/70 distribution across female and male genders. Not all SHs provided data about gender.

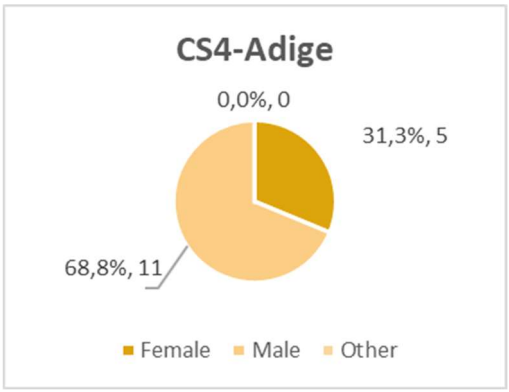

Figure 138: Gender distribution for CS4 – Adige.

Stakeholder differentiation and categorisation

The SHs belong mainly to tier 1 with none in Tier 2 and 3 in Tier 3. However, this means that, overall, SHs are perceived to be interested in being engaged in the development of the project's outputs.

The categorisation of SHs has shifted since last year now mostly holding actors from the "7. Water management authorities and representatives', "1. Civil society" and "9. Environmental authorities and representatives" (Figure 139~~Figure 139~~).

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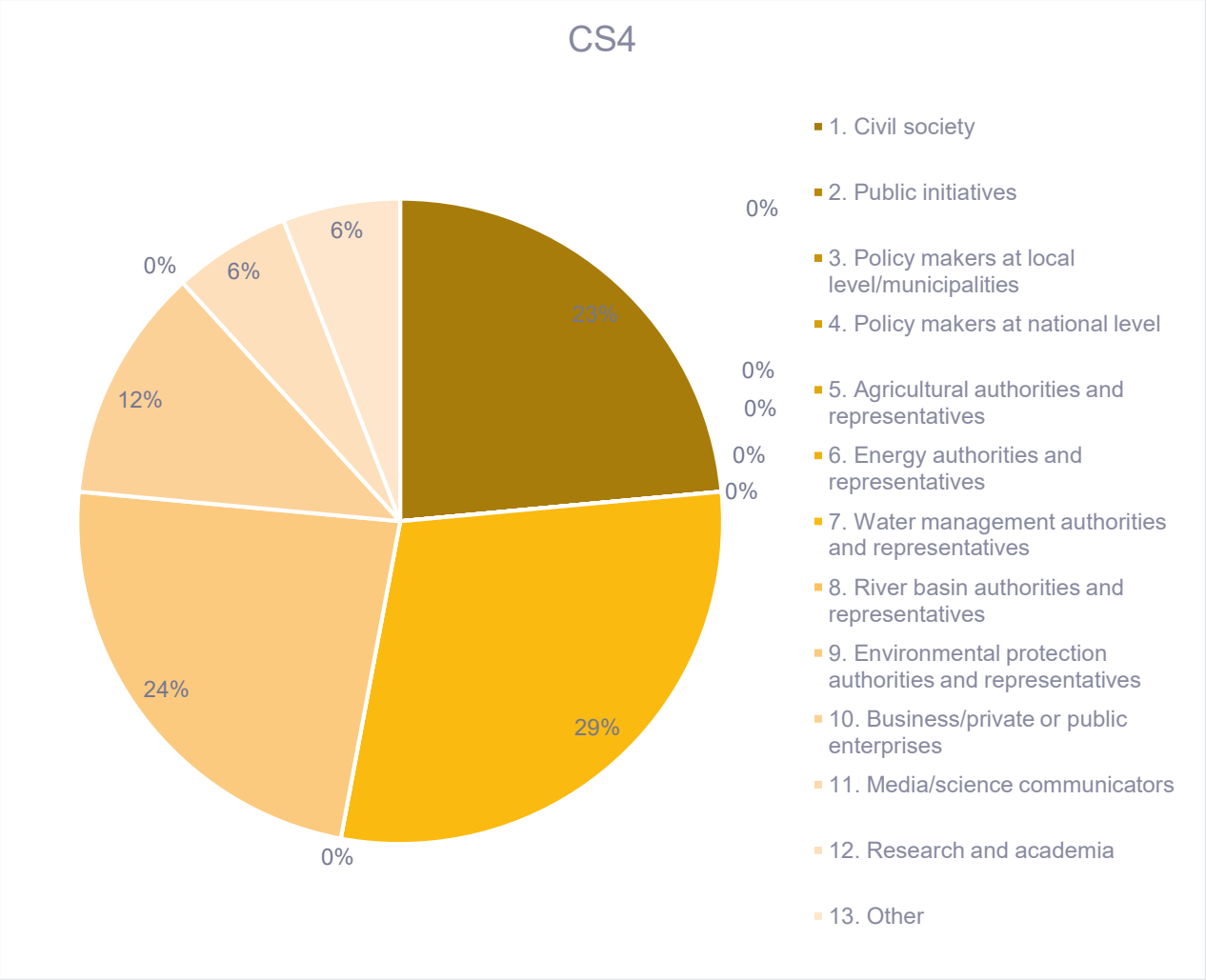

Figure 139: Distribution of stakeholders across categories for the case CS4 - Adige.

From a Power-Interest perspectives, little has changes, most consenting SHs were perceived as having mid to high interest with a 50/50 distribution between high- and low-power (Figure 140~~Figure 140~~).

Even though the upper right section of the map should be considered as the key SH group, given the number of SHs, all of them will be considered for a closer engagement, as far as they are interested.

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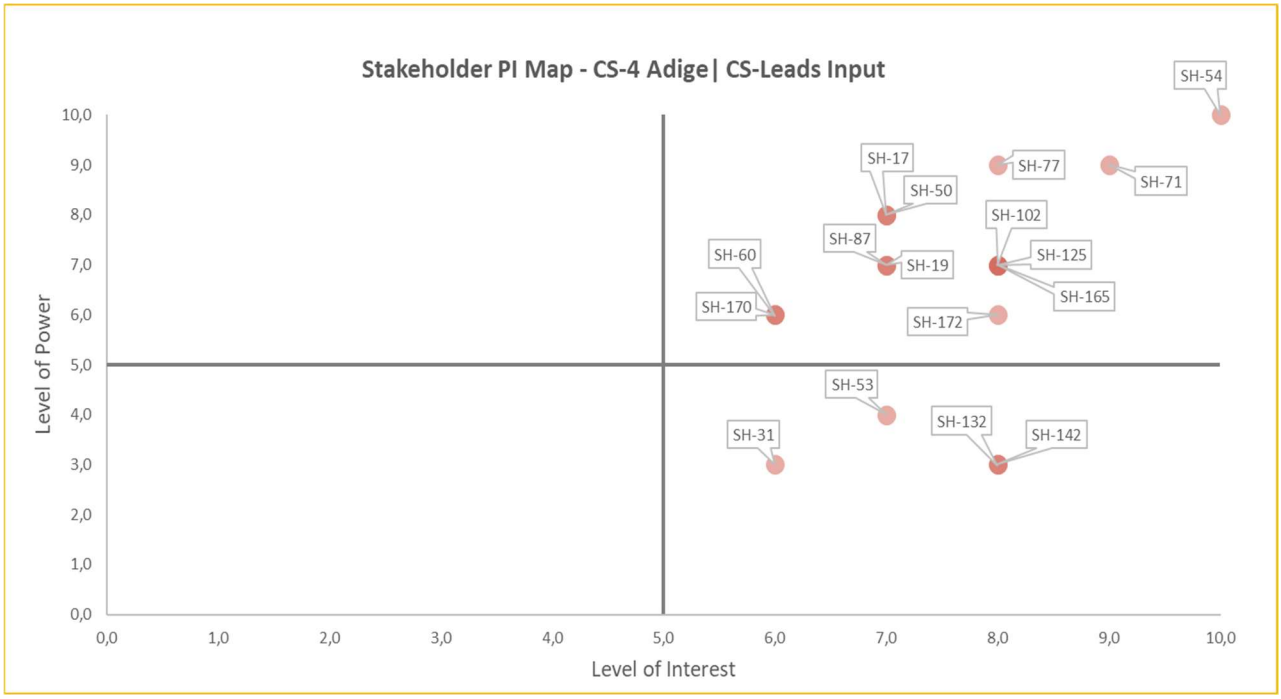

Figure 140: Power-Interest Map for CS4 – Adige, based on the CS-Leads' perception. For data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents.

Stakeholder relationships

About the relationships among the SHs, the CS-Leads characterised – based on their perception – 136 relationships across the 17 SHs. The relationships did not change significantly and correspond mainly to the non-existent (NE) type, 72.9%, followed by complementary (Cm) relationships among SHs (12.5%), and a minor share of cooperation (Cp), 11% and conflicts (Cf), 3.7% (Figure 141~~Figure 141~~ and Figure 142~~Figure 142~~). This means that efforts in this CS need to focus on building relationships among the SHs, support the creation of networks and provide the platform for SHs to find their own ways of interacting in the future.

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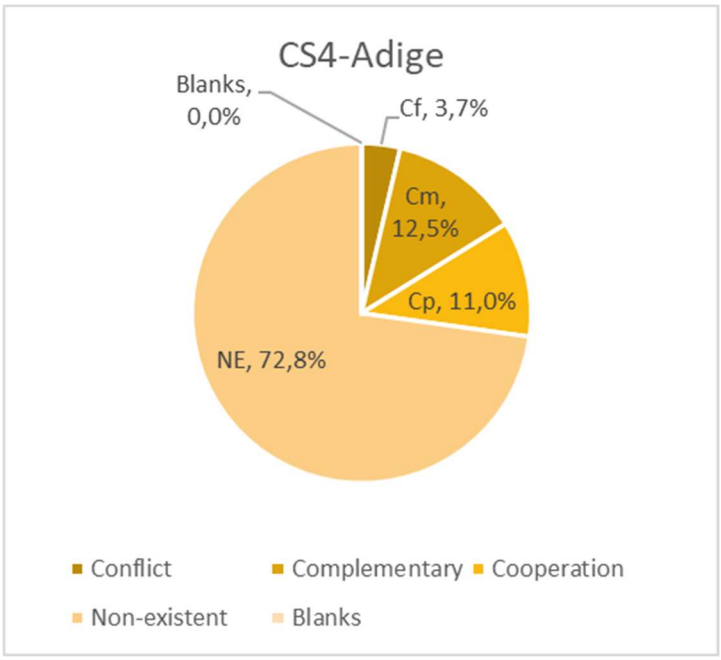

Figure 141: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads.

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SH-ID	SH-53	SH-54	SH-71	SH-17	SH-50	SH-87	SH-172	SH-170	SH-132	SH-142	SH-165	SH-102	SH-60	SH-31	SH-19	SH-77	SH-125
SH-53		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-54	Cm		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-71	NE	Cm		-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-17	NE	Cm	Cp		-	-	-	-	-	-	-	-	-	-	-	-	-
SH-50	NE	Cm	Cp	Cp		-	-	-	-	-	-	-	-	-	-	-	-
SH-87	NE	Cm	Cm	NE	NE		-	-	-	-	-	-	-	-	-	-	-
SH-172	NE	NE	NE	NE	NE	NE		-	-	-	-	-	-	-	-	-	-
SH-170	NE	NE	NE	NE	NE	NE	Cf		-	-	-	-	-	-	-	-	-
SH-132	NE	Cm	NE	NE	NE	NE	NE	NE		-	-	-	-	-	-	-	-
SH-142	NE	Cp	NE	NE	NE	NE	NE	NE	Cm		-	-	-	-	-	-	-
SH-165	NE	NE	Cp	Cp	NE	Cm	Cp	NE	NE	NE		-	-	-	-	-	-
SH-102	NE	NE	Cp	Cp	Cp	Cm	Cp	NE	NE	NE	Cp		-	-	-	-	-
SH-60	NE	NE	NE	NE	NE	NE	NE	Cm	NE	NE	NE	NE		-	-	-	-
SH-31	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE		-	-	-
SH-19	NE	NE	NE	Cf	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE		-	-
SH-77	NE	Cp	Cp	Cm	Cm	NE	NE	NE	NE	Cp	NE	NE	NE	NE	Cf		-
SH-125	NE	Cm	NE	Cf	NE	Cm	NE	Cm	NE	NE	NE	NE	NE	NE	Cm	Cf	

Figure 142: Actor-Linkage Matrix for CS4-Adige. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent.

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Stakeholder engagement plan for CS4 – Adige

The SHE plan provides a guidance to organise SHE and achieve the SHE aims considering the initial results of the SH analysis. These results show that the pool of SHs is:

- Very large, but the fully engaged SHs (i.e. consented ones) is still rather small.
- involving mainly SHs from the water sector, along with civil society, research and academia, and private and public enterprises.
- including mainly high-power SHs.
- composed by mainly non-existent relationships, and, thus, there should be a focus on networking between SHs.

Considering this background, CS-Leads scored the different co-creation approaches for the themes of purpose, power, politics, and pathways. The resulting figure (Figure 143~~Figure 143~~) was discussed with the CS-Leads, and after consideration of the aims, the analysis results, and the own CS-Leads' overview of the context, the fitting mode of co-creation is "Researching solutions".

This mode focuses on the co-creation of knowledge to inform evidence-based decision-making, influencing policies and interventions (Chambers et al., 2021). For a stronger impact, this mode of co-creation should be supported by an environment that fosters SHs to work on their relationships and questions current practices to adapt to policy changes (ibid.).

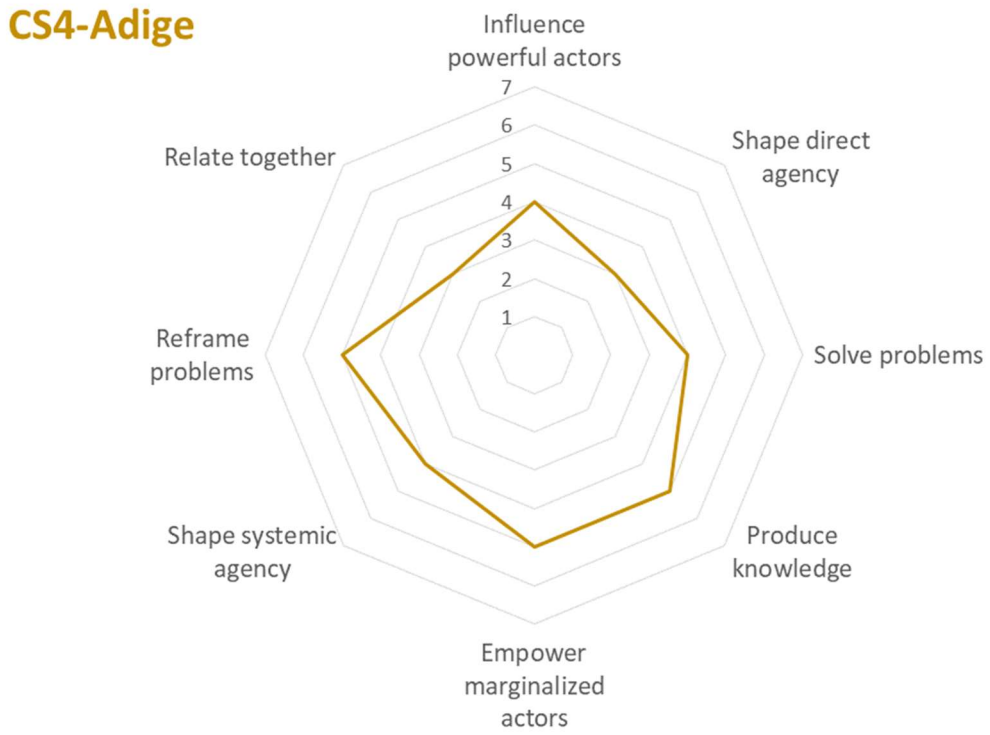

Figure 143: CS4-Adige scoring for co-creation approaches

It is important to mention that this mode was chosen after considering the main characteristics, but when comparing the obtained radar plot of the scoring with the generic shape associated to this mode, there are three outlier points: CS4-Adige presents a greater ambition to empower less powerful (marginalised) SHs and a lower intention on relating together and shaping direct agency. In the first case, the intention is to bring together all the different SHs across the sectors and the regions of the river basin. For the latter cases, even though it is an intention to

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increase work on relating together and shaping direct agency, the current focus is on producing knowledge and reframing problems. Also, a lower rate in shaping direct agency results from considering the overall view on the river basin, as there are differences in the interaction with and between SHs across the administrative sections within the basin. This does not mean that the output of the current focus will not be used in the future to build relationships and shape direct agency.

Although the CS team and SHs have technically identified different modes of co-creation as priorities, the actual scores for the particular approaches to co-creation are largely overlapping. The SHs desire a reframing of power which would entail systemic changes to policymaking and policy goals as well as the empowerment of marginalised SHs. New knowledge and specific suggestions for solutions can be helpful but are rather means to an end.

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Table 55: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS4-Adige.

	Co-exploration	Co-design		Co-development	
	Information	**Consultation**	**Involvement**	**Collaboration**	**Empowerment**
WHO? Stakeholder category	All categories should be properly informed. You may need to make a larger effort to INFORM stakeholders about the overarching aims of the project, its achievements so far and how this project may be useful to the stakeholders.	All categories can be consulted. It will be necessary to investigate in depth the relationships between the historical water regulation in Veneto and the development of the environment, territory and agrosystems of Veneto.	All categories can be involved Focus on networks for knowledge exchange on policy (uptake) and management practices. Focus on building relationships among the stakeholders, support the creation of networks and provide the platform for stakeholders to find their own ways of interacting in the future.	All categories can collaborate, with particular focus on the sectoral authorities and the local policy makers. It would be important that the results of the WSs and the project are presented to the district to improve the management of the meetings.	Empower research and academic sector together with some positions within the local municipalities and policy makers. The latter needs to be done in an equitable manner across the regions within the river basin to avoid a power imbalance and empower the currently marginalized stakeholders.
WHY? PI and ALM	The selection of stakeholder that responded is not representative, highly male, and only from a small range of stakeholder categories. Make an effort to engage more stakeholders to respond here.	Double-check whether all stakeholders are truly on board with the policies proposed by the project. Knowledge generation may need to be improved over the coming months in order to increase uptake in particular in the area of policies. Consultation about conflicts may have to be avoided with stakeholders	It seems like stakeholders would like a politically neutral space to talk about changes (maybe at policy level) to improve their management practices.	It is not easy to put together the technical/numerical aspects with the decisional ones.	Influence changes in how discussions and conflicts are managed within the DAO observatory table.

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	Co-exploration	Co-design		Co-development	
		identified as in conflict, but maybe consulted upon with other stakeholders.			
HOW? Activities	Ask the stakeholders to join the newsletter for instance or to follow us on social media	Plan activities to share the outputs of the provided feedback and discuss about it	Activities in all WSs with especial focus on WS2 and WS3 for the identification of needs and discussion on policy needs, interviews for WP1, and WP3; and focus on WS4 and WS5 for WP3 and WP4 outputs. Additional activities that foster exchange between stakeholders from different sectors, categories, and regions of the river basin are helpful. Plan activities to share the outputs of the provided feedback and discuss about it.	Find professional support for WS facilitation. Try to 'market' as part of or integrate the WS into the proceedings of other institutions (e.g., the river basin authority).	Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations) so that, the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded stakeholders. Frequent smaller conversations of peer stakeholders across different regions may need to happen to allow for recognition of peers and for technical discussions about transboundary solutions (e.g. ecological low flows, abstraction needs, conservation measures, etc.). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.

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Management and sustainment

Management

CS-Leads should not forget checking the expectations written by the official SHs in the Privacy Policy Consent Form.

The initial management plan considered different foci per year**.** The table below looks at how these were accomplished and what do to change based on the findings of the past year.

Foci	From 2022 Plan	2023 Plan
2023	Actively look to increase the interest of other stakeholders while maintaining the interest of the current high interest stakeholders. Focusing away from high interest stakeholders towards low interest stakeholders may allow discovering currently missing marginalised stakeholders.	The SH register was slightly expanded, and the gender imbalance is not as drastic as before. SH are now largely from the water sector. The PI distribution remained the same and the ALM continues revealing high levels of actors that have no relationships.
2024	Maintain the interest of the engaged stakeholders and focus on the relationships between them, including power dynamics and building trust to enhance collaboration.	Ask the stakeholders to join the newsletter for instance or to follow us on social media. Plan activities to share the outputs of the provided feedback and discuss about it. Additional activities that foster exchange between stakeholders from different sectors, categories, and regions of the river basin are helpful. Plan activities to share the outputs of the provided feedback and discuss about it. Find professional support for WS facilitation. Try to 'market' as part of or integrate the WS into the proceedings of other institutions (e.g., the river basin authority). Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations) so that, the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded stakeholders. Frequent smaller conversations of peer stakeholders across different regions may need to happen to allow for recognition of peers and for technical discussions about transboundary solutions (e.g. ecological low flows, abstraction needs, conservation measures, etc.). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.
2025	Focus on co-decision activities and further planning on sustainment of stakeholders as well as on the defined agreements.	Stay focused on providing evidence base and the results from the research. This is your largest asset. Work with policy makers to integrate policy suggestion from the NEPAT.

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Leading a SHE process through a co-creation mode of "Researching solutions", focused on solving problems and producing knowledge, while placing considerable efforts on reframing problems and empowering less powerful SHs, provides several opportunities, but is also linked to some risks. Table 56~~Table 56~~Table 40~~Table 40~~ provides details of the opportunities and risks associated to the high-scoring approaches and also linked to the co-creation Mode 1 "Researching solutions".

Meanwhile, considering the SHs' desired co-creation approach, it is advisable to particularly look out for the following risks:

- ➔ Legitimising current power relations and systems such as an imbalance across WEFE sectors and/or public authorities from each of the provinces;
- ➔ Challenges in engaging SHs of interest to influence due to prioritising the project's interest on the solution over strengthening networks and empowering SHs; and,
- ➔ On the one hand, there is a risk of low-power actors using 'blame' narratives. On the other hand, high-power actors may block processes that are against their interests.

Table 56: Overview of opportunities and risk linked to Mode 1 "Researching solutions" and the approaches that ranked higher in CS4-Adige. Based on Chambers et al. (2021).

Approach	Opportunity	Risk
Produce knowledge	Focusing creating and transferring knowledge offers the opportunity of supporting evidence-based decision-making and justifying changes.	- Echoing knowledge to create specific impacts. - Scientific knowledge overshadowing expertise and other ideas. - Focusing on budgeted activities only disregarding the pursuit of emerging goals.
Empower marginalised actors	The focus on knowledge production and transfer, can help in advocating for policy changes, building capacity, and addressing specific CS's needs. For instance, production and transfer on pressures in the WEFE sectors or data sharing for a coordinated management.	- Risk of blind devotion to speaking "truth" to powerful stakeholders to shift views and policies. - Empowering certain views can inhibit effort on reframing problems. - Risk of using "blame narratives" that result in a defensive attitude of powerful stakeholders, tending to block advancements. - Risk of overlooking imbalances and politics in powers at a local scale.
Reframe problems	Focus on reframing problems can shift co-creation views towards more creativity and transformative outputs. For CS4-Adige, these shifts should focus on creating a cross-catchment dialogue for a coordinated management. This includes raising awareness about water resources and their use across different sectors.	- Low engagement of action/solution-oriented stakeholders. - Inhibiting the development of concrete actions. - Focusing on reframing only without triggering effective shifts in policies and practices.

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Approach	Opportunity	Risk
	Reframing problems as well as relating together offers the opportunity of building legitimate and flexible processes for tangible changes in perspectives, networks and policies and practices.	- Early emphasis on differences inhibits finding a common ground.

Sustainment

As part of the 3rd WS a presentation concerning the SHs' engagement process was provided and the question about SH sustainment was asked. The slides prepared by Tamara Avellan and Simon Ryfisch were presented by Silvia Cocuccioni in Italian. A plenary discussion followed the main points of which are:

- One SH stated: "Knowledge production is needed more than having dialogue and grouping, we already see each other in other situations, we don't really need to network"; however, another SH underlined the importance to have a dialogue in a non-political context based on scientific data.
- There is a general agreement in the need of basing decision on data. It is important however to keep an eye on the quality of such data (e.g. raw data, models but also their interpretation). It is also needed to have shared values as a basis as data can be interpreted differently.
- According to some SHs the project should not act directly on single SHs behaviours but should support the change in public policies as these are in middle between data and behavioural change.
- The importance of involving the river basin authority was broadly shared among the SHs
- Ideally, the RBA would be on board. They are involved in another nexus project, which they prioritise.
- Provinces need to be brought together.

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CS5: IUWMA

The SHE plan is based on the data, information and perceptions provided and analysed by the CS-Leads, the CS SHs and the AVA- and UU-Team by August/September 2023. The plan is updated on a yearly basis taking new SH information and evaluation results into account to allow for adaptive management.

Evaluation

An initial evaluation approach that had been set up was not yielding sufficient results to provide meaningful insight into the SHE process. Thus, towards the end of 2022 and early 2023 a new strategy was developed between AVA, UU and the CS-leads with the aim of assessing:

- The quality of the process (the delivery of the plan)
- The quality of the outcome of the process (the results of the plan = i.e. fulfilling the aims)
- The intention of the quality vs the perception of the quality (at both levels above)

This resulted in a revised survey (see Annex) which was translated into the respective local languages, and a WS activity at the 3rd WS which showcased the SH landscape to the SHs and asked these to reflect on the modes of co-creation by Chambers et al. 2021. For the Inkomati Ushutu case, the 3rd WS was held in online in MS Teams on 5 June 2023 where 38 SHs attended. The aim of the event was to introduce new SHs to the project and provide an update on the progress to date to those who had previously been involved.

Results from the SH survey

Overall, SHs are very satisfied with the process quality and the process outcomes. Participants trust the outcomes of NXG as it is based on science. Of the 38 participants at this WS 10 filled in the survey.

(1) Participants were equally male and female (5 each). Respondents came from various SH groups: 3 from the agricultural sector, 2 from energy, 3 from water, 2 from the business sector and 1 policymaker. Participants were exclusively from South Africa. Participants had largely more than 20 years of experience (6).

(2) Participants feel well informed and consulted in the project and in the WS (Figure 144~~Figure 144~~). Respondents overall felt better included at the WS level than at the project level, which is to be expected. Also, levels of perception for involvement, collaboration and empowerment are lower than those for information and consultation, which is also to be expected for this kind of project.

(3) Overall, participants rate all outcomes as highly important (average above 5) with outcomes such as institution building, social equitability and process quality ranking the lowest, and management practices, networks, and process learning ranking the highest (Figure 145~~Figure 145~~). However, the results also show that expectations aren't necessarily met by the project as of yet. Differences are particularly high in institution building, policy uptake and management practices, but also in networks. Expectations are overachieved in relation to process quality, and social equitability (perceived expectation higher than perceived importance) and almost achieved for empowerment (perceived importance and expectation almost equal). Note that this may however also be due to context factors outside of the project.

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(4) In general, participants indicated to have acquired knowledge in all areas (average above 5) (Figure 146~~Figure 146~~). Knowledge uptake was slightly higher in target knowledge (5.53) than in system (5.46) or transformational (5.36) knowledge generation. Participants seem to have learned most about the future target bio-physical system (6.10). A vision of the future SH landscape seems to be less known (5.00).

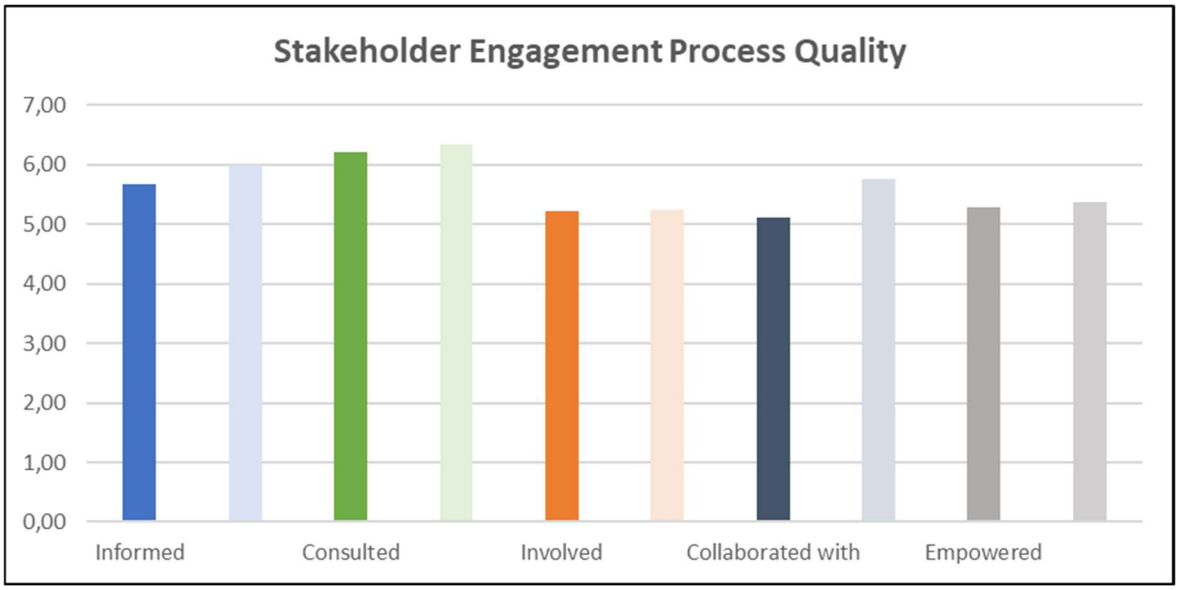

Figure 144: Degree of perceived engagement by WS3 participants in the project (dark bars) and the workshop (light bars)

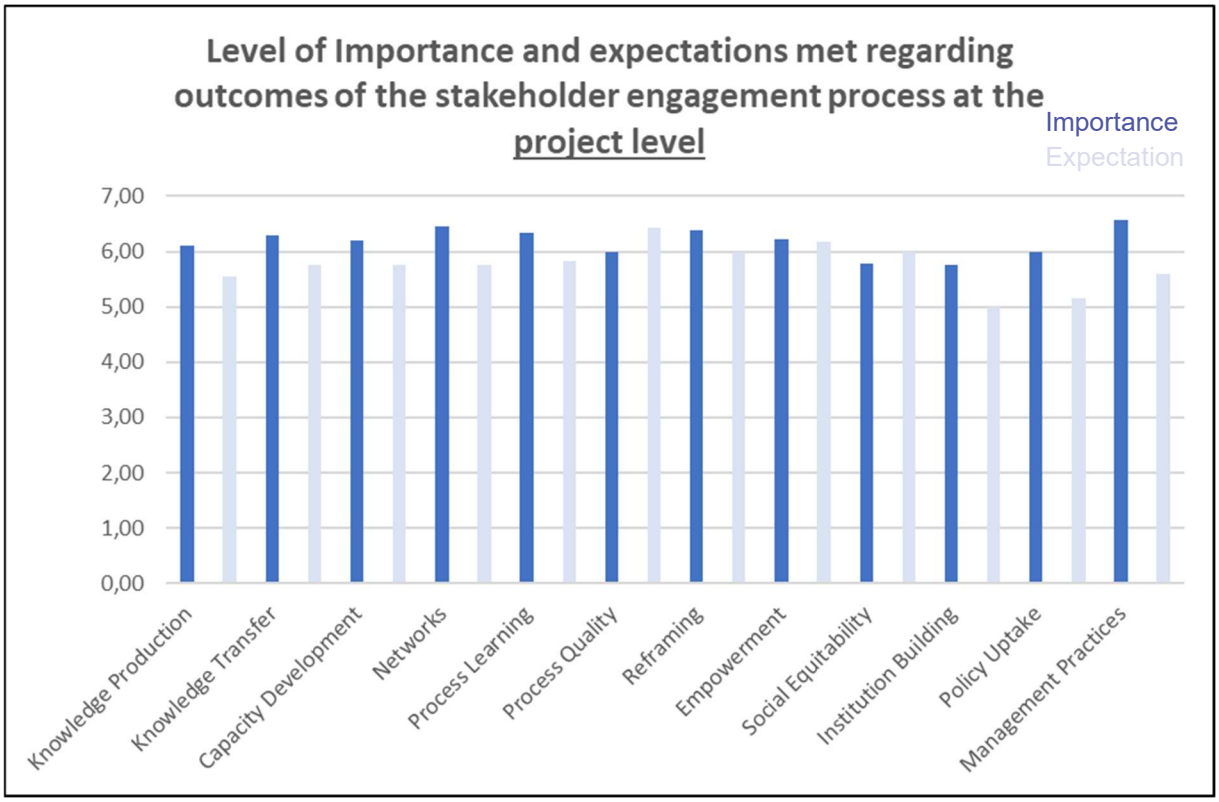

Figure 145: Level of importance (dark blue) and expectations (light blue) per outcomes of the SHE process at WS3.

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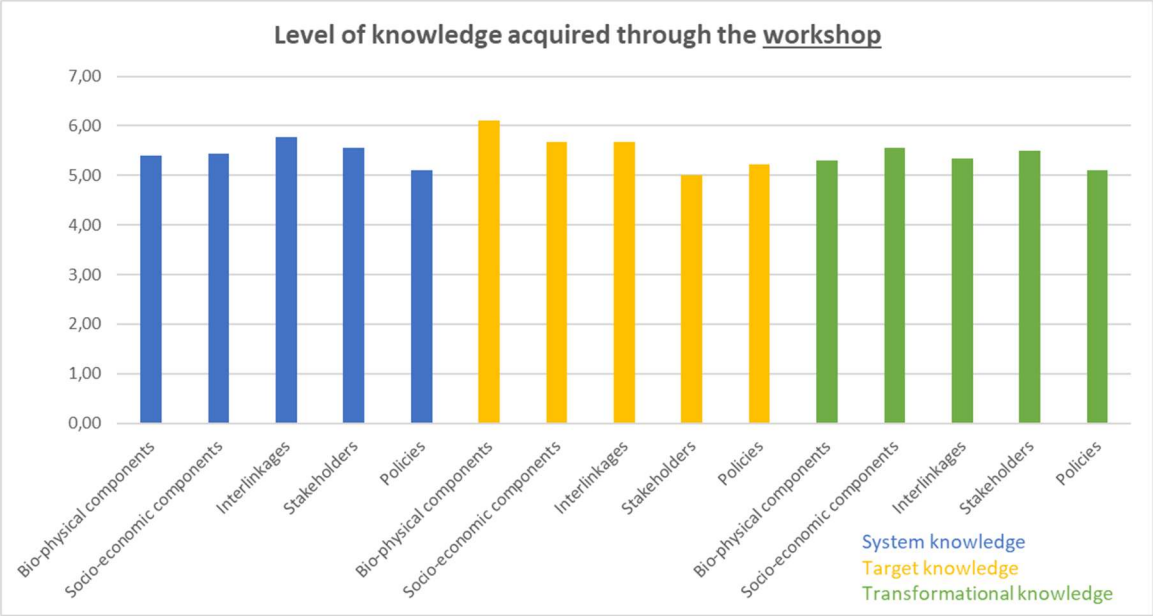

Figure 146: Knowledge generated in WS3 in different NXG areas.

The main recommendations drawn from the results for SHE are:

- ➔ Even though few participants responded, the respondents are largely senior, with an excellent gender balance and a good spread across the WEFE nexus SH groups.
- ➔ You have good levels of information and consultation. Keep these up by sharing results and outputs of the project and the WSs regularly (e.g. thank you notes to participants summarising the main outcomes of the WSs). For the next phase of the project, you may want to move further towards higher levels of engagement by involving a key set of SHs in agenda setting and invitation of SHs, timing and or hosting of WSs.
- ➔ You may want to focus on fostering networks for improving management practices through process learning. Process quality seems to be doing really well. What SH meant here exactly may need to be investigated further as SHs still feel that process learning is important. So maybe, they want to learn about good processes (of management practices?) from other sectors?
- ➔ Knowledge generation may need to be improved in particular about the desired future SH landscape or networks (think of SH sustainment). Current knowledge about policies and their transformational power on management practices may be another focus.
- ➔ While SH largely consider the (potential) outcomes of the project as useful there is also a certain scepticism about real change resulting from the project. Recommendations from SH include the involvement of policymakers, or people in power to affect policies, the RSA Economic Development Department in charge of sustainable development and the DWS planning engineers for the catchment.

Desired mode of co-creation

At the end of a session focused on the SH landscape and SHE at the third WS, break-out group discussions were held on the approaches to co-creation that together yield the modes of co-creation (see Chambers et al. 2021). For this purpose, the approaches to co-creation were briefly introduced as pairs (e.g., ‘solving problems’ and ‘reframing problems’ under

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'purpose'). as well as common risks and opportunities associated with them. Afterwards, SHs were encouraged to reflect on which degree of focus on the respective approaches is suitable for their CS. These modalities for the WS activity were chosen in response to previous experiences gathered throughout the evaluation process, which indicated that SHs were overwhelmed by being surveyed in written form on the original set of statements in the framework by Chambers et al. (2021).

The WS minutes, and in particular the comments from SHs in the break-out groups were scored along the respective scales of the approaches to co-creation, as per the framework by Chambers et al. (2021). The values yield one clear mode of co-creation, namely '**Empowering Voices**' (Figure 147~~Figure 147~~). The SHs particularly value identifying implementable actions that can help people on-the-ground. They do however also point out that high-level SHs, at least, need to give their blessing or, even better, provide a platform for a broad-based SH exchange.

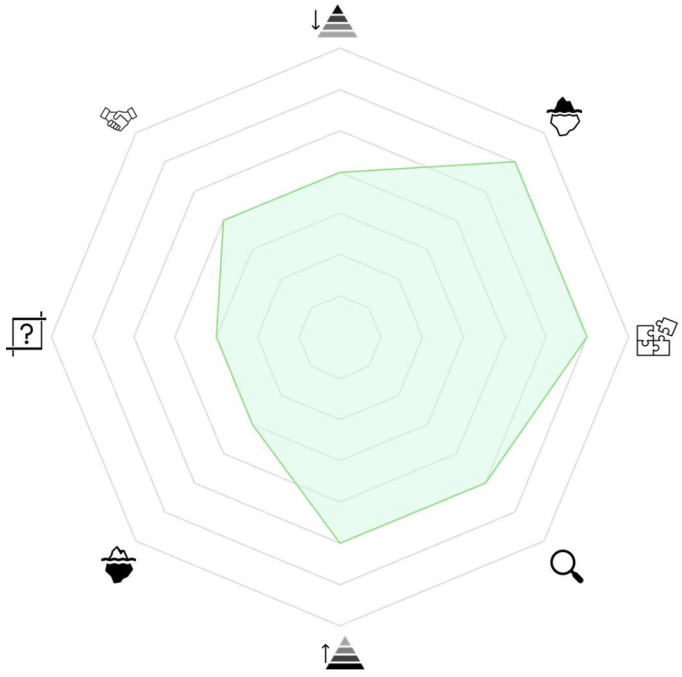

Figure 147: SH perspective on the desired approaches to co-creation – together yielding the mode 'Empowering Voices'**.** *Legend (in clockwise order from the top): 1) Influence powerful actors; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together*

Other co-creation processes focused on 'empowering voices' have created meaningful solutions for local actors based on the produced knowledge in the project. However, the knowledge produced or actions agreed upon could be ignored by high-level decision makers if not involved along the way. Positive outcomes (i.e. policy uptake, change in management actions, empowerment, etc.) were enhanced for cases that prioritized process learning and quality, fulfilled capacity needs, and planted the seed for multi-scalar partnerships and joint actions.

These aspects considered (and the general desire for relationship building), it may advisable to carefully bring SHs with different levels of power and from different levels of governance together, while being mindful of the effects of power dynamics between them.

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Specific recommendations for SHE are therefore:

- ➔ Make high-level decision-makers aware of the project and bring them on board with taking up identified solutions into policies.
- ➔ Strengthen networks and knowledge transfer for improved process quality and processes for policy uptake. The project could 'plant the seeds' for cooperation across governance sectors and levels to increase the likelihood of outcomes being put into action.
- ➔ Strengthen the capacities of local SHs to enable them to put policy recommendations into action.
- ➔ Work toward solutions that can tangibly help low-power SHs.

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Stakeholder engagement aim

The main aim of SHE for the South African CS is to obtain input from a wide range of representative SHs to inform the development of the Inkomati-Usuthu CS, WEFE Nexus Footprint, NEPAT, and associated policies.

The Mpumalanga Province in South Africa, of which the Inkomati-Usuthu river system is a crucial component, is vital to South Africa's development in terms of energy security (coal-fired power stations), food security (almost half of the country's high potential agricultural land) and water security (numerous competing water users). This study area contains conservation areas, including the southern portion of the Kruger National Park. Inequalities still exist in the South African society, and livelihoods must be incorporated into any nexus assessment, which is crucial to the aim of SHE. In an attempt to address these challenges, WEFE nexus policies will be developed that are relevant to the IUWMA with a focus on integrated water management, taking cognisance of forestry, mining, conservation, tourism, irrigation, and livelihoods aspects.

SHs from all decision-making levels were be identified, including national- and local government departments, relevant municipalities, national electricity providers, water management agencies, prominent land users in the area of interest, academics and researchers, as well as the general public. In the past year, the Inkomati-Usuthu CS saw the varying engagement of SHs and a clear call for the inclusion of further SHs. Suggestions for other SH were provided during the 3rd WS as well as through the survey that was administered then. Below are the responses from the SHs on further SHs to involve:

- Noted that Sustainable Development (RSA Economic Development Dept) should be involved
- policy makers
- It seems the biggest group of people to convince and align is the people in power to affect policies and make informed decisions. SHs within these institutions should be identified. Just a general comment since I see the misalignment within state internal departments to reach a common goal and the same with big companies. Politicians also keep making unrealistic and unsound promises to the desperate causing a breakdown in best intended projects, their execution and long-term success and continuous improvement. It is most likely a worldwide tendency.
- DWS planning engineers for the catchment; they develop strategies for the catchment

Overall, the SHE aims at obtaining input in form of the following knowledge areas:

- System knowledge:
    - Gain knowledge about the social, economic, institutional, and ecologic contexts of the area, with special emphasis on spatial scales of social and economic data (available at a provincial scale).
    - Gain general, qualitative knowledge, e.g., at a national level, of the neighbouring countries (Mozambique and Eswatini) that share part of the river basin to complement the information of the South African portion of the basin (focus of this cases study).
- Target knowledge:

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    - Determine drivers for sustainable development in the area, e.g., economic growth, jobs, socio-economic equality.
    - Gain knowledge on the required infrastructural improvements.
    - Determine criteria that characterise a balance between tourism activities and nature conservation.
- Transformation knowledge:
    - Determine requirements to invest in infrastructure.
    - Gain knowledge on the transition to renewable energy, including the re-skilling of workers and transfer of jobs.
    - Identify and understand relevant components for nature conservation and their relation to the WEFE Nexus.
    - Identify and understand main aspects that support the alignment of policies or the design and implementation of aligned policies.

Based on the conversations during the General Assembly meeting in Tours (Parallel Session 6) from 19-21 September, the following aims will be prioritized over the remaining two years:

- System knowledge:
    - Gain knowledge about the social, economic, institutional, and ecologic contexts of the area, with special emphasis on spatial scales of social and economic data (available at a provincial scale).
    - Gain general, qualitative knowledge, e.g., at a national level, of the neighbouring countries (Mozambique and Eswatini) that share part of the river basin to complement the information of the South African portion of the basin (focus of this cases study).
- Target knowledge:
    - Determine drivers for sustainable development in the area, e.g., economic growth, jobs, socio-economic equality.
    - Gain knowledge on the required infrastructural improvements.
    - Determine criteria that characterise a balance between tourism activities and nature conservation.
- Transformation knowledge:
    - Determine requirements to invest in infrastructure.
    - Gain knowledge on the transition to renewable energy, including the re-skilling of workers and transfer of jobs.
    - Identify and understand relevant components for nature conservation and their relation to the WEFE Nexus.
    - Identify and understand main aspects that support the alignment of policies or the design and implementation of aligned policies.

Meanwhile, gauging from the desired SHE outcomes, we derived likely aims as seen from the SHs' view:

- Possible system aims:
    - Deepen/improve understanding of the current (state of) WEFE Nexus problems (e.g., river basin management, energy transition, water scarcity) and identify pressures

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  - Gain/increase understanding of the institutional, organisational and political context and (current) river basin management plans (including neighbouring countries)
- Possible target aims:
  - Know about future expectations/perspectives (in general and for assessment tools)
  - Determine solutions/systems (and their drivers) that balance sectors for a sustainable production
  - *Gain knowledge on potential conflicts between sectors and how to reduce them (e.g., through the use of a common language), moving towards cooperation and trust.*
- Possible transformation aims:
  - *Improve communication between SHs and break silos*
  - *Design of pathways to enhance awareness of (water) resources management*
  - Identify relevant WEFE Nexus components and indicators

The system knowledge aims are aligned with the ones of the CS. However, there is some divergence when it comes to the target and the transformation knowledge aims. Specifically, the SHs are keen on expanding their networks and improve communication between SHs moving forward. This is not yet reflected in the CS's aims. In fact, the outcome 'networks' is also one where expectations are not met, yet.

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Stakeholder analysis

Stakeholder identification

A total of 178 (153 in 2022) SHs were preliminarily identified out of which, 33 or 18.5% consented to be officially included in the SH register and participate in the NXG SHE (Table 57). This is a significant increase in SH consent, even if the percentage is still below the overall project average (21,5%) the absolute number of consented SH is in line with other cases.

Table 57: CS5-Inkomati summary information of stakeholder identification as of Sept. 2022 and updated numbers from 2023.

Item	Count 2022	Count 2023
Preliminary listing of stakeholders	153	178
Stakeholders in registered officially	9	33
Percentage of consent [%]	5.9%	18.5%

To move forward with a GDPR compliant SH base the issue of contest was discussed at the General Assembly meeting in Tours from 19-21 September 2023. The following was agreed:

1) Most information on SH is taken from public sources → mark SHs where information was taken from public sources (add a P if taken from public source in the new column B of your CS tab in the SH dashboard)
2) Double check current names and organizations and update SHs and affiliations accordingly. Some SH may have changed jobs, retired, etc.
3) Mark all high power or high interest SH in the register. These are people you most likely may want to keep. Write to them individually and ask them to consent to the PPCF; threaten with removal if needed. Remove them from the register if the information obtained on them is not from public sources.
4) Add new SHs based on the needs outlined in the management plan below. Lay a particular focus on moving from technical SH to more political SH that could help you understand where legislation on the suggested policy packages currently stands. This will help you get into the policy cycle better. Ideally source their contact information from public sources.

SHs have been categorised within the WEFE sector where one SH can belong to more than one sector. Across the differentiated ones, there is still a clear preponderance of SHs from the water sector over the other sectors (Figure 148). Even though efforts should focus on increasing the overall interest of SHs in the project to improve the consent rate, especial attention should be placed on SHs of the energy and food sectors.

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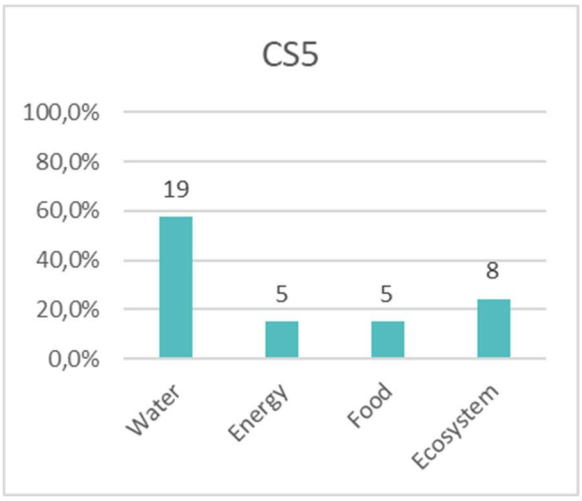

Figure 148: Distribution of stakeholders across the WEFE sectors for CS5 – IUWMA. One stakeholder can be assigned to one or more sectors.

In terms of gender, there is a significant change from a 20/80 to an almost even split between women and men. All SHs provided data about gender.

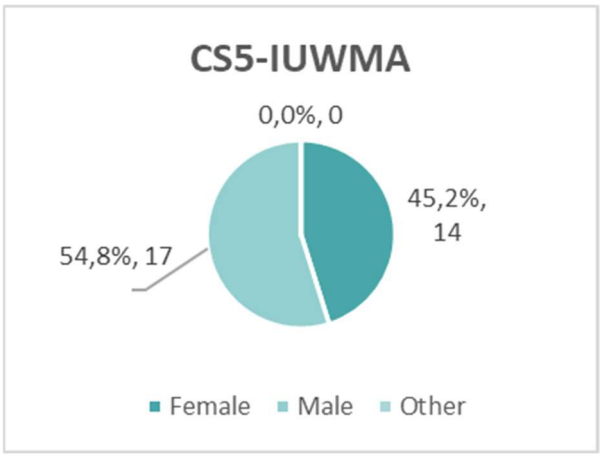

Figure 149: Gender distribution for CS5 – IUWMA.

Stakeholder differentiation and categorisation

The SHs belong mainly to tier 1 (20), followed by Tier 2 (8) and Tier 3 (5). This means that, overall, SHs are perceived to be interested in being engaged in the development of the project's outputs.

Compared to the 2022 analysis, a higher contrast between SH groups can be identified. The largest share of SH is considered as 'Policymakers at national level' (10 and 'Policymakers at local level/municipalities' (5), as well as from 'River basin authorities' (6). Other SH groups include 'businesses' (3), 'media' (2), 'research and academia' and 'civil society (1 each) (Figure

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150).

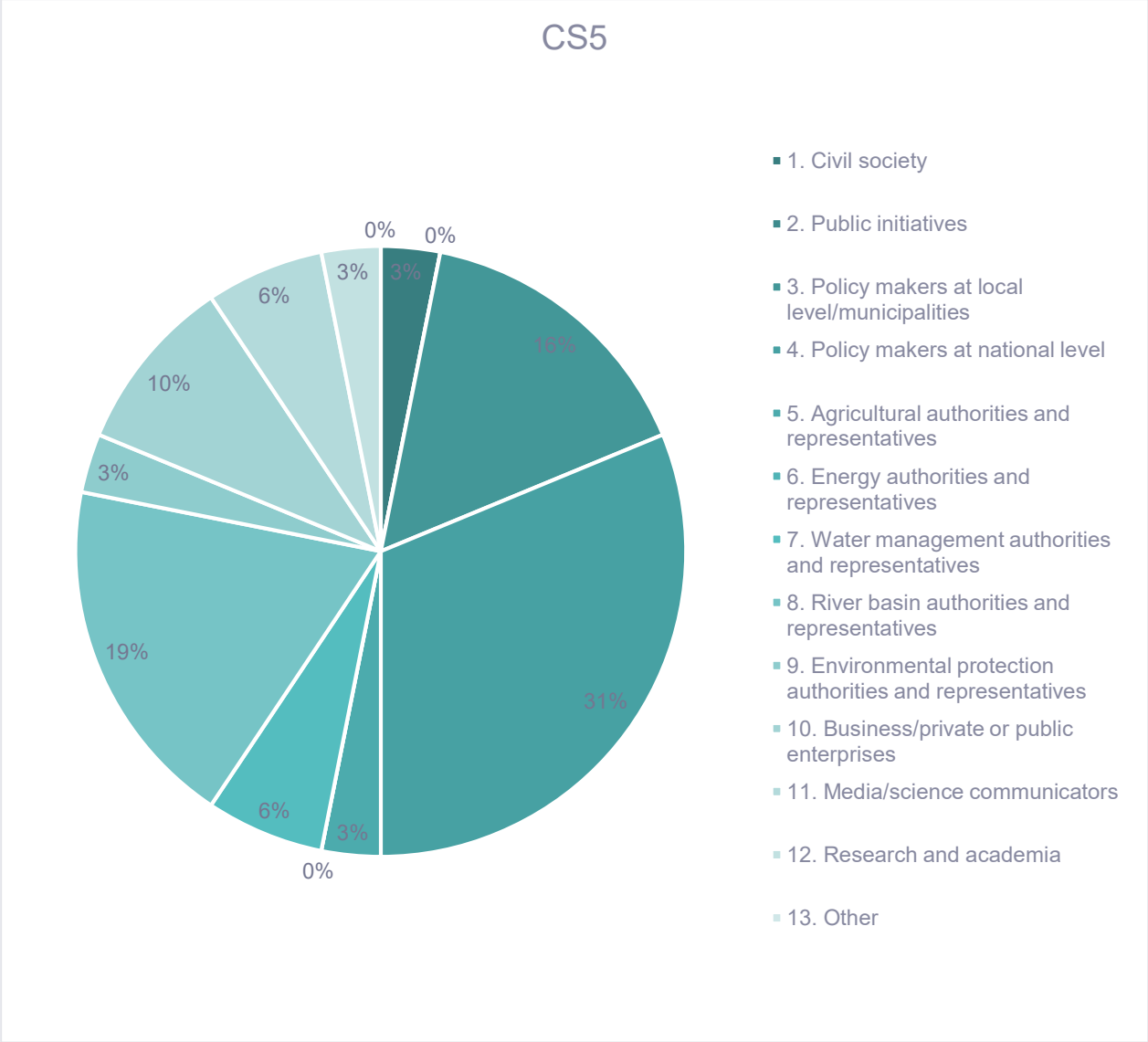

Figure 150: Distribution of stakeholders across categories for the case CS5- Inkomati Ushutu

From a Power-Interest perspectives, almost ¾ of the SH are considered to be High Interest – High Power SH (72.7%), and almost all SH are considered as High Interest SHs (93.9%) (Figure 151). An effort to reach the Low Interest – High Power SHs with a focus on people deciding on policies should be made in this second phase of the project.

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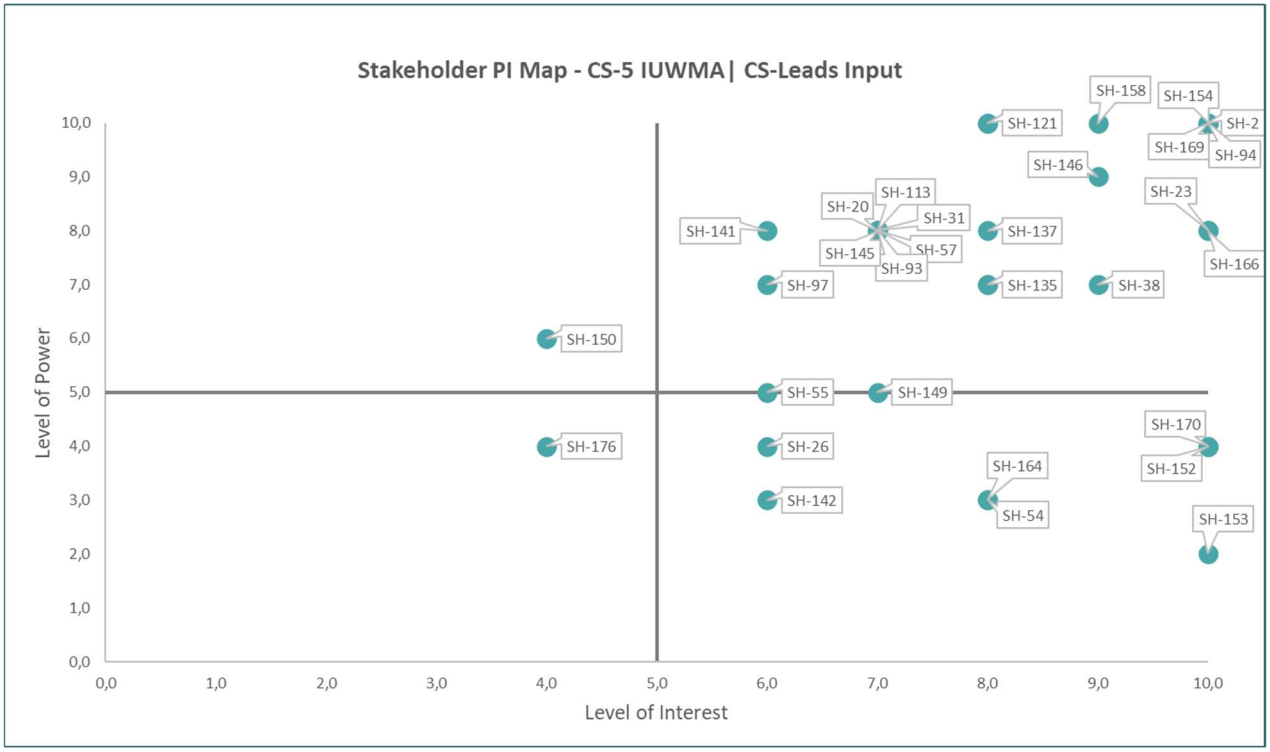

Figure 151: Power-Interest Map for CS5 – IUWMA, based on the CS-Leads' perception. For data protection and privacy matters, stakeholders are anonymised; for internal use CS-Leads know which stakeholder each number represents.

Stakeholder relationships

About the relationships among the SHs, the CS-Leads characterised – based on their perception – 505 relationships across the 33 SHs. The relationships correspond mainly to complementary (Cm) and cooperation (Cp) (41.0% and 37.4%, respectively) (Figure 152 and Figure 153). Compared to last year's analysis a larger share of non-existent (NE) relationships has been added (11.5%) and more conflicting relationships have also been identified (10.1% up from 5.6% in 2022's analysis). This is an opportunity to create new networks and relationships that were not present before the project and allow a neutral space to assess the conflicts and negotiate areas for more cooperation and collaboration.

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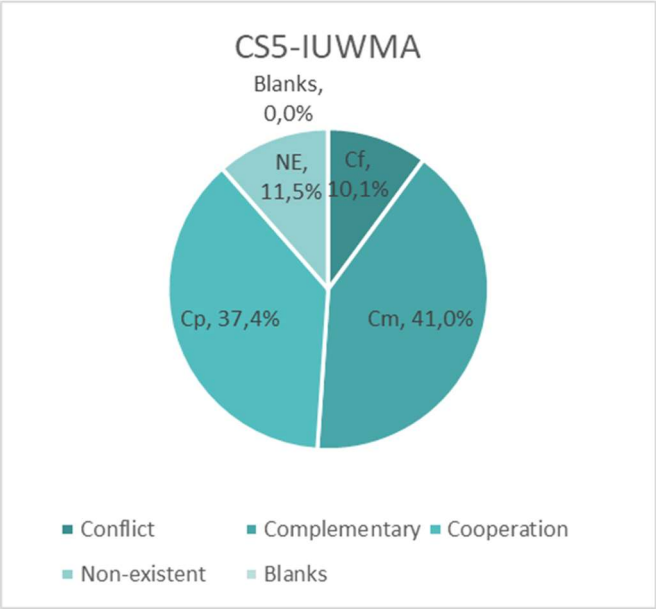

Figure 152: Share of types of relationships across stakeholders. Characterised based on the perception of CS-Leads.

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SH-ID	SH-121	SH-57	SH-145	SH-54	SH-132	SH-153	SH-97	SH-23	SH-149	SH-20	SH-154	SH-150	SH-113	SH-152	SH-158	SH-137	SH-141	SH-164	SH-169	SH-55	SH-176	SH-166	SH-67	SH-146	SH-31	SH-93	SH-142	SH-38	SH-170	SH-135	SH-26	SH-94
SH-121																																
SH-57	Cp																															
SH-145	Cp	Cp																														
SH-54	Cm	Cm	Cm																													
SH-132	Cm	Cm	Cm	Cf																												
SH-153	Cm	Cm	Cm	Cf	Cp																											
SH-97	Cp	Cp	Cp	Cm	Cm	Cm																										
SH-23	Cp	Cp	Cp	Cm	Cm	Cm	Cp																									
SH-149	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp																								
SH-20	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	Cp																							
SH-154	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	Cp	Cp	Cp																					
SH-150	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	Cp	Cp	Cp	Cp																				
SH-113	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	Cp	Cp	Cp	Cp	Cp																			
SH-152	Cp	Cp	Cp	Cf	Cp	Cp	Cp	Cm	Cp	Cp	Cp	Cp	Cp	Cp																		
SH-158	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cm																	
SH-137	Ne	Ne	Ne	Ne	Cm	Cm	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cm	Ne																
SH-141	Cm	Cm	Cm	Cm	Cm	Ne	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm															
SH-164	Cm	Cm	Cm	Cf	Cf	Cf	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cf	Cm	Cf	Cf	Cm														
SH-169	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne													
SH-55	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cm	Cp	Ne	Cf	Cf	Ne													
SH-176	Cm	Cm	Cm	Cp	Cf	Cf	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cf	Cm	Ne	Ne	Cf	Ne	Cm												
SH-166	Cm	Cm	Cm	Cf	Cf	Cf	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cf	Cm	Cf	Cm	Cp	Ne	Cm	Cf											
SH-67	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cm	Cp	Ne	Cm	Cf	Ne	Cp	Cf	Cf										
SH-146	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	Cp	Cp	Cp	Cm	Cp	Cm	Cm	Ne	Cm	Cf	Ne	Cm	Cf	Cf	Cm									
SH-31	Cm	Cm	Cm	Cf	Cp	Cp	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cp	Cm	Cm	Cf	Cf	Ne	Cm	Cf	Cf	Cm	Cm								
SH-93	Cm	Cm	Cm	Cf	Cp	Cp	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cp	Cm	Cm	Cf	Cf	Ne	Cm	Cf	Cf	Cm	Cm	Cp							
SH-142	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Ne	Cp	Cp	Cp	Cp	Cp	Cp	Cp						
SH-38	Cm	Cm	Cm	Cp	Cf	Cf	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cf	Cm	Ne	Cf	Cf	Ne	Cm	Cp	Cf	Cm	Cm	Cf	Cf	Cp					
SH-170	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Ne	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp				
SH-135	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cm	Cp	Ne	Cm	Cf	Ne	Cp	Cm	Cf	Cp	Cp	Cm	Cm	Cm	Cm	Cm			
SH-26	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Ne	Cm	Cm	Ne	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Ne	Cm	Ne	Cm		
SH-94	Cm	Cm	Cm	Cp	Cp	Cp	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cp	Cm	Cm	Cm	Cf	Ne	Cm	Cf	Cf	Cm	Cm	Cp	Cp	Ne	Cf	Ne	Cm	Cp	

Figure 153: Actor-Linkage Matrix for CS5-IUWMA. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent.

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Stakeholder engagement plan for CS5 – IUWMA

The SHE plan provides a guidance to organise SHE and achieve the SHE aims considering the findings from the SHE evaluation and the updated results of the SH analysis. These results show that:

- The SH base has increased significantly, including the consent rates (which are similar to the other CS in absolute values), and presents a better gender balance.
- SHs are still mostly from the water sector, but a good share of them seem to come from national or local policymaking.
- Most SHs are still identified as High-Interest SH, with few of them being Low Interest-High Power SHs.
- SHs are mostly cooperative or complementary, with a fair share of conflicting relationships and non-existent ones.

Considering this background, CS-Leads scored the different co-creation approaches for the themes of purpose, power, politics, and pathways. The resulting figure (Figure 154) was discussed with the CS-Leads, and after consideration of the aims, the analysis results, and the own CS-Leads' overview of the context, the fitting mode of co-creation is "Researching solutions".

This mode focuses on the co-creation of knowledge to inform evidence-based decision-making, influencing policies and interventions (Chambers et al., 2021[1]). For a stronger impact, this mode of co-creation should be supported by an environment that fosters SHs to work on their relationships and questions current practices to adapt to policy changes (ibid.).

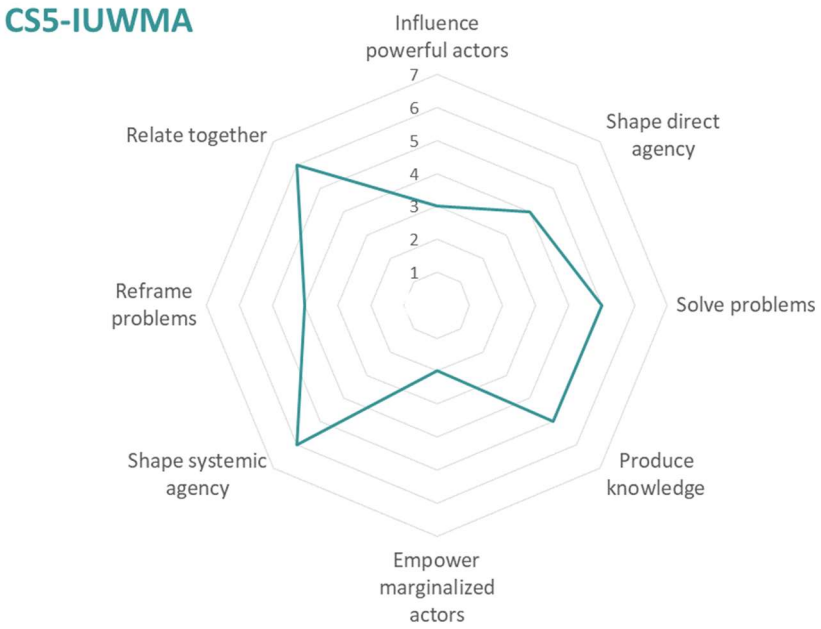

Figure 154: CS5-IUWMA scoring for co-creation approaches

CS5-IUWMA intends to bring SHs together and provide a different set of data, looking at policies from an integration perspective to propose suggestions for changes in resources

[1] Chambers, Josephine M., C. Wyborn, M.E. Ryan, R.S. Reid, M. Riechers, A. Serban, N.J. Bennett, et al. 2021. 'Six Modes of Co-Production for Sustainability'. *Nature Sustainability* 4 (11): 983–96. https://doi.org/10.1038/s41893-021-00755-x.

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management. The idea is to provide new information and complement the current conversations around the sectorial management.

The SHs' view on co-creation (see Section 'Desired mode of co-creation) share a desire to identify and develop specific actions through the project to increase the direct agency of SHs. Likewise, 'management practices' features very highly amongst the desired outcomes of SHs. However, it is also one of the realms in which the CS is still underachieving the most compared to the SHs' expectations. In addition, 'networks' and 'policy uptake' are highly desired outcomes, which SHs are currently not experiencing, yet. The CS should be careful not to overemphasise knowledge production over identifying specific actionable measures. Therefore, the focus of the CS moving forward should be:

- ➔ Formulate specific actions;
- ➔ Discuss with high-power SHs how project outputs can be integrated/translated into policies;
- ➔ Build the networks of SHs, focused on building the capacities for implementation, considering also in particular the needs of marginalised SHs.

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Table 58: Overview of the main stakeholder engagement components of the stakeholder engagement plan for CS5-IUWMA.

	Co-exploration	Co-design		Co-development	
	Information	**Consultation**	**Involvement**	**Collaboration**	**Empowerment**
WHO? Stakeholder category	All categories should be properly informed.	All categories can be consulted. Make high-level decisionmakers aware of the project and bring them on board with taking up identified solutions into policies.	All categories can be involved. Recommendations from SH include the involvement of policymakers, or people in power to affect policies, the RSA Economic Development Department in charge of sustainable development and the DWS planning engineers for the catchment.	All categories can collaborate, with particular focus on the sectoral authorities and the local policy makers. Strengthen networks and knowledge transfer for improved process quality and processes for policy uptake. The project could 'plant the seeds' for cooperation across governance sectors and levels to increase the likelihood of outcomes being put into action.	Strengthen the capacities of local stakeholders to enable them to put policy recommendations into action.
WHY? PI and ALM	You have good levels of information and consultation.	High-power actors may block processes that are against their interests.	Work toward solutions that can tangibly help low-power stakeholders. While SH largely consider the (potential) outcomes of the project as useful there is also a certain scepticism about real change resulting from the project.	The project could 'plant the seeds' for cooperation across governance sectors and levels to increase the likelihood of outcomes being put into action. Challenges in engaging stakeholders of interest to influence due to prioritising the project's interest on the solution.	Having high power stakeholders engaged in the empowerment process can support sustaining the empowerment after the project. It may help design pathways to enhance awareness of (water) resources management

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	Co-exploration	Co-design		Co-development	
					(transformational goal asked by stakeholders)
HOW? Activities	Keep these up by sharing results and outputs of the project and the WSs regularly (e.g. thank you notes to participants summarising the main outcomes of the WSs).	For the next phase of the project, you may want to move further towards higher levels of engagement by involving a key set of stakeholders in agenda setting and invitation of stakeholders, timing and or hosting of WSs.	Additional activities that foster exchange between stakeholders from different sectors, categories are helpful. Plan activities to share the outputs of the provided feedback and discuss about it.	There is an opportunity to create new networks and relationships that were not present before the project and allow a neutral space to assess the conflicts and negotiate areas for more cooperation and collaboration.	Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations) so that, the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded stakeholders. Frequent smaller conversations of sectoral peer stakeholders may need to happen to allow for recognition of peers and for technical discussions about solutions (e.g., ecological low flows, conservation measures, tourism activities). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.

*Overall, consider having WSs in hybrid modality to facilitate the participation of more stakeholders (check the WS checklist).

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Management and sustainment

Management

CS-Leads should not forget checking the expectations written by the official SHs in the Privacy Policy Consent Form.

The initial management plan considered different foci per year**.** The table below looks at how these were accomplished and what to change based on the findings of the past year.

Foci	From 2022 Plan	2023 Plan
2023	Actively look to increase the interest of other stakeholders while maintaining the interest of the current high interest stakeholders. Focusing away from high interest stakeholders towards low interest stakeholders may allow discovering currently missing marginalised stakeholders.	The SH register was significantly expanded. The SH base has a better gender balance, but is still slanted towards the water sector and high interest SH.
2024	Maintain the interest of the engaged stakeholders and focus on the relationships between them, including power dynamics and building trust to enhance collaboration.	Keep information sharing up by sharing results and outputs of the project and the WSs regularly (e.g. thank you notes to participants summarising the main outcomes of the WSs). For the next phase of the project, you may want to move further towards higher levels of engagement by involving a key set of stakeholders in agenda setting and invitation of stakeholders, timing and or hosting of WSs. Additional activities that foster exchange between stakeholders from different sectors, categories are helpful. Plan activities to share the outputs of the provided feedback and discuss about it. There is an opportunity to create new networks and relationships that were not present before the project and allow a neutral space to assess the conflicts and negotiate areas for more cooperation and collaboration. Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations) so that, the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded stakeholders. Frequent smaller conversations of sectoral peer stakeholders may need to happen to allow for recognition of peers and for technical discussions about solutions (e.g., ecological low flows, conservation measures, tourism activities). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.

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2025	Focus on co-decision activities and further planning on sustainment of stakeholders as well as on the defined agreements.	Stay focused on providing evidence base and the results from the research. This is your largest asset.

Leading a stakeholder engagement process through a co-creation mode of "Researching solutions", focused on solving problems and producing knowledge, while placing considerable efforts on reframing problems and empowering less powerful SHs, provides several opportunities, but is also linked to some risks. Table 59 provides details of the opportunities and risks associated to the high-scoring approaches and also linked to the co-creation Mode 1 "Researching solutions". Considering the recommendations derived from the SHs' likely desired outcomes and desired co-creation approaches, it is advisable to particularly look out for the following risks:

- ➔ Legitimising current power relations and systems such as an imbalance across WEFE sectors and/or public authorities from each of the countries;
- ➔ Risk of inhibiting the reframing potential;
- ➔ Challenges in engaging SHs of interest to influence due to prioritising the project's interest on the solution;
- ➔ Focusing on budgeted activities only disregarding the pursuit of emerging goals; and,
- ➔ High-power actors may block processes that are against their interests.

Table 59: Overview of opportunities and risk linked to Mode 1 "Researching solutions" and the approaches that ranked higher in CS5-IUWMA. Based on Chambers et al. (2021).

Approach	Opportunity	Risk
Solve problems	The focus on solving problems should foster achieving specific goals, such as, determining drivers for sustainable development in the area, required infrastructural improvements and criteria to balance tourism activities and nature conservation.	- Risk of facing challenges in engaging stakeholders that should be influenced due to prioritising the focus and advancing on the project's interest. - Risk of reinforcing existing dominant views on the nexus problem and possible solution, e.g., stick to sectorial view of the problem(s). - Risk of inhibiting the reframing potential.
Produce knowledge	Focusing on solving problems and creating and transferring knowledge offers the opportunity of supporting evidence-based decision-making and justifying changes.	- Echoing knowledge to create specific impacts. - Scientific knowledge overshadowing expertise and other ideas. - Focusing on budgeted activities only disregarding the pursuit of emerging goals.
	The focus on knowledge production and transfer, can help in advocating for policy changes, building capacity, and addressing specific CS's needs. For instance, knowledge on production and transfer on social, economic, institutional, and ecological contexts; transition to renewable energies.	
Shape systemic agency	Shaping systemic agency can shift views for creative and transformative solutions that, in this case, can support a balance between different sectors, find new drivers for sustainable	- Risk of disempowering stakeholders if the boundaries of the problem frame are not defined properly – leaving the feeling of problem "too big to handle".

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Approach	Opportunity	Risk
	development and find innovative ways of fulfilling infrastructural requirements.	- Risk of losing effectiveness if emotional aspects related to power and anxiety are forgotten. - Risk of creating echo chambers if more attention is placed on few identity conflicts and power differentials. - Risk of ending up with much talking and little action.
Relate together	Relating together offers the opportunity of building legitimate and flexible processes that foster tangible changes; for instance, changes in the implementation of aligned policies.	- Risk of having an apparent cooperation or consensus (illusion of consensus) if power and dialogue/discussion dynamics are not managed properly. - Risk of increasing social inequalities derived from not valuing properly voluntary contributions that each stakeholder makes.

Sustainment

Starting the session on SH involvement, a presentation on "Stakeholder Engagement process and SH landscape in the Inkomati-Ushutu CS" was presented by WP5 team (Tamara Avellan, AVA and Simon Ryfisch, Uppsala University). The presentation was followed by interactive discussion on how stakeholders would wish to continue the cooperation:

- Would like to continue talking about nexus issues in the future.
- Similar platform on Nexus issues exists in the Crocodile River Basin.
- There should be forums joined or established as and how needed to keep info flowing and or hold each other accountable. We should not drop the ball once the project is done.

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Late-project engagement (Month 36 Stakeholder Engagement Plans)

CS1: Nestos/Mesta

The SH (SH) engagement plan is based on the data, information and perceptions provided and analysed by the CS (CS) leads, the CS SHs and the AVA- and UU-Team by August/September 2024. The plan is updated on a yearly basis taking new SH information and evaluation results into account to allow for adaptive management. Thus, the plan starts with the fifth phase of the SHE plan, namely SH Evaluation.

(5) Evaluation

In the 2023-2024 cycle no SH WS took place in which an evaluation would have fitted. Rather evaluation information is based on:

(1) The self-evaluation of CS on the implementation of the recommendations of the past plan
(2) Summarized findings from the interviews with CS on the co-creation approach
(3) Information extracted from MS23 Second intermediate report on CS implementation and co-creation activities for the Nestos/Mesta CS
(4) Recommendation that ensued from the CS meeting with WP1 and WP5 in Berlin in January 2024

Results from the self-evaluation

The 2023 plan suggested a set of activities /actions to be carried out in the upcoming year (2023/2024) (last row of Table 3 in the 2023 SHE plan). Table 60 below show the degree to which the activities were implemented and further comments on these.

Table 60: Self-evaluation of the implementation of the 2023 SHE plan recommendations

Recommended activities as per the 2023 SHE plan	**How activities were implemented**	**Further comments**
Better inform SHs about updates and processes at the project level which may allow for further instances to co-design.	Done via emails including updates on the progress of the project, phone calls with some SHs, sharing of project promotional material (e.g. flyers) and the organization of a focus group (co-organised with KWR), and it will be further developed until the end of the project. We are going to inform more SHs, especially high-level decision makers, during the last year of the project where the NEPAT tool for the Nestos/Mesta CS will be ready for demonstration.	

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Provide SH with system knowledge, i.e. providing them with easily understandable results of the biophysical and socio-economic modelling and what this means to the WEFE Nexus.	During the 4th SH WS (February 2024), the first version of the NEPAT and its functionalities was demonstrated to SH by EURECAT and a menti-survey regarding possible future improvements of the tool was shared. Lielupe CS was presented as an indicative example.	
It has proven effective to focus on one particular issue where there is shared interest amongst SHs, and then formulate actions to address it. Possibly start with an issue that matters to high-level decision-makers in both riparian states (i.e. Greece and Bulgaria).	Not achieved so far but we will try to include it in the final SH agreement. One representative of the Special Secretariat for Water (Ministry of the Environment and Energy) participated in the online Focus Group that took place in May 2023. But higher-level decision makers are not engaged in the project yet.	Emphasis will be given during the last year of the project where: 1. The NEPAT will be ready for demonstration 2. Policy recommendations and policies to be tested and implemented in the Nestos/Mesta River basin are finalized.
Consider one of the following options: a) gather inputs from marginalised SHs and convey them to powerful SHs, b) manage to bring everybody to the same table and provide a platform for common dialogue, or c) have two events with one focusing on technical aspects and local-level networks and another one on high-level dialogue and 'signing off' on actions to be taken.	a) Partially done (farmers that are marginalised SHs but have expressed urgent needs for reforming water allocation schemes – Municipality of Nestos that is a low-level decision-maker) and partially in progress (communicate inputs to high-level decision makers) b) In progress – High-level decision makers should be more involved in the process. c) In progress – High-level decision makers to be involved and to be included in the final SH agreement.	Marginalized SHs such as farmers are now belonging to our core group (official group) of SHs. Also, a female SH, representative of a life-long learning organisation and having categorized herself under the sector of food, has signed the PPCF.

Interviews on SHE performance

As part of the SHE evaluation, WP5 conducted a (re-)assessment of the aims of and preferred approaches to co-creation with the CS leads. This was done to gauge 1) to what extent CS have, in their own perception, reached the aims they had set for themselves and 2) whether priorities and expectations have changed based on their experiences throughout the project. To facilitate this, UU distributed a template to capture updated aims and approaches to

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collaboration. Subsequently, in June 2024, the information provided by the CS leads was further discussed in one-on-one conversations.

Below, firstly, the modes of co-creation elicited in June 2024 are presented – this includes the desired mode of co-creation by CS leads (i.e., what the CS leads deem to be appropriate to bring about the desired outcomes) versus the one the CS leads themselves consider having de facto delivered. These are also compared with the modes originally preferred by the CS leads at the start of the project ('researching solutions' in September 2022), as well as those indicated by SHs during the third project WS ('brokering power' in March 2023).

In the most recent interview round, CS leads have identified a set of desirable co-creation approaches that form the mode of 'brokering power', thus aligning more closely with their SHs preferences (Respective templates can be found in the Annex) (Figure 155 and Figure 156). This does not mean they have abandoned approaches typical of their original co-creation mode, 'researching solutions'—such as knowledge production and problem-solving—but rather that they have expanded their focus to include new approaches and shifted the main priorities. 'Brokering power' is characterized by efforts to engage and influence powerful SHs to drive specific actions. While this can lead to tangible outcomes, such as policy changes, it requires a high degree of legitimacy granted by these actors and skilled facilitation to create a safe space for dialogue.

A notable deviation from the typical 'brokering power' mode is that the CS leads also aim to empower marginalised SHs. This relates to the two-pronged approach that the CS leads are planning to employ for the remainder of the project: 1) defining actionable, small-scale measures with local SHs in the Nestos/Mesta basin, and 2) lobbying for more fundamental policy changes with higher-level SHs – ideally through supporting the case of less powerful SHs with scientific evidence. The CS leads anticipate that the NEPAT tool will help with both.

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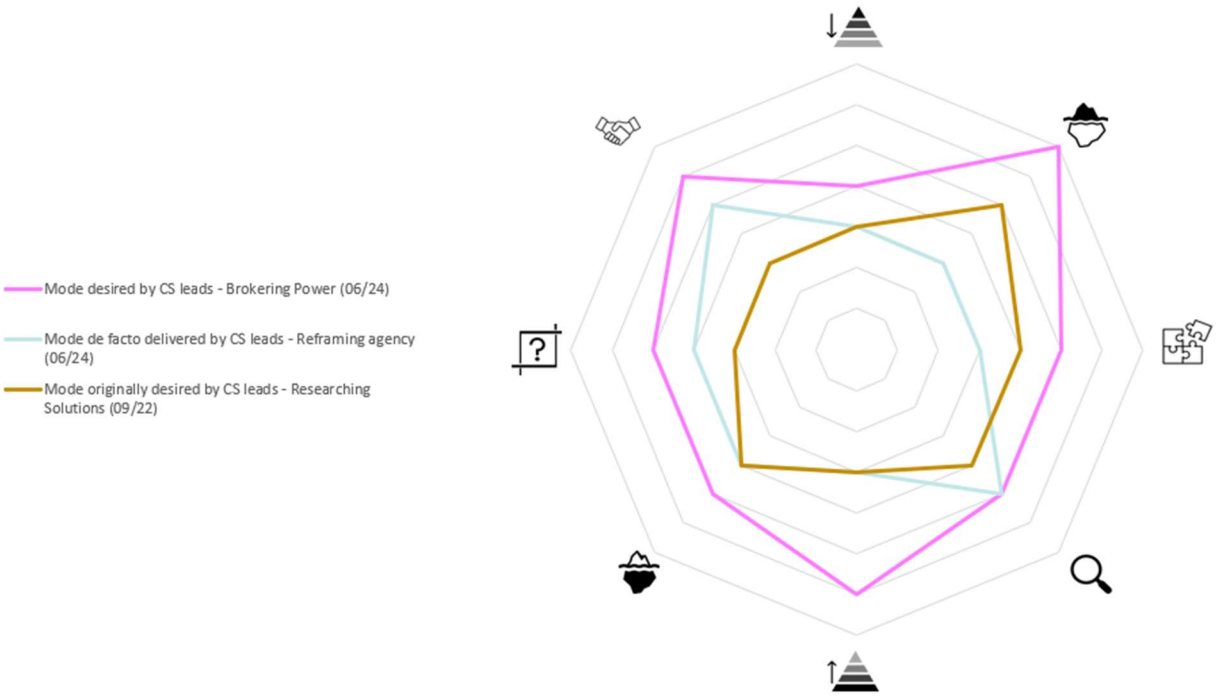

Figure 155: Comparing the Approaches/Modes of Co-Creation as assessed by CS leads. Icons from the top in clockwise order: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together

Figure 156: Comparing the CS's and SHs' Approaches/Modes of Co-Creation. Icons from the top in clockwise order: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency;

The desired mode of co-creation identified by the CS leads aligns closely with the preferences expressed by SHs. However, a key difference includes a reduced emphasis on empowering marginalised SHs, as indicated by SHs during the third WS. This suggests that local SHs

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themselves may anticipate more impactful change arising from lobbying for high-level interventions. Additionally, SHs place relatively low value on 'reframing problems.' This observation is consistent with feedback from the CS leads, who noted that while SHs are open to dialogue, significant shifts in perceptions of WEFE nexus-related problems in the basin have not occurred yet.

Lastly, comparing the current de facto mode of co-creation 'reframing agency' with the one preferred by SHs, it appears that relationship building must be emphasised for the remainder of the project. This includes sowing the seeds for joint actions. This would also indirectly link to helping SHs negotiate the actions/solutions they desire to implement to achieve their set goals. So far, SHs have shared their views on possible actions but not weighed particular options against each other, yet.

Risks that the CS leads should be mindful of are:

- overestimating the willingness of local SHs to actually implement tangible actions or, not to mention, fundamentally shift their practices;
- overlooking that power dynamics between SHs (e.g., the relative dominance of the energy sector vis-à-vis others) may still persist, despite improved SH relationships;
- underestimating the resources required to influence high-level SHs. In the conversation between the CS leads and WP5, it was indeed mentioned that resources and time are insufficient to affect policies at levels outside the basin within the NXG project.

The self-assessed level of achievement of the aims of co-creation is presented and discussed under the chapter SHE Aim.

Information extracted from MS23

MS23 is based on interviews that were carried out with CS leads during months 30-36 of the project to summarize the CS implementation and SH co-creation activities. Information relevant for this SHE plan update was extracted from the latter parts of MS23, namely 'Impact maximization' and 'Lessons learned'. The relevant elements can be summarized as follows:

- The third WS held in March 2023 was crucial to build trust between the SH and the project consortium on the one hand and across the Greek and Bulgarian SH on the other. It is described multiple times as a key turning point. SHs realized that the information they had provided throughout the course of the early phase of the project (policy selection) was taken seriously and was used as the basis for all further development of the modelling and AI simulation (NEPAT). In addition, the fact that at this WS SHs from both riparian countries were present and a large effort was made for translation and allowing for communication allowed for the cross-border SHs to realize that they had common issues and interests.
- The direct involvement and inclusion of the two key cross-border municipalities of the river basin (Nestos, GR, and Gotse Delve, BG) is considered as essential and fundamental to the reach towards the involved SHs and the successful organization of the WSs and the other interventions on the ground. Their knowledge and support are considered as invaluable. Having them both on board also allowed for a cross-border communication that was new to them.

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- The development of the project and the consistent and honest attempt of working in a co-creation manner with the SHs has allowed them to discuss cross-border issues. The project provides them a non-political space to do so and to hear each other. This is surprising in as much as participatory planning is not a common practice in either Greece or Bulgaria, both very top-down administrations, which is why WSs and interventions in this CS have been rather less immersive. It is therefore impressive to see that even timid participatory practice attempts can go a long way in opening up avenues for novel interactions and synergies.
- A limiting factor towards the impact of the project is the low reach it has into higher policy-making spheres. While SHs at the local level are heavily engaged they, as much as the research consortium, realize their limited capacity to change policies, as these are drawn up, decided upon and implemented at the national level. This actor base is so far not involved and has been challenging to reach.
- SH sustainment throughout the project is a challenge. Maintaining people's continued interest for the project over 6 WSs throughout 48 months is difficult. Transferring complex scientific and technical information was considered a large difficulty. SH sustainment beyond the lifetime of the project will be the next hurdle for impact.

Recommendations from the 'Berlin meeting'

A three-day meeting was held in Berlin, Germany from 10-12 January 2024, hosted by the Helmholtz Institutes. All CS leads, WP1 and WP5 representatives met to (a) reflect on the SHE process so far, (b) discuss the needs of the governance roadmap and the 'river contracts' to be drawn up by the end of the project, and (c) draw lessons learned from the process and suggest adapted strategies with a view of achieving the river contracts and the needed SH sustainment. Table 61 below shows the reflection and the suggested ways forward.

Table 61: Recommendations from the Berlin meeting -CS1

NESTOS/MESTA	
Reflections on SHE to date	***Ideas for SHE & Agreement moving forward****
Workshops • WS3: International & transboundary mode was very effective. Greek and BG SH met each other, open dialogue in plenary was preferred, allowed for open discussion (expressing views was encouraged to bring them closer together) • Use short presentations; short sessions; 2 people in charge of the sessions – presenter and moderator • Thank-you letters facilitated through the municipalities help in keeping in touch with SHs • Trust-building amongst SHs and SHs and researchers: incorporate feedback in minutes and project activities, facilitated continuity of SHs attending WSs • Long sessions, WS longer than 3 hours is difficult,	**Local actions** • Local action is good to create visibility to higher level; need to further investigate plans for local actions in both countries - discuss what activities they already have planned • One idea: bring the two mayors together for a "clean the river day" where they shake hands, take picture and agree to organize annually (this can be something signed without going through MFAs), organise local press, video, etc. • There is a big power plant in Greece at the border with Bulgaria > get them to both participate and sponsor a cleaning-the-river-day as part of their corporate social responsibility activities. CS has good links with operations staff (but no communication with the Athens headquarters, and ESG needs top-down level work)

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people get bored. Difficulties with long surveys, was easier because survey was introduced • Conflict are being talked about --- allocation of water across users. Discussions on pressures etc. worked well • Absence of SH from high (national) political levels and energy sector • Opinion that issues discussed at WSs will not reach higher-level SHs **SH Dynamics & Strategies** • SH feel they are not heard from high level decision making > they do not see the NXG discussions as a way to reach the high level with their concerns • Lack of coalitions at local scale > work on this aspect within the next WSs. Cooperation at local scale would be success for case-study. • Conflicts btw SHs, lack of awareness about TB and national level agreements • Lack of trust between all levels of governance, complex dialogues and administrative processes • TB setting adds more complexity, what works to open minimum dialogue? – Currently there is no dialogue, lack of awareness at low decision-making levels on pressures, common aspects, awareness on the reality of the other country. • Upstream Bulgarian side is very low power within Bulgaria (national level), same for Greece – lack of visibility for their respective national governments. Bulgaria more structured – they participate even if they don't want to; in Greece this would not happen. • Not adverse to co-creation and co-design process, but are unsure about the best modality to do this. Key issue is that SHs want to be able exploit the scientific and other project outcomes and how will these solutions be implemented and taken to higher level? • GR and BG SHs are very open to more collaboration and to work on TB issues; open to explore channels for creation of synergies	**Policy packages** • Currently aligned with what the authorities want to implement (from the Greek side). • NEPAT policies need to be achievable and quantify the impact (with 1-2 indicators). Users of the results could be regional authorities and hopefully discuss with ministry of energy and environment (general secretary natural environment and water) and ministry of agriculture. • Has good connections to the General Secretary of Nature, Environment and Water • Min of Ag and Food (responsible for irrigation): more challenging, less connections and difficult to get to change their minds. One-on-one conversations on NEPAT results needed. Need to give feedback to Luis – to model only sectoral policies and then integrated policies to show differences – as a basis for conversation. • Demonstration of impact of more integrated policies plus new indicators. Would like to present the validated policy package (those suggested by the self-learning engine) in comparison with impacts of implementing only sectoral policies. • Need pool of indicators, performance of specific policies, and extract more generalized set of indicators (footprint) – interpretation of indicators • Create something that people will understand, and will stimulate the use of tool for decision makers -- focus less on making the tool useful for implementation for different uses **SH Agreement:** • Define contents of agreement and what will be commitment of SHs, explore available means such as funding opportunities (no money no action), define a starting point (management of Natura 2000) • TB agreement on water flow allocation at MFA level (1995 agreement) but no further talks at local level on this – no update since (too much water in the winter coming from Bulgaria to Greece) – who is the entity at lead?

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• Need to find ways to engage High level decisionmakers, since decisions are made top-down	• Having the two transboundary mayors to sit together would be already an achievement since there is no transboundary dialogue > soft, not-binding agreement at local level (but this still has to go through MFAs). Both mayors still have quite some time left on their term. • Waste management is also a tangible starting point. Dovetail with Mayor's agendas – modernize irrigation systems, infrastructure for waste management, sediment transport blocking the delta area which causes risk of flooding.

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(1) SHE aim

Participatory actions have been broadly acknowledged as well-suited practices for engaging SHs to elicit valuable knowledge and explore their interests, preferences and means of power. SHs' engagement supports common understanding and establishes mutual confidence between them and decision makers. It also contributes to the transferability and dissemination of scientific knowledge and research outcomes. Therefore, SHs are expected to contribute by adding specific knowledge and expertise on issues related to water resources management, critical hot-spots, proactive actions, management of flood and drought risks, ecosystems maintenance, hydropower generation, agricultural practices, land uses, etc.

Based on the conversations during the General Assembly meeting in Tours (Parallel Session 6) from 19-21 September, the original aims of the SHE were modified and the following aims will be prioritized over the remaining time:

- To generate system knowledge:
  - Explore possible conflicts and synergies among SHs
  - Inform the research team about plans/projects that are in progress
  - Assessment of NEPAT results – Do they correspond to local needs?
  - Hot-spots and establishment of (local)-scale collaborations among SHs
- To generate target knowledge:
  - Assessment of policy impacts – NEPAT
  - Focus on common interests that may foster future collaborations
- To generate transformation knowledge:
  - Design suggestions and a river contract proposal
  - Re-design solutions (if needed) based on NEPAT outcomes
  - To build a trustful relationship among project partners and local SHs

Moreover, SHs' engagement has the potential of offering added value to the project by: a) covering existing knowledge gaps, b) raising issues that researchers should consider regarding synergies and trade-offs when it comes to the implementation of policies and actions aiming at nexus sectors management and resources allocation, c) assessing current practices and policies with respect to their effectiveness, and d) proposing future policy measures and means of actions that will reinforce resilience by taking into consideration climate change impacts. Under this framework, SHs' influence and interests will be identified, investigated, and mapped as well as, their role during the decision-making process and the organization and implementation of plans in case of emergency. Possible conflicts and synergies among them will be also explored. The overall purpose of such a process is to build strong ties between researchers and SHs in order a rich knowledge stock to be created, collaborative actions to be encouraged and transferability of the projects' outcomes to be enhanced.

Meanwhile, gauging from the desired SHE outcomes from the WS3 2023 survey, we derived likely aims as seen from the SHs' view (aims in italics have been added by SHs):

- Possible system aims:
  - Deepen/improve understanding of the current (state of) WEFE Nexus problems (e.g., river basin management, energy transition, water scarcity) and identify pressures
  - Get data for model development

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  - Gain/increase understanding of the institutional, organisational and political context and (current) river basin management plans (including neighbouring countries)
- Possible target aims:
  - *Determine solutions/systems (and their drivers) that balance sectors for a sustainable production*
  - *Shift power and resources toward less influential SHs to increase social equitability*
  - *Empower SHs to implement the project's outcomes*
- Possible transformation aims:
  - *(Co-)Design and (co-)validated of NXG tools/platform (e.g., SLNAE/NEPAT, WEFE Footprint), and build capacity (e.g., to use the NXG tools, to transition to renewable energy)*
  - *Identify relevant WEFE Nexus components and indicators*

The system knowledge aims are aligned with the ones of the CS team. However, there is a divergence when it comes to the target and transformation knowledge aims. Specifically, the SHs likely expect project outputs that help them on a day-to-day level (e.g., models, tools) that however also allow less powerful SHs to better make their concerns and ideas represented in policy discussions. To enhance social equitability is, in fact, the SHs' main priority and, from the SHs' perspective, the CS is still underachieving in that regard.

Table 62~~Table 62~~ lists the aims for the co-creation process and their self-assessed level of achievement, as of June 2024. Below the reasoning for the scoring of selected aims is presented.

Table 62: Aims for the co-creation, divided by type of knowledge. In bold are those aims identified as particularly relevant for the remaining duration of the project.

Aims for co-creation per type of co-generated knowledge	**Current level of achievement** (1=not at all achieved, 7=fully achieved)
System	
Deepen/improve understanding of the (state of) WEFE Nexus problems (e.g., river basin management, energy transition, water scarcity) and identify pressures	7
Characterise (social, economic, ecological, and institutional) context	7
Understand the institutional, organisational and political context and river basin management plans (incl. neighbouring countries)	6
Identify conflicts/synergies between SHs as well as actions and strategies, including: • Hot-spots and collaborations in terms of SH relationships • Ongoing plans/projects	**6**
Get data for model development	3
Target	
Know about future expectations/perspectives (in general and for assessment tools)	7
Determine solutions/systems (and their drivers) that balance sectors, including: • Assessing NEPAT results and their relevance for local needs	**5**

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Diffuse conflicts between sectors (e.g., through the use of a common language), moving towards cooperation and trust, including: • Establishing, especially local scale, collaborations among SHs	**6**
Raise awareness of water as a depleting resource	7
Gain knowledge on required infrastructural improvements	6
Transformation	
Develop and implement formal agreements and aligned policies for a coordinated river basin management, including: • (Re-)design solutions based on NEPAT outcomes	**4**
Design of pathways to enhance awareness of (water) resources management	**4**
(Co-)Design and (co-)validate NXG tools/platform (e.g., WEFE Footprint), and build capacity (e.g., to use the NXG tools)	5
Identify relevant WEFE Nexus components and indicators	6
Improve communication between SHs and break silos, including: • Focusing on common interests that may foster future collaborations	**5**
Determine the requirements to invest in infrastructure	5

As far as aims regarding system knowledge are concerned, the CS leads deem them largely achieved. For example, they assert that the conflicts between SHs as well as existing policies and practices are largely understood. The CS leads expressed their positive surprise that the conflicts have turned out not to be as divisive as anticipated at the start of the project – except for disagreements between dam operators and downstream farmers, which may actually inhibit joint actions in the future.

When it comes to the aims for target knowledge, assessing SH perspectives through the NEPAT tool has proven somewhat challenging. While NEPAT aims to identify optimal solutions, there is uncertainty about whether SHs will validate and accept the results. Suggestions for actions have been put forward by the research team based on some SH inputs. While the CS leads are cautiously optimistic that SHs will accept the policy packages by NEPAT, it is yet to be seen how well the NEPAT's outcomes will align with SH priorities and how SHs will respond to the proposed policies.

Additionally, some policies could not be included into the NEPAT tool, as they could not be quantified due to data gaps, a common limitation in similar projects. This raises the question of whether focusing only on quantifiable measures may overlook important policy alternatives. Again, SH input would be key in evaluating the tool's overall relevance and effectiveness.

Lastly, regarding the aims for transformation knowledge, the CS leads identify significant shortcomings, largely due to the NEPAT tool not yet being discussed with or utilized by SHs. Two particularly challenging objectives are 1) the development of formal agreements and aligned policies, and 2) the creation of pathways to raise awareness about WEFE Nexus/water resources management.

For the first challenge, the CS leads anticipate difficulties in achieving a river basin contract but foresee formal agreements. Even if small-scale, transboundary actions were to be agreed upon, any tangible outcomes are unlikely to materialise before the conclusion of the NXG project. At the very least, they hope to initiate and institutionalize transboundary dialogue.

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Regarding the second challenge, the CS leads are concerned that some SHs may struggle to fully understand the NEPAT tool's functionalities and outputs, which could hinder their ability to provide informed feedback when NEPAT results are presented for validation.

Overall, the CS leads are optimistic that the NEPAT tool may facilitate the definition of specific, actionable outcomes. However, there are lingering concerns regarding its accessibility to SHs, and thorough, carefully planned discussions on the NEPAT outputs and the implications for SH realities will likely be necessary.

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(2) SH analysis

SH identification

In the past year the SH register has changed. To move forward with a GDPR compliant SH base the issue of contest was discussed at the General Assembly meeting in Tours from 19-21 September 2023. The following was agreed:

1) Most information on SH is taken from public sources → mark SHs where information was taken from public sources (add a P if taken from public source in the new column B of your CS tab in the SH dashboard)
2) Double check current names and organizations and update SHs and affiliations accordingly. Some SH may have changed jobs, retired, etc.
3) Mark all high power or high interest SH in the register. These are people you most likely may want to keep. Write to them individually and ask them to consent to the PPCF; threaten with removal if needed. Remove them from the register if the information obtained on them is not from public sources.
4) Add new SHs based on the needs outlined in the management plan below. Lay a particular focus on moving from technical SH to more political SH that could help you understand where legislation on the suggested policy packages currently stands. This will help you get into the policy cycle better. Ideally source their contact information from public sources.

A steady increase in SHs have been identified and a respective increase in the relative number of consented SHs can be observed that is above the CSs general average (Table 63). In the remainder of the document SHs that consented to be included will be termed ‘official SHs’.

Table 63: CS1-Nestos/Mesta summary information of SH identification as of Sept. 2024

Item	Count 2022	Count 2023	Count 2024
Preliminary listing of SHs	63	91	102
SHs in registered officially	12	29	33
Percentage of consent [%]	19%	31,9%	32,4%

The official SHs still belong mainly to the water and ecosystems sectors; and while the energy and food sector are still the least represented ones, SH numbers have further increased here (Figure 157). Thus, the efforts of the past years in focusing on these less represented SH have been paying off.

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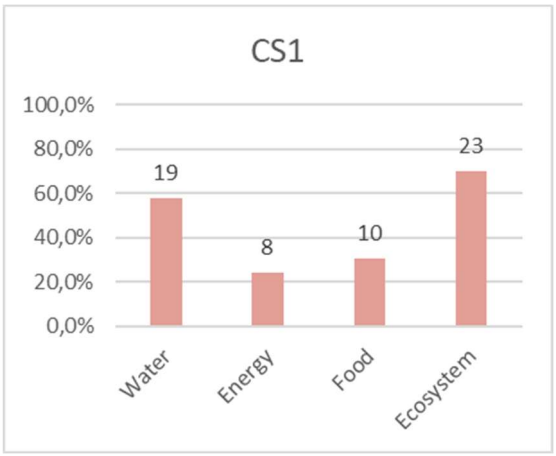

Figure 157: Distribution of SHs across the WEFE sectors for CS1 - Nestos/Mesta. One SH can be assigned to one or more sectors.

In terms of gender, there is a slight improvement towards an equal distribution across female and male genders (20/80 in 2023) (Figure 158). Gender balance is an issue here, but due to the nature of positions and the way society is organized little can be done here.

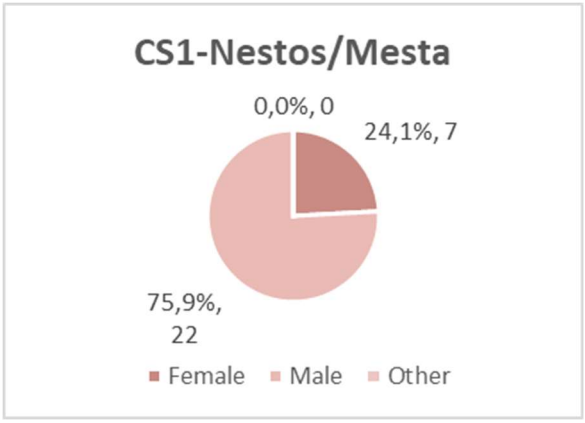

Figure 158: Gender distribution for CS1 - Nestos/Mesta. One SH identified with both female and male.

SH differentiation and categorisation

The official SHs belong now largely to tier 2 SHs (14) followed by Tier 3 (10) and Tier 1 (9) SHs. The CS was able to attract a good distribution across all Tiers of SHs.

In terms of categorization, this hasn't changed much in the overall distribution, however more local level policy makers have come forward (Figure 159).

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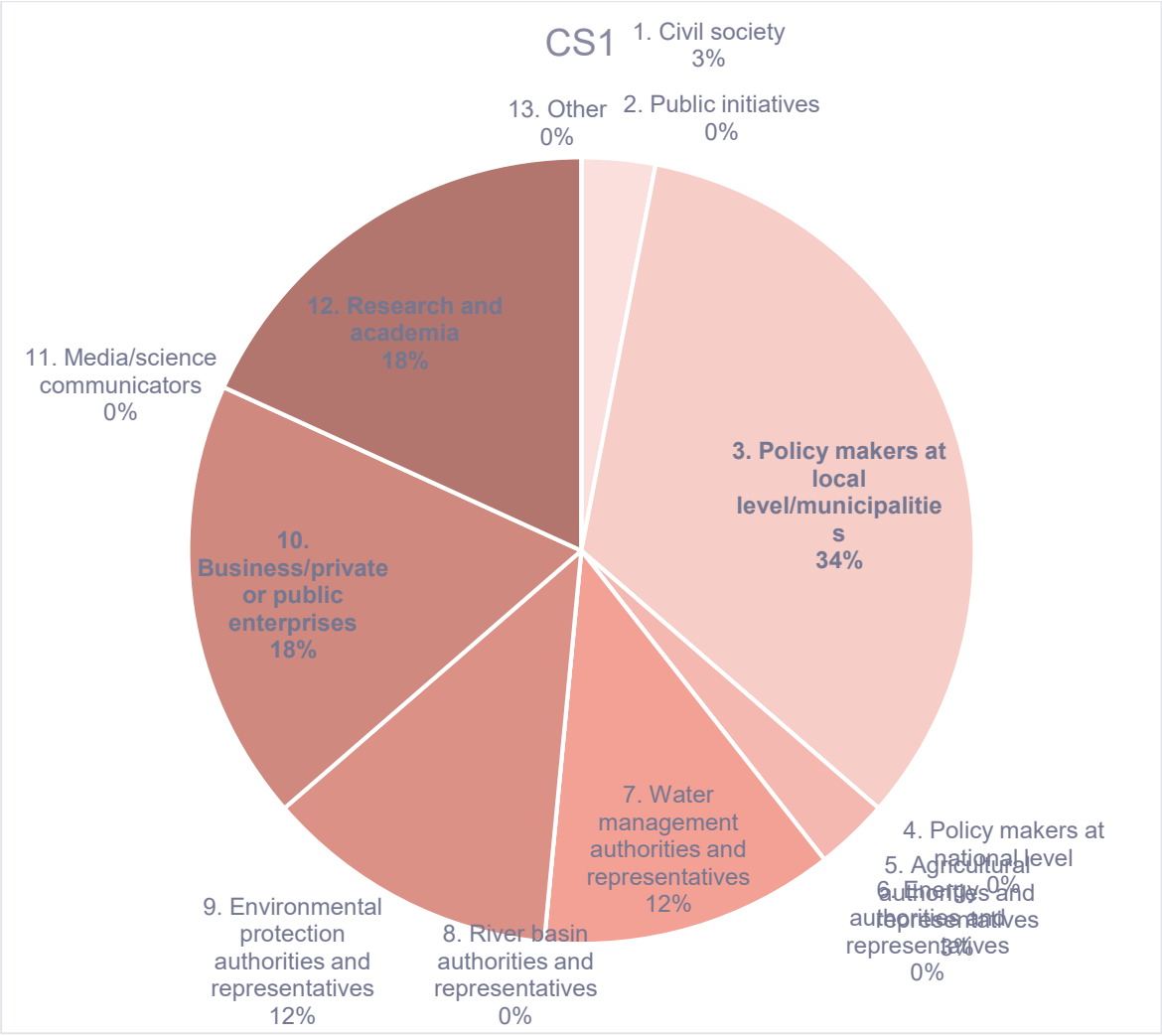

Figure 159: Distribution of SHs across categories for the case CS1 - Nestos/Mesta

Little change can be seen in the Power-Interest matrix in comparison to the previous year. From a Power-Interest perspectives, official SHs were mostly perceived as having high interest by CS-leads. The remaining SHs are almost equally split across being perceived as high interest-high power and high interest-low power (Figure 160). Low interest – High Power actors are completely missing in this register.

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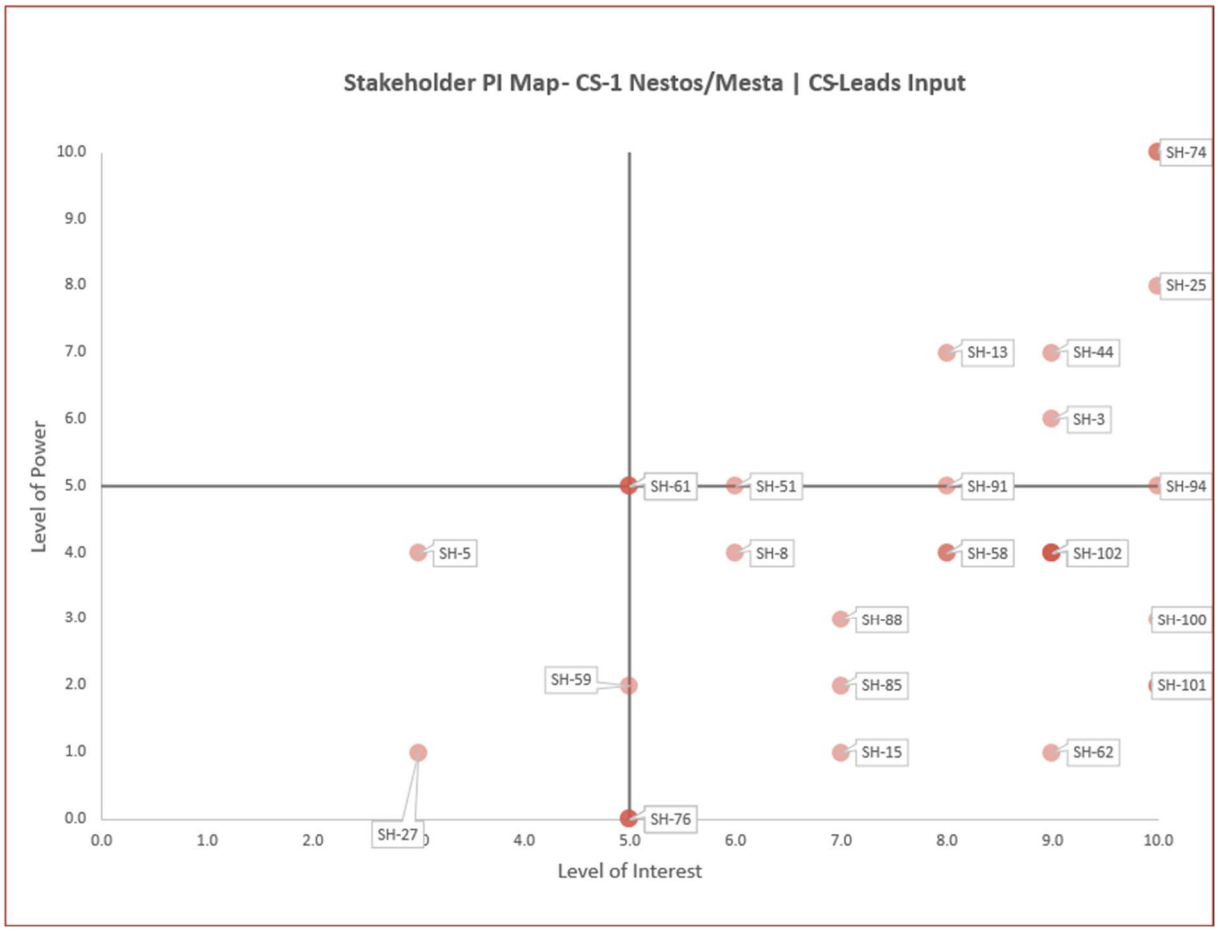

Figure 160: Power-Interest Map for CS1 - Nestos/Mesta. based on the CS-Leads' perception. For data protection and privacy matters, SHs are anonymised; for internal use CS-Leads know which SH each number represents.

SH relationships

The CS-Leads characterised – based on their perception – 528 relationships (up from 78 in 2022, and 378 in 2023). The relationships correspond mainly to the non-existent (NE) relationships between SHs (59,3%) followed by rather cooperation (Cp) (24,1%), and complementary types (Cm) (13,6%), and a very low share of conflicts (Cf) between some SHs (3%) (Figure 161 and Figure 162). This distribution is mostly due to the fact that many transboundary SHs have not had any previous interactions (Greeks with Bulgarians and vice versa).

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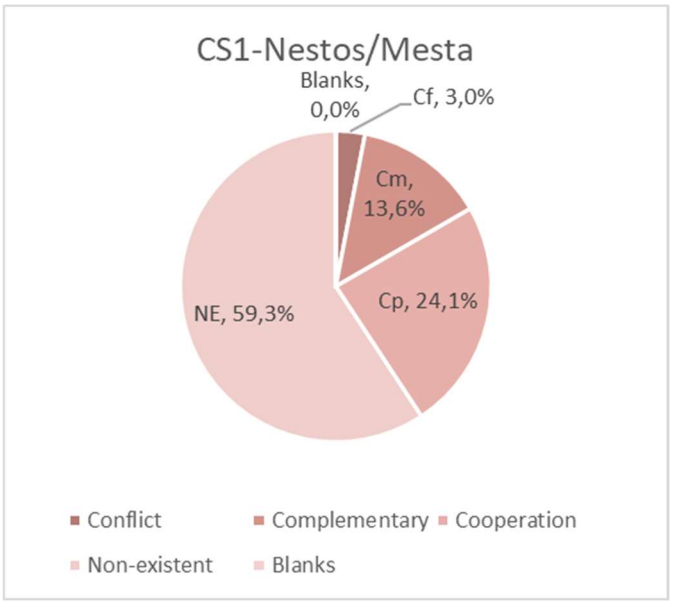

Figure 161: Share of types of relationships across SHs. Characterised based on the perception of CS-Leads.

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SH-ID	SH-18	SH-58	SH-3	SH-55	SH-8	SH-13	SH-80	SH-82	SH-26	SH-61	SH-40	SH-51	SH-74	SH-54	SH-94	SH-44	SH-100	SH-88	SH-27	SH-43	SH-76	SH-15	SH-91	SH-48	SH-85	SH-25	SH-28	SH-87	SH-45	SH-94	SH-41	SH-101	SH-102
SH-18																																	
SH-58	Cm																																
SH-3	Cm	Cf																															
SH-55	Cm	Cp	Cf																														
SH-8	Cp	Cm	Cm	Cm																													
SH-13	Cm	Cm	Cm	Cm	Cm																												
SH-80	Cp	Cm	Cf	Cm	Cp	Cm																											
SH-82	Ne	Ne	Ne	Ne	Ne	Ne	Ne																										
SH-26	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cm																									
SH-61	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cm	Cp																								
SH-40	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cm	Cm																							
SH-51	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cm	Cm	Cm	Cp																						
SH-74	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cm	Cm	Cp	Cp																					
SH-54	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Ne	Ne	Ne	Ne	Ne	Ne																				
SH-94	Cp	Cp	Cp	Cp	Cp	Cm	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Cm																			
SH-44	Cp	Cp	Cp	Cp	Cp	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cp																		
SH-100	Ne	Ne	Ne	NE	Ne	Ne	Ne	Cf	Cp	Cp	Cf	Ne	Ne	Ne	Ne	Ne																	
SH-88	Ne	Ne	Ne	NE	Ne	Ne	Ne	Cp	Cm	Cp	Cm	Cp	Cp	Ne	Ne	Ne	Ne																
SH-27	Ne	Ne	Ne	NE	Ne	Ne	Ne	Cm	Cp	Cp	Cm	Cp	Cp	Ne	Ne	Ne	Cf	Cm															
SH-43	Ne	Ne	Ne	NE	Ne	Ne	Ne	Cm	Cp	Cp	Cm	Cp	Cp	Ne	Ne	Ne	Cp	Cm	Cm														
SH-76	Ne	Ne	Ne	NE	Ne	Ne	Ne	Cf	Cp	Cp	Cf	Cp	Cp	Ne	Ne	Ne	ne	Cp	Cf	Cf													
SH-15	Ne	Ne	Ne	NE	Ne	Ne	Ne	Cp	Cp	Cm	Cp	Cp	Cp	Ne	Ne	Ne	Cp	Cm	Cp	Cp	Cp												
SH-91	Ne	Ne	Ne	NE	Ne	Ne	Ne	Cp	Cp	Ne	Cp	Cp	Cf	Ne	Ne	Ne	Ne	Cp	Cp	Cp	Cf	Cp											
SH-48	Ne	Ne	Ne	NE	Ne	Ne	Ne	Cp	Cp	Cm	Cp	Cp	Cp	Ne	Ne	Ne	Cp	Cp	Cp	Cp	Cp	Cm	Cp										
SH-85	Cp	Cp	Cp	Cp	Cp	Cm	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cp	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne									
SH-25	Cp	Cp	Cp	Cp	Cp	Cm	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cp	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cm								
SH-28	Cm	Cm	Cm	Cm	Cp	Cm	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cp	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cp							
SH-87	Cm	Cm	Cm	Cm	Cp	Cm	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cp	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cp	Cm						
SH-45	Ne	Ne	Cf	Ne	Cm	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne					
SH-94	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Ne	Ne	Ne	Ne	Ne	Ne	Cm	Cm	Cm	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cm	Cm	Ne				
SH-41	Ne	Ne	Cm	Ne	Ne	Cm	Cm	Ne	Ne	Ne	Ne	Ne	Ne	Cm	Cm	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne			
SH-101	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cp	Cp	Ne	Ne	Cm	Ne	Ne	Ne	Cp	Cp	Cp	Cp	Cp	Ne	Cp	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Ne		
SH-102	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cf	Cp	Cp	Cf	Ne	Ne	Ne	Ne	Ne	Cm	Ne	Cf	Cp	Ne	Cp	Ne	Cp	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cp	

Figure 162: Actor-Linkage Matrix for CS1-Nestos/Mesta. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent.

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(3) SHE

The SHE plan in Table 64 provides guidance to organise SHE and achieve the SHE aims considering the findings from the SHE evaluation and the updated results of the SH analysis. These results show that:

- The SH list and consent has stabilized at around 100 SHs and a 30% consent rate. The WEFE sectors are not represented equally with a bias towards the ecosystems and water sectors, and a remaining lack of representation in the energy and food sectors, even though large efforts were undertaken here and numbers tripled and quadrupled since the first analysis in 2022.
- Gender distribution remains highly male dominant.
- The distribution across categories is similar, however an increase in the business/private or public enterprise sector can be seen.
- The predominance of high interest SH continues, however also more low power- high interest SH have been added.
- Most relationships are considered as non-existent. This is a result from the transboundary nature of the project and provides an opportunity for cross-border fertilization.

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Table 64: Overview of the main SHE components of the SHE plan for CS1-Nestos/Mesta.

	Co-exploration	Co-design		Co-development	
	Information	**Consultation**	**Involvement**	**Collaboration**	**Empowerment**
WHO? SH category	All categories should be properly informed. Make a conscious effort to convince high-power (esp. high-level) SHs of the value of the project/of the outcomes of the project.	Local SHs with local decision-making power (e.g. mayors) across both riparian countries ideally across all Nexus Sectors.	User of the project (and specifically NEPAT) results could be regional authorities and hopefully discuss with ministry of energy and environment (general secretary natural environment and water) and ministry of agriculture.	Continue with the trust-building efforts of honest and open co-creation and participation with the currently involved SHs.	Investigate plans for local actions in both countries - discuss what activities they already have planned. There is a big power plant in Greece at the border with Bulgaria > get them to both participate and sponsor a cleaning-the-river-day? as part of their corporate social responsibility activities.
WHY? PI and ALM	It is important that high-level decision makers are made aware of the project and are on board with taking up identified solutions into policies. Need to find ways to engage High level decisionmakers, since decisions are made top-down	Gain/increase understanding of the institutional, organisational and political context and (current) river basin management plans (including neighbouring countries) Lack of awareness about TB and national level agreements	NEPAT policies need to be achievable and quantify the impact (with 1-2 indicators). Create something that people will understand, and will stimulate the use of tool for decision makers -- focus less on making the tool useful for implementation for different uses	Lack of trust between levels of governance, complex dialogues and administrative processes	Local action is good to create visibility to higher level Lack of coalitions at local scale > work on this aspect within the next WSs. Cooperation at local scale would be success for case-study.
HOW? Activities	Invite high-level SHs from both countries	Showcase (Co-)Designed and (co-)validated NXG	Min of Ag and Food (responsible for	Bring the two mayors together for a “clean the	Suggest informal meetings and visits of high-level

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	Co-exploration	Co-design		Co-development	
	to final WS and 'agreement ceremonies'.	tools/platform (e.g., SLNAE/NEPAT, WEFE Footprint), and build capacity (e.g., to use the NXG tools, to transition to renewable energy)	irrigation): more challenging, less connections and difficult to get to change their minds. One-on-one conversations on NEPAT results needed.	river day"? where they shake hands, take picture and agree to organize annually Nudge TB SHs to come together for a yearly meeting to discuss WEFE Nexus issues.	national decision-makers to the River Basin to unfreeze the process of the TB agreement.

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(4) Management and sustainment

Management

The initial management plan considered different foci per year. Table 65~~Table 65~~ looks at how these were accomplished and what changed based on the findings of the past year.

Table 65: Priorities of the different plans and how these were accomplished and changed over the course of the project.

Foci	From 2022 Plan	From 2023 Plan	2024 Plan
2023	Actively look to increase the interest of other SHs while maintaining the interest of the current high interest SHs. Focusing away from high interest SHs towards low interest SHs may allow discovering currently missing marginalised SHs.	The SH register was expanded and new SH categories, like the business sector were added. A larger SH of low power – low interest SH was established. However, the gender distribution and the lack of high power- low interest SH is still an issue.	The SH register was modified to be GDPR compliant. Make a conscious effort to convince high-power (esp. high-level) SHs of the value of the project/of the outcomes of the project. Continue with the trust-building efforts of honest and open co-creation and participation with the currently involved SHs.
2024	Maintain the interest of the engaged SHs and focus on the relationships between them, including power dynamics and building trust to enhance collaboration.	Better inform SHs about updates and processes at the project level which may allow for further instances to co-design. Provide SH with system knowledge, i.e. providing them with easily understandable results of the biophysical and socio-economic modelling and what this means to the WEFE Nexus.	Done via emails including updates on the progress of the project, phone calls with some SHs, sharing of project promotional material (e.g. flyers) and the organization of a focus group (co-organised with KWR), and it will be further developed until the end of the project. We are going to inform more SHs, especially high-level decision makers, during the last year of the project where the NEPAT tool for the Nestos/Mesta CS will be ready for demonstration. During the 4th SH WS (February 2024), the first version of the NEPAT and its functionalities was demonstrated to SH by EURECAT and a menti-survey regarding possible future improvements of the tool was shared. Lielupe CS

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		It has proven effective to focus on one particular issue where there is shared interest amongst SHs, and then formulate actions to address it. Possibly start with an issue that matters to high-level decision-makers in both riparian states (i.e. Greece and Bulgaria). Consider one of the following options: a) gather inputs from marginalised SHs and convey them to powerful SHs, b) manage to bring everybody to the same table and provide a platform for common dialogue, or c) have two events with one focusing on technical aspects and local-level networks and another one on high-level dialogue and 'signing off' on actions to be taken.	was presented as an indicative example. Not achieved so far but we will try to include it in the final SH agreement. One representative of the Special Secretariat for Water (Ministry of the Environment and Energy) participated in the online Focus Group that took place in May 2023. But higher-level decision makers are not engaged in the project yet. a) Partially done (farmers that are marginalised SHs but have expressed urgent needs for reforming water allocation schemes – Municipality of Nestos that is a low-level decision-maker) and partially in progress (communicate inputs to high-level decision makers) b) In progress – High-level decision makers should be more involved in the process. c) In progress – High-level decision makers to be involved and be included in the final SH agreement.
2025	Focus on co-decision activities and further planning on sustainment of SHs as well as on the defined agreements.	Stay focused on providing evidence base and the results from the research. This is your largest asset. Work with policy makers to integrate policy suggestion from the NEPAT.	Invite high-level SHs from both countries to final WS and 'agreement ceremonies'. Showcase (Co-)Designed and (co-)validated NXG tools/platform (e.g., SLNAE/NEPAT, WEFE Footprint), and build capacity (e.g., to use the NXG tools, to transition to renewable energy) Nudge TB SHs to come together for a yearly meeting to discuss WEFE Nexus issues. Min of Ag and Food (responsible for irrigation): more challenging, less connections and difficult to

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			get to change their minds. One-on-one conversations on NEPAT results needed. Suggest informal meetings and visits of high-level national decision-makers to the River Basin to unfreeze the process of the TB agreement. Bring the two mayors together for a "clean the river day?" where they shake hands, take picture and agree to organize annually

Sustainment

A session dedicated to SH sustainment was held at the General Assembly Meeting in Tours from 19-21 September 2023. A summary of the suggested recommendations can be found below. In general, SH sustainment was considered to be challenging to implement without further dedicated funding and/or more succinct purpose. Linking sustainment to a particular issue to tackle or initiative to start makes strategizing for sustainment more tangible.

- It is difficult to find a common date and time (for the WSs); some of the SH feel that it is waste of time because they feel that they are not heard. → Certificate of attendance could maybe mobilise people.
- SHs are expecting solutions: local SHs would like to feel empowered, but are these solutions transboundary? → keep transboundary perspective when designing solutions.
- Lower-level SH feel like their recommendations are not being heard at higher levels: Dissemination of outcomes to higher levels. Continue working with local municipalities. →Think about what information to package how. Get clarity on what you want to achieve with whom.

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CS2: Lielupe

The SHE plan is based on the data, information and perceptions provided and analysed by the case study (CS) leads, the CS SHs and the AVA- and UU-Team by August/September 2024. The plan is updated on a yearly basis taking new SH information and evaluation results into account to allow for adaptive management. Thus, the plan starts with the fifth phase of the SHE plan, namely SH Evaluation.

(5) Evaluation

In the 2023-2024 cycle no SH WS took place in which an evaluation would have fitted. Rather evaluation information is based on:

(5) The self-evaluation of CS on the implementation of the recommendations of the past plan
(6) Summarized findings from the interviews with CS on the co-creation approach
(7) Information extracted from MS23 Second intermediate report on CS implementation and co-creation activities for the Lielupe CS
(8) Recommendation that ensued from the CS meeting with WP1 and WP5 in Berlin in January 2024

Results from the self-evaluation

The 2023 plan suggested a set of activates/actions to be carried out in the upcoming year (2023/2024) (last row of Table 2 in the 2023 SHE plan). Table 66~~Table 66~~ below show the degree to which the activities were implemented and further comments on these.

Table 66: Self-evaluation of the implementation of the 2023 SHE plan recommendations

Recommended activities as per the 2023 SHE plan	How activities were implemented	Further comments
Think of incentives that might increase the interest of marginalized, low interest SHs such as invitations to events, highlighting research results of interest to them or providing them with free access to results and findings.	SH lists were updated by adding new contacts, e.g., from ministries. Invitations to the events were sent to large group of SH.	Due to structural changes of institutions (reorganization of respective ministries and shifting of responsibilities), the SH lists will be renewed accordingly. Highlights of the research results will be prepared for this group of SH along with maturity of the project products.
Share as much scientific evidence with the SH as possible (even if they may not understand the scientific papers).	SH were provided with background information materials, presentations from research, e.g., NXG partners delivered	This activity will be continued
Show at each WS which advancements/decisions were made based on the SHs' inputs (feedback to the feedback or acknowledging their inputs).	SH inputs were reflected in presentations on the CS activities	This activity will be continued
Plan activities to share the outputs of the provided feedback and discuss about it.	SH feedback to outputs was taken in interactive sessions and discussions	This activity will be continued

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Consider organizing a high-power event for (political) SH from both countries to allow for awareness raising on the Nexus and floating the idea of an inter-ministerial cross-country working group.	This activity was not implemented	Most important NXG results are still in delivery phase, and thus the high-power event has been postponed to the year 2025
WSs – activities to co-decide features and design of the tools (WS2 to WS6), focus groups (within or in between WS2 and WS3), role activities to build trust. 1-on-1 activities to bring in marginalized current low-interest or uninformed SHs.	Wide range of activities were employed in the project implementation; however, these were not designed specifically to the low-interest SH.	Targeted approach will be strengthened to address low-interest SH along with maturity of the project products.
Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations). So that the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded SHs. Frequent smaller conversations of transnational peer SHs may need to happen to allow for recognition of peers and for technical discussions about transboundary solutions (e.g., ecological low flows, abstraction needs, conservation measures, etc.). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.	Setting the SH agreement on common activities in the Lielupe RB was discussed at the 4th SH WS. Wide range of possible activities were identified for further implementation. BEF has agreed to act as a focal point for the actions – initiating, leading, and facilitating the cooperation process e.g., organizing joint events.	Facilitated SH cooperation initiatives are envisaged.

Interviews on SHE performance

As part of the SHE evaluation, WP5 conducted a (re-)assessment of the aims of and preferred approaches to co-creation with the CS leads (see template of questions in the Annex). This was done to gauge 1) to what extent CS have, in their own perception, reached the aims they had set for themselves and 2) whether priorities and expectations have changed based on their experiences throughout the project. To facilitate this, WP5 distributed a template to capture updated aims and approaches to collaboration. Subsequently, in June 2024, the information provided by the CS leads was further discussed in one-on-one conversations.

Below, firstly, the modes of co-creation elicited in June 2024 are presented – this includes the desired mode of co-creation by CS leads ('undetermined' mode) versus the one the CS leads themselves consider having de facto delivered ('researching solutions') (Figure 163). These are also compared with the modes originally preferred by the CS leads at the start of the project ('navigating differences' in September 2022).

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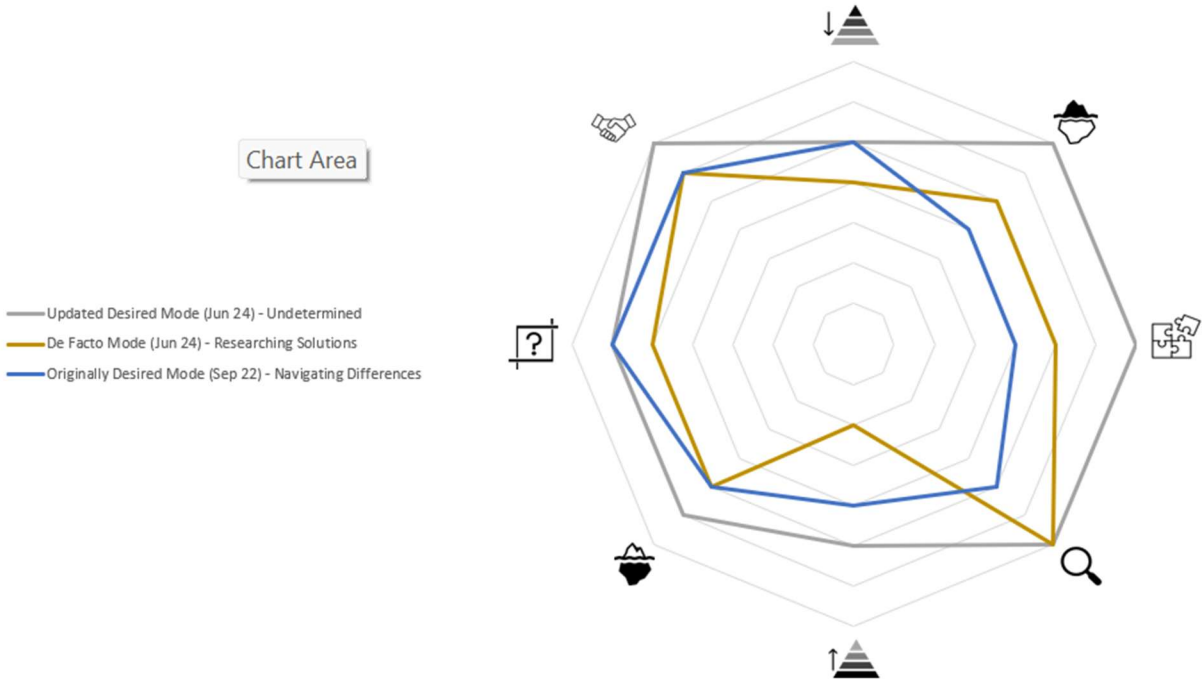

Figure 163: Approaches/Modes of Co-Creation of the CS Leads. Icons in clockwise order starting with the top icon: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together

Comparing the desired mode of co-creation in September 2022 with the one elicited in June 2024, it becomes evident that there is a significant shift in regard to some approaches to co-creation. For one, there is a stronger desired focus on shaping direct agency, solving problems, and producing knowledge. This does not mean they have abandoned approaches typical of their original co-creation mode, 'navigating differences', but rather that they have expanded their focus to include additional foci. The updated desired mode of co-creation does not align with one of the six identified by Chambers et al. (2021). Rather it is characterised by the intended focus on all eight approaches to co-creation.

However, the CS leads themselves are under the impression that there is discrepancy between their ideal and what is de facto delivered. Regarding the approaches of 'shaping direct agency' and 'solving problems' the CS leads still anticipate delivering on their objectives as soon as SHs have thoroughly engaged with the NEPAT tool. Then they foresee a possibility for all SHs to optimise policies as well as for local SHs to specifically change their practices based on the evidence presented in the NEPAT tool. Yet, when it comes to the empowerment of marginalised voices, such as the ability to directly engage with high-power SHs in policymaking, the CS leads do not expect positive change. They observe that marginalised SHs (here mostly local SHs) feel cut off from key information, but at the same time also might not be interested in devoting time to influencing policies in the river basin.

Interestingly, at the third project WS in June 2023, local SHs in fact indicated a desire to have their voices heard, but not to directly engage with high-power SHs (Figure 164 and Figure 165). In contrast, all the other SHs actually emphasised 'empowering marginalised voices.' This mode is characterised by knowledge production and solution-oriented co-creation, while there is less of an emphasis on deeply questioning the underlying problems of the river basin. The difference to 'researching solutions', which is the de facto mode of the CS, is the focus on empowering low-power SHs.

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Figure 164: Approaches/Modes of Co-Creation of National, Regional, and NGO/Other SHs. Icons in clockwise order starting with the top icon: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together

Figure 165: Approaches/Modes of Co-Creation of the Local SHs. Icons in clockwise order starting with the top icon: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together

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Lastly, comparing the de facto mode of co-creation 'reframing agency' with the one preferred by SHs, it appears that besides empowering marginalised voices it is advisable to actually 'solve problems', i.e. suggest implementable actions (Figure 166). The CS leads anticipate the NEPAT tool to contribute to this.

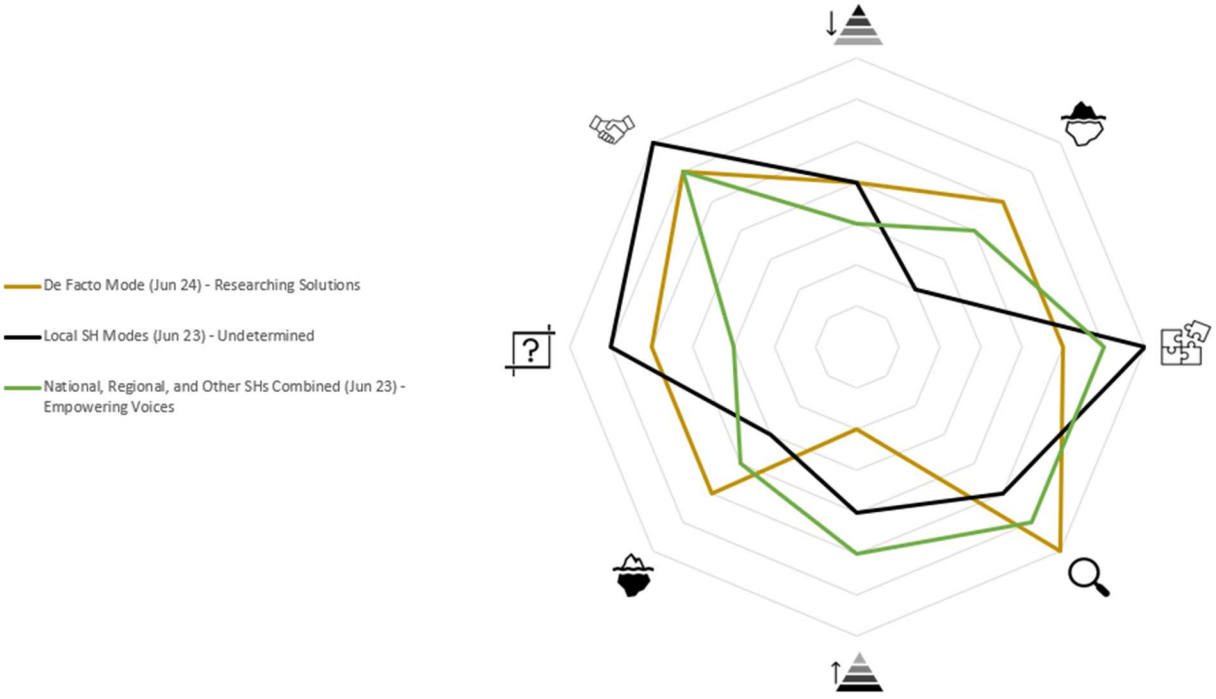

Figure 166: Comparing Approaches/Modes of Co-Creation of the CS Leads and SHs. Icons in clockwise order starting with the top icon: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together

All in all, besides further developing particular suggestions for policy changes, it might be recommendable for CS leads to make a conscious decision on whether they wish to focus on empowering low-power SHs or not. Since it is not the SHs' own desire it is possibly best to ensure their perspectives are represented in the policy packages chosen and validated with the help of the NEPAT tool, but to part from that focus on lobbying high-power SHs to implement the suggested actions. In addition, it is advisable to sow the seeds for joint actions through continued relationship building, which is, as indicated by the CS leads, appreciated by SHs.

Information extracted from MS23

MS23 is based on interviews that were carried out with CS leads between during months 30-36 of the project to summarize the CS implementation and SH co-creation activities. Information relevant for this SHE plan update was extracted from the latter parts of MS23, namely 'Impact maximization' and 'Lessons learned'. The relevant elements can be summarized as follows:

- Cooperation between Latvian and Lithuanian border municipalities in the Lielupe CS is implemented at project level and thus it is important to sustain these practices beyond the project's scope.

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- SHs are showing an increasing trust in project results as they see them being developed based on scientific approaches.
    - The core SH group in Latvia is formed by representatives from Latvia University of Life Sciences and Technologies, Latvian Environment, Geology and Meteorology Centre and Bauska County municipality. In Lithuania the most active (engaged) SHs are from Center for Environmental Policy (AAPC).
    - Keep the face-to face WS approach, invite project partners including modelers and tool developers, as they are the ones who could provide scientific support which is of high importance. Sending background materials to participants prior to the event is always very much appreciated by SHs.
    - Participants are interested to see the results of the NEPAT and willing to participate in joint transboundary activities in the Lielupe River basin. The interest of SHs and their readiness to be engaged in project activities have remained high. They joined the WSs until the end of each one, showing their high interest - especially important when it was a two-day event.
    - Timely and regular interaction with SHs by informing, consulting, involving, collaborating and empowering is required throughout the whole project duration. SHs are willing to share their knowledge, allocate time for participation in the project activities if they see that the project outputs would be beneficial for their everyday practices, or lead to improvement of policies, raising of knowledge, etc. Use of local language helped to provide the general overview of the project but for trans-boundary CSs it is important to have a common language approach. Translate background material. The presence of experts was appreciated because they were able to answer technical questions; SHs got the answers they were looking for in real time from the experts. There were also subgroups in local languages that provide feedback to the plenary session in English.
- Involvement of SHs from WEFE sectors at various levels (national, regional, local) is of crucial importance for the implementation of the Lielupe CS. To date, the SHE activities have related to providing information and to consultation. Collaboration and empowerment of SHs in CS implementation will be achieved in future reporting periods. The CS Lead acknowledges that closer cooperation (at national and transboundary levels) between SHs should be established during elaboration and implementation of River Basin Management Plans. Bringing up the issue on cooperation beyond the implementation of the NXG project at local and regional levels will help to facilitate a process that aims to design and adopt a (transboundary) SH agreement for integrated management of the Lielupe river basin's resources.
- Obtaining feedback from SHs via evaluation surveys, as well as learning from other CS on SHE approaches, successes and challenges is always useful to get inspiration for agenda development and communication tools to be applied during the interaction with SHs at the events. Asking participants for feedback during the event is the most effective way vs. sending the evaluation survey sometime later.
- Nature-based solutions have been prioritised by SHs as policy instruments. Lielupe CS Leads would rate it as an achievement if nature-based solutions are mainstreamed in various sectors e.g., agriculture, forestry, urban environment. However, the time frame of the project will be too short to see this. Such initiatives must be continued along with allocation of financial support schemes.

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Recommendations from the 'Berlin meeting'

A three-day meeting was held in Berlin, Germany from 10-12 January 2024, hosted by the Helmholtz Institutes. All CS leads, WP1 and WP5 representatives met to (a) reflect on the SHE process so far, (b) discuss the needs of the governance roadmap and the 'river contracts' to be drawn up by the end of the project, and (c) draw lessons learned from the process and suggest adapted strategies with a view of achieving the river contracts and the needed SH sustainment. Table 67~~Table 67~~ below shows the reflection and the suggested ways forward.

Table 67: Recommendations from the Berlin meeting

LIELUPE	
Reflections on SHE to date	***Ideas for SHE & Agreement moving forward****
Workshops: • WS1 – online (still COVID times), invited local and regional experts, higher political levels have not been approached or reached yet; event in Bauska – cross boarder cooperation, entirely on the local level, no national • WS3 they had a networking session where other projects on similar topics were presented > it gave motivation to join the WSs • Two steps approach for prioritization and validation of policy instruments • Prepping SH prior WS > send material before meeting like conceptual model and list of policies • Takes time to get the conversation going and when it finally it gets going meeting time is up > use post-it to write participants opinion • WS3 – face-to-face, include networking session where SHs could present their own projects active in the Lielupe WS, networking session will be continued • Ftf setting works well and allows for better and closer interrelations • SHs need preparation, information prior to meeting is useful. SHs appreciate this, e.g. draft CM and list of priority instruments, not for careful studying, but sharing • Networking really useful, include other projects, gain additional interest hook for people to come	• Water quality is the core topic **Local actions:** • Ideas from Bauska report are still on the table • Synergies with another project can help to do some actions in the region • Have a transboundary event and 'launch' the TB WG within the LIFE Project • Transboundary working group (meetings 1-2 times per year) used LIFE Goodwater project platform (already willing to cooperate with us); involve river basin authorities and local level SHs. Activities: Exchange of data; transboundary harmonization of approaches for water management; umbrella plan and comparison and discussion about WFD implementation report > compare reports on WFD implementation; exchange of info on local activities. Promote NEPAT in the LIFE platform • "Cleaning the river day" with border municipalities, clean river together and demonstrate NEPAT > use also other projects to build synergies to organize the day. • Use NEPAT to bridge national and local > results of NEPAT for the national ministries (environment agriculture, economics, climate and energy) and river basin authorities to see impact of integrated policies vs. silo policies. • Harmonization of methodologies, data, tools and outputs would be necessary (the advantage is that some high-level formal agreement is already

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• It takes time to get discussion going, and by the time they get into it, time is up. **Activities and tools at future workshops:** • Plenary presentation • Moderated WG discussion, world café session people move around the room and people get to talk about all topics (vs. WG where only one topic is discussed) • Survey on SH interest, most important interlinkages in the basin SH perceptions • Individual contributions dots for prioritization, sticky notes to share views in written form • Mentimeter also works in ftf meetings (not just in online settings) • Non-political setting and discussions about what does not work • Two-step approach for policy instruments, first discussion than voting **SH Dynamics and Strategies** • Environment Dept will now be integrated within the Ministry Climate & Energy • SH agreement: SHs want to participate in NXG beyond project but need someone to take the lead; an institutional setting that will call for this meeting (this could be at any level, it is a matter of power and interest to take up this role). RBA is *not excited* to take up this role. • The expert level we have been talking to want now to be empowered to have their voice heard by the competent higher decision-making level • Issues of agendas and interests at individual SH levels, some want to use NXG to transfer their own agendas (rather than nexus messages). Higher levels have their own agenda. How to send feedback on outcomes and recommendations to higher level political levels? • Local level feels upset about not getting consulted about RBMs by national level • Implementation is different between the two countries, and upstream doesn't care too much	in place) • Go back to core group to SHs to look at possible actions, but see the use of NEPAT more at RBA and ministries (municipalities will not be interested in the use of the tool) • Ministry of Environment, Ministry of Agriculture, Ministry of Economics – show the results of comparison between siloed policies vs integrated • Need for FtF WS to get feedback on tool WS4 with RBA, and Ministries will be invited

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about downstream • There is an umbrella plan for LV and LT, comparing different activities indicated in each national RBMs and across the border according to WFD, what is currently in national WFDs • Know about activities performed at regional and local levels, national level letters of support are provided but no feedback comes to them about the implementation of projects • Joint development of regional measures • SHs are waiting for designation of authority to implement transboundary agreement (formal agreement at MFA level exists but its not being fulfilled), adhoc exchange exists • Have ready-made solutions in the drawer to be put in front of the highest level (in moments of crisis). (e.g., validated policy packages from the NEPAT). • How to sell NEPAT? The value is the scientific method behind it. Policies can be added, new SDMs created for new cases, etc. Need for NEPAT and SDMs to reflect real policies rather than wishful thinking. • We have core group of SHs (ambassadors), we would like to expand list of SHs and invite to the remaining WSs.	

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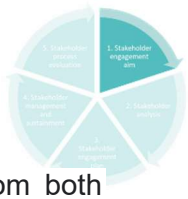

(1) SHE aim

The Lielupe CS covers 2 neighbouring countries – Latvia and Lithuania. SHs from both countries that can be interested in participating will be approached. Potential interest in development of Lielupe River Basin can have SH groups (at national, regional, and local level) having direct or indirect impacts in the region. The CS will strive to involve SHs from national authorities (ministries, agencies), regional planning authorities and local municipalities having practical and direct link to the CS. SHs who work at various levels of involvement will be addressed as well e.g., developers of river basin management plans, research institutions/universities, professional associations, environmental NGOs, and business (large farms and enterprises) active in the region.

Based on the conversations during the General Assembly meeting in Tours (Parallel Session 6) from 19-21 September, the following aims will be prioritized over the remaining two years (crossed-out aims are no longer a priority):

- System knowledge:
  - Characterise social, economic, ecological, and institutional contexts associated with regional development planning.
  - Improve understanding of the water quality issues (the status quo and targets).
  - Gain understanding of the river basin management plans between both countries.
- Target knowledge:
  - Determine what set of solutions that balances different sectors by their design and scale of applicability.
  - Knowledge on potential conflicts between the agricultural and ecological sectors.
  - ~~Determine innovative systems for sustainable production~~.
- Transformation knowledge:
  - ~~Gain understanding on how to improve communication between SHs as well as the requirements of an appropriate platform to do so.~~
  - *Design communication pathways between various level SHs to ensure practical involvement and cooperation*
  - Determine suitable pathways to design and implement formal agreements for the case of a transboundary river basin.
  - Design and implement suitable ways for a coordinated management between the countries.

Meanwhile, gauging from the desired SHE outcomes, we derived likely aims as seen from the SHs' view (aims in italics have been added by SHs):

- Possible system aims:
  - Deepen/improve understanding of the current (state of) WEFE Nexus problems (e.g., river basin management, energy transition, water scarcity) and identify pressures
- Possible target aims:
  - Determine solutions/systems (and their drivers) that balance sectors for a sustainable production

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  - Gain knowledge on potential conflicts between sectors and how to reduce them (e.g., through the use of a common language), moving towards cooperation and trust.

- Possible transformation aims:
  - Develop and implement formal agreements and aligned policies for a coordinated river basin management
  - *(Co-)Design and (co-)validated of NXG tools/platform (e.g., SLNAE, WEFE Footprint), and build capacity (e.g., to use the NXG tools, to transition to renewable energy)*
  - *Identify relevant WEFE Nexus components and indicators*
  - Improve communication between SHs and break silos

The aims are largely aligned with the ones of the CS team. However, there are slightly different 'transformation aims', with SHs likely being more focused on developing specific, tangible tools that can also be used for knowledge transfer to/communication with higher-level SHs. Incidentally, for SHs, 'knowledge transfer' is both a high-priority outcome and one where there is still a large discrepancy between expectations and experience.

Table 68~~Table 68~~ lists the aims for the co-creation process and their self-assessed level of achievement, as of June 2024. Below the reasoning for the scoring of selected aims is presented.

Table 68: Aims for the co-creation, divided by type of knowledge. In bold are those aims identified as particularly relevant for the remaining duration of the project.

Aims for co-creation per type of co-generated knowledge	Current level of achievement (1=not at all achieved, 7=fully achieved)
System	
Deepen/improve understanding of the (state of) WEFE Nexus problems and identify pressures, focusing particularly on: ○ Improving understanding of the water quality issues (the status quo and targets).	**5**
Characterise (social, economic, ecological, and institutional) context, focusing particularly on: ○ Capturing regional development planning	**5**
Understand the institutional, organisational and political context and river basin management plans (incl. neighbouring countries)	**6**
Get data for model development	6
Target	
Know about future expectations/perspectives (in general and for assessment tools)	6
Determine solutions/systems (and their drivers) that balance sectors.	**4**
Diffuse conflicts between sectors (e.g., through the use of a common language), moving towards cooperation and trust, focusing on: • The agricultural and ecological sectors	**4**
Transformation	
Develop and implement formal agreements and aligned policies for a coordinated river basin management	**5**

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Design of pathways to enhance awareness of (water) resources management	4
(Co-)Design and (co-)validate NXG tools/platform (e.g., WEFE Footprint), and build capacity (e.g., to use the NXG tools)	4
Identify relevant WEFE Nexus components and indicators	5
Improve communication between SHs and break silos, including: • Ensuring practical involvement and cooperation between SHs from various levels • Designing pathways toward a coordinated management between countries	**5**

As far as the systems knowledge aims are concerned, the CS leads see a relatively high-level of achievement. Particularly the interviews conducted for the governance assessment of WP1 were seen as helpful to characterise the socio-political context in the basin. It also, supposedly, helped SHs further enhance their nexus-thinking, which already existed due to previous nexus-related projects in the basin. In addition, the SHs helped take stock of the WEFE interlinkages in the basin, particularly facilitated through the exercises for developing the conceptual models.

The CS leads assessed a lower level of achievement for some of the target knowledge aims. They anticipate however that the NEPAT tool will not only suggest specific possible solutions for problems in the basin but also demonstrate to SHs from different sectors how their respective policies are interlinked.

The aims for transformational knowledge are not considered to be achieved, yet, but the CS leads anticipate progress throughout the remainder of the project, citing introducing the NEPAT tool to the SHs and generally the benefits of continuous engagement.

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(2) SH analysis

SH identification

In the past year the SH register has changed. To move forward with a GDPR compliant SH base the issue of contest was discussed at the General Assembly meeting in Tours from 19-21 September 2023. The following was agreed:

1) Most information on SH is taken from public sources → mark SHs where information was taken from public sources (add a P if taken from public source in the new column B of your CS tab in the SH dashboard)
2) Double check current names and organizations and update SHs and affiliations accordingly. Some SH may have changed jobs, retired, etc.
3) Mark all high power or high interest SH in the register. These are people you most likely may want to keep. Write to them individually and ask them to consent to the PPCF; threaten with removal if needed. Remove them from the register if the information obtained on them is not from public sources.
4) Add new SHs based on the needs outlined in the management plan below. Lay a particular focus on moving from technical SH to more political SH that could help you understand where legislation on the suggested policy packages currently stands. This will help you get into the policy cycle better. Ideally source their contact information from public sources.

A total of 118 (instead of 75 (2022) and 93 (2023)) Latvian and Lithuanian SHs were identified out of which 30 (25,4%) (instead of 23; 30,75% and 30; 31,3%) consented to be officially included in the SH register and participate in the NXG SHE (Table 69). In the remainder of the document SHs that consented to be included will be termed 'official SHs'.

Table 69: CS2-Lielupe summary information of SH identification as of Sept. 2024

Item	Count 2022	Count 2023	Count 2024
Preliminary listing of SHs	75	96	118
SHs in registered officially	23	30	30
Percentage of consent [%]	30.7%	31,3%	25,4%

The official SHs belong mainly to the water (56.7%) and ecosystems (50%) sectors, followed by the energy (26.7%) and food (10%) sectors (Figure 167). This distribution has not changed.

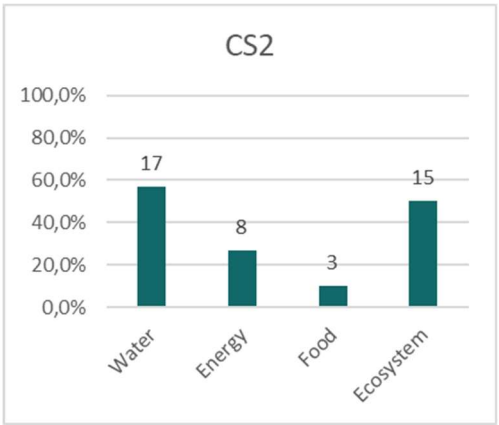

Figure 167: Distribution of SHs across the WEFE sectors for CS2 - Lielupe. One SH can be assigned to one or more sectors.

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In terms of gender, there is an almost 40/60 distribution across female and male genders (Figure 168). All SHs provided data about gender. This information has not changed.

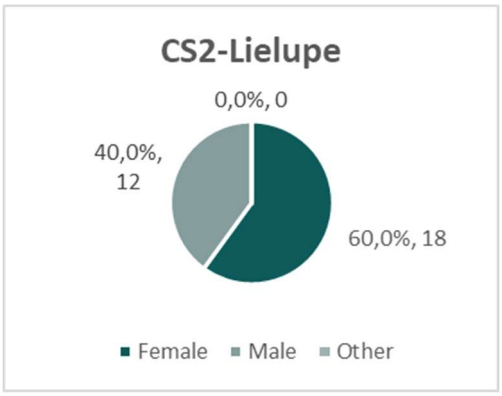

Figure 168: Gender distribution for CS2 – Lielupe

SH differentiation and categorisation

No changes have occurred here since last year.

The official SHs are distributed across tiers as follows in a descending order: tier 2 with 18 SHs; tier 1 with seven SHs; tier 3 with five SHs. This means that SHs are perceived to be more interested in the application of the project's outputs, rather than with their development.

From a Power-Interest perspectives, all consenting SHs were perceived as having rather high interest, except SH-77 and SH-92 (and SH33 and SH53). More than half of them were perceived as low power (Figure 169).

Low interest – High Power actors are completely missing in this register. Emphasis should be laid on seeking out these actors, as they may be able to move the project forward. Particular care should be placed on grooming the 10 high interest – low power actors.

Even though the upper right section of the map should be considered as the key SH group, given the number of SHs, all of them will be considered for a closer engagement, as far as they are interested.

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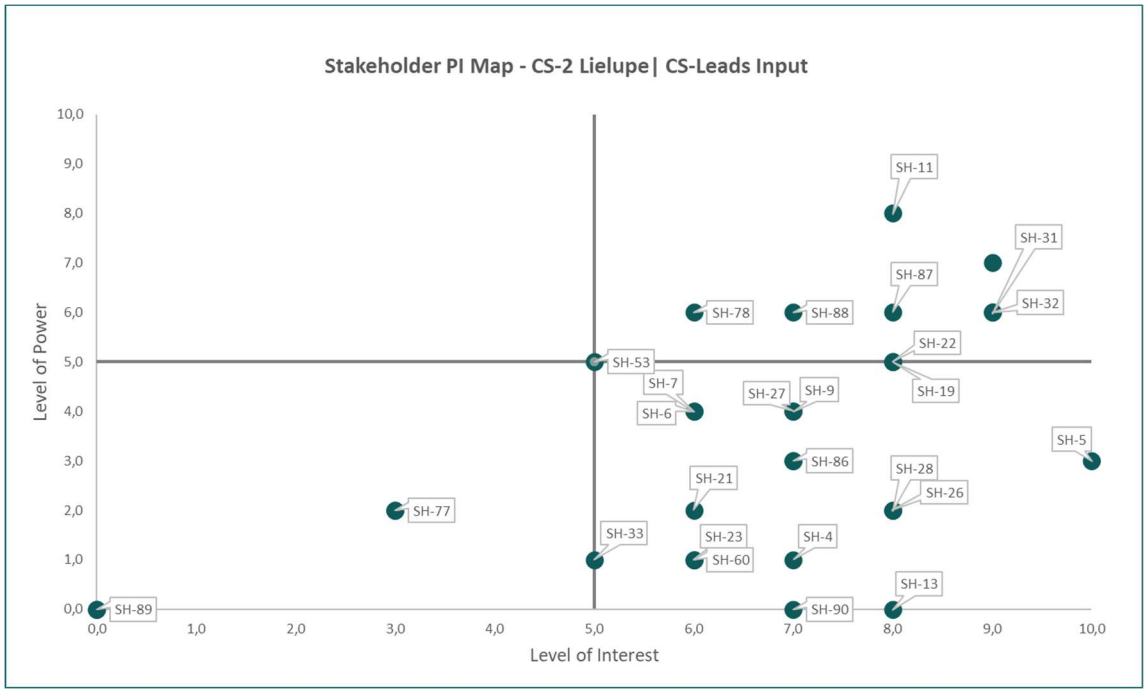

Figure 169: Power-Interest Map for CS2 - Lielupe. based on the CS-Leads' perception; For data protection and privacy matters, SHs are anonymised; for internal use CS-Leads know which SH each number represents.

SH relationships

No changes have occurred here since last year.

About the relationships among the official SHs, the CS-Leads characterised – based on their perception – 435 (210 in 2022) relationships. The relationships correspond mainly to the non-existent category (257, 59,1%) followed by complementary (Cm) type, 31,3% and a very low share of cooperation (Cp), 9,7% (Figure 170 and Figure 171Figure ~~Figure~~). The large number of non-existent relationships is due to the international nature of the transboundary basin. Many SH are coming together in this project that have not had a need to interact before. This is therefore an opportunity to foster new relationships that may become the basis for transboundary cooperation.

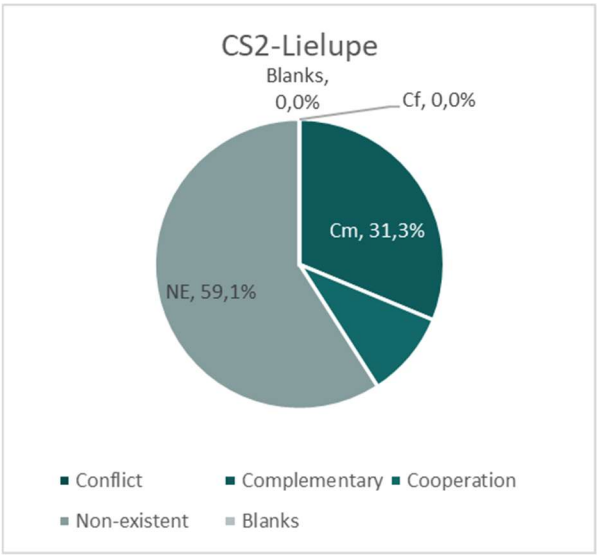

Figure 170: Share of types of relationships across SHs. Characterised based on the perception of CS-Leads.

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SH-ID	SH-4	SH-5	SH-6	SH-7	SH-9	SH-11	SH-13	SH-19	SH-21	SH-22	SH-23	SH-26	SH-27	SH-28	SH-31	SH-32	SH-33	SH-58	SH-77	SH-78	SH-86	SH-60	SH-53	SH-87	SH-88	SH-89	SH-90	SH-91	SH-92	SH-93
SH-4																														
SH-5	CM																													
SH-6	CM	CP																												
SH-7	CM	CP	CP																											
SH-9	CP	CM	CM	CM																										
SH-11	CP	CM	CM	CM	CM																									
SH-13	CM	CM	CM	CM	CM	CM																								
SH-19	CM	CM	CM	CM	CM	CM	CM																							
SH-21	CP	CM	CM	CM	Cm	CP	CM	CM																						
SH-22	CM	CM	CM	CM	CM	CM	CM	CM	CM																					
SH-23	CM	CM	CM	CM	CP	CM	CM	CM	CM	CM																				
SH-26	CM	CM	CM	CM	CM	CM	CM	CP	CM	CM	CP																			
SH-27	CM	CM	CM	CM	CM	CM	CM	CP	CM	CM	CP	CP																		
SH-28	CM	CM	CM	CM	CM	CM	CM	CP	CM	CM	CP	CP	CP																	
SH-31	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CP	CP	CP	CM																
SH-32	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CP	CP	CP	CM	CP															
SH-33	CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	CP	CP	CP	CM	CP	CP														
SH-58	NE	CM	CM	CM	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE													
SH-77	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CM												
SH-78	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CM	CP											
SH-86	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CP	CP	NE	CP	CP	CP	CM	CM	CM										
SH-60	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE									
SH-53	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE								
SH-87	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CM	CM	CM	CM	NE	NE							
SH-88	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CP	CM	CM	NE	CM	CM	Cm						
SH-89	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CM	NE	NE					
SH-90	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CP	NE	NE	CM	NE				
SH-91	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CP	NE	CM	CM	CM	CM	NE	CP	NE	CM			
SH-92	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CP	NE	NE	NE	CM	NE	NE	CP	NE	CM	CP		
SH-93	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	CM	NE	CM	NE	NE	CM	NE	

Figure 171: Actor-Linkage Matrix for CS2-Lielupe. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent.

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(3) SHE

The SHE plan (Table 70) provides guidance to organise SHE and achieve the SHE aims considering the findings from the SHE evaluation and the updated results of the SH analysis. These results show that:

- Only marginal changes have occurred and the number of 'official SHs' has stayed the same.
- Recommendations of reaching out to high power - low interest SHs has not occurred and the group of SHs that the CS is interacting with has remained similar as in the previous project phase.

Working towards any kind of 'formal agreement' will require working either through the current SH base to reach their higher ups or reaching the decision-makers through different means.

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Table 70: Overview of the main SHE components of the SHE plan for CS2-Lielupe.

	Co-exploration	Co-design		Co-development	
	Information	**Consultation**	**Involvement**	**Collaboration**	**Empowerment**
WHO? SH category	We have core group of SHs (ambassadors), we would like to expand list of SHs and invite to the remaining WSs.	Events (seminars, conferences, working groups, River basin consultative boards) organised by other projects/initiatives could be a good platform where to meet SHs, to get their viewpoints and to introduce NXG results.	Involve river basin authorities and local level SHs.	Continue with the trust-building efforts of honest and open co-creation and participation with the currently involved SHs	Try to bring together high-power SHs from both riparian countries, without disregarding opinions of low-power SHs Go back to core group to SHs to look at possible actions, but see the use of NEPAT more at RBA and ministries (municipalities will not be interested in the use of the tool) Ministry of Environment, Ministry of Agriculture, Ministry of Economics – show the results of comparison between siloed policies vs integrated
WHY? PI and ALM	Know about activities performed at regional and local levels, national level, letters of support are provided but no feedback comes to them about the	Asking participants for feedback during the event is the most effective way vs. sending the evaluation survey sometime later.	SHs are willing to share their knowledge, allocate time for participation in the project activities if they see that the project outputs would be beneficial for their everyday practices, or	SHs are showing an increasing trust in project results as they see them being developed based on scientific approaches. The presence of experts was appreciated because they were able to answer	The expert level we have been talking to want now to be empowered to have their voice heard by the competent higher decision-making level The CS Lead acknowledges that closer cooperation (at

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	Co-exploration	Co-design		Co-development	
	implementation of projects		lead to improvement of policies, raising of knowledge, etc. Local level feels upset about not getting consulted about RBMs by national level Implementation is different between the two countries, and upstream doesn't care too much about downstream There is an umbrella plan for LV and LT, comparing different activities indicated in each national RBMs and across the border according to WFD, what is currently in national WFDs	technical questions; SHs got the answers they were looking for in real time from the experts. Cooperation between Latvian and Lithuanian border municipalities in the Lielupe CS is implemented at project level and thus it is important to sustain these practices beyond the project's scope.	national and transboundary levels) between SHs should be established during elaboration and implementation of River Basin Management Plans. Bringing up the issue on cooperation beyond the implementation of the NXG project at local and regional levels will help to facilitate a process that aims to design and adopt a (transboundary) SH agreement for integrated management of the Lielupe river basin's resources. Nature-based solutions have been prioritised by SHs as policy instruments. Lielupe CS Leads would rate it as an achievement if nature-based solutions are mainstreamed in various sectors e.g., agriculture, forestry, urban environment. However, the time frame of the project will be too short to see this. Such initiatives must be continued along with allocation of financial support schemes. How to sell NEPAT? The value is the scientific method behind it. Policies can be added, new SDMs created for

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	Co-exploration	Co-design	Co-development	
				new cases, etc. Need for NEPAT and SDMs to reflect real policies rather than wishful thinking.
HOW? Activities	Have a transboundary event and 'launch' the Transboundary working group	Training session on how to use and make use of NEPAT, depending on the type of SH in a WS setting (take note of your own WS recommendations) or in one-on-one sessions with those trickier SHs[1]	Transboundary working group (meetings 1-2 times per year) *"Cleaning the river day" with border municipalities, clean river together and demonstrate NEPAT > use also other projects to build synergies to organize the day.*[2]	Use NEPAT to bridge national and local > results of NEPAT for the national ministries (environment agriculture, economics, climate and energy) and river basin authorities to see impact of integrated policies vs. silo policies.

[1] Keep the face-to face workshop approach, invite project partners including modelers and tool developers, as they are the ones who could provide scientific support which is of high importance. Obtaining feedback from SHs via evaluation questionnaires, as well as learning from other CS on SHE approaches, successes and challenges is always useful to get inspiration for agenda development and communication tools to be applied during the interaction with SHs at the events.

[2] At the WS5 meeting in Riga, Latvia, on Oct. 2nd 2024 this was discussed and discarded as unrealistic due to administrative and bureaucratic issues that such an activity would entail. It remains in the plan as a suggestion.

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(4) Management and sustainment

Management

The initial management plan considered different foci per year. Table 71~~Table 71~~ looks at how these were accomplished and what changed based on the findings of the past year.

Table 71: Priorities of the different plans and how these were accomplished and changed over the course of the project.

Foci	From 2022 Plan	From 2023 Plan	2024 Plan
2023	Look to increase the interest of other SHs while maintaining the interest of current high interest SHs. Focusing away from high interest SHs may allow discovering missing marginalised SHs.	While the SH register was expanded, the distribution remained the same as in 2022. Mostly high-interest SHs are present in the current SH register.	The SH register was modified to be GDPR compliant. The core SH group in Latvia is formed by representatives from Latvia University of Life Sciences and Technologies, Latvian Environment, Geology and Meteorology Centre and Bauska County municipality. In Lithuania the most active (engaged) SHs are from Center for Environmental Policy (AAPC).
2024	Maintain the interest of the engaged SHs and focus on the relationships between them, including power dynamics and building trust to enhance collaboration.	Think of incentives that might increase the interest of marginalized, low interest SHs such as invitations to events, highlighting research results of interest to them or providing them with free access to results and findings. Share as much scientific evidence with the SH as possible (even if they may not understand the scientific papers). Show at each WS which advancements/decisions were made based on the SHs' inputs (feedback to the feedback or acknowledging their inputs). Plan activities to share the outputs of the provided feedback and discuss about it.	SH lists were updated by adding new contacts, e.g., from ministries. Invitations to the events were sent to large group of SH. SH were provided with background information materials, presentations from research, e.g., NXG partners delivered SH inputs were reflected in presentations on the CS activities SH feedback to outputs was taken in interactive sessions and discussions Wide range of activities were employed in the project implementation; however, these were not designed specifically to the low-interest SH.

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		Consider organizing a high-power event for (political) SH from both countries to allow for awareness raising on the Nexus and floating the idea of an inter-ministerial cross-country working group.	This activity was not implemented
		WSs – activities to co-decide features and design of the tools (WS2 to WS6), focus groups (within or in between WS2 and WS3), role activities to build trust. 1-on-1 activities to bring in marginalized current low-interest or uninformed SHs.	Setting the SH agreement on common activities in the Lielupe RB was discussed at the 4th SH WS. Wide range of possible activities were identified for further implementation.
		Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations). So that the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded SHs. Frequent smaller conversations of transnational peer SHs may need to happen to allow for recognition of peers and for technical discussions about transboundary solutions (e.g., ecological low flows, abstraction needs, conservation measures, etc.). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.	BEF has agreed to act as a focal point for the actions – initiating, leading, and facilitating the cooperation process e.g., organizing joint events.
2025	Focus on co-decision activities and further planning on sustainment of SHs as well as on the defined agreements.	Stay focused on providing evidence base and the results from the research. This is your largest asset.	Have a transboundary event and 'launch' the Transboundary working group Training session on how to use and make use of NEPAT, depending on the type of SH in a WS setting (take note of your own WS recommendations) or in one-on-one sessions with those trickier SHs

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			Transboundary working group (meetings 1-2 times per year) *"Cleaning the river day" with border municipalities, clean river together and demonstrate NEPAT* Use NEPAT to bridge national and local > results of NEPAT for the national ministries (environment agriculture, economics, climate and energy) and river basin authorities to see impact of integrated policies vs. silo policies.

Sustainment

A session dedicated to SH sustainment was held at the General Assembly Meeting in Tours from 19-21 September 2023 and highlighted the need to identify a specific committee/body to take up the issue. Otherwise, a mandate from the Ministry may be needed to carry on with activities.

Discussion on facilitation towards a SH agreement was continued at the fourth SH WS 6-7 February 2024, in Riga, Latvia. In cooperation with WP1 (Caro Mooren, KWR) there were key elements of a SH agreement, step-by-step process description and the timeline to reach the SH agreements presented. Discussion among participants highlighted the main topic for cross-border cooperation related to water quality issues in the Lielupe RB. The proposed format included working group meetings, local practical actions, involving River Basin Authorities (LV/LT), National, Regional and Local level SHs.

SHs appreciated the proposal of the Baltic Environmental Forum taking a role of a focal point of maintaining the cross-border cooperation of SHs in the Lielupe River basin. Study visits and experience exchange were identified as the most wanted form of cooperation. By the year 2028, in the frame of Horizon project NATALIE, the Baltic Environmental Forum can act as a focal point for the actions – initiating, leading, and facilitating the cooperation process e.g., organizing joint events. The NXG project is aiming to develop a Governance roadmap for the implementation of the SH agreement action plan. Validation of the roadmap and the SH agreement is envisaged to take place during the sixth SH WS.

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CS3: Jiu

The SH (SH) engagement plan is based on the data, information and perceptions provided and analysed by the case study (CS) leads, the CS SHs and the AVA- and UU-Team by August/September 2024. The plan is updated on a yearly basis taking new SH information and evaluation results into account to allow for adaptive management. Thus, the plan starts with the fifth phase of the SHE plan, namely SH Evaluation.

(5) Evaluation

In the 2023-2024 cycle no SH WS took place in which an evaluation would have fitted. Rather evaluation information is based on:

(1) The self-evaluation of CS on the implementation of the recommendations of the past plan
(2) Interviews on SHE performance and methods of co-creation with CS leads in June 2024
(3) Information extracted from MS23 Second intermediate report on CS implementation and co-creation activities for the Jiu CS
(4) Recommendation that ensued from the CS meeting with WP1 and WP5 in Berlin in January 2024

Results from the self-evaluation

The 2023 plan suggested a set of activities/actions to be carried out in the upcoming year (2023/2024) (last row of Table 3 in the 2023 SHE plan). Table 72 below show the degree to which the activities were implemented and further comments on these.

Table 72: Self-evaluation of the implementation of the 2023 SHE plan recommendations

Recommended activities as per the 2023 SHE plan	How activities were implemented	Further comments
Provide SH with system knowledge, i.e. providing them with easily understandable results of the (biophysical and) socio-economic modelling and what this means to the WEFE Nexus and particularly to policies.	Key SH were consulted (online meetings) during the development of the SDM directly contributing to completing the input data and for validating the outcome. This paved the interest for the online WS (#4) on NEPAT decision support tool, facilitating a high rate of participation. Further on the tool was used in a ”live”, hands-on session managed by EURECAT (WS #5), by a core group of SH from the SDG nuclei in the WEFE ministries in RO (with potential to be the future WEFE Nexus taskforce/NEPAT end users)	The NEPAT session gave the possibility for SH from water, agrifood, environment and climate adaptation sectors to experience working with the tool
Emphasise presenting project results to high-power SHs, trying to instil a Nexus-thinking amongst them.	An international WS Water-Energy-Food-Ecosystems (WEFE) Nexus for Sustainable Development during the NXG Annual Meeting Bucharest, Romania September 17-19, 2024	The WS was organised with the support of RO government, Department for Sustainable Development, Water management Authorities in Jiu CS and the University of Economic

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		Sciences in Romania. It was attended by 46 participants out of which 18 SH from different levels in the WEFE sectors in Romania
Discuss with high-power SHs how project outputs can be specifically integrated/translated into policies.	Discussions initiated from the start of the project, follow-up steps planned during 2024 and 2025 once the NEPAT is finalised. for further utilisation and integration in the one-stop-shop that will be created in Romania's Centre of Excellence for Sustainable Development (CEXDD). Additionally explore further utilization in education at the Bucharest Faculty of Agro-Environmental Economy	
Focus on transformation knowledge to help SH reframe and target policy uptake and management practices.	Follow-up plan to stimulating the use of the tool in SD policy making context to break silos for stimulating sustainable action and in an educational context for building up on nexus thinking by future professionals	
Possibly shift focus at the remaining WSs, focusing on how NXG results can be specifically fed into the policy-making process.	Targeted meetings with „NEXUS champions" will be organised during the remining duration of the NXG to follow the actual knowledge transformation processes and use opportunities for promotion of the NXG overall approach support (SHE, governance assessment, policy inventory, NEPAT). Agree on additional capacity building or other type of needs to ensure policy making level is making use of NXG results	WS#6 will be organised as closing NXG event, targeting the week of June 24-29, 2024 (International Day of the Danube River is on 29/6)

Interviews on SHE performance

As part of the SHE evaluation, WP5 conducted a (re-)assessment of the aims of and preferred approaches to co-creation (as per Chambers et al., 2021) with the CS leads. This was done to gauge 1) to what extent CS have, in their own perception, reached the aims they had set for themselves and 2) whether priorities and expectations have changed based on their experiences throughout the project. To facilitate this, WP5 distributed a template to capture updated aims and approaches to collaboration (see Annex). Subsequently, in June 2024, the information provided by the CS leads was further discussed in one-on-one conversations.

Below, the modes of co-creation elicited in June 2024 are presented – this includes the desired mode of co-creation and the one the CS leads themselves consider to have de facto delivered (Figure 172). These are also compared with the mode preferred by the CS leads at the start of the project (September 2022) and the one indicated by SHs at the third WS (June 2023).

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This CS's mode of co-creation has significantly changed since the inception of the project. Originally, the CS lead had identified 'Researching Solutions' as the adequate mode. This mode focuses on the co-creation of knowledge to inform evidence-based decision-making, influencing policies and interventions to initiate immediate action within the existing socio-political system. Relationship building was hardly a focus at the time. In June 2024, however, the CS lead instead identified approaches to co-creation as desirable that collectively yield the mode 'Reframing Agency'. This mode is not focused on immediate actions, but rather on fundamentally shifting aspects such as, for example, policy goals, policy-making processes, as well as putting SHs in the position to independently employ the tools necessary for reflective, integrated co-creation beyond the duration of the project. While the CS lead did not make the latter an explicit objective of the co-creation process, it was communicated that the NEPAT tool as well as emerging relationships shall help break down sectoral divisions. Partly, this shall be achieved, for example, through targeting high-level decision-makers who will be able to structurally change policy-making processes.

At the CS's third WS, SHs expressed preferences more aligned with the CS's original approach (except for a higher focus on influencing high-power SHs), emphasising particularly the expectation for the project to propose specific actions for addressing WEFE issues (Figure 173). In the interview, the CS lead mentioned that the co-creation had previously been more action-oriented, but the decision to shift came from realizing that targeting high-power SHs could lead to more meaningful and long-lasting impacts.

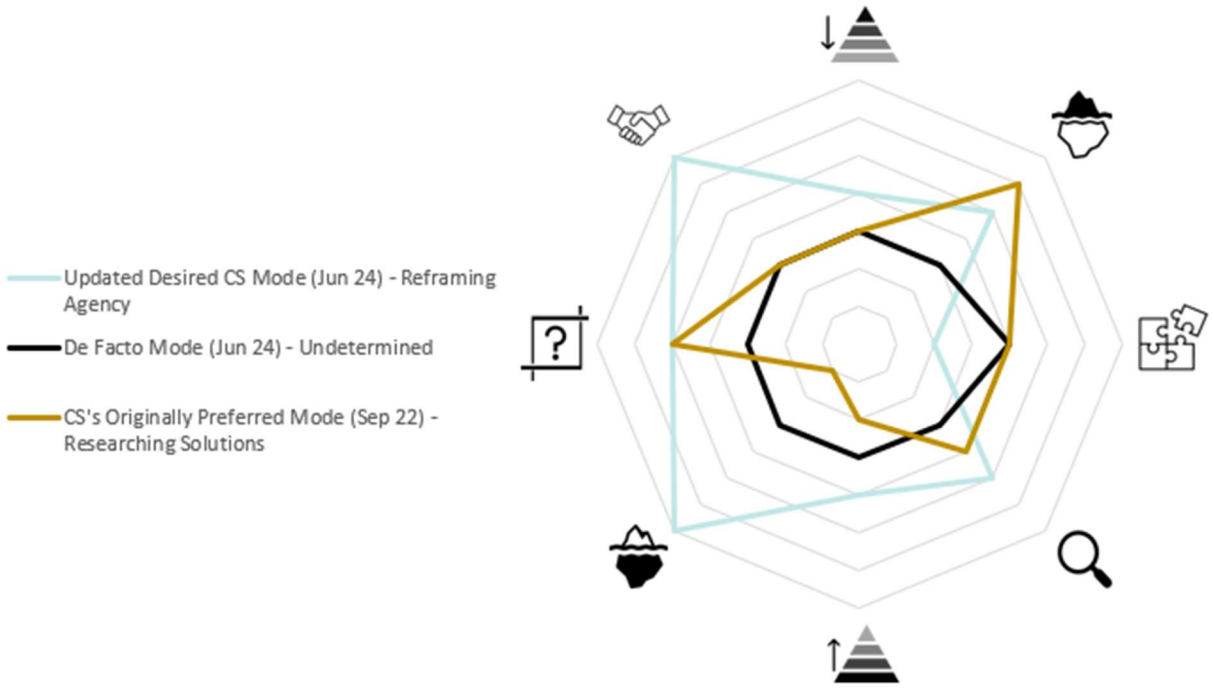

Figure 172: Approaches/modes of Co-Creation as assessed by CS lead. Icons from the top in clockwise order: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together

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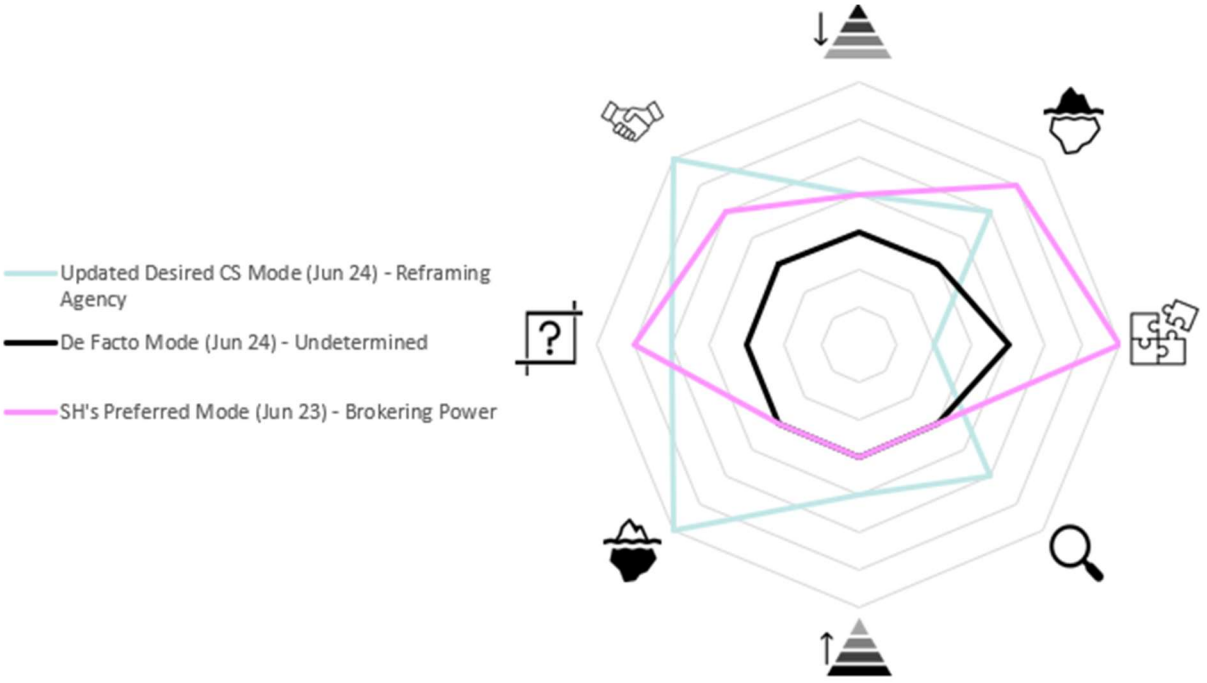

Figure 173 : Approaches/modes of Co-Creation, comparing SH and CS perceptions. Icons from the top in clockwise order: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together

Pursuing this mode of 'Reframing Agency', it is advisable that the CS lead is aware of and manages the following risks:

- Contexts may arise in which the NXG approach could be used to suggest supposed consensus, but do not result in actual agreed-upon actions;
- Solution-oriented actors may become disappointed by the NEPAT tool limitation to support immediately implementable actions;
- The urgency to meet different policy objectives at sector level could lead to overlooking a nexus approach in the absence of a binding obligation.
- Emotional aspects such as anxieties about losing power, from the perspective of high-power SHs, may need to be addressed

From the interview, it appears as if the CS lead is already well aware of these potential risks. The CS lead expressed concern over the limited resources and time within the project, which could result in any outputs to become 'paper tigers'. The CS lead stressed the need to promote continuity of the engagement process with high-power SHs beyond the project as well as the need for more fundamental changes in policy-making at EU level through rules and regulations that support a nexus approach– for example, by mandating the use of tools such as the NEPAT in cross-sectoral forums or during the future updates of river basin management plans (in accordance with the Water Framework Directive (WFD))

In addition, the CS lead will explore options for a 'low-hanging fruit', in terms of an actionable outcome of the project that can be implemented in the near future in order to better appeal to action-oriented SHs.

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Information extracted from MS23

MS23 is based on interviews that were carried out with CS leads during months 30-36 of the project to summarize the CS implementation and SH co-creation activities. Information relevant for this SHE plan update was extracted from the latter parts of MS23, namely 'Impact maximization' and 'Lessons learned'. The relevant elements can be summarized as follows:

Timing of knowledge transfer and capacities to take up content:

- Critical element is the interaction with SH *between* the WSs. We should also put some check points at which the SH should *receive* input /information about what was done with their inputs. The in-between interaction is equally important as the WSs themselves.
- Information shared and interactive dialogues facilitated during WSs. Mobilizing HP SH by tailored approach (bilateral meetings, joining complementary initiatives that may benefit of nexus approach).
- Keeping the SH attention and trust especially as regards the value of the co-creation processes (intersectoral dialogues) and the scientific base of the NEPAT tool.
- Create the conditions to mitigate for the natural changes of the SH landscape bringing the newcomers to the project speed by sharing powerful aggregated results and giving easy to-use-access to relevant project tools.
- Empowerment based on increased knowledge and awareness on WEFE Nexus interactions.
- The main capacity missing for all is the direct involvement in the WEFE Nexus decision making processes. In our CS we tried to apply a strategy of mobilising not only HI-LP but also involve as often as possible targeted HI-HP SH, identifying opportunities in the national context.
- The cons are concerning the capacity of SHs to directly influence nexus policies development and implementation due to their low power in influencing the required change in the appropriate timeframe. The need for a synchronized top-down/bottom-up approach increases the expectations as regards the opportunities offered by the NXG approach and tools.

Elements that influence the impact of the results:

- The outcome needs to stay relevant for capturing the real-life nexus challenges in local conditions. Consequently, the development of the NXG tools and solutions needs to retain a pragmatic approach. Thus, their development in the Jiu CS will continue in close collaboration with connected authorities at catchment and national levels.
- The SHs perceive the tools proposed by the project and the possibility to incorporate CS specifics in their design as an opportunity for improved public policy development in the WEFE sectors and for reaching SDGs in Romania.
- Further project activities should build upon the activated interest by providing elements to reflect the incorporation of SH input into different NXG deliverables and tools, contributing to SHs sense of ownership and their activation for using the planned results.

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➔ Having WEFE Nexus impact included in the ex-ante and ex-post evaluation procedures in policy making in all WEFE sectors, at all levels (EU, national, regional, local).

Recommendations from the 'Berlin meeting'

A three-day meeting was held in Berlin, Germany from 10-12 January 2024, hosted by the Helmholtz Institutes. All CS leads, WP1 and WP5 representatives met to (a) reflect on the SHE process so far, (b) discuss the needs of the governance roadmap and the 'river contracts' to be drawn up by the end of the project, and (c) draw lessons learned from the process and suggest adapted strategies with a view of achieving the river contracts and the needed SH sustainment. Table 73 below shows the reflection and the suggested ways forward.

Table 73: Recommendations from the Berlin meeting – CS3

JIU	
Reflections on SHE to date	***Ideas for SHE & Agreement moving forward****
Workshops: • Consistent representation of all WEFE sectors and from SDG & CC • Hybrid format really worked well. National SHs could then join and representative of sister projects • Interactive format outside political context was useful for constructive discussion • Sharing of scientific information, provides a scientific base for shared objectives and for nexus thinking – useful to get attention of SH • Too many targets in each of the WSs • One-way scientific language presentations were hard to follow • Translation and interpretation were really useful • Break-out rooms were not possible – people want to stay in plenary • Best discussions were over lunch • Challenging to keep interest in between WSs/events (there is a need to provide them with bits and pieces throughout the project?) **SHs Dynamics & Strategies:** • Work with low power SH with high interest > they felt empowered by having space to share	**Aim is to influence policy-making process via:** • NEPAT (help SHs to use NEPAT) • Governance assessment • SHE **Local actions**: • Local actions should reach out to national level; focus on existing policies capturing the opportunity of having newly financed programmes active in each WEFE sector • Select for policies that are more relevant for RBMs (water-related policies), but maybe also for the Just Transition Mechanism (need a comparative analysis) • Meeting in the CS with key SH and discuss with them what is more relevant to them (depends also on context after the elections) • Creation of Task Force (ad-hoc gathering of SHs with support from the River Basin Management Authorities) (also upscale to other basins) and through SD department, TF to be attached to existing structures. **NEPAT tool and NXG approach**: • Training sessions for SHs on how to use NEPAT e.g.; at the Sustainable Development department at national level (maybe in the autumn 2024) • Important to include in NEPAT, the SDG indicators that are currently used at national level to have understanding of impact of policies (and relevance for policy-making)

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their everyday work; NXG as way to get their messages to the higher decision-making levels • 2024 is year of elections at all levels (European, National and provincial) > opportunity and risk • Intersectoral dialogue is important for SH agreement for increased sense of ownership; water and sustainable development authorities well engaged > can be the ambassador; each sector could have a champion/ambassador • NEPAT and its usefulness and usability are still unclear to SHs: how were their inputs used and made use of? How to use NEPAT? • At the beginning of the project, CS partner informed the national government (water department manager of the ministry of environment; state secretary or ministry department managers) about the NXG project and then started informing/engaging the lower levels > this is because the governance system in Romania is centralized and top down > this is done to make sure the civil servants can participate to NXG activities without being blocked by their bosses. Therefore, they acquired strategic support through bilateral meetings, and the sustainable development department gave NXG a letter of support prior to project start, which was very useful. SD group also asked 'silent' SH to come to the project. • Just Transition Mechanism meeting > DG Regio talking and one civil servant (as SH in the NXG task force for Romania CS) asked how the bring in nexus thinking is considered in the JTM > the DG Regio was surprised by the idea of bringing water resources and ecosystems in the conversation in a context focused on transition to a climate-neutral local economy etc. The topic need to be brought higher also on EU agenda by NXG ambassadors! • River Basin Authorities primarily focus on protecting the water resources often leading to bottlenecks when looking for cross-sector consensus regarding the use • NXG Setting is working. SHs are already acting as multipliers in other settings including towards the EU, SHs are now empowered. (How can this empowerment be better put in action?)	• Develop NXG activities around key international days (e.g., World Water Day, Danube Day). NXG activities in all CSs > official public launch of NXG recommendations? • There is a structure for policy making from the Prime Ministers offices > use that for governance roadmap of NEPAT policy packages and to promote NXG SHE and NXG governance approach into policy decision making. Aim to have NXG governance approach picked up/integrated into the national policy making structure (as an alternative or guide to enhance policy making with a nexus viewpoint embedded) • SH engaged are basin level, regional and national. Try to keep them in a NXG task force beyond NXG project. Would get support by river basin and sustainable development department. This taskforce would be attached to one of the activities of the sustainable development department. • Each of the ministries in the four sectors, but SD department has working groups in each ministry, so they can create line of continuity and would be good target groups. SD Department is also planning a One-Stop-Shop entity to support actions for reaching Romania's SDGs • Nexus assessments won't work unless the preparatory work is done correctly. The NXG assessment will work for information and awareness purpose. Increased trust should stimulate demand for updates to keep the tool relevant in real context. **SHE process** • Post action/policy online, nobody objects… therefore, shallow participation. 'Real' participation needs to be stimulated

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SH Sustainment: • Task-force using 'champions' of the sectors (and on the levels) • Identify the champions that have now been empowered to talk on 'our' behalf on the Nexus in their settings. • Bring the champions to other NXG events • Bring the NEPAT tool into SDG policymaking groups and make the use of the tools part of their working routine	

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(1) SHE aim

To actively involve SHs and facilitate their engagement in co-creation and validation of a NEXUS WEFE approach to support improved policymaking for water management and sustainable development primarily focused on Jiu basin, while also assessing relevant interactions within the Lower Danube region. Additionally, we aim to promote CS results as a trustful and solid reference at a national level in Romania and in the region (in dialogue with other CS in NXG and sister projects under H2020-LC-CLA-2020-2, e.g., Rexus, GoNexus), for identifying common interests, potential conflicts, and areas of compromise between different profiles SHs in diverse economic and biodiversity contexts. Furthermore, we aim to contribute to dissemination of project results at various levels facilitating their effective use in assessment processes for water use requirements, evaluation of the vulnerabilities of current water systems and improved strategies and action plans towards achieving EU targets related to WEFE sectors (WFD, CAP, Green Deal, etc).

Involvement of SHs in the work of the Jiu CS is of pivotal importance. Based on the conversations during the General Assembly meeting in Tours (Parallel Session 6) from 19-21 September, the following aims will be prioritized over the remaining two years (crossed-out aims are no longer a priority):

- System knowledge:
    - Current state of the social, economic, institutional, and ecologic contexts that are relevant for a WEFE Nexus approach.
    - Increase understanding of the institutional and organisational structure, functions, and information flows.
    - ~~Explore aspects related to the clean energy transition that are relevant to address for the WEFE Nexus in the region.~~
    - Understand existing conflicting actions and strategies regarding WEFE Nexus.
- Target knowledge:
    - Determine the appropriate level of public awareness of water as a depleting resource.
    - ~~Determine expectations and requirements for an assessment and planning instrument including interface for communication and reporting instrument.~~
    - Build towards a common language to facilitate SHs' understanding of WEFE Nexus paving the reduction of the potential conflicts.
- Transformation knowledge:
    - Determine pathways to enhance awareness of water resources and its management.
    - Gain understanding on how to break silos based on an integrated view of the reality in the local context.
    - Tailor the design of the NXG platform to support communication and reporting of the status of water resources among SHs.
    - Build capacity and identify/select relevant indicators for monitoring WEFE Nexus in connection with strategic objectives for water management and sustainable development.

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Table 74 lists the aims for the co-creation process and their self-assessed level of achievement, as of June 2024. Below the reasoning for the scoring of selected aims is presented.

Generally, the achievement of the aims linked to target and transformation knowledge are well-advanced in the eyes of the CS lead. This is reportedly linked to two main factors: 1) The project is now approaching its conclusion and so far the focus was on collecting CS specific data and validate it with the SH and 2) the CS lead was able to build NXG approach on the existing experience with Integrated Water Resources Management (IWRM) amongst SHs. Hence, although there was no close familiarity with the WEFE Nexus, SHs had already been exposed to similar concepts and awareness-raising for Nexus issues successful accordingly. There were only minor doubts concerning the accuracy of the assessment of the governance context.

When it comes to the aims linked to transformation knowledge, the CS lead still perceives a significant degree of underachievement. The achievement of the aims relies heavily on how the NXG project will wrap-up its results in a ready-to-use package for the SH including the NEPAT tool, during the remainder of the project. While the CS lead anticipates some progress regarding the achievement of the aims, there are lingering doubts whether the NEPAT tool will be able to provide valuable policy suggestions and whether there will be enough time by the conclusion of the project for SHs to accumulate enough user experience to stimulate employing the NEPAT tool in the future. Also, the CS lead questioned the relevance of the NXG WEFE footprint for SHs, as it would constitute an additional monitoring effort in the future, if it were to be integrated systematically into policymaking in the future.

*Table 74: Aims for the co-creation, divided by type of knowledge. In **bold** are those aims identified as particularly relevant for the remaining duration of the project.*

Aims for co-creation per type of co-generated knowledge	Current level of achievement (1=not at all achieved, 7=fully achieved)
System	
Deepen/improve understanding of the (state of) **WEFE Nexus problems** (e.g., river basin management, energy transition, water scarcity) and identify pressures, including: • Explore aspects related to the clean energy transition that are relevant to address for the WEFE Nexus in the region.	**7**
Characterise (social, economic, ecological, and institutional) context	**7**
Understand the institutional, organisational and political context and river basin management plans	**7**
Identify conflicts/synergies between SHs as well as actions and strategies	**7**
Get data for model development	7
Target	
Know about future expectations/perspectives (for assessment tools) • Determine expectations and requirements for an assessment and planning instrument including interface for communication and reporting instrument.	**6**
Determine solutions/systems (and their drivers) that balance sectors	6
Diffuse conflicts between sectors (e.g., through the use of a common language), moving towards cooperation and trust, including:	**7**

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• Build towards a common language to facilitate SHs' understanding of the WEFE Nexus, paving the reduction of the potential conflicts.	
Raise awareness of water as a depleting resource	**7**
Gain knowledge on required infrastructural improvements	6
Transformation	
Develop and implement formal agreements and aligned policies for a coordinated river basin management	1
Design of pathways to enhance awareness of (water) resources management	**5**
(Co-)design and (co-)validate NXG tools/platform and build capacity (e.g., to use the NXG tools).**SH**	**7**
Identify relevant WEFE Nexus components and indicators, including: • Build capacity and identify/select relevant indicators for monitoring WEFE Nexus in connection with strategic objectives for water management and sustainable development.	**7**
Improve communication between SHs and break silos, including: • Based on an integrated view of the reality in the local context	**7**
Determine the requirements to invest in infrastructure	1

Meanwhile, gauging from the desired SHE outcomes, we derived likely aims as seen from the SHs' view:

- Possible system aims:
  - Deepen/improve understanding of the current (state of) WEFE Nexus problems (e.g., river basin management, energy transition, water scarcity) and identify pressures
  - Gain/increase understanding of the institutional, organisational and political context and (current) river basin management plans (including neighbouring countries)
  - *Get data for model development*
- Possible target aims:
  - Know about future expectations/perspectives (in general and for assessment tools)
  - *Determine solutions/systems (and their drivers) that balance sectors for a sustainable production*
  - *Gain knowledge on potential conflicts between sectors and how to reduce them (e.g., through the use of a common language), moving towards cooperation and trust.*
  - Awareness of water as a depleting resource
- Possible transformation aims:
  - Design of pathways to enhance awareness of (water) resources management
  - (Co-)Design and (co-)validated of NXG tools/platform (e.g., NEPAT, WEFE Footprint), and build capacity (e.g., to use the NXG tools, to transition to renewable energy)
  - Identify relevant WEFE Nexus components and indicators
  - Improve communication between SHs and break silos

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The SH's aims for the engagement process are likely aligned with the ones of the CS leads. However, SHs rate 'reframing' (i.e. changed beliefs/priorities SH) as an important objective which might be there at risk not to be fulfilled being highly dependent on changing awareness and the way policies are made at multiple levels (e.g., to stimulate breaking down silos).Transforming this objective in an outcome, CS in order to meet the SHs' expectations, would need a synchronized top-down approach exceeding the CS borders that was initiated from the start of the project and maintained along the implementation. Building on increased interest of the HP SHs will be at focus for actions towards the project end along with consolidating the capacity of HI-LP SHs using the NXG tools.

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(2) SH analysis

SH identification

In the past year the SH register has changed. To move forward with a GDPR compliant SH base the issue of contest was discussed at the General Assembly meeting in Tours from 19-21 September 2023. The following was agreed:

1) Most information on SH is taken from public sources → mark SHs where information was taken from public sources (add a P if taken from public source in the new column B of your CS tab in the SH dashboard)
2) Double check current names and organizations and update SHs and affiliations accordingly. Some SH may have changed jobs, retired, etc.
3) Mark all high power or high interest SH in the register. These are people you most likely may want to keep. Write to them individually and ask them to consent to the PPCF; threaten with removal if needed. Remove them from the register if the information obtained on them is not from public sources.
4) Add new SHs based on the needs outlined in the management plan below. Lay a particular focus on moving from technical SH to more political SH that could help you understand where legislation on the suggested policy packages currently stands. This will help you get into the policy cycle better. Ideally source their contact information from public sources.

A total of 129 (instead of 94 in 2022) Romanian SHs were identified out of which 33 (30.9%) (instead of 25; 26,6%) consented to be officially included in the SH register and participate in the NXG SHE (Table 75). In the remainder of the document SHs that consented to be included will be termed 'official SHs'.

Table 75: CS3-Jiu summary information of SH identification as of Sept. 2022

Item	Count 2022	Count 2023	Count 2024
Preliminary listing of SHs	94	108	129
SHs in registered officially	25	34	33
Percentage of consent [%]	26.6%	31,5%	25,6%

Not all SHs belong to one WEFE sector, some SHs belong to other sectors (e.g., civil society, policy makers at national level) and not all of them were differentiated. Across the differentiated ones, there is a rather even distribution of the SHs across the WEFE sectors with a predominance towards water-related SH (Figure 174).

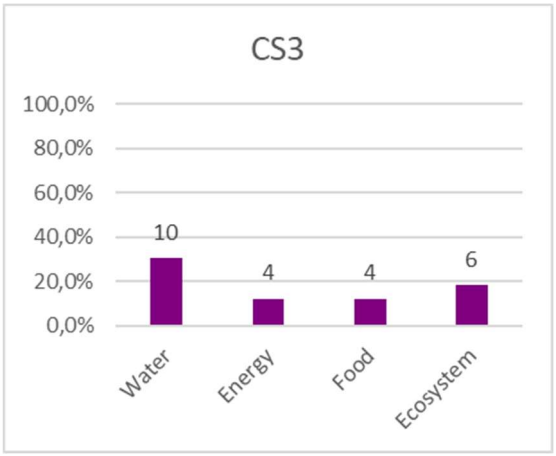

Figure 174: Distribution of SHs across the WEFE sectors for CS3 - Jiu. One SH can be assigned to one or more sectors.

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In terms of gender, there is a 60/40 distribution across female and male genders (Figure 175). All SHs provided data about gender.

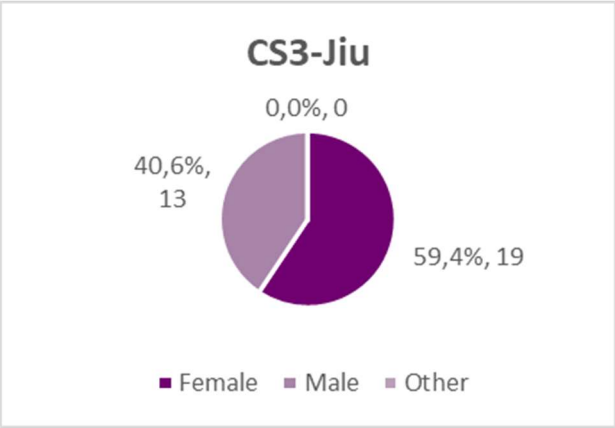

Figure 175: Gender distribution for CS3 – Jiu

SH differentiation and categorisation

The 33 official SHs belong mainly to tier 2. This means that SHs are perceived to be more interested in the application of the project's outputs, rather than with their development.

Additionally, these SHs were categorised mainly as "4. Policy makers at national level" "and "8. River basin authorities and representatives" (Figure 176). The large representation of national policy makers is useful in the top-down political context of the country.

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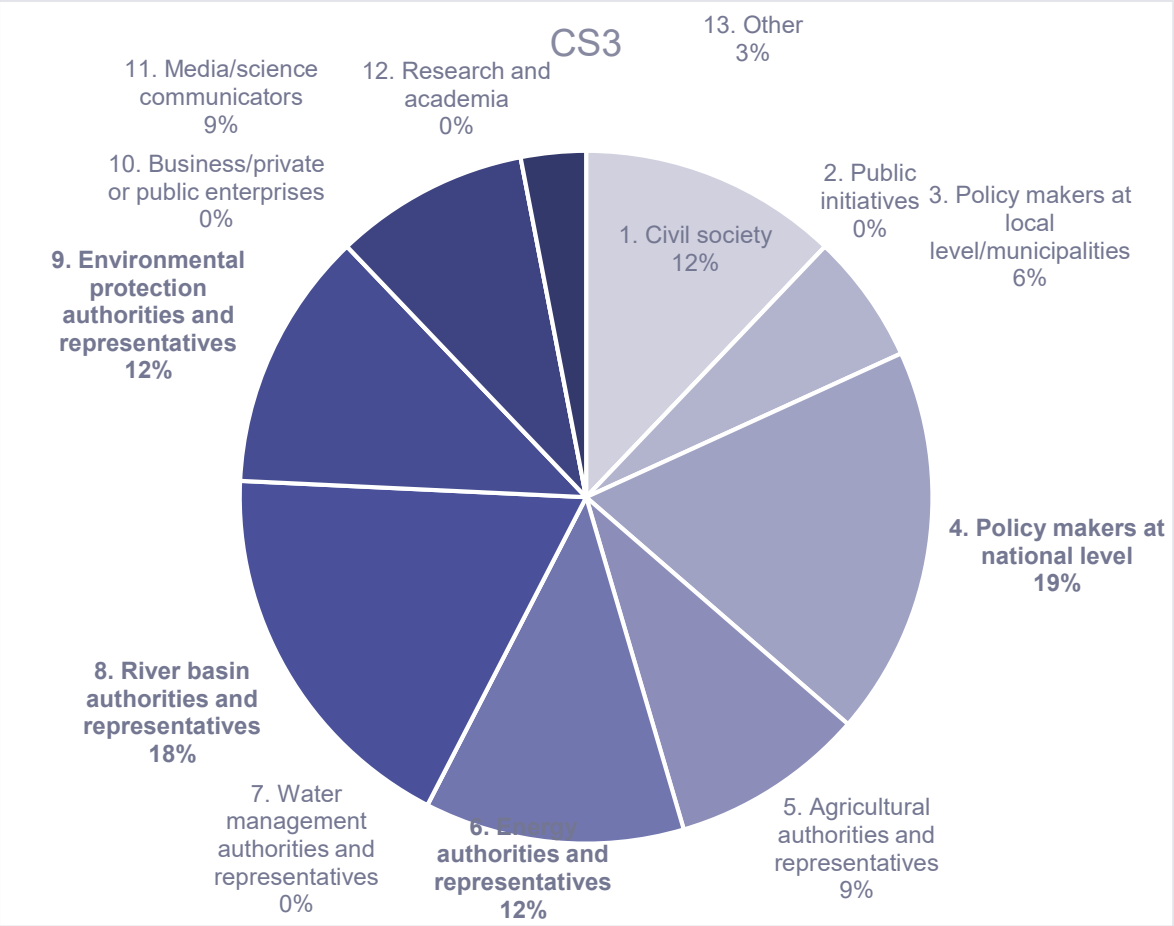

Figure 176: Distribution of SHs across categories for the case CS3 - Jiu.

From a Power-Interest perspectives, most, except one SH, were perceived as high interest SH with being HI-HP SH (78,8%) (Figure 177). Thus, few low interest SH were added in the past year and the challenge of targeting LI-HP SH remain and will be tackled with a tailored approach in the last WSs of the project.

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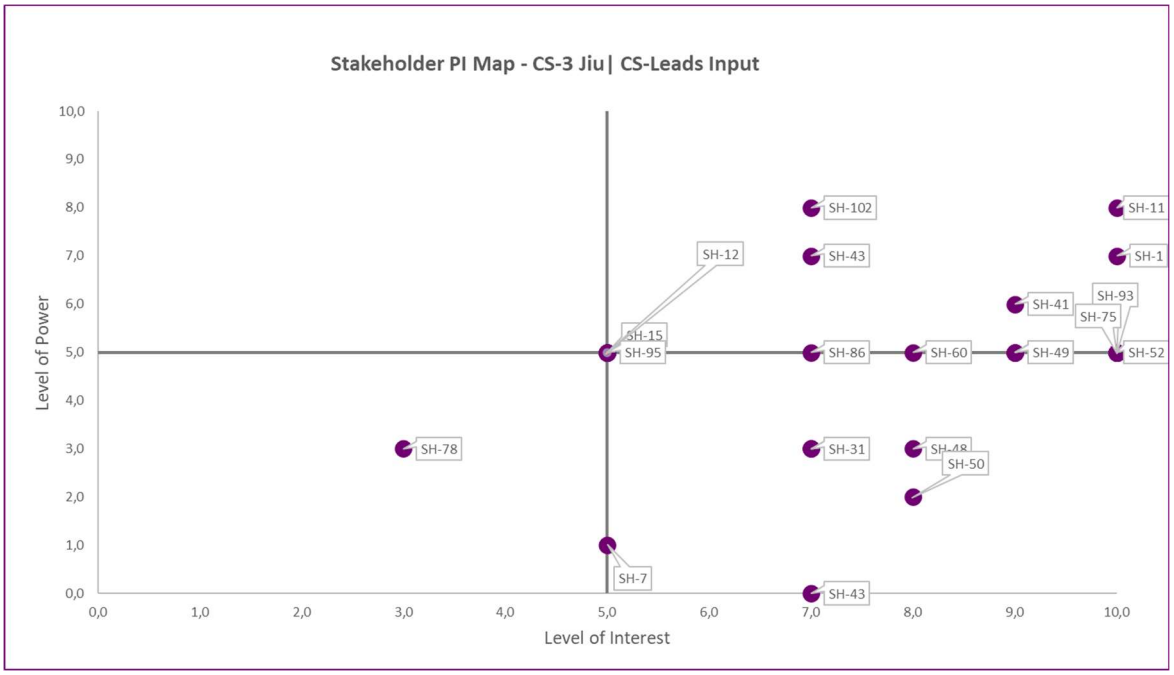

Figure 177: Power-Interest Map for CS3 - Jiu. Above: based on the CS-Leads' perception. For data protection and privacy matters, SHs are anonymised; for internal use CS-Leads know which SH each number represents.

SH relationships

About the relationships among the SHs, the CS-Leads characterised – based on their perception – 1035 relationships across the 33 SHs. The relationships correspond mainly to the cooperative (Cp) type, 64.9%, followed by complementary (Cm) relationships among SHs (27,4%), and a significant but low relative share of conflicts (Cf), 7.6% (Figure 178 and Figure 179). In contrast to other CS, there are no non-existent relationships amongst the SH identified in the case. Thus, the Romanian SH base Complementarity is embedded in the legislation and was a good base to build on for developing project products. Cooperation if exists is bilateral not nexus based- also a good starting point. As followers, we targeted SH aware of the IWRM principles and those open to dialog for improved resource management.reflects the strategy applied in SH mapping and selection for promoting project objectives, taking into consideration favourable elements such as IWRM knowledge and practice, existing relationship or bilateral cooperation.

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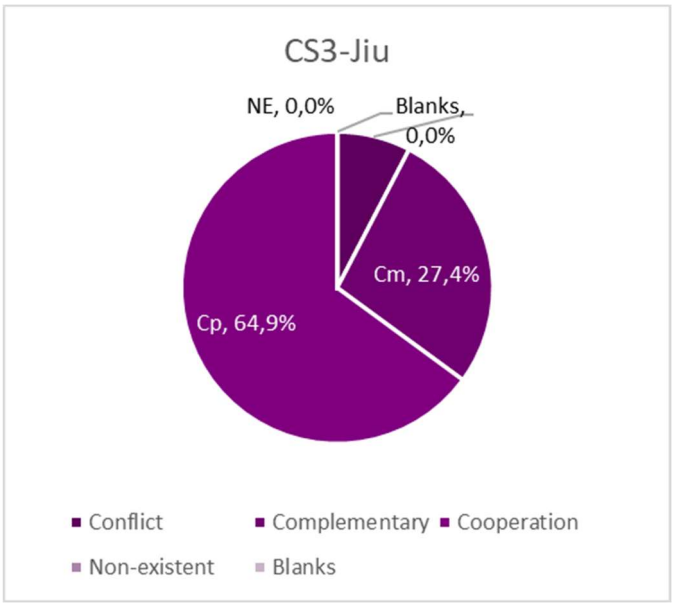

Figure 178: Share of types of relationships across SHs. Characterised based on the perception of CS-Leads.

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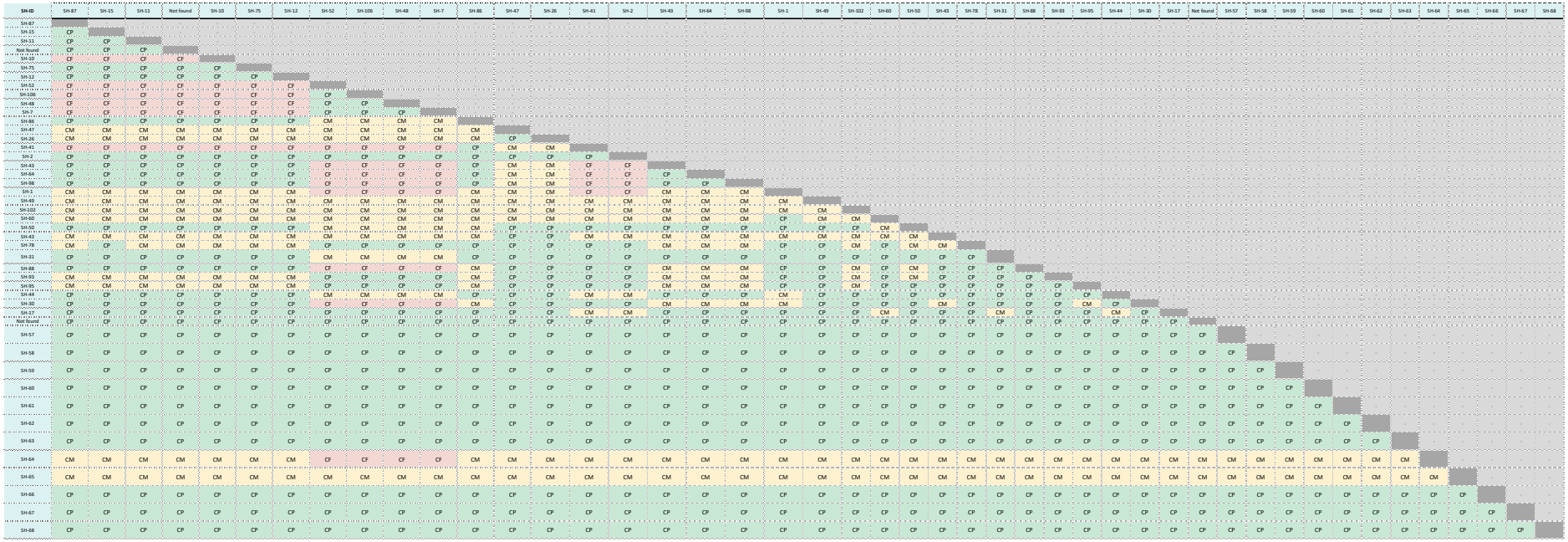

Figure 179: Actor-Linkage Matrix for CS3-Jiu. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent.

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(3) SHE

The SHE plan in Table 76 provides guidance to organise SHE and achieve the SHE aims considering the findings from the SHE evaluation and the updated results of the SH analysis. These results show that:

- There continues to be a balanced distribution across WEFE sectors.
- Gender distribution is rather balanced with a slant towards more women.
- The distribution across Tiers and categories has stayed largely the same.
- No significant changes were made in the power/interest distribution or across the relationships between actors.

Table 76: Overview of the main SHE components of the SHE plan for CS3-Jiu. SH: SH.

	Co-exploration	**Co-design**		**Co-development**	
	Information	**Consultation**	**Involvement**	**Collaboration**	**Empowerment**
WHO? SH category	Mobilise not only HI-LP but also involve as often as possible targeted HI-HP SH identifying opportunities in the national context.	Hybrid format really worked well. National SHs could then join and representative of sister projects Consistent representation of all WEFE sectors and from SDG & CC	There is a structure for policy making from the Prime Ministers offices > use that for governance roadmap of NEPAT policy packages and to promote NXG SHE and NXG governance approach into policy decision making.	SH engaged are basin level, regional and national. Meet in the CS with key SH and discuss with them what is more relevant to them (depends also on context after the election) Try to keep them into a NXG task force beyond NXG project	Work with low power SH with high interest > they felt empowered by having space to share their everyday work; NXG as way to get their messages to the higher decision-making levels Water and sustainable development authorities well engaged > can be the ambassador; each sector could have a champion/ambassador
WHY? PI and ALM	The capacity of SHs to directly influence nexus policies development and implementation due to their low power in	Interactive format outside political context was useful for constructive discussion Challenging to keep interest in between	The SHs perceive the tools proposed by the project and the possibility to incorporate CS specifics in their design	Aim to have NXG governance approach picked up/integrated into the national policy making structure (as an alternative or guide to enhance policy	Setting is working, SHs are acting as multipliers in other settings including towards the EU, SHs are now empowered.

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	Co-exploration	Co-design		Co-development	
	influencing the required change in the appropriate timeframe. The need for a synchronized top-down/bottom-up approach increases the expectations as regards the opportunities offered by the NXG approach and tools.	WSs/events (there is a need to provide them with bits and pieces throughout the project?)	as an opportunity for improved public policy development in the WEFE sectors and for reaching SDGs in Romania. However, NEPAT and its usefulness and usability are still unclear to SHs: how were their inputs used and made use of? How to use NEPAT?	making with a nexus viewpoint embedded) Select for policies that are more relevant for RBMs (water-related policies), but maybe also for the Just Transition Mechanism (need a comparative analysis) 2024 is year of elections at all levels (European, National and provincial) > opportunity and risk	Intersectoral dialogue is important for SH agreement for increased sense of ownership. The outcome needs to stay relevant for capturing the real-life nexus challenges in local conditions. Consequently, the development of the NXG tools and solutions needs to retain a pragmatic approach. Thus, their development in the Jiu CS will continue in close collaboration with connected authorities at catchment and national levels.
HOW? Activities	Develop NXG activities around key international days (e.g., World Water Day, Danube Day). NXG activities in all CSs > official public launch of NXG recommendations?	Training sessions[1] for SHs on how to use NEPAT e.g.; at at national level with the SDG nuclei in WEFE ministries (→ @ the GA in September in Bucharest); in the curricula of the faculty of Economic at the University		Creation of Task Force (ad-hoc gathering of SHs with support from the River Basin Management Authorities) (also upscale to other basins) and through SD department, TF to be attached to existing structures. → Pursue agreement on	Identify the champions that have now been empowered to talk on 'our' behalf on the Nexus in their settings. Bring the champions to other NXG events

[1] For the remaining workshops keep the following in mind: Reduce the number of targets in each of the workshops; One-way scientific language presentations were hard to follow; Translation and interpretation were really useful; Break-out rooms were not possible – people want to stay in plenary.

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	Co-exploration	Co-design	Co-development
			taking over the NEPAT tool and make use of it in SD policy making and educational contexts *(Would get support by river basin and sustainable development department. This taskforce would be attached to one of the activities of the sustainable development department.)*

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(4) Management and sustainment

Management

The initial management plan considered different foci per year Table 77~~Table 77~~ looks at how these were accomplished and what changed based on the findings of the past year.

Table 77: Priorities of the different plans and how these were accomplished and changed over the course of the project.

Foci	From the 2022 Plan	From the 2023 Plan	2024 Plan
2023	Actively look to increase the interest of other SHs while maintaining the interest of the current high interest SHs. Focusing away from high interest SHs towards low interest SHs may allow discovering currently missing marginalised SHs.	The SH register was slightly expanded but distributions stayed mostly the same. SH are happy with the way the project is interacting with them.	The SH register was modified to be GDPR compliant.
2024	Maintain the interest of the engaged SHs and focus on the relationships between them, including power dynamics and building trust to enhance collaboration.	Provide SH with system knowledge, i.e. providing them with easily understandable results of the (biophysical and) socio-economic modelling and what this means to the WEFE Nexus and particularly to policies. Emphasise presenting project results to high-power SHs, trying to instil a Nexus-thinking amongst them. Discuss with high-power SHs how project outputs can be specifically integrated/translated into policies.	Key SH were consulted (online meetings) during the development of the SDM directly contributing to completing the input data and for validating the outcome. This paved the interest for the online WS(#4) on NEPAT decision support tool, facilitating a high rate of participation. Further on the tool was used in a ”live”, hands-on session managed by EURECAT (WS #5), by a core group of SH from the SDG nuclei in the WEFE ministries in RO (with potential to be the future WEFE Nexus taskforce/NEPAT end users) An international WS Water-Energy-Food-Ecosystems (WEFE) Nexus for Sustainable Development during the NXG Annual Meeting Bucharest, Romania September 17-19, 2024 Discussions initiated from the start of the project, follow-up steps planned during 2024 and 2025 once the NEPAT is finalised. for further

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			utilisation and integration in the one-stop-shop that will be created in Romania's Centre of Excellence for Sustainable Development (CEXDD). Additionally explore further utilization in education at the Bucharest Faculty of Agro-Environmental Economy
		Focus on transformation knowledge to help SH reframe and target policy uptake and management practices.	Follow-up plan to stimulating the use of the tool in SD policy making context to break silos for stimulating sustainable action and in an educational context for building up on nexus thinking by future professionals
		Possibly shift focus at the remaining WSs, focusing on how NXG results can be specifically fed into the policy-making process.	Targeted meetings with „NEXUS champions" will be organised during the remining duration of the NXG to follow the actual knowledge transformation processes and use opportunities for promotion of the NXG overall approach support (SHE, governance assessment, policy inventory, NEPAT). Agree on additional capacity building or other type of needs to ensure policy making level is making use of NXG results
2025	Focus on co-decision activities and further planning on sustainment of SHs as well as on the defined agreements.	Stay focused on providing evidence base and the results from the research. This is your largest asset.	Develop NXG activities around key international days (e.g., World Water Day, Danube Day). NXG activities in all CSs > official public launch of NXG recommendations Training sessions for SHs on how to use NEPAT e.g.; at at national level with the SDG nuclei in WEFE ministries (→ @ the GA in September in Bucharest); in the curricula of the faculty of Economic at the University Creation of Task Force

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			(ad-hoc gathering of SHs with support from the River Basin Management Authorities) (also upscale to other basins) and through SD department, TF to be attached to existing structures. → Pursue agreement on taking over the NEPAT tool and make use of it in SD policy making and educational contexts Identify the champions that have now been empowered to talk on 'our' behalf on the Nexus in their settings.

Sustainment

A session dedicated to SH sustainment was held at the General Assembly Meeting in Tours from 19-21 September 2023. In general, SH sustainment was considered to be challenging to implement without further dedicated funding and/or more succinct purpose. Linking sustainment to a particular issue to tackle or initiative to start makes strategizing for sustainment more tangible.

From the M23 reflection, the following can be retained:
"*The national authorities are interested to make use of the results in the Jiu CS for upscaling at national level in connection with sustainable development and adaptation to climate change strategies and action plans. The registered participants that signed the consent forms (25) expressed interest in further engagement in project activities for reaching the objectives of their activity.*"

In addition, the 'Berlin meeting' (see section 5 Evaluation) suggested the following aspects on sustainment:

- Task-force using 'champions' of the sectors (and on the levels)
- Identify the champions that have now been empowered to talk on 'our' behalf on the Nexus in their settings.
- Bring the champions to other NXG events.
- Bring the NEPAT tool into [government's Sustainable Development] (SD) group and use as tools for their use.
- SH engaged are basin level, regional and national. Try to keep them into a NXG task force beyond NXG project. Would get support by river basin and sustainable development department. This taskforce would be attached to one of the activities of the sustainable development department.

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CS4: Adige

The SH (SH) engagement plan is based on the data, information and perceptions provided and analysed by the case study (CS) leads, the CS SHs and the AVA- and UU-Team by August/September 2024. The plan is updated on a yearly basis taking new SH information and evaluation results into account to allow for adaptive management. Thus, the plan starts with the fifth phase of the SHE plan, namely SH Evaluation.

(5) Evaluation

In the 2023-2024 cycle no SH WS took place in which an evaluation would have fitted. Rather evaluation information is based on:

(1) The self-evaluation of CS on the implementation of the recommendations of the past plan
(2) Summarized findings from the interviews with CS on the co-creation approach
(3) Information extracted from MS23 Second intermediate report on CS implementation and co-creation activities for the Adige CS
(4) Recommendation that ensued from the CS meeting with WP1 and WP5 in Berlin in January 2024

Results from the self-evaluation

The 2023 plan suggested a set of activities /actions to be carried out in the upcoming year (2023/2024). Table 78 below show the degree to which the activities were implemented and further comments on these.

Table 78: Self-evaluation of the implementation of the 2023 SHE plan recommendations

Recommended activities as per the 2023 SHE plan	**How activities were implemented**	**Further comments**
Ask the SHs to join the newsletter for instance or to follow us on social media.	-	
Plan activities to share the outputs of the provided feedback and discuss about it.	*The updated policy packages were shared via email exchanges, also asking for data to integrate them in the SDM / NEPAT. The updated hydrological model was presented in a small WS in Eurac.*	
Additional activities that foster exchange between SHs from different sectors, categories, and regions of the river basin are helpful.	*The exchange between different sectors/categories was brought forward through activities planned under the hat of other projects (which were partially or completely overlapping in terms of study area-conflicts addressed) to (i) ensure consistency and avoid repetitions (ii) not to overload SHs with requests and participatory activities. For instance, we took part in the moderation of the table on water in the SH WS of the South Tyrol Climate Change Adaptation*	

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	Plan. There policies and adaptation measures were discussed.	
Find professional support for WS facilitation. Try to 'market' as part of or integrate the WS into the proceedings of other institutions (e.g., the river basin authority).	*We have not organised a comprehensive CS WS since WS3. We are planning to have WS4-5-6 within a broader event on Adige in Eurac, potentially also with professional moderator (if budget allows). + See point above*	
Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations) so that, the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded SHs. Frequent smaller conversations of peer SHs across different regions may need to happen to allow for recognition of peers and for technical discussions about transboundary solutions (e.g. ecological low flows, abstraction needs, conservation measures, etc.). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.	*1-on-1, small group discussions have been caried out, but not national conversations. We recognise the importance of smaller conversations of peer SHs across different regions, however these have proved more difficult to organise, so we focussed more on exchanges between sectors (within the same region).*	*We are not planning to have a final real river contract by the end of the project, but more a declaration of intent on specific actions to move towards a river contract (e.g. data sharing, regular exchanges etc.)*

Interviews on SHE performance

As part of the SHE evaluation, WP5 conducted a (re-)assessment of the aims of and preferred approaches to co-creation (as per Chambers et al., 2021) with the CS leads. This was done to gauge 1) to what extent CS have, in their own perception, reached the aims they had set for themselves and 2) whether priorities and expectations have changed based on their experiences throughout the project. To facilitate this, WP5 distributed a template to capture updated aims and approaches to collaboration (see Annex). Subsequently, in June 2024, the information provided by the CS leads was further discussed in one-on-one conversations.

Below, the modes of co-creation elicited in June 2024 are presented – this includes the desired mode of co-creation and the one the CS leads themselves consider having de facto delivered (Figure 180). These are also compared with the mode preferred by the CS leads at the start of the project ('Researching Solutions' September 2022) and the one indicated by SHs at the third WS (June 2023) (Figure 181).

The preferred mode of co-creation has not significantly changed for the CS lead since the inception of the project. The original mode identified as suitable by the CS lead was 'Researching Solutions' or 'Empowering Voices'. The foci for the co-creation have not substantially changed since, with the exception of a stronger emphasis on 'relationship

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building' as well as a de-prioritisation of 'reframing problems'. In fact, the SHs desired mode of co-creation also bears significant resemblance with the one of the CS, only emphasising solving problems even more.

According to the CS lead, the ambition to encourage SHs to put themselves into each other's shoes and reflect upon problems and solutions ('reframing problems') was given up between the second and third WS. Many topics are supposedly 'too sensitive' to be addressed and SHs rather interested in hard, scientific data than critical reflections. At the same time, 'solving problems', which is usually the counterpart of 'reframing problems', is not a strong emphasis either. There is no expectation that specific suggestions for actions will be taken up by SHSHs in the near future. The hope is rather that change can be initiated in the long-run through 'producing knowledge' and 'relationship building' now, accepting that there might not be an immediate impact. It is important to note that meanwhile the SHs viewed both 'reframing' and 'solving problems' as central purposes of the co-creation process, but the CS lead does not deem them realistic due to the reasons mentioned above.

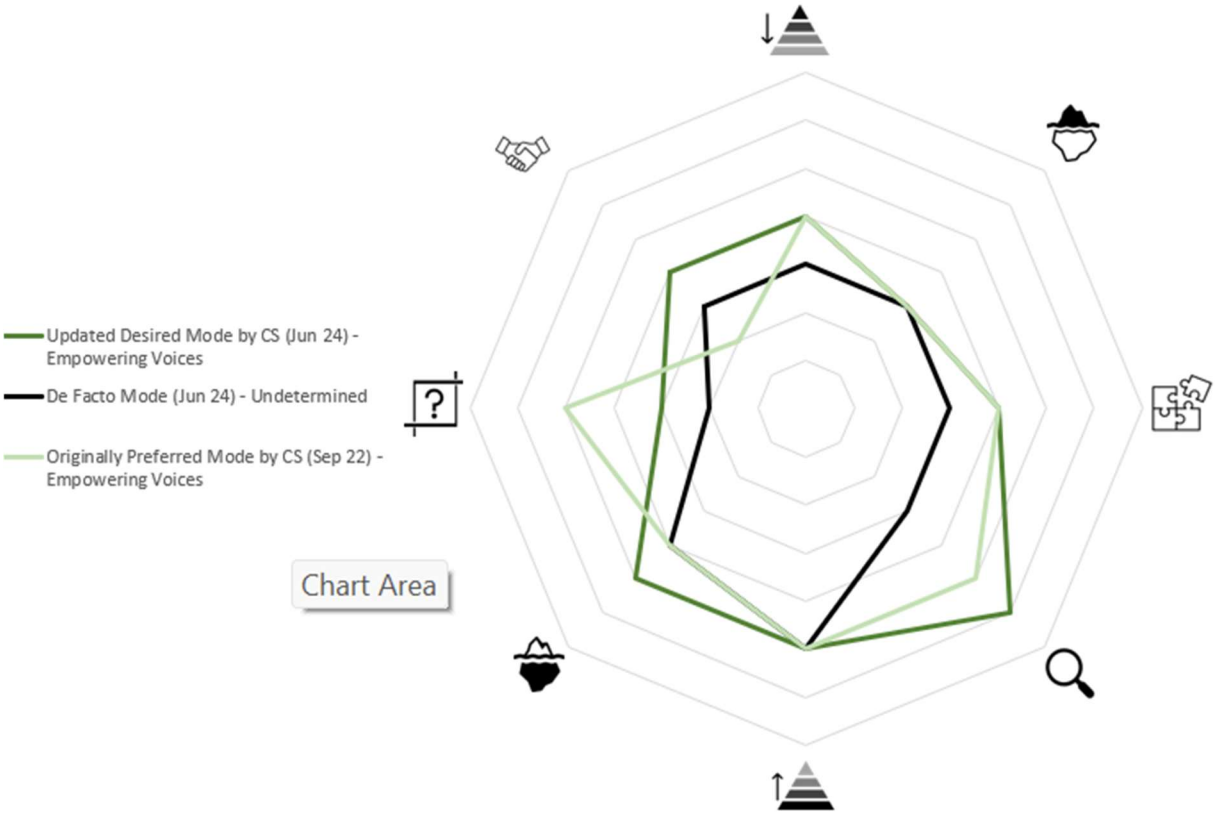

Figure 180: Approaches/modes of Co-Creation as assessed by the CS lead. Icons from the top in clockwise order: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together

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Figure 181: Approaches/modes of Co-Creation, comparing perceptions of CS lead and SHs. Icons from the top in clockwise order: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together

When it comes to shaping 'direct' or 'systemic agency', the CS lead sees little opportunity to currently influence SHs with the NEPAT tool – also because the data sources for the tool were so spotty that any generated policy suggestions may be of limited value (and at basin rather than the more relevant provincial level). Rather the focus is currently on strengthening the position of local and low-power SHs in the policy-making process through 'relationship building'. The CS lead does not consider this wholly achieved, yet, however – and is somewhat pessimistic that the project will be able to facilitate it within the allocated time and resources. To actually generate the impact, the CS lead believes that it would require a follow-up project, which includes a component on conflict mitigation and would involve skilled facilitators.

The CS is in a difficult situation. There is an awareness that deeper changes in policy-making processes and relationships between SHs with conflictual relationships would be necessary, but cannot foresee providing this forum within the framework of NXG. Therefore, they are aware of but possibly unable to manage one of the major risks of co-creation processes pursuing the modes of 'Researching Solutions' or 'Empowering Voices'.

Information extracted from MS23

MS23 is based on interviews that were carried out with CS leads during months 30-36 of the project to summarize the CS implementation and SH co-creation activities. Information relevant for this SHE plan update was extracted from the latter parts of MS23, namely 'Impact maximization' and 'Lessons learned'. The relevant elements can be summarized as follows:

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Aligning policy work with modelling work.

- It is hard to make the policy packages fit into the NEPAT and SDM. It was already challenging to select the policy instruments – involving a very large amount of work – and it is then harder to see that we cannot model them due to lack of data.
- Discussions on hydrological modelling and quantitative data attract more SHs in comparison to discussions on the nexus itself (e.g WS 3 and bilateral meetings). They seem to be more interested in knowledge production, data collection and sharing, rather than having dialogue and grouping.
- One of the original goals was to foster the use of the NEPAT from the province of Trento for the update of a water-related policy. However, due to the lack of (downscaled) provincial data, we must use higher-level data which is not as precise. NEPAT results therefore will be at the basin scale, looking at the broader picture Consequently, we have to lower our expectations not being able to obtain results at the province level, although the policies are more province-oriented. This is especially critical considering there is a general agreement on the need of basing decisions on data. Moreover, SHs underlined the importance to keep an eye on the quality of such data (e.g. raw data, models but also their interpretation), which might be limited under current model co-development settings.
- Models are working with high level data, which is not precise enough for the SHs to take decisions or update policies quantitatively based on such inputs. The limitations of our models (e.g. a lack of monitoring / data collection of specific processes, lack of open access data / limited sharing of data) could be used to pinpoint the gaps and to identify the steps needed to achieve a more reliable SDM and consequently NEPAT tool.

Working with (key) SHs:

- Although the Permanent Observatory on Water Uses was established by the Eastern Alps River Basin Authority, a lack of an overarching authority with executive power was identified by the SHs. During drought events, the Observatory can only act as an advisor and decisions are taken by underlying bodies such as the two Autonomous Provinces and the Veneto region. Moreover, although drought can be foreseen months in advance, decisions are usually taken under emergency situations.
- Environmental associations are regularly not deeply involved in decision-making; for instance, they do not sit at the Observatory table. The environmental sector is therefore not represented in decision-making, underlining the importance of including Ecosystems in nexus thinking.
- The diverse and opposed interests in water in the upstream and downstream areas are characterised by different cultural, linguistic, economic, and legislative autonomy levels. Consequently, a basin logic is usually not adopted: each sector is aiming at securing the necessary amount of water to their needs.
- The Province of Trento proved to be particularly interested in the project and would like to use the knowledge emerging from project activities as a basis for updating local water-related policies. They consequently offered to be co-organisers of the second WS.
- During a SHE activity of another project (on similar topics), one of the most relevant SHs of the province of Trento (with whom we had bilateral meetings) tried spontaneously to advertise NXG to the river basin authority, the most influential SH,

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who is not joining the activities of NXG. He perfectly explained the nexus concept and how the results could be used at the river basin level.

- Environmental and fishermen associations were particularly interested in joining project activities, mainly to make their voices heard by more powerful actors. This underlines the importance of the project in empowering marginalised actors.
- An effective strategy for SH sustainment is therefore important to keep the interest in the project

Recommendations for workshops:

- Important to have interested SHs "champions" on board already at proposal stage, so they can support the organisation of SH events (as we are a Research institution). Having such SH champions would make it easier to promote events and assist with SHE and retention.
- Bilateral exchanges with few but key SHs presenting them the project goals and the status of the project activities ensure a close and long-term collaboration.
- It is almost impossible to find a date that suits the main group of SHs and internal NXG partners.
- An online WS allows a broader participation and fosters the interaction among upstream and downstream SHs, however limits the interaction.
- It would be good to have a professional moderator but we do not have the budget to pay for this. It is also challenging for us to bring everyone together in the same room as we cannot pay everyone for their travel.
- The survey and WS activities increased the length of the WS substantially. In the third WS, most of the SHs stayed for that session, however only few filled in the survey. The SHs were probably tired and interacted in a limited way as this occurred at the end of the WS. Moreover, the session took a very long time to prepare (e.g. adapting and translating the slides & survey). They helped reflecting ourselves on the process and its goals.
- Potential formats for the next WSs should consider:
    - Holding two WSs (downstream and upstream) or finding a better way to attract SHs since quite a long travel time is required to reach a common location.
    - Having a longer WS or further bilateral meetings, with some activities in the afternoon for selected SHs.
    - WSs should not be too packed with activities and inputs to the SHs but rather aim for a balanced agenda including room for discussion, interactions and collection of SHs needs.
    - It is hard and time consuming to translate many slides and concepts and there is often limited time to explain the concepts to the SHs in more detail, which makes the breakout group discussions challenging for keeping them interested and engaged.
    - The hydrological model discussions foster engagement and attract SHs to the WSs. The more technical SHs are able to provide feedback and suggestions, however associations and sectoral representatives have more difficulties in understanding such results, which are at the basis of the following steps (e.g. SDM, NEPAT).

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Recommendations from the 'Berlin meeting'

A three-day meeting was held in Berlin, Germany from 10-12 January 2024, hosted by the Helmholtz Institutes. All CS leads, WP1 and WP5 representatives met to (a) reflect on the SHE process so far, (b) discuss the needs of the governance roadmap and the 'river contracts' to be drawn up by the end of the project, and (c) draw lessons learned from the process and suggest adapted strategies with a view of achieving the river contracts and the needed SH sustainment. Table 79 below shows the reflection and the suggested ways forward.

Table 79: Recommendations from the Berlin meeting - CS4

ADIGE	
Reflections on SHE to date	***Ideas for SHE & Agreement moving forward****

Workshops:
• WS1 online on zoom, breakout room, ppt where notes were written on the slides allowing SHs to double check on the notes taken by moderators
• WS2 hybrid sponsored by government of Trento, post-its on relevance in breakout rooms, posters of policy packages, droughts
• WS3 online, 3 hours very long for online mtg., WG trying to balance up- and downstream SH but was challenging bc of people coming and dropping out, poll on teams on SHE process, people engaged bc of the hydrological model that was presented
• Informal networking is not really possible in online WS settings, but face-to-face are challenging because the basin is large
• Bilateral interaction more effective than WSs > combination bilateral to prep then agreement in WS > risk of bilateral is to think in silos again both topic wise and scale wise (up and down stream) > bring SH together in cross cutting platforms e.g., climate adaptation platform in Romania
• Bilateral interactions more useful than large group meetings for building trust, and getting in depth on certain topics
• River Basin Authority is not attending WSs, energy sector is not sharing data
• SHs that do attend WSs have a large interest in the model development
 	
SHs Dynamics & Strategies:
	Local actions:
	• One event where all river basin actors are participating and explore using the NEPAT > find a higher-level goal they all to have to fulfil to bring them around the table (or predefined scenarios to explore) – maybe on World Water Day 2025
	  ○ Policies on regional development are higher level goals that bring all three provinces together
	  ○ Water policies are run fully at provincial level (not much power at national level)
	• Province of Trento use NEPAT to update their water management plan or a specific policy:
	  ○ This solution focuses only on one part of the basin (Trento)
	  ○ Trento wants scientific basis to use it, write a technical paper in a local technical journal with recommendations, incl. upstream & downstream considerations
	  ○ Memorandum of understanding that province of Trento will use the NEPAT to explore the policies > difficult;
	• Agreement on data sharing, data collection or on using only one hydrological model or at least integrating them > memorandum of intention to explore the one hydrological model. (even awareness of a basin scale model would be good)
	• Have NXG results mentioned at the Osservatorio Alto Adriatico > have the province of Trento to bring NXG into the Osservatorio
	• Sustain NXG results via other projects in the river basin
	• Overall, a signed agreement would be challenging to achieve

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• Difficult to get new SH on board; only SHs via researchers' network • Difficult to bring upstream and downstream SH together • SH feedback: 2 governance scales > provincial/regional which works well and basin scale does not work well. • APRIE Trento ambassadors of NXG • Not all SHs understand NEPAT • Leveraging the NXG fans > use them to draw in missing SHs • Basin scale communication is poor. Different entities don't talk to each other, basin authority exists but struggles getting people together. • Strategy needed that does not just work in emergency contexts. • NXG – useful for addressing the need for (informal) non-political dialogues, scientific-based setting, addressing need for data-sharing and joint model development (based on same principles)	• How to get SHs together? Wine-making research institute (?) **NEPAT tool and NXG approach**: • Ideal outcome: if NXG results were presented at the observatory table of the river basin or if they would use the results to improve the river basin management ○ Modulations in the NEPAT for water allocation for the different sectors • There are different hydrological models for three regions (we need to clarify what model NEPAT is based on) • Focus on the energy sector and see what they need (are we offering anything to the hydropower sector?). Include in the SHE recommendations deliverable that it matters what the focus is going into the engagement process. • NEPAT can suggest an optimal water allocation today and in the future. We can look at the whole basin and in parts. The comparison shows added value of NXG/NEPAT. Illustrate winners & losers -- check who are those SHs and prepare plan for engagement accordingly. **Potential Narrative:** • Problem with trust… often related to lack of transparency • Sitting them into one room (upstream/downstream) would build toward nexus-thinking at basin scale • Update of water plan of one of the regions as pilot to show NEPAT can influence policy (Trento) --- create a technical paper in the direction of updating plan • Ultimately, after the project, develop a basin-wide model (long-term)

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(1) SHE aim

Although being a single country river, the Adige River basin presents a complex institutional, socio-economic, and bio-physical context. This complexity cannot be grasped by simply adopting a data driven approach. Engaging SHs responsible for different fields of the WEFE nexus will be paramount to build a full picture of the current and future interconnections and challenges within the Nexus. On the one hand, engaging SHs will benefit the project by better understanding the WEFE nexus in the Adige CS and beyond and allow us to develop better tools. On the other hand, this knowledge will increase SHs' awareness to improve their decision making in the future.

In the process of achieving these goals, a special attention will be given to pinpointing the presence of a conflict hotspot(s) through a first-level screening. This will be an area of smaller dimensions within the river basin where different SHs of different sectors will be heard and brought together in a participative process. Moreover, given the size and complexity of the river basin it is not envisaged to develop a river contract within the framework of the NXG project.

While in other CS the perspective of SHs about what aims they would like to be involved in was also assessed, this could not be done in the Adige case, as not enough SHs answered the survey to be able to derive this information. Thus, it is not clear if a mismatch between the suggested aims of the CS leads, and the SH exists which may be also causing SH fatigue.

Based on the conversations during the General Assembly meeting in Tours (Parallel Session 6) from 19-21 September, the following aims will be prioritized over the remaining two years:

- To improve system knowledge:
  - Explore the current state of the Nexus by improving modelling approaches related to water supply and demand, with a special focus on water scarcity and its implications on the other Nexus sectors
  - Increase understanding of the current institutional and political context that characterise the area, to identify existing and potential conflicts
- To generate target knowledge:
  - Determine the drivers of cooperation between SHs to share data and foster a coordinated management of water resources
- To generate transformation knowledge:
  - Enhancing SH awareness on water resources, their management and uses among different sectors
  - Co-develop, validate, and promote the use of the SNLAE and WEFE Footprint tools that the projects will develop to plan for future environmental and socio-economic conditions
  - Determine drivers for a cross-catchment dialogue that fosters a coordinated design and implementation of existing and future river contracts between up-stream and downstream areas of the river basin

Table 80 lists the aims for the co-creation process and their self-assessed level of achievement, as of June 2024. Below the reasoning for the scoring of selected aims is presented.

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Generally, the achievement of the aims linked to system knowledge are well-advanced in the eyes of the CS lead. Exceptions to this are the collection of relevant data and somewhat the understanding of prevailing conflicts. The CS lead communicated that data was scattered and a number of SHs (including from the energy sector) were unwilling to share data. To understand the relationships between SHs, the interviews within the framework of WP1's governance assessment were deemed helpful, but insufficient, as some relevant SHs did not participate.

Achieving the target knowledge aims has been hampered by the quality of data, which possibly has affected the validity of the NEPAT tool suggestions. In addition, the WSs did not provide the space or time to build relationships and trust. Therefore, conflicts have not been diffused.

When it comes to the aims linked to transformation knowledge, the CS lead still perceives a significant degree of underachievement. The CS lead believes that the structure of NXG, and especially its WSs, did not allow for free-flowing discussions on emerging topics or break common 'group dynamics'. In addition, the CS lead does not feel that the team on-site would even be equipped to facilitate such discussions and assist the SHs in agreeing on joint actions, nor are the SHs present at the WSs powerful enough to sign any form of agreement.

Table 80: Aims for the co-creation, divided by type of knowledge. In bold are those aims identified as particularly relevant for the remaining duration of the project. Aims indicated by other CS are relevant but not this CS are in grey cells.

Aims for co-creation per type of co-generated knowledge	**Current level of achievement** (1=not at all achieved, 7=fully achieved)
System	
Deepen/improve understanding of the (state of) **WEFE Nexus problems** (e.g., river basin management, energy transition, water scarcity) and identify pressures, including: • Improving modelling approaches related to water supply and demand, with a special focus on water scarcity and its implications on the other Nexus sectors.	**6**
Characterise (social, economic, ecological, and institutional) context	6
Understand the institutional, organisational and political context and river basin management plans	6
Identify conflicts/synergies between SHs as well as actions and strategies	**5**
Get data for model development	4
Target	
Know about future expectations/perspectives (for assessment tools)	3
Determine solutions/systems (and their drivers) that balance sectors	3
Diffuse conflicts between sectors (e.g., through the use of a common language), moving towards cooperation and trust, including: • Determining the drivers of cooperation between SHs to share data and foster a coordinated management of water resources	**3**
Raise awareness of water as a depleting resource, including: • Enhancing SH awareness on water resources, their management and uses among different sectors	**6**
Gain knowledge on required infrastructural improvements	3
Transformation	

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Develop and implement formal agreements and aligned policies for a coordinated river basin management: • Determine drivers for a cross-catchment dialogue that fosters a coordinated design and implementation of existing and future river contracts between up-stream and downstream areas of the river basin	1
~~Design of pathways to enhance awareness of (water) resources management~~[1]	
(Co-)design and (co-)validate NXG tools/platform (e.g., WEFE Footprint), and build capacity (e.g., to use the NXG tools).	**3**
Identify relevant WEFE Nexus components and indicators, including:	6
Improve communication between SHs and break silos	**3**
~~Determine the requirements to invest in infrastructure~~	

[1] Aims that have been crossed-out are not an aim of this CS and have thus not been evaluated.

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(2) SH analysis

SH identification

In the past year the SH register has changed. To move forward with a GDPR compliant SH base the issue of contest was discussed at the General Assembly meeting in Tours from 19-21 September 2023. The following was agreed:

1) Most information on SH is taken from public sources → mark SHs where information was taken from public sources (add a P if taken from public source in the new column B of your CS tab in the SH dashboard)
2) Double check current names and organizations and update SHs and affiliations accordingly. Some SH may have changed jobs, retired, etc.
3) Mark all high power or high interest SH in the register. These are people you most likely may want to keep. Write to them individually and ask them to consent to the PPCF; threaten with removal if needed. Remove them from the register if the information obtained on them is not from public sources.
4) Add new SHs based on the needs outlined in the management plan below. Lay a particular focus on moving from technical SH to more political SH that could help you understand where legislation on the suggested policy packages currently stands. This will help you get into the policy cycle better. Ideally source their contact information from public sources.

A total of 190 (150 in 2022) SHs were preliminarily identified out of which, still, only 17 (9%) consented to be officially included in the SH register and participate in the NXG SHE (Table 81). While the consent rate increased, the overall consent rate in this case is far below the average consent rate across all cases both in absolute and relative values.

Table 81: CS4-Adige summary information of SH identification as of Sept. 2022 and updated in September 2023 and September 2024

Item	Count 2022	Count 2023	Count 2024
Preliminary listing of SHs	150	189	187
SHs in registered officially	10	17	16
Percentage of consent [%]	6.7%	9.0%	8,6%

Not all SHs have been categorised within the WEFE sector and some SHs may belong to other or cross-cutting sectors (e.g., civil society, policy makers at national level). Across the differentiated ones, there is a clear preponderance of SHs from the water sector over the other sectors and no change was observed to the previous reporting time (Figure 182).

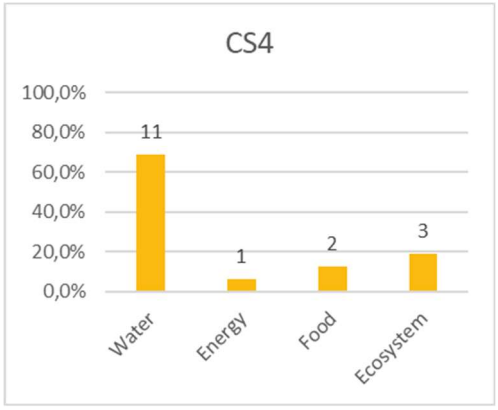

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Figure 182: Distribution of SHs across the WEFE sectors for CS4 – Adige. One SH can be assigned to one or more sectors.

In terms of gender, the 30/70 distribution across female and male genders remained the same. Not all SHs provided data about gender.

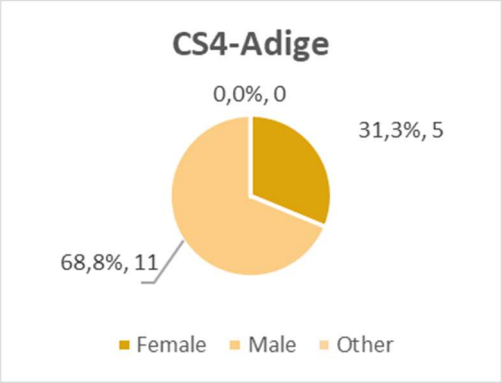

Figure 183: Gender distribution for CS4 – Adige.

SH differentiation and categorisation

The SHs belong mainly to tier 1 with none in Tier 2, and 3 in Tier 3. However, this means that, overall, SHs are perceived to be interested in being engaged in the development of the project's outputs.

The categorisation of SHs has shifted since last year now mostly holding actors from the "7. Water management authorities and representatives', "1. Civil society" and "9. Environmental authorities and representatives" (Figure 184).

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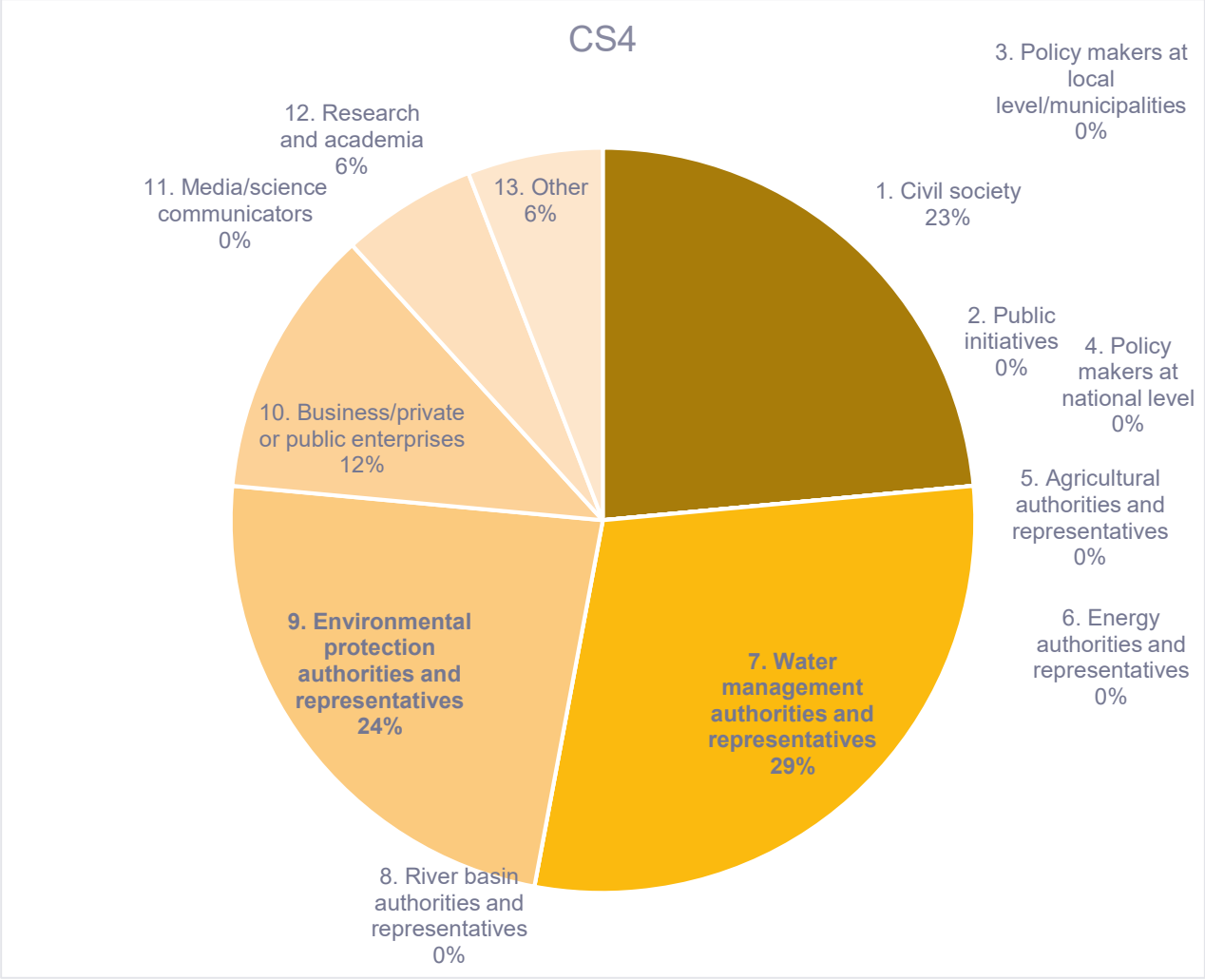

Figure 184: Distribution of SHs across categories for the case CS4 - Adige.

No changes have occurred here.

From a Power-Interest perspectives, little has changes, most consenting SHs were perceived as having mid to high interest with a 50/50 distribution between high- and low-power (Figure 185).

Even though the upper right section of the map should be considered as the key SH group, given the number of SHs, all of them will be considered for a closer engagement, as far as they are interested.

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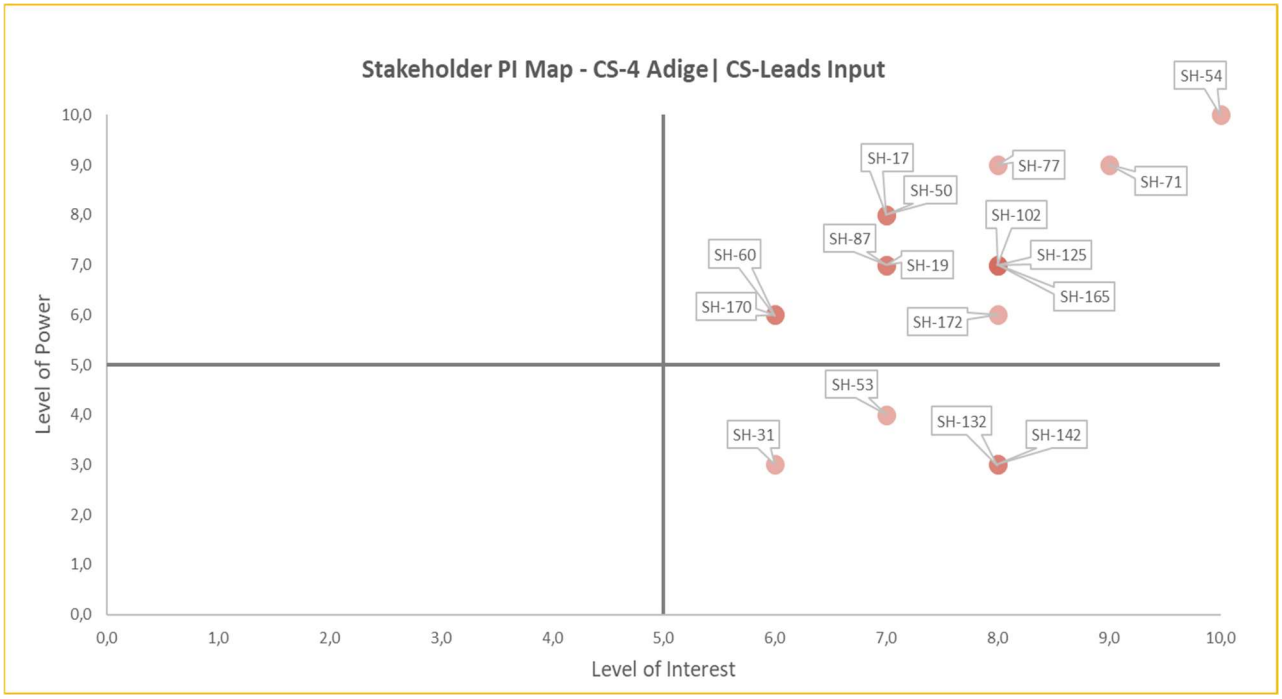

Figure 185: Power-Interest Map for CS4 – Adige, based on the CS-Leads' perception. For data protection and privacy matters, SHs are anonymised; for internal use CS-Leads know which SH each number represents.

SH relationships

No changes in comparison to the previous year have occurred here.

About the relationships among the SHs, the CS-Leads characterised – based on their perception – 136 relationships across the 17 SHs. The relationships did not change significantly and correspond mainly to the non-existent (NE) type, 72.9%, followed by complementary (Cm) relationships among SHs (12.5%), and a minor share of cooperation (Cp), 11% and conflicts (Cf), 3.7% (Figure 186 and Figure 187). This means that efforts in this CS need to focus on building relationships among the SHs, support the creation of networks and provide the platform for SHs to find their own ways of interacting in the future.

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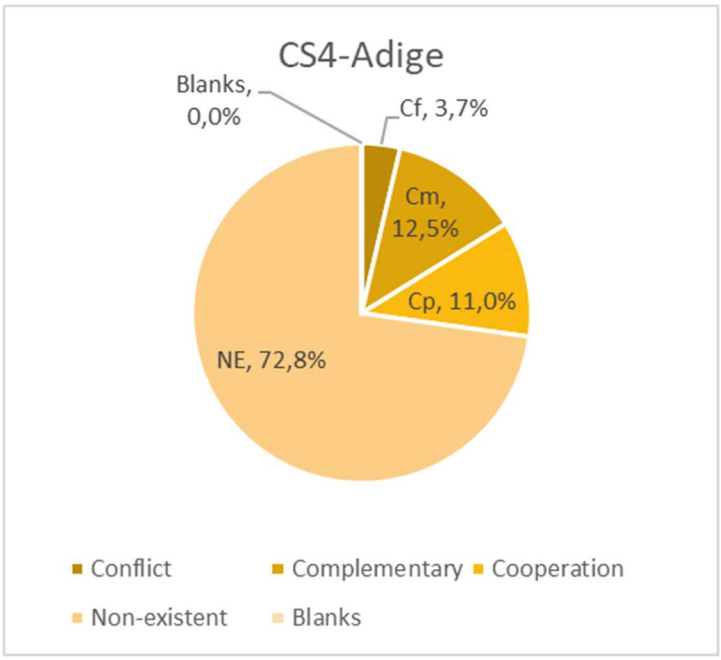

Figure 186: Share of types of relationships across SHs. Characterised based on the perception of CS-Leads.

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SH-ID	SH-53	SH-54	SH-71	SH-17	SH-50	SH-87	SH-172	SH-170	SH-132	SH-142	SH-165	SH-102	SH-60	SH-31	SH-19	SH-77	SH-125
SH-53		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-54	Cm		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-71	NE	Cm		-	-	-	-	-	-	-	-	-	-	-	-	-	-
SH-17	NE	Cm	Cp		-	-	-	-	-	-	-	-	-	-	-	-	-
SH-50	NE	Cm	Cp	Cp		-	-	-	-	-	-	-	-	-	-	-	-
SH-87	NE	Cm	Cm	NE	NE		-	-	-	-	-	-	-	-	-	-	-
SH-172	NE	NE	NE	NE	NE	NE		-	-	-	-	-	-	-	-	-	-
SH-170	NE	NE	NE	NE	NE	NE	Cf		-	-	-	-	-	-	-	-	-
SH-132	NE	Cm	NE	NE	NE	NE	NE	NE		-	-	-	-	-	-	-	-
SH-142	NE	Cp	NE	NE	NE	NE	NE	NE	Cm		-	-	-	-	-	-	-
SH-165	NE	NE	Cp	Cp	NE	Cm	Cp	NE	NE	NE		-	-	-	-	-	-
SH-102	NE	NE	Cp	Cp	Cp	Cm	Cp	NE	NE	NE	Cp		-	-	-	-	-
SH-60	NE	NE	NE	NE	NE	NE	NE	Cm	NE	NE	NE	NE		-	-	-	-
SH-31	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE		-	-	-
SH-19	NE	NE	NE	Cf	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE		-	-
SH-77	NE	Cp	Cp	Cm	Cm	NE	NE	NE	NE	Cp	NE	NE	NE	NE	Cf		-
SH-125	NE	Cm	NE	Cf	NE	Cm	NE	Cm	NE	NE	NE	NE	NE	NE	Cm	Cf	

Figure 187: Actor-Linkage Matrix for CS4-Adige. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent.

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(3) SHE

The SHE plan in Table 82 provides guidance to organise SHE and achieve the SHE aims considering the findings from the SHE evaluation and the updated results of the SH analysis. These results show that:

- There were basically no changes to the SH register of the previous year, which is very large, but the number of fully engaged SHs (i.e. consented ones) is still rather small.
- involving mainly SHs from the water sector, along with civil society, research and academia, and private and public enterprises.
- including mainly high-power SHs.
- composed by mainly non-existent relationships, and, thus, there should be a focus on networking between SHs.

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Table 82: Overview of the main SHE components of the SHE plan for CS4-Adige.

	Co-exploration	Co-design		Co-development	
	Information	**Consultation**	**Involvement**	**Collaboration**	**Empowerment**
WHO? SH category		Difficult to get new SH on board; only SHs via researchers' network Focus on the energy sector and see what they need (are we offering anything to the hydropower sector?).	Difficult to bring upstream and downstream SH together SHs that do attend WSs have a large interest in the model development Discussions on hydrological modelling and quantitative data attract more SHs in comparison to discussions on the nexus itself. They seem to be more interested in knowledge production, data collection and sharing, rather than having dialogue and grouping.	2 governance scales > provincial/regional which works well and basin scale does not work well. The diverse and opposed interests in water in the upstream and downstream areas are characterised by different cultural, linguistic, economic, and legislative autonomy levels. Consequently, a basin logic is usually not adopted: each sector is aiming at securing the necessary amount of water to their needs.	APRIE Trento/Bolzano ambassadors of NXG Leveraging the NXG fans > use them to draw in missing SHs Environmental associations are regularly not deeply involved in decision-making; for instance, they do not sit at the Observatory table. The environmental sector is therefore not represented in decision-making, underlining the importance of including Ecosystems in nexus thinking. Environmental and fishermen associations were particularly interested in joining project activities, mainly to make their voices heard by more powerful actors. This underlines the importance of the project in empowering marginalised actors.

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	Co-exploration	Co-design		Co-development	
WHY? PI and ALM		Bilateral interaction more effective than WSs > combination bilateral to prep then agreement in WS > risk of bilateral is to think in silos again both topic wise and scale wise (up and downstream) > bring SH together in cross cutting platforms e.g., climate adaptation platform in Romania Bilateral interactions more useful than large group meetings for building trust, and getting in depth on certain topics Bilateral exchanges with few but key SHs presenting them the project goals and the status of the project activities ensure a close and long-term collaboration. NEPAT can suggest an optimal water allocation today and in the future.. The comparison shows added value of NXG/NEPAT.	River Basin Authority is not attending WSs, energy sector is not sharing data Basin scale communication is poor. Different entities don't talk to each other, basin authority exists but struggles getting people together. Sitting them into one room (upstream/downstream) would build toward nexus-thinking at basin scale Not all SHs understand NEPAT There are different hydrological models for three regions (we need to clarify what model NEPAT is based on)	Policies on regional development are higher level goals that bring all three provinces together Water/sectoral policies are run fully at provincial level (not much power at national or basin level)	Strategy needed that does not just work in emergency contexts. NXG – useful for addressing the need for (informal) non-political dialogues, scientific-based setting, addressing need for data-sharing and joint model development (based on same principles)
HOW?	In person Project event where all	Training session on how to use and make use of NEPAT, depending on the type of SH in a WS setting		Regular meetings among researchers and different	Have NXG results mentioned at the Osservatorio Alpi

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	Co-exploration	Co-design	Co-development	
Activities	results are presented One event where all river basin actors (incl. researchers) are participating presenting their innovations and, involving different ongoing projects	(take note of your own WS recommendations[1])	SHs to share advancements on data sharing and model developments	Orientali > have the province of Trento or Bolzano to bring NXG into the Osservatorio Sustain NXG results via other projects in the river basin Identify additional ambassadors to keep the subject alive beyond the duration of NXG

[1] When holding a workshop or an event take a look at your own recommendations of how to best frame and carry-out those workshops for maximum results (see evaluation section of this plan).

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(4) Management and sustainment

Management

The initial management plan considered different foci per year. Table 83~~Table 83~~ looks at how these were accomplished and what changed based on the findings of the past year.

Table 83: Priorities of the different plans and how these were accomplished and changed over the course of the project.

Foci	From the 2022 Plan		From the 2023 Plan	2024 Plan
2023	Actively look to increase the interest of other SHs while maintaining the interest of the current high interest SHs. Focusing away from high interest SHs towards low interest SHs may allow discovering currently missing marginalised SHs.		The SH register was slightly expanded, and the gender imbalance is not as drastic as before. SH are now largely from the water sector. The PI distribution remained the same and the ALM continues revealing high levels of actors that have no relationships.	The SH register was modified to be GDPR compliant.
2024	Maintain the interest of the engaged SHs and focus on the relationships between them, including power dynamics and building trust to enhance collaboration.		Ask the SHs to join the newsletter for instance or to follow us on social media. Plan activities to share the outputs of the provided feedback and discuss about it. Additional activities that foster exchange between SHs from different sectors, categories, and regions of the river basin are helpful.	- The updated policy packages were shared via email exchanges, also asking for data to integrate them in the SDM / NEPAT. The updated hydrological model was presented in a small WS in Eurac. The exchange between different sectors/categories was brought forward through activities planned under the hat of other projects (which were partially or completely overlapping in terms of study area-conflicts addressed) to (i) ensure consistency and avoid repetitions (ii) not to overload SHs with requests and participatory activities. For instance, we took part in the moderation of the table on water in the SH WS of the South

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			Find professional support for WS facilitation. Try to 'market' as part of or integrate the WS into the proceedings of other institutions (e.g., the river basin authority). Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations) so that, the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded SHs. Frequent smaller conversations of peer SHs across different regions may need to happen to allow for recognition of peers and for technical discussions about transboundary solutions (e.g. ecological low flows, abstraction needs, conservation measures, etc.). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.	Tyrol Climate Change Adaptation Plan. There policies and adaptation measures were discussed. We have not organised a comprehensive CS WS since WS3. We are planning to have WS4-5-6 within a broader event on Adige in Eurac, potentially also with professional moderator (if budget allows). + See point above 1-on-1, small group discussions have been caried out, but not national conversations. We recognise the importance of smaller conversations of peer SHs across different regions, however these have proved more difficult to organise, so we focussed more on exchanges between sectors (within the same region).
2025	Focus on co-decision activities and further planning on sustainment of SHs as well as on the defined agreements.		Stay focused on providing evidence base and the results from the research. This is your largest asset. Work with policy makers to integrate policy suggestion from the NEPAT.	In person Project event where all results are presented One event where all river basin actors (incl. researchers) are participating presenting their innovations and, involving different ongoing projects Training session on how to use and make

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				use of NEPAT, depending on the type of SH in a WS setting (take note of your own WS recommendations) Training session on how to use and make use of NEPAT, depending on the type of SH in a WS setting (take note of your own WS recommendations) Regular meetings among researchers and different SHs to share advancements on data sharing and model developments

Sustainment

A session dedicated to SH sustainment was held at the General Assembly Meeting in Tours from 19-21 September 2023. A summary of the suggested recommendations can be found below. In general, SH sustainment was considered to be challenging to implement without further dedicated funding and/or more succinct purpose. Linking sustainment to a particular issue to tackle or initiative to start makes strategizing for sustainment more tangible.

- Ideally, the RBA would be on board. They are involved in another nexus project, which they prioritise.
- Provinces need to be brought together.

Further recommendation on SH sustainment from the evaluation include:

- An effective strategy for SH sustainment is therefore important to keep the interest in the project
- Sustain NXG results via other projects in the river basin

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CS5: IUWMA

The SHE plan is based on the data, information and perceptions provided and analysed by the CS-Leads, the CS SHs and the AVA- and UU-Team by August/September 2024. The plan is updated on a yearly basis taking new SH information and evaluation results into account to allow for adaptive management. Thus, the plan starts with the fifth phase of the SHE plan, namely SH Evaluation.

(5) Evaluation

In the 2023-2024 cycle no SH WS took place in which an evaluation would have fitted. Rather evaluation information is based on:

(1) The self-evaluation of CS on the implementation of the recommendations of the past plan
(2) Summarized findings from the interviews with CS on the co-creation approach
(3) Information extracted from MS23 Second intermediate report on CS implementation and co-creation activities for the Inkomati-Usuthu CS
(4) Recommendation that ensued from the CS meeting with WP1 and WP5 in Berlin in January 2024

Results from the self-evaluation

The 2023 plan suggested a set of activities /actions to be carried out in the upcoming year (2023/2024) (last row of Table 87 in the 2023 SHE plan). Table 84~~Table 84~~ below show the degree to which the activities were implemented and further comments on these.

Table 84: Self-evaluation of the implementation of the 2023 SHE plan recommendations

Recommended activities as per the 2023 SHE plan	**How activities were implemented**	**Further comments**
Keep these up by sharing results and outputs of the project and the WSs regularly (e.g. thank you notes to participants summarising the main outcomes of the WSs).	A project update was sent to SHs on 2 November 2023, including the outcomes of the governance and policy assessment, conceptual models and complexity science models. Following WS 4, a summary document was shared highlighting the key outcomes.	Prior to WS 4, a reminder email will be sent to SHs along with a case-study specific newsletter on project progress.
For the next phase of the project, you may want to move further towards higher levels of engagement by involving a key set of SHs in agenda setting and invitation of SHs, timing and or hosting of WSs.	Prior to WS 4, email requests were sent to key SHs to encourage attendance of the WS. WS 5 has specifically been set up in two different locations to enable key SHs	The same process will be followed for key SHs prior to WS 5.

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	to attend the sessions. A virtual session to include all interested in the NEPAT functioning has also been set up. Separate sessions were decided upon to shorten the amount of time required from key SHs, thus motivating for their attendance.	
Additional activities that foster exchange between SHs from different sectors, categories are helpful. Plan activities to share the outputs of the provided feedback and discuss about it.	A project update was sent to SHs on 2 November 2023, including the outcomes of the governance and policy assessment, conceptual models and complexity science models. Following WS 4, a summary document was shared highlighting the key outcomes.	Prior to WS 4, a reminder email will be sent to SHs along with a case-study specific newsletter on project progress.
There is an opportunity to create new networks and relationships that were not present before the project and allow a neutral space to assess the conflicts and negotiate areas for more cooperation and collaboration.	Through the hosting of WSs, this has allowed SHs to network and to voice their concerns.	
Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations) so that, the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded SHs. Frequent smaller conversations of sectoral peer SHs may need to happen to allow for recognition of peers and for technical discussions about solutions (e.g., ecological low flows, conservation measures, tourism activities). These conversations may be facilitated by the research	WS 5 will explore the potential roles and responsibilities for successful implementation of policy packages.	Following WS 5 and based on SH inputs, key SHs involved in implementing the policy packages will be approached, which may involve one-on-one meetings.

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teams or, when needed, mediated by an expert.		

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Interviews on SHE performance

As part of the SHE evaluation, WP5 conducted a (re-)assessment of the aims of and preferred approaches to co-creation (as per Chambers et al., 2021) with the CS leads. This was done to gauge 1) to what extent CS have, in their own perception, reached the aims they had set for themselves and 2) whether priorities and expectations have changed based on their experiences throughout the project. To facilitate this, WP5 distributed a template to capture updated aims and approaches to collaboration (see Annex for the template). Subsequently, in June 2024, the information provided by the CS leads was further discussed in one-on-one conversations.

Below, the modes of co-creation elicited in June 2024 are presented – this includes the desired mode of co-creation and the one the CS leads themselves consider having de facto delivered (Figure 188). These are also compared with the mode preferred by the CS leads at the start of the project ('Researching Solutions' in September 2022) and the one indicated by SHs at the third WS (September 2023) (Figure 189).

Figure 188: Approaches/modes of Co-Creation, as assessed by the CS leads. Icons from the top in clockwise order: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together

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Figure 189: Approaches/modes of Co-Creation, comparing CS lead and SH perceptions. Icons from the top in clockwise order: 1) influencing powerful; 2) direct agency; 3) solve problems; 4) producing knowledge; 5) empowering marginalised; 6) systemic agency; 7) reframe problems; 8) relating together

The CS leads' desired mode of co-creation has not changed substantially since the inception of the project. In September 2022, the CS leads identified 'Researching Solutions' as the appropriate mode, focused on the co-creation of knowledge to inform evidence-based decision-making, influencing policies and intervention. The only aspect that has since become a stronger focus is 'empowering marginalised' SHs, moving from merely informing them to trying to create a forum for them to communicate their needs to high-power SHs. All in all, the desired mode of co-creation (as of June 2024) resembles most 'Empowering Voices'. De facto, though, it has proven very difficult so far to bring the perspectives of the low-power SHs attending the WSs to the high-power SHs implementing potential decisions. This was also a concern communicated by SHs at the third WS.

The desired modes of co-creation are largely shared between CS leads and SHs. One major difference that stands out is that the CS leads ultimately aim for more profound changes to policy-making by altering the distribution of agency across the socio-political system. This is not a desired approach of the SHs; and, in fact, it is also one of the approaches that the CS leads currently deem hardly delivered, at all.

Moving forward, it may be advisable to create an environment that fosters SHs to work on their relationships and questions current practices to adapt to policy changes, which are both aspects the CS leads intend to emphasise for the remainder of the project. The CS leads want to bring SHs together, looking at policies from an integrated perspective with suggestions for changes in resources management. The idea is to provide new information and complement the current conversations around the sectorial management. So far, however, the CS leads

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have observed that SHs are not particularly willing to put themselves into other SHs' shoes, but hope that the NEPAT-based results will kickstart open(-minded) discussions.

In addition, if possible, either at the upcoming WSs or in separate forums, CS leads should discuss with high-power SH how project outputs can be integrated/translated into policies and identify champions among those SHs to do so. Here, again, the CS leads hope that the NEPAT tool will help to communicate the urgency, relevance, and possibility of integrated WEFE policies.

Information extracted from MS23

MS23 is based on interviews that were carried out with CS leads during months 30-36 of the project to summarize the CS implementation and SH co-creation activities. Information relevant for this SHE plan update was extracted from the latter parts of MS23, namely 'Impact maximization' and 'Lessons learned'. The relevant elements can be summarized as follows:

For this project the models are developed at a catchment level, however data and information are often only available on an administrative level which make the obtaining of the data considerably more challenging and often requires significant processing to transform the data to a catchment level. The catchment level makes sense in terms of the water related aspects, however, when it comes to food and energy most of the information and data is available based on administrative boundaries. Additionally, the implementation of policies is in general at an administrative boundary level.

Expectations and potential impact:

- SHs are sceptical with beliefs that **this may be another project which will sit on the shelf and not contribute to on-the-ground changes**. SHs are not convinced that the project will make significant changes, however the focus of the SHs needs to be shifted to the small steps required to make the changes and to the requirement for SHs to get involved in this change themselves as a project cannot be successful without this.
- SHs have expressed fatigue with no tangible outcomes being visible to them. SHs feel like they are used for information with little to no benefit to themselves being obvious at this stage. **Presentation of results and sharing available deliverables** may be contributing to positive attitudes towards the project.
- SHs are sceptical about South Africa's ability to implement policy and make the **necessary structural changes**.
  - Incorporation of the proposed policy packages (that form the best possible footprint) into immediate planning.
  - More cross-sector collaboration and increased understanding of the impact of sectoral policies on other sectors.

Agency and power of CS leads and engaged SHs:

- Limited engagement with specific sectors (energy) and limited engagement with high-level SHs that could be integral to the implementation of the project. The lack of representation of critical SHs in this project as well as other existing forums.
- The limitations on the project's ability to take into consideration all aspects within the basin due to lack of information, unwillingness of SHs to share information, the need to have common indicators across all CSs and lack of participation of some SHs who form part of the larger Nexus within the basin.

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- Jones & Wagener does not necessarily have relationships with SHs who could effect change in policy at a national or provincial level. However, Jones & Wagener does have a relationship with a retired government official, who will be consulted to assist with introductions to higher level SHs.
- In addition, Jones & Wagener does not have the necessary power to sway SHs from sectors/institutions who do not engage with the project team. However, it should be noted that these SHs do not attend or engage with existing forums/discussions on Nexus related issues.

  - **Most of the SHs actively attending the WSs and focus sessions do not have the power to change policy themselves however they are able to potentially engage with those that do have the power**.
  - South Africa has a history of strong policy development however policy implementation is often lacking. In some cases, **SHs unable to influence policy development may be able to influence policy implementation**.

Modes of interaction

- SHs seem to react more positively to the CS team due to the relationships built during the engagements and efforts made to meet with the SHs. It seems that the initial scepticism has been reduced. This could be due to maintaining contact and sharing project outcomes when available.
  - **In-person meetings allow for better engagement** with SHs than virtual meetings, however due to the scale of the catchment and location of SHs, the **virtual meetings allow for greater attendance**.
  - **One-on-one focus** sessions held in early 2023 assisted in forming positive relationships as effort was made to meet with SHs where they were comfortable. However, these sessions were used to get information from SHs only and therefore may have contributed to their fatigue.
- SHs want to see results and therefore sharing of deliverables and results are important. However, the display of the results needs to be carefully considered to get the correct message across to SHs and to assist with understanding the available results.
- SHs believe that the public sector agricultural SHs are under-represented. SHs believe that SHs from organisations that promote indigenous / traditional knowledge should be included.
  - **SHs encouraged the use of the hybrid meeting method for future WSs**.
    - The hybrid format has the advantage of potentially attracting more SHs and allowing for remote attendance for those SHs not able to travel to the site however the opportunities for networking are reduced and sometimes virtual attendance can lead to only partial attention being given to the content.
    - Although most of our SHs are fluent in English. South Africa has 11 official languages, and some SHs would have benefited from translating communications into different languages. However, the challenge is to select the appropriate languages, as translation into all 11 official languages would not be feasible.
    - Additionally, being a developing country, not all SHs have access to internet and electricity. Therefore, other modes of communication could have been considered.

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- **SHs recommended that a project-wide virtual event should be organised toward the end of the project (with a political inflection) that brings together key decision makers from the various CS. Key results could be presented, and SHs could exchange strategies for implementation.**

Recommendations from the 'Berlin meeting'

A three-day meeting was held in Berlin, Germany from 10-12 January 2024, hosted by the Helmholtz Institutes. All CS leads, WP1 and WP5 representatives met to (a) reflect on the SHE process so far, (b) discuss the needs of the governance roadmap and the 'river contracts' to be drawn up by the end of the project, and (c) draw lessons learned from the process and suggest adapted strategies with a view of achieving the river contracts and the needed SH sustainment. Table 85~~Table 85~~ below shows the reflection and the suggested ways forward.

Table 85: Recommendations from the Berlin meeting – CS5

INKOMATI	
Reflections on SHE to date	***Ideas for SHE & Agreement moving forward****
Workshops: • WS1 - online, presentations, mindmap, software for conceptual model, time for further discussion, input on issues of catchment but also nexus in SA, ca. 30 people • WS2 – in person, input to indicator, alignment of footprint, conceptual models, break-out groups (printed out) work on CMS and draw on paper, discussion on targets, WEFE Nexus footprint and indicators and discussions on that, SH survey • WS3 fully online, progress in plenary, SHs validated policy instruments in wg, and then voting, break out rooms about different modes of co-creation • Small group talks in break out rooms helped SH networking. On physical levels lunch breaks were really useful. Hybrid WS for broader interaction with people across the basin -- Basin really large, bringing all SHs together is really challenging. • For NXG WSs, need to understand what higher-level SH are interested in, their priorities for measures to implement. • Is bringing in people from other projects on similar topic at the NXG meetings a way to further support networking and building synergies? Something to consider for next WSs.	**Local actions:** • Goal: expand, build the network on NEXUS talks across these forums and authorities. Find ongoing platforms, initiatives and demonstrate NEPAT and NXG co-creation approach in these venues and aim for a commitment to continue and expand these exchanges. Identify ambassadors that can prompt these exchanges beyond the project • Make use of existing regional forums and regional sustainable development. SH agreement could be to just link into one of the groups and have them take up Nexus thinking. • Goals should be achievable, show impacts of solutions • Sell methodology to how to do policy-making using nexus thinking. • Key target (user): national planning commission • Show what the tool can do, how policies impact on the WEFE as a whole, selling this as something to be used in the future in policy making (or policy setting), there is value in the tool and the science behind it -- exploit this beyond the catchment • Users: Ministry of forestry and environment, agriculture, mining and something… get in there to high level people, climate commission -- Show the results and ouptuts

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• Load sharing: colleagues come only for part of the meeting • SHs excited about the projects and were happy to hear about European perspective (e.g., National Environment Act – similar regulation) **SH Dynamics and Strategies** • Goal for basin: To build a network of cross sectoral SH in SA • How to use NEPAT output? Outputs of NEPAT is still too unclear to be able to share with higher level SHs. • Political commitment -- is it really an option? SH to formulate recommendations for the higher level. Garret (?) has link with a couple of people who have decision making influence. Strategy to have conversations with 'higher' level SHs in one-on-one meetings of what recommendations they would be comfortable with • Transboundary is basically impossible: SHs that were contacted didn't really show up, cooperation will not happen • Bringing various initiatives together might be an opportunity; but some might see NXG as competition • Find the instruments about CC, just transition, 'green', SD - to hook into the political conversation	• Research forums and initiatives in place and at WS4, ask SHs what ongoing initiatives they are aware for follow-up (get info from Frank and Eva). Try to go beyond water (e.g., SDG). • At WS4: Ask SHs to see what agreement they would like to see put in place

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(1) SHE aim

The main aim of SHE for the South African CS is to obtain input from a wide range of representative SHs to inform the development of the Inkomati-Usuthu CS, WEFE Nexus Footprint, NEPAT, and associated policies.

The Mpumalanga Province in South Africa, of which the Inkomati-Usuthu river system is a crucial component, is vital to South Africa's development in terms of energy security (coal-fired power stations), food security (almost half of the country's high potential agricultural land) and water security (numerous competing water users). This study area contains conservation areas, including the southern portion of the Kruger National Park. Inequalities still exist in the South African society, and livelihoods must be incorporated into any nexus assessment, which is crucial to the aim of SHE.

SHs from all decision-making levels were be identified, including national- and local government departments, relevant municipalities, national electricity providers, water management agencies, prominent land users in the area of interest, academics and researchers, as well as the general public.

Based on the conversations during the General Assembly meeting in Tours (Parallel Session 6) from 19-21 September, the following aims will be prioritized over the remaining two years (crossed-out aims are no longer a priority):

- System knowledge:
  - Gain knowledge about the social, economic, institutional, and ecologic contexts of the area, with special emphasis on spatial scales of social and economic data (available at a provincial scale).
  - Gain general, qualitative knowledge, e.g., at a national level, of the neighbouring countries (Mozambique and Eswatini) that share part of the river basin to complement the information of the South African portion of the basin (focus of this CS).
- Target knowledge:
  - Determine drivers for sustainable development in the area, e.g., economic growth, jobs, socio-economic equality.
  - Gain knowledge on the required infrastructural improvements.
  - ~~Determine criteria that characterise a balance between tourism activities and nature conservation.~~
- Transformation knowledge:
  - ~~Determine requirements to invest in infrastructure.~~
  - Gain knowledge on the transition to renewable energy~~, including the re-skilling of workers and transfer of jobs.~~
  - Identify and understand relevant components for nature conservation and their relation to the WEFE Nexus.
  - Identify and understand main aspects that support the alignment of policies or the design and implementation of aligned policies.

Meanwhile, gauging from the desired SHE outcomes, we derived likely aims as seen from the SHs' view (aims in italics have been added by SHs):

- Possible system aims:

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  - Deepen/improve understanding of the current (state of) WEFE Nexus problems (e.g., river basin management, energy transition, water scarcity) and identify pressures
  - Gain/increase understanding of the institutional, organisational and political context and (current) river basin management plans (including neighbouring countries)
- Possible target aims:
  - Know about future expectations/perspectives (in general and for assessment tools)
  - Determine solutions/systems (and their drivers) that balance sectors for a sustainable production
  - *Gain knowledge on potential conflicts between sectors and how to reduce them (e.g., through the use of a common language), moving towards cooperation and trust.*
- Possible transformation aims:
  - *Improve communication between SHs and break silos*
  - *Design of pathways to enhance awareness of (water) resources management*
  - Identify relevant WEFE Nexus components and indicators

The system knowledge aims are aligned with the ones of the CS. However, there is some divergence when it comes to the target and the transformation knowledge aims. Specifically, the SHs are keen on expanding their networks and improve communication between SHs moving forward. This is not yet reflected in the CS's aims. In fact, the outcome 'networks' is also one where expectations are not met, yet.

Table 86~~Table 86~~ lists the aims for the co-creation process and their self-assessed level of achievement, as of June 2024. Below the reasoning for the scoring of selected aims is presented.

The CS leads felt that they have been able to characterise the (social, economic, ecological, and institutional) context, for which they particularly deemed the development of the conceptual models at the second WS as well as the interviews as part of WP1's governance assessment helpful. The characterisation of the South African organisational and political context was likewise successful, but less so for the neighbouring countries of Eswatini and Mozambique. For those countries the CS leads lamented a lack of networks, time, and resources to adequately involve the respective SHs.

Target knowledge aims have also been largely achieved, but there are some lingering interrelated challenges. Key SHs, particularly from the energy sector, provided limited input, leaving the research team to make assumptions about their actual objectives. The WSs did not provide the forum to alleviate those shortcomings. WSs did not allow participants to dive deep into discussions on the quality and impact of policies, especially in terms of their quantification. As one CS lead noted, "we are trying to back the quantification scientifically," but even when relevant data existed, it was often not shared with the team. Lastly, although the NEPAT tool will offer suggestions for solutions (based on assumptions made by the CS leads), the "implementation of such will be another, more challenging, story."

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When it comes to the aims linked to transformation knowledge, the CS leads belief that a shift in strategy will be necessary from hereon forward. So far, WSs have mostly been attended by low-power SHs. In the future, the CS would like to make a conscious effort to target high-power SHs. However, in general, the CS leads feel that it is difficult to 'get things done in SA' – which is a sentiment shared by SHs present at the WSs. While a formal agreement is likely out of the question, the CS leads will try to encourage the implementation of actions, such as data sharing, which are "low-hanging fruits." The CS leads assume that an implementation of more ambitious, large-scale actions would require another (follow-up) project with a different co-creation focus.

Table 86: Aims for the co-creation, divided by type of knowledge. In bold are those aims identified as particularly relevant for the remaining duration of the project. Aims indicated by other CS are relevant but not this CS are in grey cells.

Aims for co-creation per type of co-generated knowledge	**Current level of achievement** (1=not at all achieved, 7=fully achieved)
System	
~~Deepen/improve understanding of the (state of) WEFE Nexus problems (e.g., river basin management, energy transition, water scarcity) and identify pressures.~~[1]	
Characterise **(social, economic, ecological, and institutional) context**, with an emphasis on: • Spatial scales of social and economic data (available at a provincial scale).	7
Understand the **institutional, organisational and political context** and river basin management plans, including: • Gaining general, qualitative knowledge, e.g., at a national level, of the neighbouring countries (Mozambique and Eswatini) that share part of the river basin to complement the information of the South African portion of the basin.	5
~~Identify conflicts/synergies between SHs as well as actions and strategies~~	
~~Get data for model development~~	
Target	
Know about future expectations/perspectives (for assessment tools)	
Determine **solutions/systems (and their drivers)** that balance sectors, focusing on: • Drivers for sustainable development in the area, e.g., economic growth, jobs, socio-economic equality.	5
~~Diffuse conflicts between sectors (e.g., through the use of a common language), moving towards cooperation and trust~~	
~~Raise awareness of water as a depleting resource~~	
Gain **knowledge on required infrastructural improvements**	6
Transformation	
Develop and implement formal agreements and aligned policies for a coordinated river basin management: • Determine	4
~~Design of pathways to enhance awareness of (water) resources management~~	
~~(Co-)design and (co-)validate NXG tools/platform (e.g., WEFE Footprint), and build capacity (e.g., to use the NXG tools).~~	

[1] Crossed-out aims were not considered in this CS and thus not evaluated.

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Identify relevant WEFE Nexus components and indicators, including:	7
~~Improve communication between SHs and break silos~~	
Determine the requirements to invest in infrastructure	5

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(2) SH analysis

SH identification

In the past year the SH register has changed. To move forward with a GDPR compliant SH base the issue of contest was discussed at the General Assembly meeting in Tours from 19-21 September 2023. The following was agreed:

1) Most information on SH is taken from public sources → mark SHs where information was taken from public sources (add a P if taken from public source in the new column B of your CS tab in the SH dashboard)
2) Double check current names and organizations and update SHs and affiliations accordingly. Some SH may have changed jobs, retired, etc.
3) Mark all high power or high interest SH in the register. These are people you most likely may want to keep. Write to them individually and ask them to consent to the PPCF; threaten with removal if needed. Remove them from the register if the information obtained on them is not from public sources.
4) Add new SHs based on the needs outlined in the management plan below. Lay a particular focus on moving from technical SH to more political SH that could help you understand where legislation on the suggested policy packages currently stands. This will help you get into the policy cycle better. Ideally source their contact information from public sources.

Based on the above process a number of SH were removed from the preliminary SH list resulting thus in a total of 154 (versus 178 in 2023 and 153 in 2022) out of which, 34 or 22,1% consented to be officially included in the SH register and participate in the NXG SHE (Table 87). This brings this CS average consent rate in the range of the overall project average (21,6%) and the absolute number of consented SH in line with other cases.

Table 87: CS5-Inkomati summary information of SH identification as of Sept. 2022 and updated numbers from 2023 and 2024.

Item	Count 2022	Count 2023	Count 2024
Preliminary listing of SHs	153	178	154
SHs in registered officially	9	33	34
Percentage of consent [%]	5.9%	18.5%	22,1%

SHs have been categorised within the WEFE sector where one SH can belong to more than one sector. Across the differentiated ones, there is still a clear preponderance of SHs from the water sector over the other sectors (Figure 190). Respective efforts of reaching out to the energy and food sectors have proven to be challenging in this project and are a general reflection of other similar fora.

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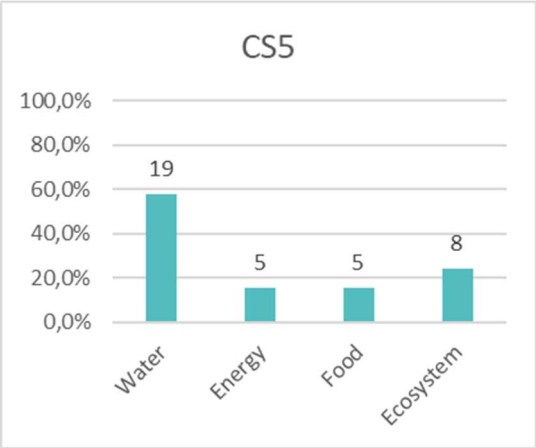

Figure 190: Distribution of SHs across the WEFE sectors for CS5 – IUWMA. One SH can be assigned to one or more sectors.

In terms of gender, there is a significant change from a 20/80 (in 2022) to an almost even split between women and men since 2023. All SHs provided data about gender.

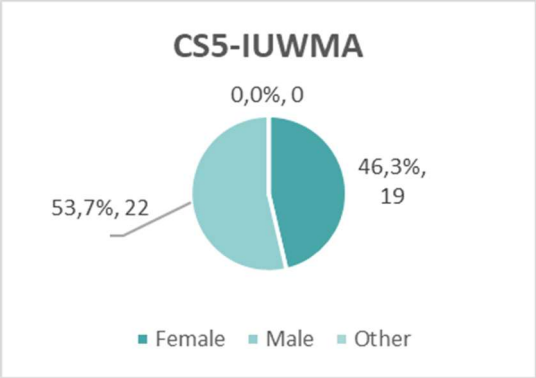

Figure 191: Gender distribution for CS5 – IUWMA.

SH differentiation and categorisation

The SHs belong mainly to tier 1 (18), followed by Tier 2 (9) and Tier 3 (7). This means that, overall, SHs are perceived to be interested in being engaged in the development of the project's outputs.

Compared to the 2022 analysis, a higher contrast between SH groups can be identified. The largest share of SH is considered as 'Policymakers at national level' (10) and 'Policymakers at local level/municipalities' (4), as well as from 'River basin authorities' (6). Other SH groups

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include ‘businesses’ (5), ‘media’ (2), ‘research and academia’ and ‘civil society (1 each) (Figure 192).

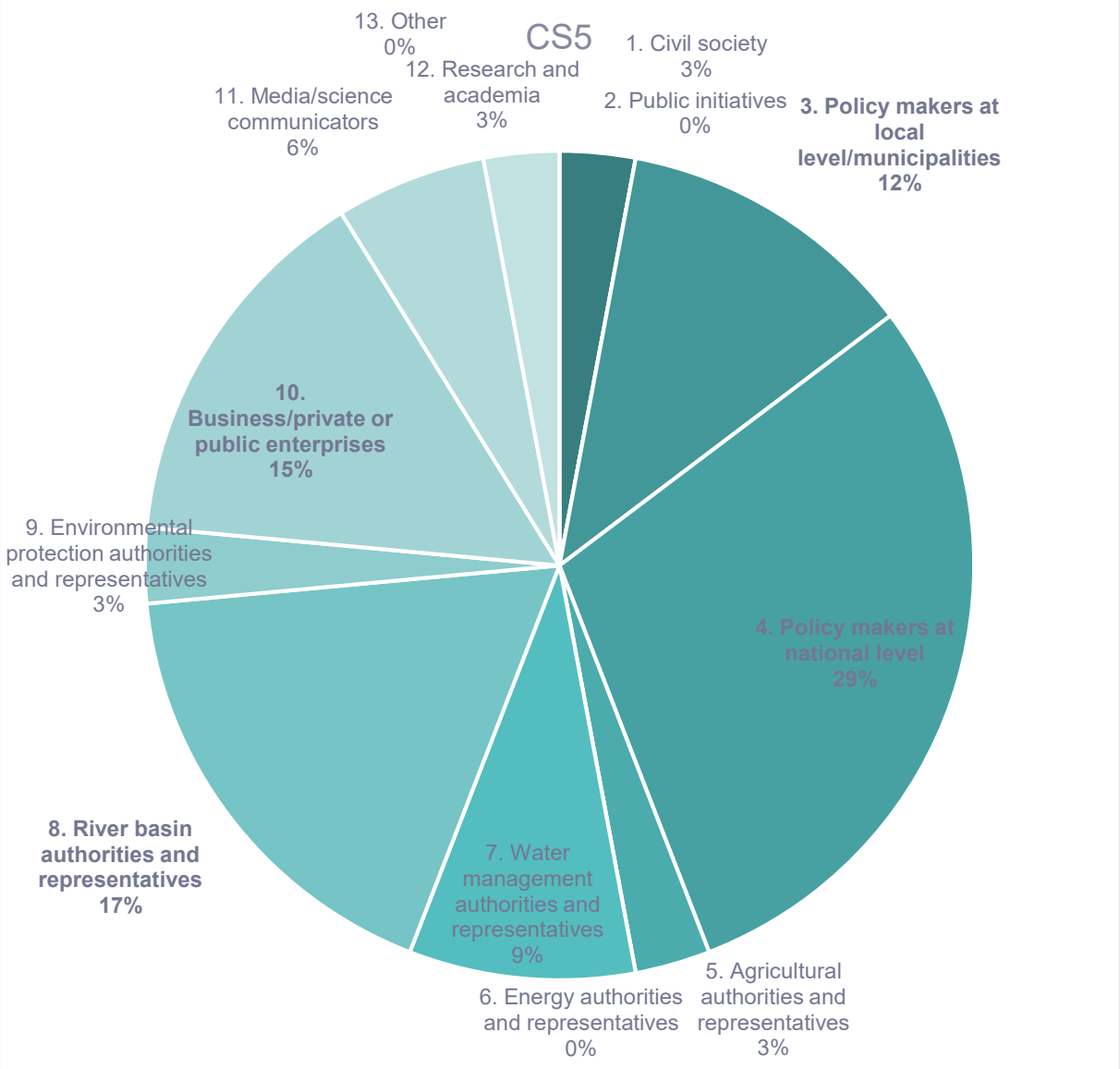

Figure 192: Distribution of SHs across categories for the case CS5- IUWMA

From a Power-Interest perspectives, almost ¾ of the SH are considered to be High Interest – High Power SH (70,6%), and almost all SH are considered as High Interest SHs (97,1%) (Figure 193). An effort to reach the Low Interest – High Power SHs with a focus on people deciding on policies should be made in this second phase of the project. Little has changed here in the distribution with respect to the previous year.

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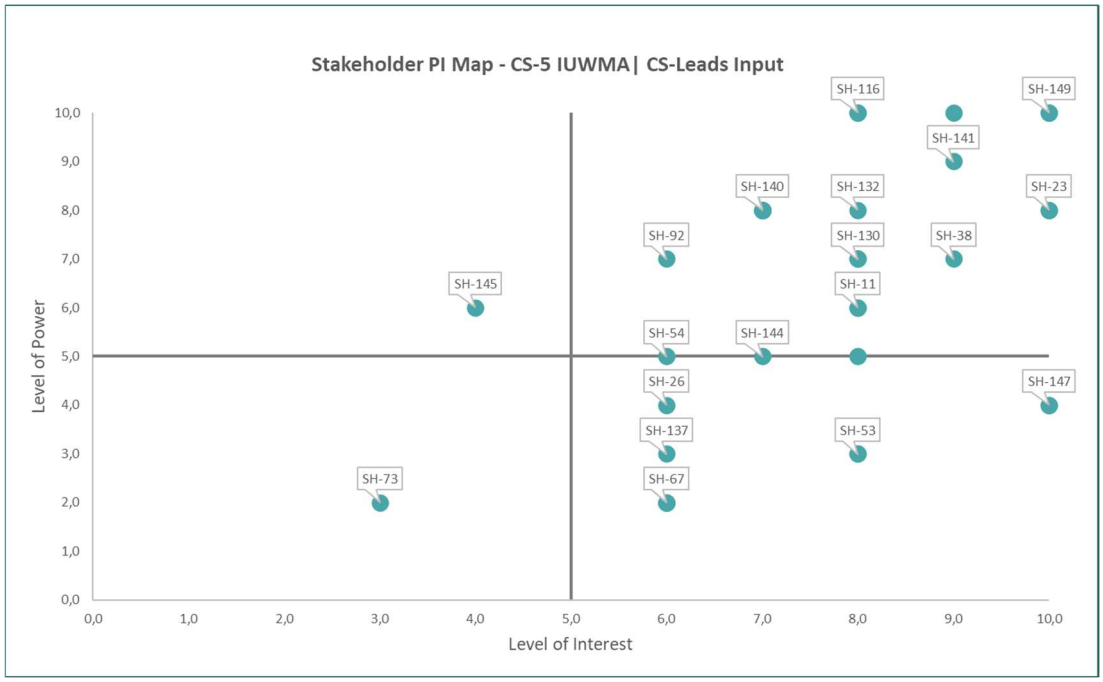

Figure 193: Power-Interest Map for CS5 – IUWMA, based on the CS-Leads' perception. For data protection and privacy matters, SHs are anonymised; for internal use CS-Leads know which SH each number represents.

SH relationships

About the relationships among the SHs, the CS-Leads characterised – based on their perception – 595 relationships across the 35 SHs. The relationships correspond mainly to complementary (Cm) and cooperation (Cp) (47,4% and 33,8%, respectively) (Figure 194 and Figure 195). Compared to last year's analysis again an increasing share of non-existent (NE) relationships has been added (11.0%) and more conflicting relationships have also been identified (11,9% compared to 10.1% in 2023's and 5.6% in 2022's analysis). This is an opportunity to create new networks and relationships that were not present before the project.

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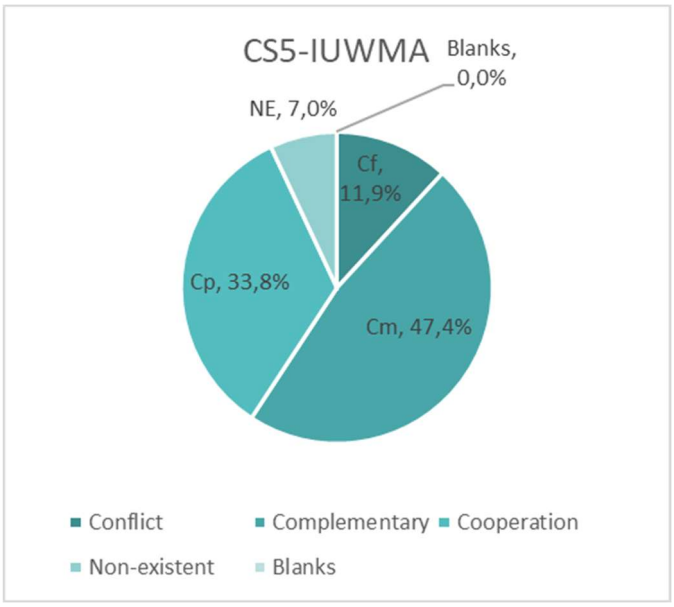

Figure 194: Share of types of relationships across SHs. Characterised based on the perception of CS-Leads.

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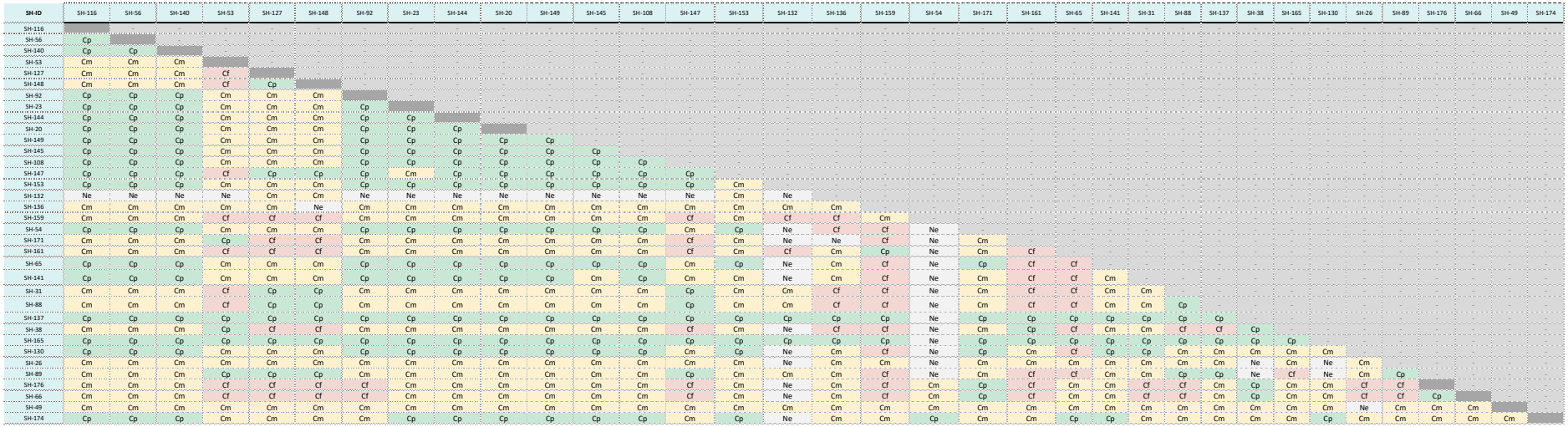

SH-ID	SH-116	SH-56	SH-140	SH-53	SH-127	SH-148	SH-92	SH-23	SH-144	SH-20	SH-149	SH-145	SH-108	SH-147	SH-153	SH-132	SH-136	SH-159	SH-54	SH-171	SH-161	SH-65	SH-141	SH-31	SH-88	SH-137	SH-38	SH-165	SH-130	SH-26	SH-89	SH-176	SH-66	SH-49	SH-174
SH-116																																			
SH-56	Cp																																		
SH-140	Cp	Cp																																	
SH-53	Cm	Cm	Cm																																
SH-127	Cm	Cm	Cm	Cf																															
SH-148	Cm	Cm	Cm	Cf	Cp																														
SH-92	Cp	Cp	Cp	Cm	Cm	Cm																													
SH-23	Cp	Cp	Cp	Cm	Cm	Cm	Cp																												
SH-144	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp																											
SH-20	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	Cp																										
SH-149	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	Cp	Cp	Cp																								
SH-145	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	Cp	Cp	Cp	Cp																							
SH-108	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	Cp	Cp	Cp	Cp	Cp																						
SH-147	Cp	Cp	Cp	Cf	Cp	Cp	Cp	Cm	Cp	Cp	Cp	Cp	Cp	Cp																					
SH-153	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cm																				
SH-132	Ne	Ne	Ne	Ne	Cm	Cm	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Ne	Cm	Ne																			
SH-136	Cm	Cm	Cm	Cm	Cm	Ne	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm																		
SH-159	Cm	Cm	Cm	Cf	Cf	Cf	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cf	Cm	Cf	Cf	Cm																	
SH-54	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cm	Cp	Ne	Cf	Cf	Ne																
SH-171	Cm	Cm	Cm	Cp	Cf	Cf	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cf	Cm	Ne	Ne	Cf	Ne	Cm															
SH-161	Cm	Cm	Cm	Cf	Cf	Cf	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cf	Cm	Cf	Cm	Cp	Ne	Cm	Cf														
SH-65	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cm	Cp	Ne	Cm	Cf	Ne	Cp	Cf	Cf													
SH-141	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	Cp	Cp	Cp	Cm	Cp	Cm	Cm	Ne	Cm	Cf	Ne	Cm	Cf	Cf	Cm												
SH-31	Cm	Cm	Cm	Cf	Cp	Cp	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cp	Cm	Cm	Cf	Cf	Ne	Cm	Cf	Cf	Cm	Cm											
SH-88	Cm	Cm	Cm	Cf	Cp	Cp	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cp	Cm	Cm	Cf	Cf	Ne	Cm	Cf	Cf	Cm	Cm	Cp										
SH-137	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Ne	Cp	Cp	Cp	Cp	Cp	Cp	Cp									
SH-38	Cm	Cm	Cm	Cp	Cf	Cf	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cf	Cm	Ne	Cf	Cf	Ne	Cm	Cp	Cf	Cm	Cm	Cf	Cf	Cp								
SH-165	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Ne	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cp							
SH-130	Cp	Cp	Cp	Cm	Cm	Cm	Cp	Cp	Cp	Cp	Cp	Cp	Cp	Cm	Cp	Ne	Cm	Cf	Ne	Cp	Cm	Cf	Cp	Cp	Cm	Cm	Cm	Cm	Cm						
SH-26	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Ne	Cm	Cm	Ne	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Ne	Cm	Ne	Cm					
SH-89	Cm	Cm	Cm	Cp	Cp	Cp	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cp	Cm	Cm	Cm	Cf	Ne	Cm	Cf	Cf	Cm	Cm	Cp	Cp	Ne	Cf	Ne	Cm	Cp				
SH-176	Cm	Cm	Cm	Cf	Cf	Cf	Cf	Cm	Cm	Cm	Cm	Cm	Cm	Cf	Cm	Ne	Cm	Cf	Cm	Cp	Cf	Cm	Cm	Cf	Cf	Cm	Cp	Cm	Cm	Cf	Cf				
SH-66	Cm	Cm	Cm	Cf	Cf	Cf	Cf	Cm	Cm	Cm	Cm	Cm	Cm	Cf	Cm	Ne	Cm	Cf	Cm	Cp	Cf	Cm	Cm	Cf	Cf	Cm	Cp	Cm	Cm	Cf	Cf	Cp			
SH-49	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Cm	Ne	Cm	Cm	Cm		
SH-174	Cp	Cp	Cp	Cm	Cm	Cm	Cm	Cp	Cp	Cp	Cp	Cp	Cp	Cm	Cp	Ne	Cm	Cm	Cp	Cm	Cm	Cp	Cp	Cm	Cm	Cm	Cm	Cm	Cp	Cm	Cm	Cm	Cm	Cm	

Figure 195: Actor-Linkage Matrix for CS5-IUWMA. Based on the perception of CS-Leads. Cf: Conflict; Cm: Complementary; Cp: Cooperation; NE: non-existent.

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(3) SHE

The SHE plan provides a guidance to organise SHE and achieve the SHE aims considering the findings from the SHE evaluation and the updated results of the SH analysis. These results show that:

- The SH base has now stabilized at an average level.
- SHs are still mostly from the water sector, but a good share of them seem to come from national or local policymaking.
- Most SHs are still identified as High-Interest SH, with few of them being Low Interest-High Power SHs.
- SHs are mostly cooperative or complementary, with a fair share of conflicting relationships and non-existent ones.

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Table 88: Overview of the main SHE components of the SHE plan for CS5-IUWMA.

	Co-exploration	Co-design		Co-development	
	Information	**Consultation**	**Involvement**	**Collaboration**	**Empowerment**
WHO? SH category	Following the increased attention to the energy and food sectors, an increase is food sector SHs has been seen, however the energy sector is still very much under-represented. SHs believe that the public sector agricultural SHs are under-represented. SHs believe that SHs from organisations that promote indigenous / traditional knowledge should be included.	For NXG WSs, need to understand what higher-level SH are interested in, their priorities for measures to implement. SHs believe that the public sector agricultural SHs are under-represented. SHs believe that SHs from organisations that promote indigenous / traditional knowledge should be included.	Users: Ministry of forestry and environment, agriculture, mining and something… get in there to high level people, climate commission Is bringing in people from other projects on similar topic at the NXG meetings a way to further support networking and building synergies?	Key target (user): national planning commission South Africa has a history of strong policy development however policy implementation is often lacking. In some cases, SHs unable to influence policy development may be able to influence policy implementation.	Most of the SHs actively attending the WSs and focus sessions do not have the power to change policy themselves however they are able to potentially engage with those that do have the power.
WHY? PI and ALM	The limitations on the project's ability to take into consideration all aspects within the basin due to lack of information, unwillingness of SHs to share information,	Small group talks in break out rooms helped SH networking. On physical levels lunch breaks were really useful. Hybrid WS for broader interaction with people across the basin -- Basin really large, brigning all SHs together is really challenging.	How to use NEPAT output? Outputs of NEPAT is still too unclear to be able to share with higher level SHs. Show what the tool can do, how policies impact on the WEFE as a	SHs are sceptical with beliefs that this may be another project which will sit on the shelf and not contribute to on-the-ground changes. Goals should be achievable, show impacts of solutions	Sell methodology to how to do policy-making using nexus thinking. Limited engagement with specific sectors (energy) and limited engagement with high-level SHs that could be integral to the implementation of the

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	Co-exploration	Co-design		Co-development	
	the need to have common indicators across all CSs and lack of participation of some SHs who form part of the larger Nexus within the basin. Jones & Wagener does not necessarily have relationships with SHs who could effect change in policy at a national or provincial level. However, Jones & Wagener does have a relationship with a retired government official, who will be consulted to assist with introductions to higher level SHs.	SHs want to see results and therefore sharing of deliverables and results are important. However, the display of the results needs to be carefully considered to get the correct message across to SHs and to assist with understanding the available results.	whole, selling this as something to be used in the future in policy making (or policy setting), there is value in the tool and the science behind it -- exploit this beyond the catchment For this project the models are developed at a catchment level, however data and information are often only available on an administrative level which make the obtaining of the data considerably more challenging and often requires significant processing to transform the data to a catchment level.	Sell methodology to how to do policy-making using nexus thinking. SHs are sceptical about South Africa's ability to implement policy and make the necessary structural changes. Jones & Wagener does not have the necessary power to sway SHs from sectors/institutions who do not engage with the project team. However, it should be noted that these SHs do not attend or engage with existing forums/discussions on Nexus related issues.	project. The lack of representation of critical SHs in this project as well as other existing forums.
HOW? Activities	SHs recommended that a project-wide virtual event[1] should be organised toward the end of the project (with a political inflection) that brings together key decision makers from the various CS. Key results could be presented, and SHs could exchange strategies for implementation.			Make use of existing regional forums and regional sustainable development. SH agreement could be to just	Goal for basin: To build a network of cross sectoral SH in SA Goal: expand, build the network on NEXUS talks

[1] Stakeholders encouraged the use of the hybrid meeting method for future workshops. When carrying out workshops or events keep in mind your own recommendations and lessons learned (see Evaluation section).

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	Co-exploration	Co-design	Co-development	
			link into one of the groups and have them take up Nexus thinking. > Incorporation of the proposed policy packages (that form the best possible footprint) into immediate planning. > More cross-sector collaboration and increased understanding of the impact of sectoral policies on other sectors.	across these forums and authorities. Find ongoing platforms, initiatives and demonstrate NEPAT and NXG co-creation approach in these venues and aim for a commitment to continue and expand these exchanges. Identify ambassadors that can prompt these exchanges beyond the project

*Overall, consider having workshops in hybrid modality to facilitate the participation of more SHs (check the workshop checklist).

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(4) Management and sustainment

Management

The initial management plan considered different foci per year. Table 89~~Table 89~~ looks at how these were accomplished and what changed based on the findings of the past year.

Table 89: Priorities of the different plans and how these were accomplished and changed over the course of the project.

Foci	From the 2022 Plan	From the 2023 Plan	2024 Plan
2023	Actively look to increase the interest of other SHs while maintaining the interest of the current high interest SHs. Focusing away from high interest SHs towards low interest SHs may allow discovering currently missing marginalised SHs.	The SH register was significantly expanded. The SH base has a better gender balance, but is still slanted towards the water sector and high interest SH.	The SH register was modified to be GDPR compliant. Following the increased attention to the energy and food sectors, an increase is food sector SHs has been seen, however the energy sector is still very much under-represented. SHs believe that the public sector agricultural SHs are under-represented. SHs believe that SHs from organisations that promote indigenous / traditional knowledge should be included.
2024	Maintain the interest of the engaged SHs and focus on the relationships between them, including power dynamics and building trust to enhance collaboration.	Keep information sharing up by sharing results and outputs of the project and the WSs regularly (e.g. thank you notes to participants summarising the main outcomes of the WSs). For the next phase of the project, you may want to move further towards higher levels of engagement by involving a key set of SHs in agenda setting and invitation of SHs, timing and or hosting of WSs. Additional activities that foster exchange between SHs from different sectors, categories are helpful. Plan activities to share the outputs of the provided feedback and discuss about it. There is an opportunity to create new networks and relationships that were not present before the project and allow a neutral space	A project update was sent to SHs on 2 November 2023, including the outcomes of the governance and policy assessment, conceptual models and complexity science models. Prior to WS 4, email requests were sent to key SHs to encourage attendance of the WS. Following WS 4, a summary document was shared highlighting the key outcomes. WS 5 will explore the potential roles and responsibilities for

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		to assess the conflicts and negotiate areas for more cooperation and collaboration. Participation in WSs, activities for dialogue and trust building (1-on-1, small group discussions, national vs. transnational topical conversations) so that, the final draft of a river contract includes clear roles and responsibilities that empower previously disregarded SHs. Frequent smaller conversations of sectoral peer SHs may need to happen to allow for recognition of peers and for technical discussions about solutions (e.g., ecological low flows, conservation measures, tourism activities). These conversations may be facilitated by the research teams or, when needed, mediated by an expert.	successful implementation of policy packages WS 5 has specifically been set up in two different locations to enable key SHs to attend the sessions. A virtual session to include all interested in the NEPAT functioning has also been set up. Separate sessions were decided upon to shorten the amount of time required from key SHs, thus motivating for their attendance. Through the hosting of WSs, this has allowed SHs to network and to voice their concerns. .
2025	Focus on co-decision activities and further planning on sustainment of SHs as well as on the defined agreements.	Stay focused on providing evidence base and the results from the research. This is your largest asset.	SHs recommended that a project-wide virtual event should be organised toward the end of the project (with a political inflection) that brings together key decision makers from the various CS. Key results could be presented, and SHs could exchange strategies for implementation. Make use of existing regional forums and regional sustainable development. SH agreement could be to just link into one of the groups and have them take up Nexus thinking. > Incorporation of the proposed policy packages (that form the best possible footprint) into immediate planning. > More cross-sector collaboration and increased understanding of the impact of sectoral policies on other sectors.

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			Goal for basin: To build a network of cross sectoral SH in SA Goal: expand, build the network on NEXUS talks across these forums and authorities. Find ongoing platforms, initiatives and demonstrate NEPAT and NXG co-creation approach in these venues and aim for a commitment to continue and expand these exchanges. Identify ambassadors that can prompt these exchanges beyond the project

Sustainment

A session dedicated to SH sustainment was held at the General Assembly Meeting in Tours from 19-21 September 2023. A summary of the suggested recommendations can be found below. In general, SH sustainment was considered to be challenging to implement without further dedicated funding and/or more succinct purpose. Linking sustainment to a particular issue to tackle or initiative to start makes strategizing for sustainment more tangible.

- Forums exist which are active (energy might not attend);
- Ultimate goal is to get new SHs involved

Other recommendations include:

- Make use of existing regional forums and regional sustainable development. SH agreement could be to just link into one of the groups and have them take up Nexus thinking. Goal: expand, build the network on NEXUS talks across these forums and authorities. Find ongoing platforms, initiatives and demonstrate NEPAT and NXG co-creation approach in these venues and aim for a commitment to continue and expand these exchanges. Identify ambassadors that can prompt these exchanges beyond the project

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Final engagement (Month 42-46 evaluations)

CS1: Nestos/Mesta

The evaluation below is based on surveys distributed at the 5th and 6th WS of the Nestos/Mesta CS. The surveys, translated into local languages, were identical with the one distributed at the 3rd WS. Thus, the survey assessed:

- The quality of the process (the delivery of the plan)
- The quality of the outcome of the process (the results of the plan = i.e. fulfilling the aims)
- The intention of the quality vs the perception of the quality (at both levels above)

In addition, a WS activity equivalent to the one conducted at the 3rd WS showcased the SH landscape to the SHs and asked these to reflect on the preferred modes of co-creation by Chambers et al. 2021. Specifically, SHs were encouraged to reflect on which mode of co-creation would have been desirable for the co-creation process and which they actually experienced. For the Nestos/Mesta case, WSs were attended by 38 and 53 SHs, respectively.

Results from the SH survey

Overall, SHs are very satisfied with the process quality and the process outcomes. Of the 38 and 53 participants at the 5th and 6th WSs, respectively, 16 and 14 filled in the survey.

(1) Of the respondents at the 5th WS, participants were equally male and female (8 each). Respondents came from various SH groups – specifically, the water, environmental, and policy-making sectors. The energy sector was not represented, however. Participants were predominantly from Greece (11), rather than Bulgaria (5). Participants had mostly either comparatively little experience (less than 5 years) or more than 20 years of experience. Of the respondents at the 6th WS, participants were equally male and female (7 each). Respondents came from various SH groups – specifically, the water, environmental, and policy-making sectors. The energy sector was not represented, however. Participants came in almost equal parts from Greece (8) and Bulgaria (6). The large majority of them had more than 20 years of experience.

(2) Participants feel consulted and involved in the project and in the WS (Figure 196~~Figure 196~~ and Figure 197~~Figure 197~~). Respondents overall felt better included at the WS level than at the project level, which is to be expected. Also, levels of perception for collaboration and empowerment are comparatively lower but were evaluated better at the 6th WS than before. The focus of the last WS was on signing a SH agreement, which possibly left the SHs with a sense of ownership and empowerment.

(3) On average, participants rate all outcomes as highly important (average above 5), with no outcome sticking out as particularly important (Figure 198~~Figure 198~~ and Figure 199~~Figure 199~~). For the 5th workshop, there was a somewhat large disparity between the answers of single SHs, however. Also, at the 5th WS, SHs indicated that the project had especially regarding social equitability and institution building underdelivered relative to the SHs' expectations (Figure 198~~Figure 198~~). The responses from the 6th workshop indicate a significant improvement in this regard (Figure 199~~Figure 199~~). Also, the dispersion of the responses had

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decreased, with the exception of the outcome “Reframing”, which one respondent felt the project had not delivered at all.

(4) In general, participants indicated to have acquired knowledge in all areas (average above 5) (Figure 200~~Figure 200~~ and Figure 201~~Figure 201~~). Also, the 6th WS seems to have on average provided higher levels of knowledge gain compared to the 5th WS, with an especially discernible increase regarding social and economic components of the nexus. This is somewhat surprising since the 6th WS was mostly focused on bringing the project to a successful end in the form of a SH agreement, rather than being focused on additional knowledge production.

Figure 196: Degree of perceived engagement by CS1-WS5 participants in the project (dark bars) and the workshop (light bars)

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Figure 197: Degree of perceived engagement by CS1-WS6 participants in the project (dark bars) and the workshop (light bars).

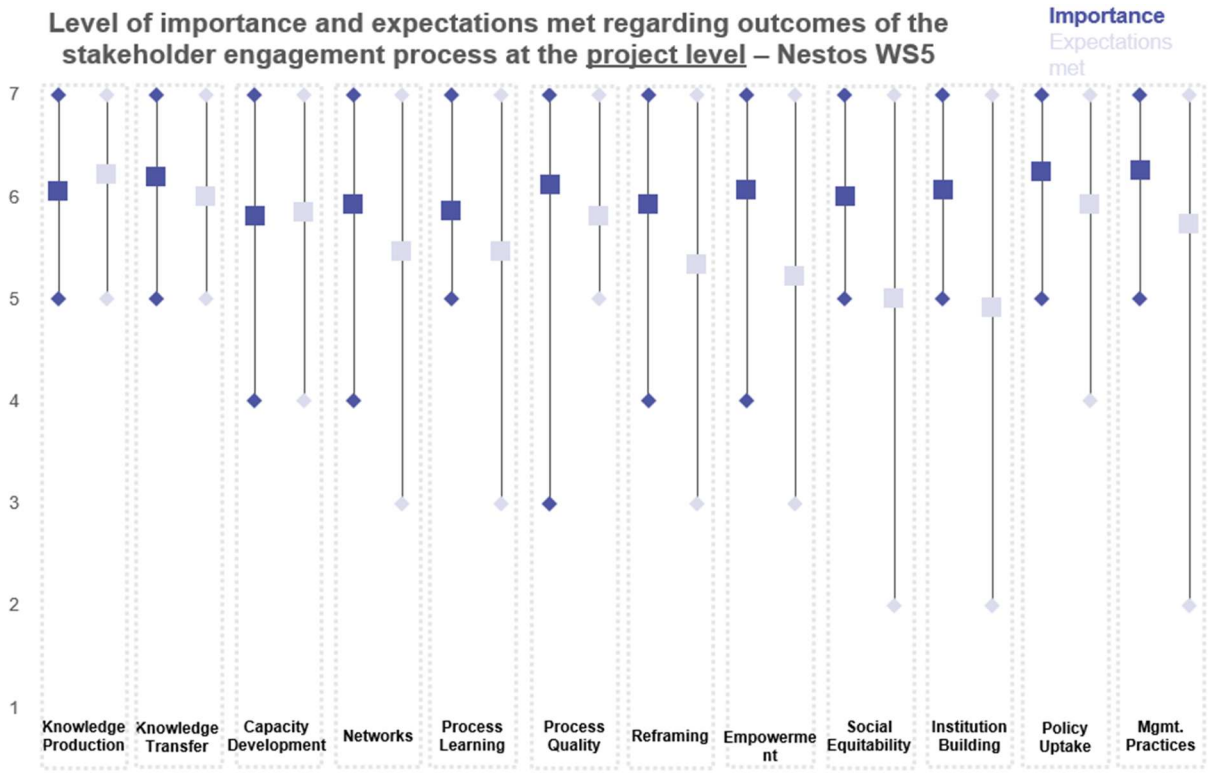

Figure 198: Level of importance (dark blue) and expectations (light blue) per outcomes of the SHE process at CS1-WS5.

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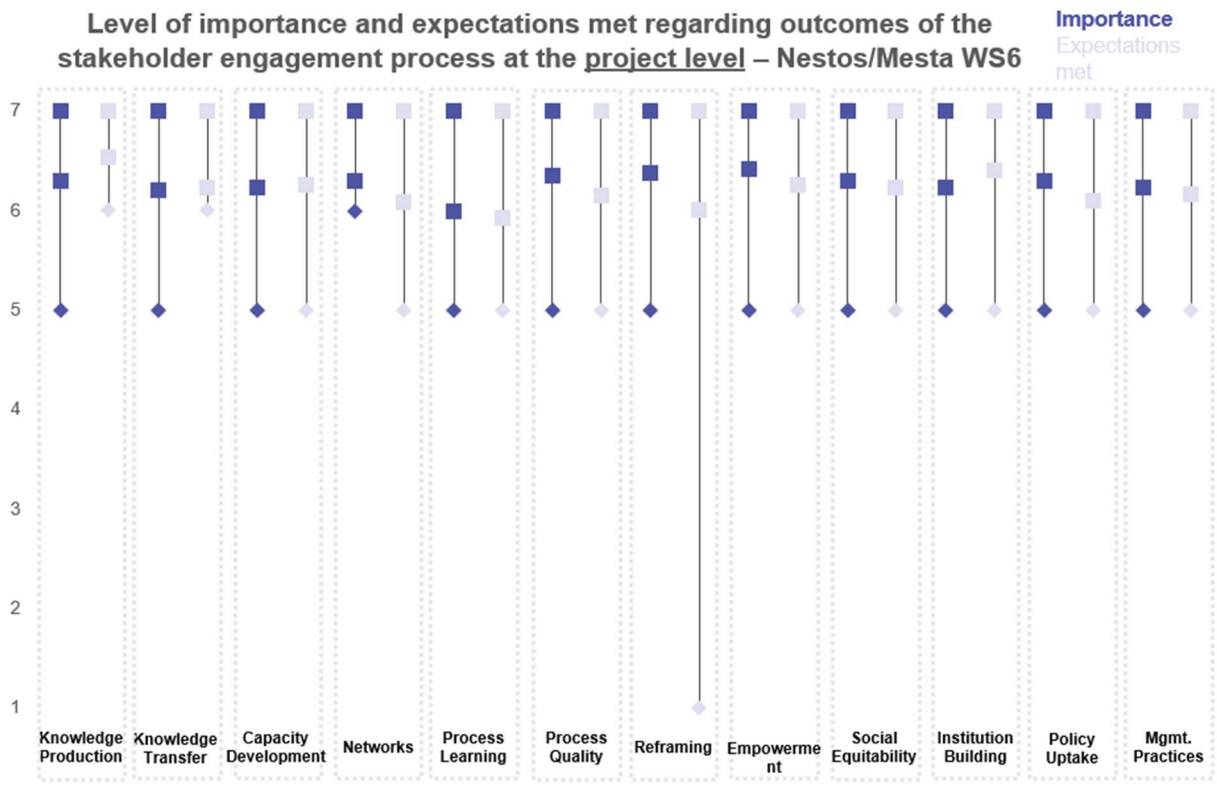

Figure 199: Level of importance (dark blue) and expectations (light blue) per outcomes of the SHE process at CS1-WS6.

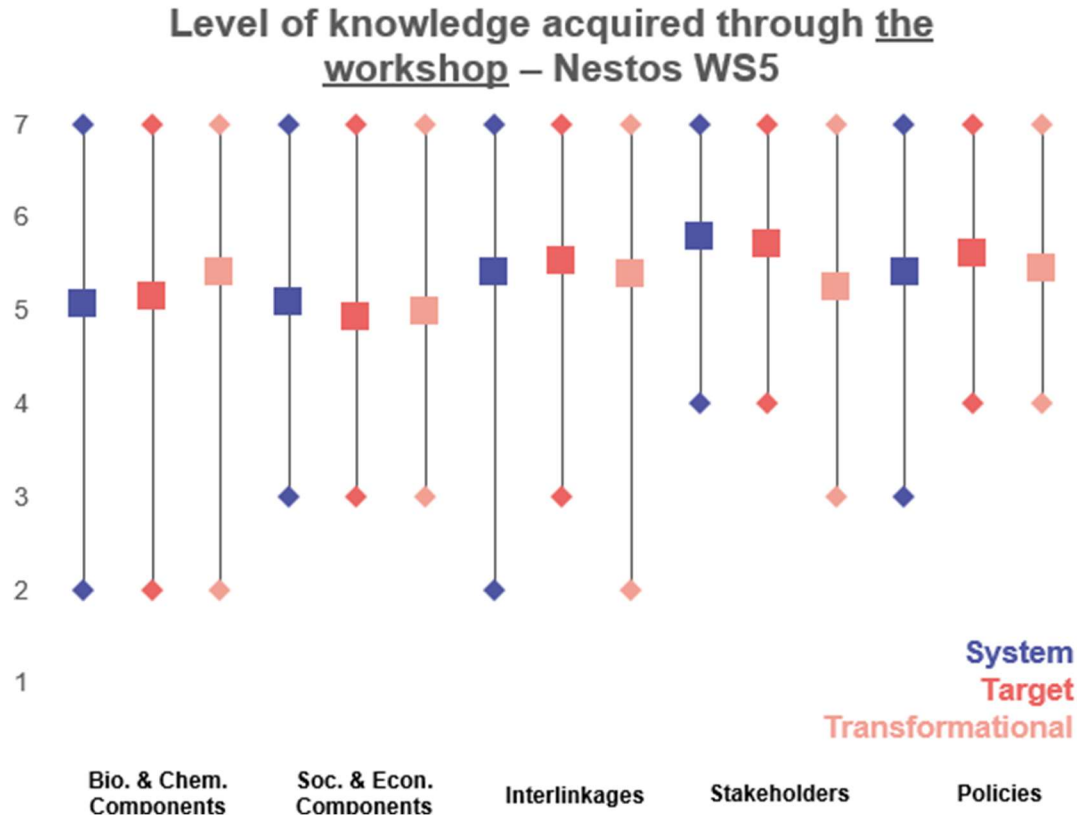

Figure 200: Knowledge generated in CS1-WS5 in different NXG areas.

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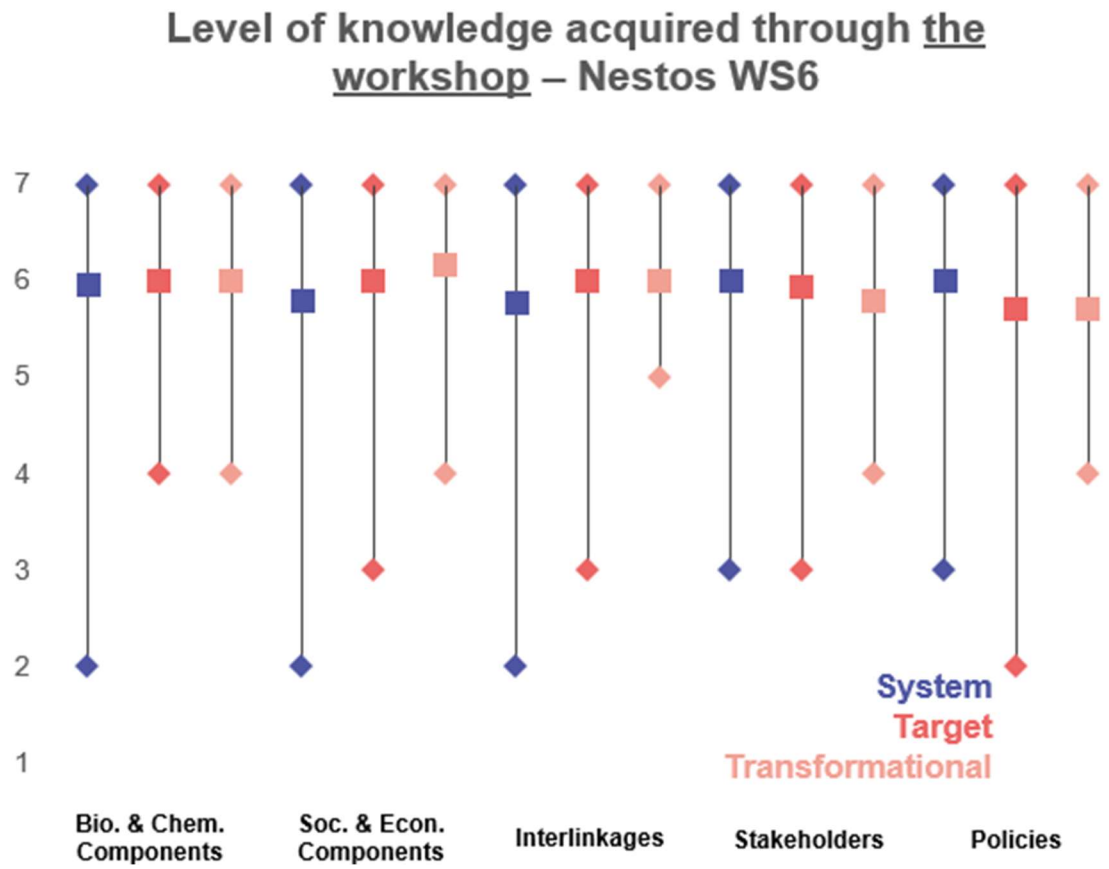

Figure 201: Knowledge generated in CS1-WS6 in different NXG areas.

Desired mode of co-creation

At the end of a session focused on the SH landscape and SHE at the 5th WS, a plenary discussion was held on the approaches to co-creation that together yield the modes of co-creation (see Chambers et al. 2021). For this purpose, the approaches to co-creation were briefly introduced as pairs (e.g., 'solving problems' and 'reframing problems' under 'purpose'). as well as common risks and opportunities associated with them. Afterwards, SHs were encouraged to reflect on the degree of focus of the respective approaches for their CS. Specifically, SHs were encouraged to reflect on which approaches to co-creation would have been most appropriate for their CS and which approaches they had actually experienced over the course of the project.

The WS minutes were scored along the respective scales of the approaches to co-creation, as per the framework by Chambers et al. (2021). The values for the preferred mode of co-creation of the SHs yield '**Empowering Voices**' (or possibly 'Brokering Power'), which is consistent with their desired mode indicated at the 3rd WS. Meanwhile, in their perception, the SHs have rather experienced '**Researching Solutions**' (Figure 202~~Figure 202~~). There is a large overlap between the two modes and previous interviews with the CS leads actually indicate that their intentions align with the SH's expectations. However, while the CS leads were lauded for their knowledge and technical tools provided to the SHs, the SHs expressed the need for continuous engagement at international level between the countries to have sustainable impact beyond the project. Also, funding for the eventually agreed upon actions in the governance roadmap will often require funding, which would necessitate higher-level and high-power actors to support the process. While the SHs overall expressed great satisfaction with the co-creation

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process, there remain concerns that the voices of lower-level SHs will remain unheard and planned actions unimplementable.

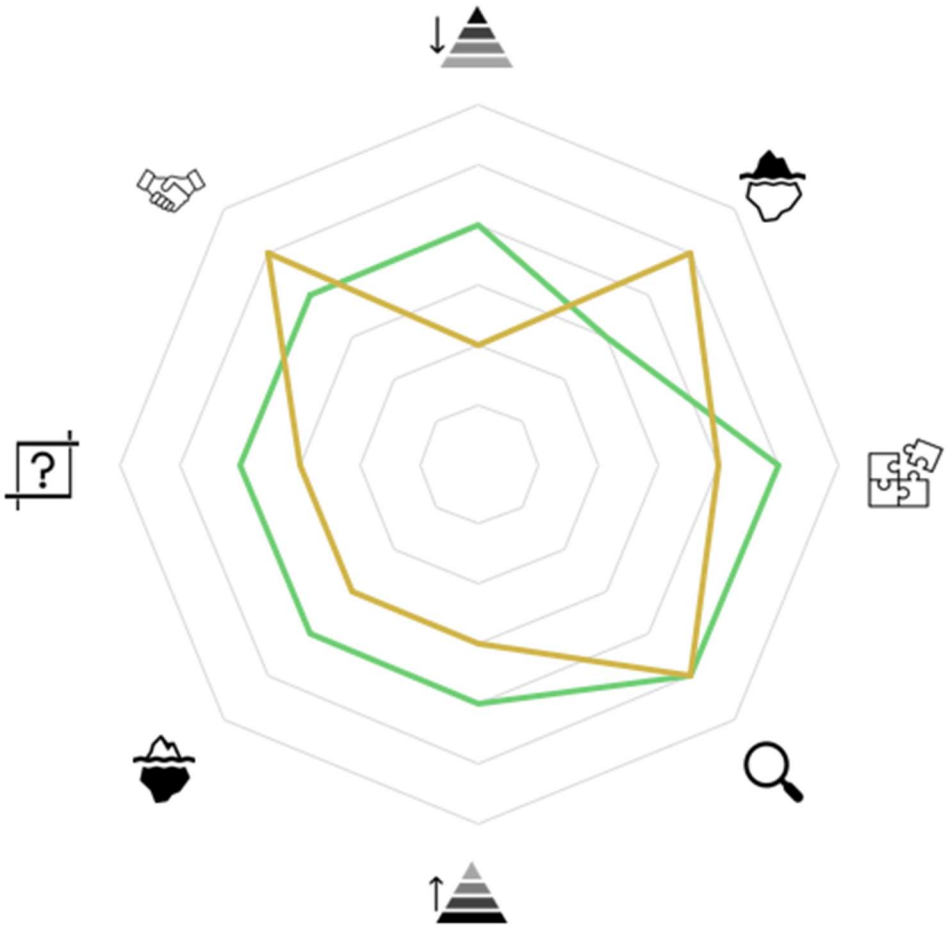

Figure 202: SH perspective on the desired and experienced approaches to co-creation CS1-WS6. The SHs desired "Empowering Voices" (green) and experienced "Researching Solutions" (yellow). Legend (in clockwise order from the top): 1) Influence powerful actors; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together

These challenges are by no means unique to this CS, however. Chambers et al. (2021) show that other co-creation processes have created meaningful solutions for local actors based on the produced knowledge in the project. However, the knowledge produced, or actions agreed upon could be ignored by high-level decision makers if not involved along the way. Positive outcomes (i.e. policy uptake, change in management actions, empowerment, etc.) were enhanced for cases that planted the seed for multi-scalar partnerships and joint actions. This should be part of the SH management and sustainment strategy beyond the project.

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CS2: Lielupe

The evaluation below is based on surveys distributed at the 5th and 6th WS of the Lielupe CS. The surveys, translated into local languages, were identical with the one distributed at the 3rd WS. Thus, the survey assessed:

- The quality of the process (the delivery of the plan)
- The quality of the outcome of the process (the results of the plan = i.e. fulfilling the aims)
- The intention of the quality vs the perception of the quality (at both levels above)

In addition, a WS activity equivalent to the one conducted at the 3rd WS showcased the SH landscape to the SHs and asked these to reflect on the preferred modes of co-creation by Chambers et al. 2021. Specifically, SHs were encouraged to reflect on which approaches to co-creation they experienced throughout the SH engagement process of NXG. For this purpose, the approaches to co-creation were briefly introduced as pairs (e.g., 'solving problems' and 'reframing problems' under 'purpose'). as well as common risks and opportunities associated with them. Afterwards, SHs were encouraged to indicate with through stickers for each approach to co-creation how they experienced the co-creation process.

The activity did not include a question on what approaches to co-creation they actually experienced throughout the project. This is because the CS leads did not want to overwhelm the SHs and were at the same time pressed for time at the final WS. For the Lielupe case, WSs were attended by 11 and 11 SHs, respectively.

Results from the SH survey

Overall, SHs are very satisfied with the process quality and the process outcomes. Of the 11 and 11 participants[1] at the 5th and 6th WSs, respectively, 8 and 15 filled in the survey.

1) Of the 8 respondents at the 5th WS, participants were predominantly female (6). Respondents came from various SH groups – specifically, the water, environmental, and policy-making sectors. The energy sector was not represented, however. Participants were predominantly from Latvia (6). Participants had mostly more than 10 years, but less than 20 years of experience. Of the respondents at the 6th WS, participants were predominantly female (10). Respondents came from various SH groups – specifically, the water, environmental, and policy-making sectors. The energy sector was also represented with one SH. Participants came in almost equal parts from Latvia (8) and Lithuania (7). The majority of them had more than 10, but less than 20 years of experience.
2) Participants feel informed, consulted, and involved in the project and in the WS (Figure 203 and Figure 204). Respondents overall felt better engaged at the WS level than at the project level, which is to be expected. Also, levels of perception for collaboration and empowerment are comparatively lower. The focus of the last WS was on signing a SH agreement, which however did not seem to boost the SHs' sense of ownership and empowerment. Also, answers for the 6th workshop were much more dispersed, which may however merely be a consequence of the higher number of responses.

[1] For the final survey all SH were asked to fill it in, not just the WS participants.

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3) On average, participants rate all outcomes as highly important (average above 5), with knowledge production and process quality sticking out as particularly important for the respondents from the 5th WS (Figure 205 and Figure 206). For the 5th workshop, institution building was also one outcome in regard to which the project particularly underdeveloped in the eyes of the SHs (Figure 205). The responses from the 6th workshop largely confirm the indications of the previous one (Figure 206). However, here knowledge transfer was identified as the most important outcome, while institution building was again considered to be underdelivered by the project. By and large, both the importance as well as too which degree the project had delivered on stakeholder expectations showed a larger dispersion and a lower average score for the 6th WS. This can be a consequence of the higher number of responses or the type of SHs that responded. Alternatively, albeit at still quite a high level of satisfaction, the SHs might have felt that the project did not quite deliver what they had originally hoped for.
4) In general, participants indicated to have gained a good level of knowledge through the 5th and 6th WS (Figure 207 and Figure 208). However, particularly knowledge gain on the social and economic components of the nexus was scored lower than the other aspects. Interestingly, the system knowledge deemed to be acquired was often rated lower than particularly the transformational knowledge, which is an uncommon experience, given that it is usually easier to determine the current state of a system rather than how to transform it. Maybe the SHs wanted to express that their knowledge gain regarding the state of the system was more limited than the additional knowledge acquired on how to transform it.

Figure 203: Degree of perceived engagement by CS2 - WS5 participants in the project (dark bars) and the workshop (light bars)

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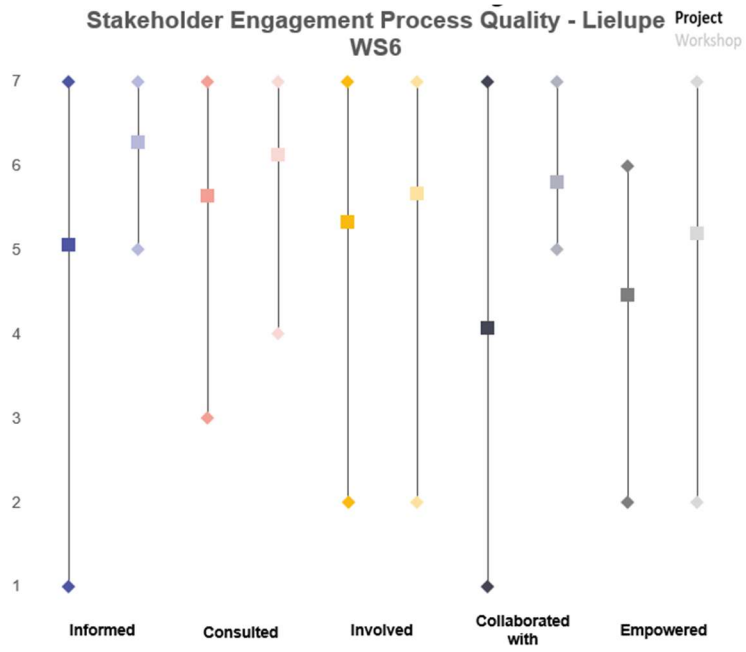

Figure 204: Degree of perceived engagement by CS2 - WS6 participants in the project (dark bars) and the workshop (light bars).

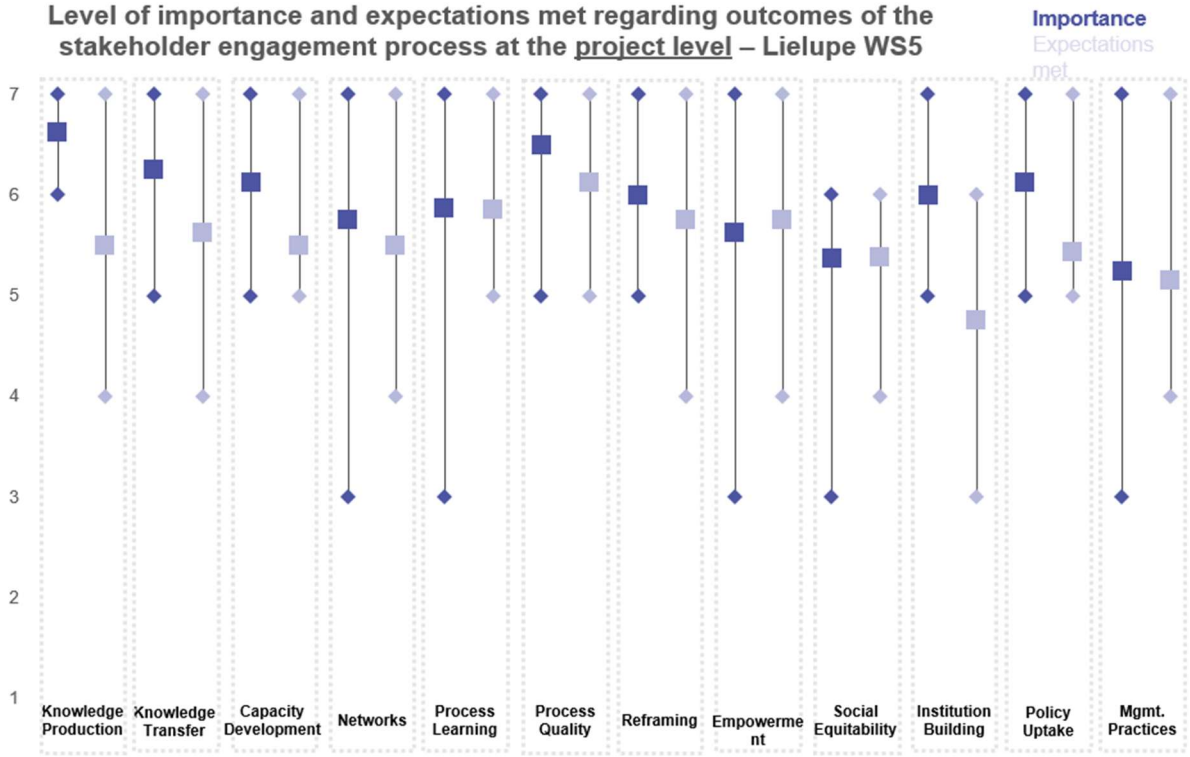

Figure 205: Level of importance (dark blue) and expectations (light blue) per outcomes of the SHE process at CS2 - WS5.

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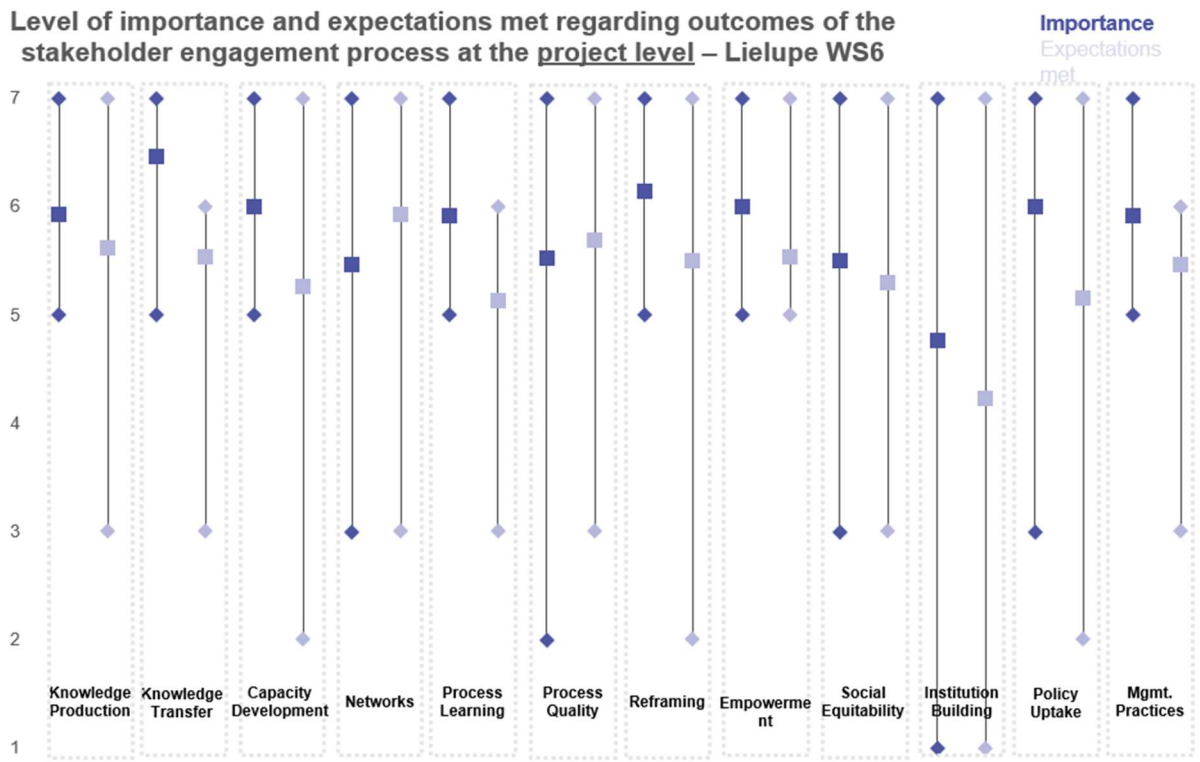

Figure 206: Level of importance (dark blue) and expectations (light blue) per outcomes of the SHE process at CS2 - WS6.

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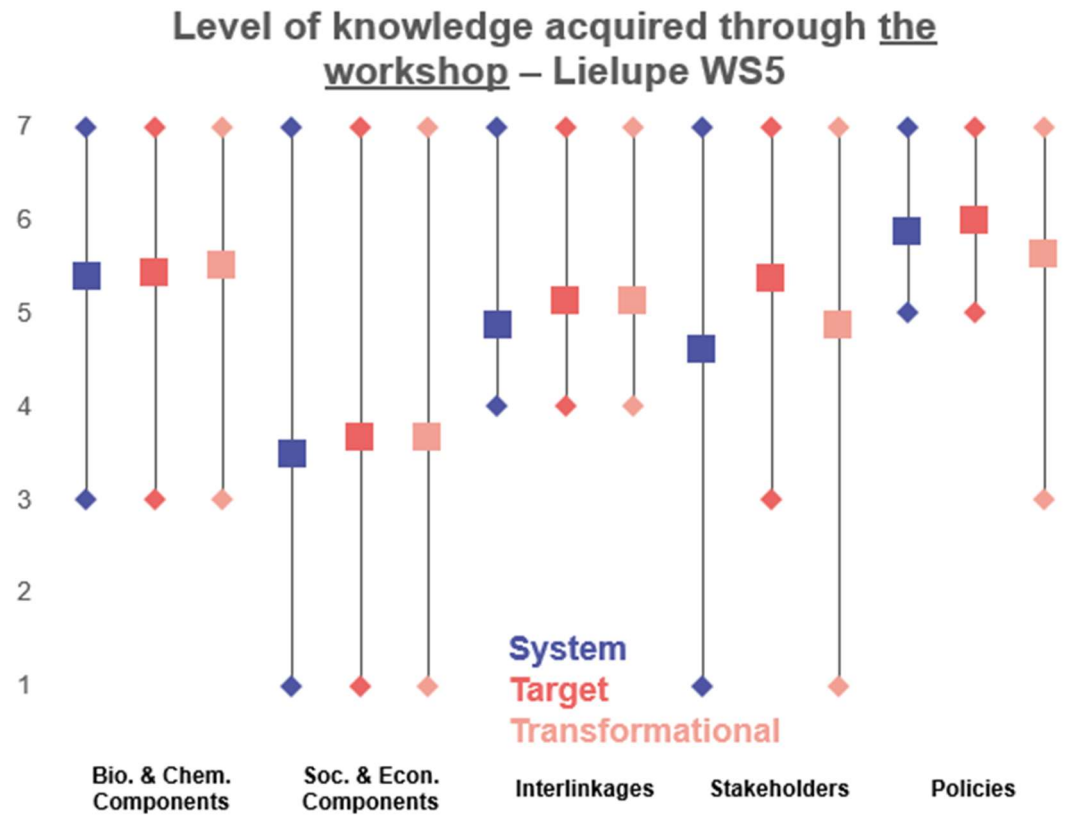

Figure 207: Knowledge generated in CS2 - WS5 in different NXG areas.

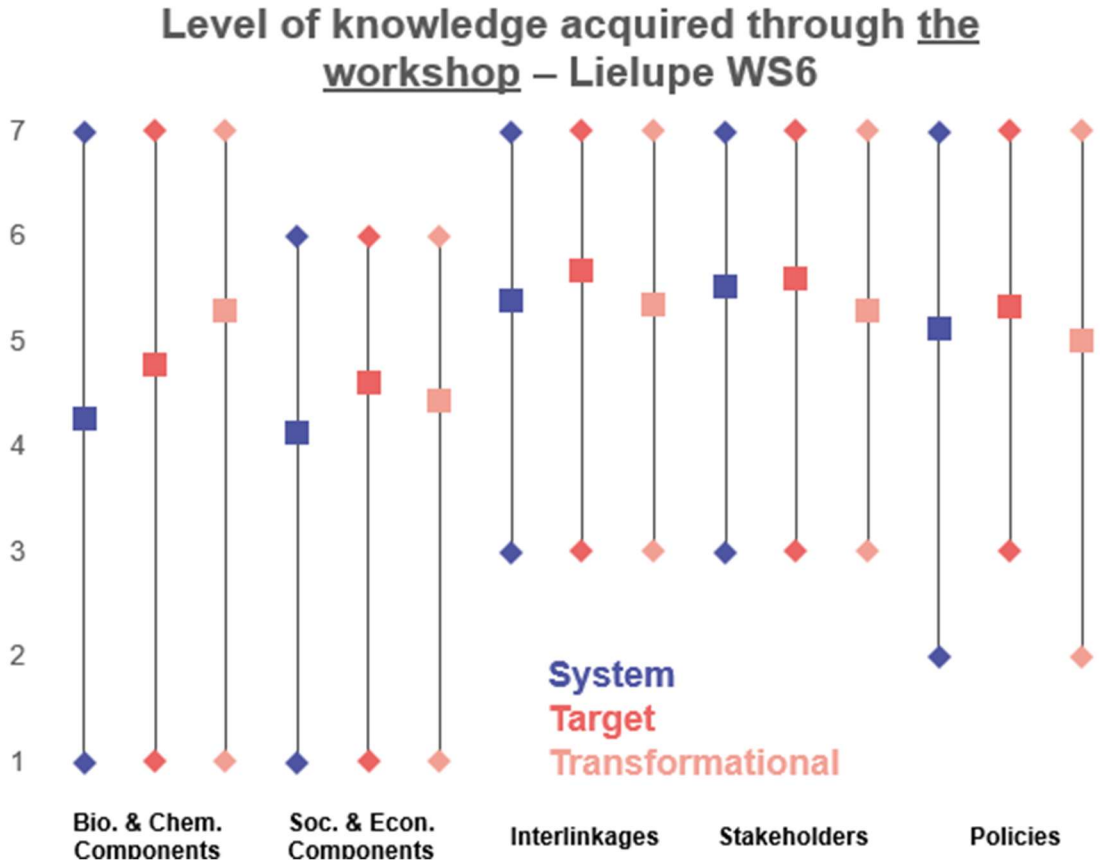

Figure 208: Knowledge generated in CS2 - WS6 in different NXG areas.

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Desired mode of co-creation

The SHs were separated into Latvian and Lithuanian SHs. However, while some single SHs expressed outlier opinions of how they experienced the co-creation process in NXG, on average both SH groups indicated an almost identical experience (Figure 209~~Figure 209~~). Specifically, the SHs experienced the mode of co-creation '**Empowering Voices**', which is characterised by focusing on clearly identified problems through knowledge production, while ensuring that the opinions and knowledge of commonly marginalised SHs are considered. Thereby, the SHs are consistent with what they communicated as the desirable mode of co-creation at the 3rd WS.

There is however a risk with this mode that more powerful SHs will prevent the implementation of identified measures and actions. While future impacts of the projects are yet to be determined, the SHs have already indicated that in comparison to the delivery of other outcomes, NXG has underdelivered regarding policy uptake (see Figure 206~~Figure 206~~ above). This is a risk which will need to be managed moving forward. In addition, there is a perceived increase in collective agency between SHs and in awareness for Nexus challenges, but both SH groups, and especially the Lithuanian SHs, indicated that, in comparison to other co-creation process that aim to empower voices, there has been a limited focus on building the agency of SHs directly linked to the sustainability challenges.

The CS leads had previously identified '**navigating differences**' as a desirable mode of co-creation, which is characterised by building relationships to overcome conflict and act jointly. While SHs did experience some space for dialogue, there is no sense of common ownership.

Figure 209: SH perspective on the experienced approaches to co-creation. Both SHs from Latvia (dark green) and Lithuania (light green) experienced the mode of co-creation "Empowering Voices". Legend (in clockwise order from the top): 1) Influence power; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together

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CS3: Jiu

The evaluation below is based on surveys distributed at the end of the project. The survey, translated into local languages, was not identical with the one distributed at the 3rd WS, in so far as the final survey omitted workshop-specific questions. This is because the CS did not conduct another project-exclusive WS after the 3rd WS, not allowing for the distribution of the survey. Thus, the final survey only assessed:

- The quality of the process at project-level (the delivery of the plan)
- The quality of the outcome of the process (the results of the plan = i.e. fulfilling the aims)

In addition, a WS activity equivalent to the one conducted at the 3rd WS, which showcased the SH landscape to the SHs and asked these to reflect on the preferred modes of co-creation by Chambers et al. 2021, could also not be conducted.

The final survey was only answered by five SHs. The respondents represent national water authorities and national civil society initiatives. Their answers are summarised below:

(1) Respondents rated the level of engagement at project-level highly in all five categories (Figure 210).
(2) On average, the respondents rate all outcomes as highly important (average above 6) (Figure 211). Possibly it is noteworthy, that the outcomes regarding policy uptake still met SH expectations overarchingly, but not to the same extent as for the other outcomes.

The respondents were all very high-interest SHs who readily engaged with the project. It is possible that the answers are therefore so positive.

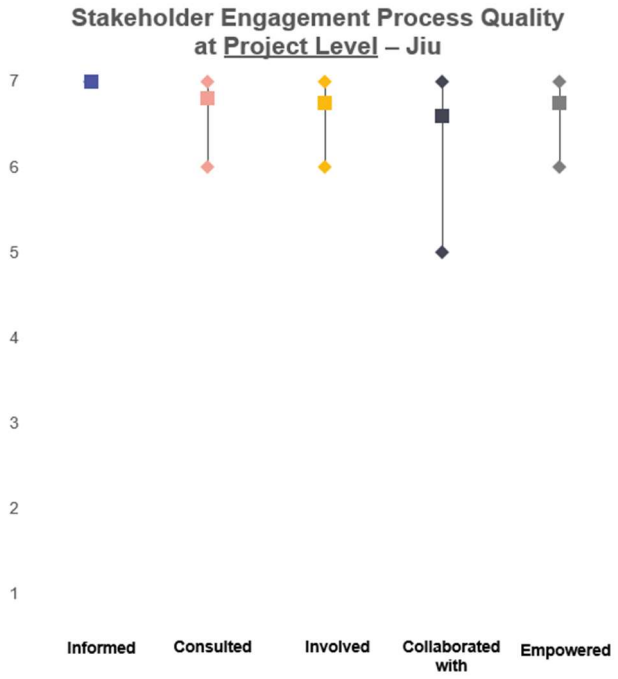

Figure 210: Degree of perceived engagement by CS3 - WS6 participants in the project.

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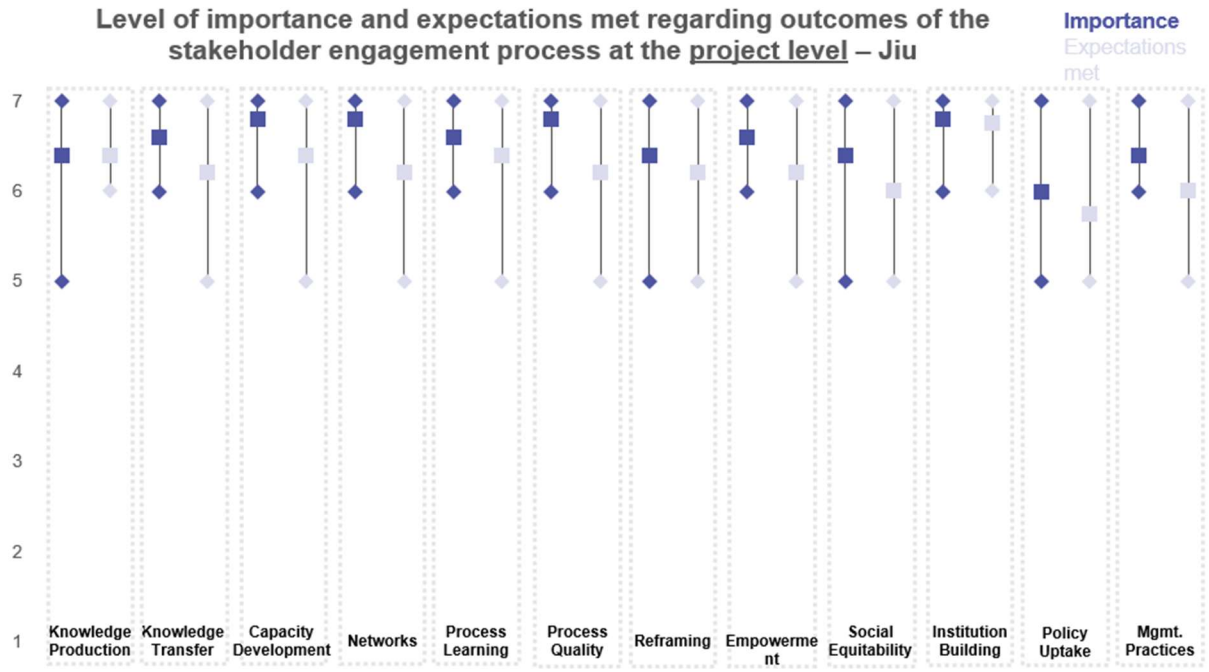

Figure 211: Level of importance (dark blue) and expectations (light blue) per outcomes of the SHE process CS3-WS6.

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CS4: Adige

This CS did not conduct a 5th WS. In addition, the last project activity took the form of an open forum, which was jointly implemented with other relevant projects. Hence, there was no NXG-specific final WS. A survey on project-specific outcomes and process quality was distributed afterwards, but no responses were returned.

However, an activity equivalent to the one conducted at the 3rd WS, which showcased the SH landscape to the SHs and asked these to reflect on the preferred modes of co-creation by Chambers et al. 2021, was implemented at the final project activity.

Desired mode of co-creation

Specifically, SHs were encouraged to reflect on which mode of co-creation would have been desirable for the co-creation process and which they actually experienced. For this purpose, the approaches to co-creation were briefly introduced as pairs (e.g., 'solving problems' and 'reframing problems' under 'purpose'). as well as common risks and opportunities associated with them. Afterwards, SHs were encouraged to indicate with the help of stickers for each approach to co-creation what they would have desired and what they experienced. Twenty SHs engaged with this activity. The desired and actually experienced modes of co-creation show the responses in an aggregated form.

The SHs largely experienced the co-creation process as they desired. There is one noticeable exception, however (Figure 212). The SHs would have desired a strong focus on empowering marginalised actors, but only see this achieved to a limited degree through the NXG project. The mode '**navigating differences'**, which the SHs would have desired, is characterised by inclusive, empowering processes rather than transferring scientific knowledge. It supports reframing and long-term change by minimising hierarchies and fostering trust. However, it remains vulnerable to disruption by unsupportive high-level actors, highlighting the risk of power imbalances undermining outcomes. At the 3rd WS, the SHs had still preferred 'empowering voices' as a mode of co-creation. It shows hereby that there is a continued focus on 'empowering marginalised actors', which is a strong characteristic of both modes. However, 'navigating differences' rather seeks impacts through relationship building than knowledge production. This shift could be a consequence of most knowledge production already haven taken place earlier in the project or a realisation on part of the SHs that additional knowledge will not primarily aid with implementing sustainable actions if the necessary relations are not in place.

The SHs do acknowledge that the CS leads made an effort to address the potential risk of power imbalances by engaging with high-power actors. The de facto experienced mode **'reframing agency'** commonly creates safe, open-ended spaces for exploring systemic change and collective agency without predefined solution agendas. While effective at triggering deep reflection, these cases risk becoming echo chambers, limiting broader impact and policy influence. While the answers do not give a particular indication of whether the SHs expect the project to trigger policy changes, it appears as if they have appreciated the project as a forum for exchange and relationship building, but perceive an insufficient elevation of marginalised voices in this context. In this context, it is important to point out that the answers for this particular approach were spread from 2 to 6 along the scoring scale, indicating significantly different SH perceptions – and possibly being representative of the polarised nature of the CS.

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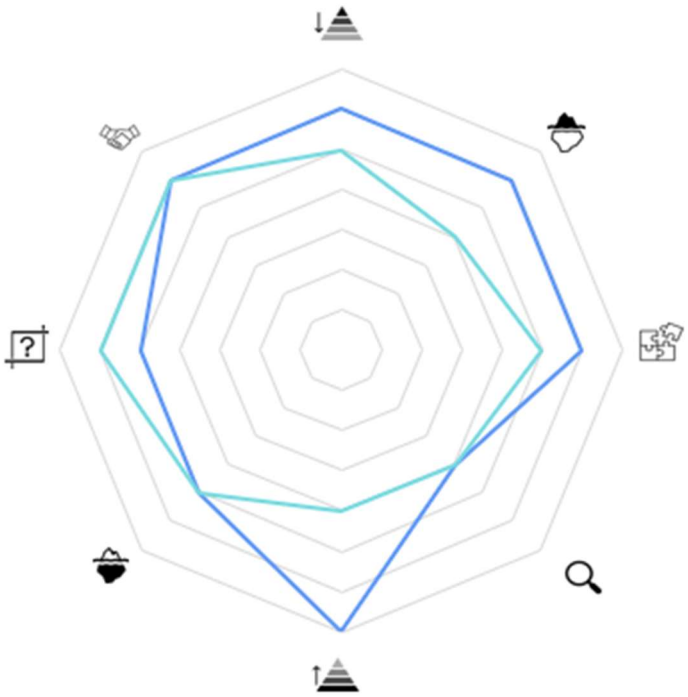

Figure 212: SH perspective on the desired and experienced approaches to co-creation WS6 – CS4. The SHs desired "Navigating Differences" (dark blue) and experienced "Reframing Agency" (light blue). Legend (in clockwise order from the top): 1) Influence powerful actors; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together

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CS5: IUWMA

This CS conducted both a 5th and a 6th WS. While the former was implemented physically in two different locations – once in the river basin area and once in the capital Pretoria – as well as virtually, the latter was only held virtually. A survey, equivalent to the one distributed after the 3rd WS was distributed at the end of both WSs. However, only after the 5th WS was it possible to obtain a meaningful number of responses (8), while only two SHs responded to the survey after the 6th, and therefore final, WS. Given the low response rate after the 6th WS, we will only interpret the data from the 5th WS below.

However, an activity equivalent to the one conducted at the 3rd WS, which showcased the SH landscape to the SHs and asked these to reflect on the preferred modes of co-creation by Chambers et al. 2021, was implemented at the final project WS.

Results from the SH survey

Overall, SHs were very satisfied with the process quality and the process outcomes at the 5th WS. Of the 17 participants, respectively, 8 filled in the survey.

1) Of the 8 respondents, participants were predominantly female (5). Respondents came from authorities in all Nexus-relevant sectors. Participants had mostly more than 20 years of experience.
2) Participants feel informed, consulted, and involved in the project and in the WS (). Respondents overall felt better engaged at the WS level than at the project level, which is to be expected. Levels of perception for collaboration and empowerment are comparatively lower, but on average not substantially. Importantly, though, the answers are more dispersed for the level of collaboration, which signals that some SHs did not feel quite as engaged as others.
3) On average, participants rate all outcomes as highly important (average above 5), with knowledge production, knowledge transfer, capacity development, process learning, and policy uptake sticking out as particularly important for the respondents (Figure 214). Furthermore, albeit at still quite a high level of satisfaction, SHs indicate for the outcomes knowledge production, capacity development, empowerment, social equitability, and institution building that their expectations had not been met. Besides knowledge production and capacity development, these are all outcomes that are usually associated with co-creation processes that critically engage with power structures and policy-making processes.
4) In general, participants indicated to have gained a good level of knowledge through the 5th WS (Figure 215). However, particularly knowledge gain on the social and economic components of the nexus was scored lower than the other aspects. For each of the surveyed categories the SHs also indicated that the level of transformational knowledge acquired is lower compared to the system and target knowledge. This is particularly noteworthy in the context of the 5th WS as it started to engage with the selection of policy packages and already tried to identify potential pathways toward a more sustainable WEFE nexus in the basin. Possibly, the WS did add value for the SHs in this regard but not quite to the extent as intended.

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Figure 213: Degree of perceived engagement by CS5 - WS5 participants in the project (dark bars) and the workshop (light bars)

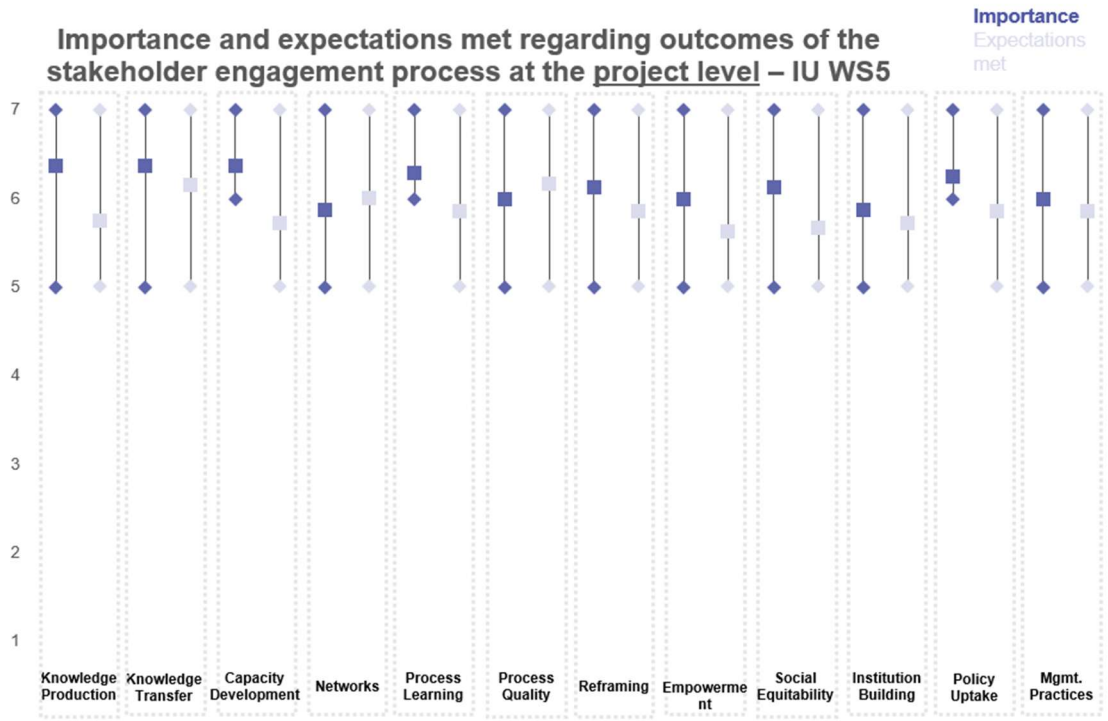

Figure 214: Level of importance (dark blue) and expectations (light blue) per outcomes of the SHE process at CS5 - WS5.

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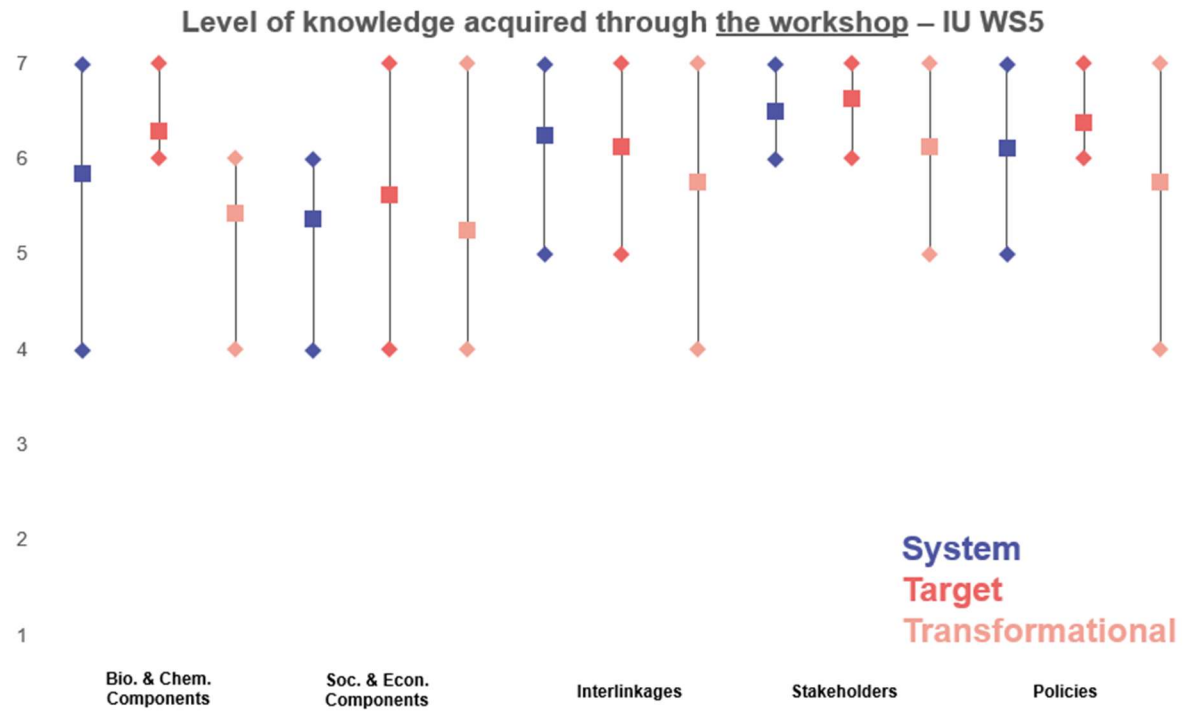

Figure 215: Knowledge generated in CS5 - WS5 in different NXG areas.

Desired mode of co-creation

Specifically, SHs were encouraged to reflect on which mode of co-creation would have been desirable for the co-creation process and which they actually experienced. For this purpose, the approaches to co-creation were briefly introduced as pairs (e.g., 'solving problems' and 'reframing problems' under 'purpose'). as well as common risks and opportunities associated with them. Afterwards, SHs were encouraged to indicate with through the online tool Menti for each approach to co-creation what they would have desired and what they experienced. Five SHs engaged with this activity anonymously. The desired and actually experienced modes of co-creation show the responses in an aggregated form (Figure 216).

Besides how the project shaped direct agency (i.e., provided local SHs with practical tools for changing their behaviour) as well as how it sought to create impacts – specifically through emphasising relationship building and to a lesser extent knowledge production, the expectations and experiences of SHs were not quite aligned. Particularly large discrepancies show regarding the type of SHs the project primarily engaged with. In the perception of SHs, the project has focused on lobbying powerful SHs, while insufficiently capturing and elevating the voices of marginalised SHs. This is a common risk of the mode '**Brokering Power**', which the SHs perceived. The desired approaches to co-creation of the SHs do not yield collectively a mode which is reflected in Chambers et al. (2021).

Interestingly, in previous evaluations the SHs in South Africa had noted the problems related to it being desirable to engage with local SHs, who are directly affected by sustainability challenges, and the potential roadblocks to change, if high-power, high-level SHs are not engaged with and do not provide their political support. While the exact mode of co-creation desired by SHs cannot be determined, what continues to be a prominent feature (compared to the evaluation at the 3rd WS) is the heavy emphasis on 'empowering marginalised actors', which is a strong feature of the mode 'empowering voices'. It is rather surprising that the SHs

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who engaged with this activity rated the 'influencing powerful actors' as relatively unimportant. At the same time, the answers indicate that the SHs feel that the project has made good on the promise to engage with powerful SHs, but disregarded local, marginalised voices along the way.

Figure 216: SH perspective on the desired and experienced approaches to co-creation. The SHs desired a mode of co-creation not capture by Chambers et al. (red) and experienced "Brokering Power" (purple). Legend (in clockwise order from the top): 1) Influence powerful actors; 2) Shape direct agency; 3) Solve problems; 4) Produce knowledge; 5) Empower marginalised actors; 6) Shape systemic agency; 7) Reframe problems; 8) Relate together

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Supplementary material: Forms, templates and guidelines

Annex 1: Privacy Policy Consent Form

Example of CS-5: Inkomati–Usuthu Water Management Area (IUWMA)

All forms are available in English and the respective local language(s) (CS1: Greek and Bulgarian; CS2: Latvian and Lithuanian; CS3: Romanian; and CS4: Italian and German).

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Consent Form – Placement in the NEXOGENESIS Stakeholder Register

Fields marked with * are mandatory.

Project description

Water, energy, food and ecosystems form an interconnected nexus that is central in providing resources and services needed to sustain human activity. The nexus is affected by changes in climate, precipitation and land cover as well as economic development, agriculture and urban growth. Currently, humans are extracting resources at a faster rate than they are replaced, thereby deepening resource and ecological deficits. Through the four-year NEXOGENESIS project, which started 1 September 2021, IHE Delft and 20 partners will support the development of policies that address the nexus interconnectedness at several levels to manage resources effectively and avoid conflicts between users.

Case study description

The Inkomati-Usuthu Water Management Area (IUWMA), which has its headwaters in South Africa, flows into Swaziland and Mozambique. The Inkomati-Usuthu Catchment Management Agency (IUCMA) administers water resources management. The Mpumalanga Province, of which the Inkomati-Usuthu system is a crucial component, is vital to South Africa's development in terms of energy security (coal-fired power stations), food security (almost half of the country's high potential agricultural land) and water security (numerous competing water users). The most prevalent challenge that exists for this water management area is that the pursuit of fossil-fuel-based energy security is threatening food and water security. Climate change is likely to exacerbate resource sector challenges, making it more difficult for these countries to meet development objectives. It is predicted that the mean annual precipitation in southern African countries will decrease by 20% by the 2080s. Lower food production, coupled with reduced availability of water and power, threatens economic development. The IUWMA is also located in a strategic water source area, downstream of mining activities, and contains high potential agricultural land. It contains conservation areas, including the southern portion of the Kruger National Park.

☐ I am aware that this form refers to the case study of the Inkomati-Usuthu Water Management Area (CS- 5)

Show

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Consent to privacy policy

This Privacy Policy describes the personal data collected or processed when being placed in the NEXOGENESIS Stakeholder Register. It also explains how your personal data is used, shared and protected, what choices you have relating to your personal data, and how you can contact us. For the South African case study, the collection of personal information will also comply with the Protection of Personal Information Act (POPI Act).

What personal data we collect and why we collect it

NEXOGENESIS pursues two societal goals: (1) develop locally adapted river management strategies, (2) inform and influence local, national or supranational policies in relation to sustainable resource management.

NEXOGENESIS also pursues a scientific goal of enhancing the academic knowledge base on the Water- Energy-Food Nexus.

NEXOGENESIS intends to pursue its goals in a participatory manner through a multi-actor approach. Stakeholders are identified through consortium members and other stakeholders. All stakeholders are asked to consent to the storage and use of their personal data through this online form.

The following data is collected about stakeholders in the NEXOGENESIS stakeholder register: Last Name of

- Stakeholder
- First Name of Stakeholder Institution
- Position
- E-mail
- Sex or gender (voluntary statement) Type
- of Stakeholder (Tier 1, 2 or 3)
- Expectations (or also potential driving factors) Interest
- in the project
- Power over the project

Being placed in the NEXOGENESIS stakeholder register **allows the research consortium to tailor their interaction to the stakeholders needs and interests**. Stakeholder engagement is critical for the success of the project, but we understand that interaction with and in a research project may not be in line with each stakeholder's interest. Thus, understanding stakeholder interests and needs is important to avoid stakeholder fatigue while providing interested stakeholders means for being kept informed, interacting or even co-deciding.

While the project intends to achieve its (academic) goals in as much of a participatory manner as possible it is also limited in time and funds. Hence, not all actors that would want to partake in the project may be possibly included to the degree that they would want to. At the same time other actors may be relied upon more heavily than they had anticipated. The consortium will take the utmost care in considering all stakeholders needs and desires, but may, unintentionally or because of its projects' limitations fail to do so.

The personal data you provide to the NEXOGENESIS stakeholder register are subject to processing and are stored in a file under the responsibility of **AVA** (Task Lead in NEXOGENESIS project of Task 5.3 Stakeholder engagement strategy and guidance on implementation and of Task 6.5 Policy impact strategy) to be shared with consortium members exclusively. **We use your data only for** reasons relating to:

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1. the communication and dissemination of information in relation to the NEXOGENESIS project, processing of your requests,
2. the invitation to partake in NEXOGENESIS engagement workshops, consultation workshops related to NEXOGENESIS solutions, events relating to outreach and advocacy that highlight the policy importance of NEXOGENESIS outputs and outcomes, and other similar events that foster NEXOGENESIS societal goals,
3. the invitation to provide comments and or feedback on NEXOGENESIS scientific outputs such as publications, technical briefs and assessments, conferences and other similar activities that foster NEXOGENESIS academic goals,
4. any other requests to partake in NEXOGENESIS specific surveys, with your additional explicit consent.

Your personal data are not allowed to be used by any third party, except as provided by the law and this Policy. The NEXOGENESIS stakeholder register collects and processes information that is considered purely personal data, as well as other information that is not considered as such. The NEXOGENESIS stakeholder register does not collect or process sensitive personal data, namely, data related to a user's health, sex life, sexual orientation, genetic or biometric data, or data revealing one's racial or ethnic origin, political opinions, or religious or philosophical beliefs. When you are placed in the NEXOGENESIS stakeholder register, we collect the information you provide us, including your e-mail. The personal information we collect will be only used for the defined, explicit, and legitimate purposes explained to you and will not be further processed in a manner incompatible with those purposes. Moreover, we limit the collection to only that information that is appropriate, relevant and necessary for the purposes explained to you. If not required by law, we will not obtain your consent before collecting your personal data from third parties. Instead, it will be deemed that you have previously given such consent to any third party from whom NEXOGENESIS receives such information.

Your rights

The consent is valid until further notice. You have the right to withdraw your consent at any time. You do this by contacting j.susnik@un-ihe.org or tamara.avellan@posteo.de. We will in this case cease to process personal data that we have collected based on this consent. However, data included in results that have already been obtained will not be affected by the withdrawal of your consent. Certain data may also be archived in accordance with German law.

You have the right of access to information about the personal data we process about you. You also have the right to have incorrect personal data about you corrected. If you have a complaint about our processing of your personal data, you can contact our Data Protection Officer via j.susnik@un-ihe.org or tamara. avellan@posteo.de. You also have the right to submit a complaint to the supervisory authority (i.e., German Data Protection Agency), if you think that we process your personal data incorrectly.

Privacy Policy Changes

Although most changes are likely to be minor, NEXOGENESIS may change its Privacy Policy from time to time, and in NEXOGENESIS sole discretion. Should changes to the Privacy Policy occur NEXOGENESIS will let you know and request you to consent to or decline the changes.

Credit and Contact Information

This privacy policy was created by NEXOGENESIS. If you have any questions about this Privacy Policy, please contact us via: j.susnik@un-ihe.org or tamara.avellan@posteo.de.

* Please provide your consent to being placed in the stakeholder register.

- ○ Yes, I consent to being placed in the NEXOGENESIS stakeholder register
- ○ No, I do not consent to being placed in the NEXOGENESIS stakeholder register

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Personal information

* First name

* Last name

* Organization

* Position

* Country

* Email address

Sex or gender

- ☐ Female
- ☐ Male
- ☐ Divers
- ☐ Other/wish not to state

Stakeholder categorization and classification

* Please provide a brief statement about your expectations from NEXOGENESIS

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* Select your most pertinent stakeholder category

- ○ Tier 1 (direct engagement on project implementation and/or outcomes)
- ○ Tier 2 (interest in project results and products for application)
- ○ Tier 3 (general interest in project)

Please rate your INTEREST in NEXOGENESIS (*your amount of -desired- involvement in the project*)

Please rate your POWER in NEXOGENESIS (*your ability to change or stop the project*)

Newsletter

I would like to sign up for the NEXOGENESIS newsletter

- ○ Yes
- ○ No

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Annex 2: Stakeholder Tiers and Categories

Stakeholders register categories

Stakeholders are defined here as "*individuals, groups and organisations who are affected by or can affect those parts of the phenomenon (this may include nonhuman and non-living entities and future generations)*" (Reed et al. 2009, p.1933)[1].

In NXG different stakeholder categories were already suggested during the proposal writing stage. Three broad categories – Tier 1, 2 and 3 – were established for communication purposes:

- **Tier 1**: This tier includes stakeholders (SH) that will be **directly engaged in the project implementation and/or outcomes**. SH will potentially collaborate (they might be informed or consulted only) in the processes of development of the models and self-learning nexus assessment engine, and analysis and validation of policy suggestions.
- **Tier 2**: This tier includes stakeholders with an **interest in the application of project results and products**. A wider constellation of interested stakeholders (local government, European policy departments -EC DGs-, stakeholders in different basins) who wish to utilise the NXG engine will be engaged.
- **Tier 3**: This tier includes stakeholders with a **general interest in the project**. A wide group of stakeholders will be identified for dissemination of outcomes, and could include neighbouring basin or country authorities, business or private enterprises, and national planning agencies.

Further categories help consortium members to 'think outside the box' or beyond the 'usual suspects' thus allowing to also expand the stakeholder identification. For all tiers the categories presented in Table 1 are of relevance.

Table 1 Categories for stakeholder identification

#	Category*	Definition	Examples
1	Civil society	Individuals or organised groups (representing a specific community with a collective interest or activity), that are actively engaged (as e.g., users, protectors) to any of the NXG resources and services of interest (water, energy, food, ecosystems - WEFE).	Women's groups, local minorities, CSOs (civil society organisations, including NGOs).
2	Public initiatives	Leader or representative of existing local procedures, arrangements or organised activities carried out by the civil society (see above) that specifically address the interconnection between two or more of the WEFE nexus.	Already existing initiatives where the project can connect to focussing on e.g., Water-Energy, Water-Agriculture.
3	Policy makers at local level/municipalities	Individuals or organisations with an active participation and decision-making power regarding the local management of one or more WEFE-nexus-related resources and services	-The ones that work on water issues (local/regional councillors)

[1] Reed, Mark S., Anil Graves, Norman Dandy, Helena Posthumus, Klaus Hubacek, Joe Morris, Christina Prell, Claire H. Quinn, and Lindsay C. Stringer. 2009. 'Who's in and Why? A Typology of Stakeholder Analysis Methods for Natural Resource Management'. Journal of Environmental Management 90 (5): 1933–49. https://doi.org/10.1016/j.jenvman.2009.01.001.

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#	Category*	Definition	Examples
		(e.g., water, land, energy, agriculture, biodiversity).	-Civil servants/policy makers in municipalities, regional admins, governments that work/design/ participate in discussions on water, energy-water, agriculture-water, environment-water issues. -Strategic managers Politicians/ people who can take the decisions (e.g., mayor of the municipality)
4	Policy makers at national level	Individuals or organisations with an active participation and decision-making power regarding the management of one or more WEFE-nexus-related resources and services (e.g., water, land, energy, agriculture) at a national level.	-policy makers in municipalities, regional admins, governments that work/design/ participate in discussions on water, energy-water, agriculture-water, environment-water issues. Strategic managers
5	Agricultural authorities and representatives	Organisations that represent the interests of the farmers or farm managers (see above) in the CS location(s). These organisations address from laws and policies to consultation and capacity development activities towards ensuring a good quality of agricultural activities.	- Agricultural chambers - Strategic managers that work/design/participate in discussions on agriculture, agriculture-water, agriculture-energy, agriculture-environment issues
6	Energy authorities and representatives	Organisations in charge of shaping energy policies, overseeing the enforcement/implementation of laws, including inspection activities (controlling and monitoring).	- Strategic managers that work/design/participate in discussions on energy, energy-water, energy-agriculture, energy-environment issues
7	Water management authorities and representatives	Organisations in charge of shaping water policies, overseeing the enforcement/implementation of laws, including inspection activities (controlling and monitoring).	- Strategic managers that work/design/participate in discussions on water, energy-water, agriculture-water, environment-water issues
8	River basin authorities and representatives	Organisations in charge of developing and implementing water management strategies at a river basin scale. Can include existing transboundary cooperation entities.	- Strategic managers that work/design/participate in discussions on water, energy-water, agriculture-water, environment-water issues at a river basin scale
9	Environmental protection authorities and representatives	Organisations in charge of shaping environmental policies (including ecosystem and biodiversity protection), overseeing the enforcement/implementation of laws, including inspection activities (controlling and monitoring).	- Strategic managers that work/design/participate in discussions on environmental protection (of ecosystem and biodiversity), environment-water issues
10	**Business/private or public enterprises**	Organisations providing goods and services that are actively engaged (as e.g., users, protectors) to any of the NXG resources and services of interest (water, energy, food, ecosystems - WEFE).	- Energy and water supply companies - Mining company
11	Media/science communicators	Individuals or organisations communicating engaged on but not limited to news transmissions, environmental topics for a general audience, or science communication.	- Newspaper - Organisations publishing informative bulletins (e.g., of water resources status)
12	Research and academia	Individuals or organisations related to the design, planning, management, and execution of	- Research institutes - Universities

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#	Category*	Definition	Examples
		research projects and/or educational and capacity building based on research.	
13	Other	Individuals or organisations that can have an interest on the specific CS and do not belong to any of the other categories.	

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Annex 3: Survey for the Stakeholder Engagement Evaluation (WS 1 & 2)

NXG – Survey Stakeholder Engagement Evaluation

The following survey shall help elicit your expectations for and experiences with the stakeholder* engagement process** in the NXG project, so far. Responses will be collected regularly throughout the project and the project team will analyse the information gathered and consider adjustments to the process, if necessary. There are no right or wrong answers.

☐ I consent to allow the NXG project to process these answers and publish results in an anonymised or aggregated form, following the EU's General Data Protection Regulation.

* 'Stakeholder' means a person or institution with an interest in and that affects or is affected by the governance of a river basin. In the survey, you will also read 'most influential stakeholders'/'least influential stakeholders', which refers to stakeholders with significant/minor control over how resources in the river basin are governed, distributed, and used. Whether you consider yourself or someone else to be (not) influential is for the purposes of this survey up to your judgement.

** 'Process' or 'stakeholder engagement process' refer to the activities (e.g. drafting policy packages, developing a conceptual model for the river basin) and interactions (e.g. quality or form of discussions) during the workshops as well as interactions you may have with other stakeholders and the NXG project team between the workshops.

Demographic Information

Name: _____ ☐Prefer not to answer

Year of birth: _____☐Prefer not to answer

Affiliation: ☐Agricultural authority ☐ Energy authority ☐ Environmental authority ☐ Water authority ☐Business ☐Civil society ☐Media ☐Policy maker at local or regional level ☐Policy maker at national level ☐Public initiative ☐Other: ___ ☐Prefer not to answer

Stakeholder Relationships

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Conflict: Please indicate the level of conflict between the interests and views of stakeholders from the water, energy, food, and environment (WEFE) sectors in the basin. *1=very little to no conflicts between stakeholders, 7=highly polarised conflicts between stakeholders from all WEFE sectors*							
Score	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Solidarity and Trust: Please indicate your perception of the level of solidarity and trust between stakeholders from WEFE sectors in the basin. *1=very poor social cohesion and trust among stakeholders, 7=very strong social cohesion and trust among stakeholders*							
Score	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Motivation	You *may* specify here why you assigned any of the scores above:						

Outcomes of the stakeholder engagement process

Please indicate on a scale from 1 to 7 how important you find different potential outcomes of this process, considering immediate and long-term outcomes *(1=not important at all, 7=very important)*.

Knowledge Production: Examples: better understanding of the state of the river basin; outputs such as maps or management plans.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Knowledge Transfer: Examples: learn together through the engagement process; 'spread the word' with other stakeholders.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Capacity Development: Examples: increased ability to understand and/or manage problems; increased participation in policy processes.							

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Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Networks: Examples: new stakeholder networks; strengthened solidarity and trust.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Process Learning: Example: gather lessons learned on what makes a good collaborative process to be able to implement similar activities in the future.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Process Quality: Examples: the process feels fair, respectful, legitimate, and transparent.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Reframing: Examples: changed perceptions of own and others' roles and responsibilities; newfound mutual respect; enhanced willingness to cooperate.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Empowerment: Examples: newfound confidence in using knowledge to mobilise for change; commitment to work on the matter after the project.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Social Equitability: Example: shifts in policies and policy-making that address the concerns of less influential stakeholders.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7

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Institution Building: Examples: new institutions connecting stakeholders; strengthened relations and partnerships between existing institutions.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Policy Uptake: Example: new or revised legislation or strategies for the river basin.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Management Practices: Examples: Shift management practices regarding resource use, such as changed land use practices.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Ecological Outcomes: Examples: improved ecological health of river basin; reduced climate change impacts on river basin.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Social Outcomes: Examples: improved access to resources; new livelihood opportunities.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Motivation	You *may* specify here why you assigned any of the scores above:						

Approaches to a Stakeholder Engagement Process

Toward the end of this survey, we would like to ask you about your priorities regarding eight approaches to stakeholder engagement processes. **Please mark one statement per approach that reflects your needs (under 'desirable')**. Statements under a characteristic are not necessarily mutually exclusive. However, please only mark the one that describes your needs and experience the best, respectively.

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Solving problems: To what degree and how should the process focus on pursuing solutions to the problems in the river basin?							
Definitions	There should be no focus on solutions.	Solutions may emerge, but the focus should be on dialogue.	The project team may suggest solutions based on the views of stakeholders.	Stakeholders should build relationships, then may explore solutions together.	The project team should help stakeholders negotiate solutions.	Stakeholders should agree on solutions quickly, so the process can then focus on optimising them.	The project team and stakeholders need to fill some knowledge gaps, so decision-makers can optimise current solutions.
Desirable	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Reflecting on assumptions: To what degree and how should the process focus on reflecting on problems and solutions?							
Definitions	There should be no reflections on problems and solutions.	Stakeholders should reflect on logistical aspects of solutions (e.g. ways to collect information).	Stakeholders should reflect on how to develop solutions (e.g. policy-making process).	The project team should guide stakeholders through negotiations over solutions.	The project team should help stakeholders consider other views on problems and solutions.	The process should focus on critically engaging with what the problems and solutions are.	The process should mainly focus on critically engaging with what the problems and solutions are.
Desirable	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Changing local behaviour: To what degree should the process focus on changing the behaviour of local resource users in the river basin?							
Definitions	Do not focus on local resource users, as they are not at fault for any of the problems.	Do not mainly focus on local resource users, as they are not at fault for most problems.	Help local resource users grasp WEFE-Nexus linkages, and their role in this Nexus.	Enable local resource users to get organised.	Provide information to decision-makers, so that they help local resource users tackle any problems.	Equip local resource users with the right knowledge and tools, so that they can tackle any problems.	Raise awareness of problems amongst local resource users and seek to change their behaviour.
Desirable	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7

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Changing the 'system': To what degree should the process focus on changing core governance aspects (e.g., policy-making, goals, stakeholder relations)?							
Definitions	Only initiate actions absolutely necessary to adapt to a changing environment.	Provide information to local resource users so that they make necessary changes.	Provide information to policy makers so that they make necessary changes.	Improve the cooperation between local stakeholders.	Improve the cooperation between local, national, and international stakeholders.	Empower local resource users to influence the development goals for the river basin.	Make decision-makers reflect on how they can share benefits in the river basin more equitably.
Desirable	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7

Engaging most influential stakeholders: To what degree should the process encourage most influential stakeholders to relinquish some power and control?							
Definitions	Do not allow the most influential stakeholders to participate in the process.	Allow the most influential stakeholders to convince others of their plans.	Make the most influential stakeholders aware of other stakeholders' views.	Encourage the most influential stakeholders to cooperate with other stakeholders.	Encourage the most influential stakeholders to reflect on their power and what it means for others.	Encourage the most influential stakeholders to reduce their power and control.	Encourage the most influential stakeholders to reduce their own and their peers' power and control.
Desirable	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7

Engaging least influential actors: To what degree should the process focus on involving least influential stakeholders?

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Definitions	There should only be discussions between the project team and the most influential stakeholders.	Provide the least influential stakeholders with information about problems and solutions.	Encourage the least influential stakeholders to explore how to cope with any problems.	Help the least influential stakeholders to get heard by others.	Empower the least influential stakeholders to directly engage with other stakeholders.	Enable the least influential stakeholders to define actions with other stakeholders.	Mainly focus on enabling the least influential actors to define actions with other stakeholders.
Desirable	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Producing and sharing knowledge: To what degree should the process focus on knowledge production and sharing *to generate impact*?							
Definitions	There is no need for knowledge production and sharing.	There is some need for knowledge sharing.	There is a need to fill some knowledge gaps and that key insights are shared.	There is a need to fill some knowledge gaps, but the key is that all relevant knowledge is shared.	There is a strong need for knowledge production and sharing.	There is a very strong need for knowledge production and sharing.	Knowledge production and sharing should be the main focus of the process.
Desirable	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Building relationships: To what degree should the process focus on building relationships between stakeholders and acting jointly *to generate impact*?							
Definitions	There is no need to for relationship building or joint actions.	There is a need for some relationship building or joint actions.	Create some space for dialogue and relationship building.	Emphasise dialogue and relationship building.	Facilitate learning together, but focus less on initiating joint actions.	Facilitate learning together and initiate joint actions.	Strongly emphasise learning together, relationship building, and joint actions.
Desirable	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7

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Workshop-specific questions

The last set of questions concern the contents and activities of the second workshop and how you experienced them. These are optional free-text questions.

In what ways does the conceptual model (not) help you understand the WEFE-Nexus in the river basin and other stakeholders´ challenges?
In what ways do the selected policy instruments for the policy package (not) reflect a balanced integration of the interests of WEFE-Nexus stakeholders?
Do you think you will be able to trust the outcomes of NXG and consider them potentially useful? Why or why not?
Do you have any other comments, questions, or concerns?

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Annex 4: Survey for the Stakeholder Engagement Evaluation (WS 3, 5/6)

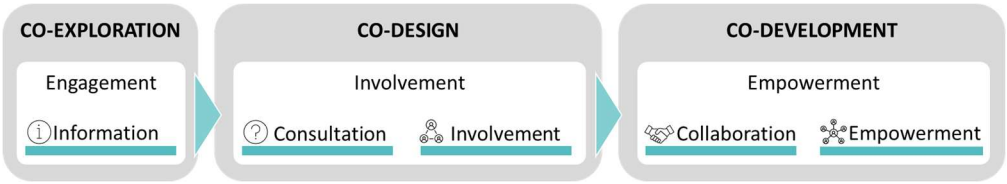
Survey: NXG Stakeholder Engagement Evaluation

Water, energy, food, and ecosystems (WEFE) are **interconnected** and comprise a coherent system (nexus), which is characterised by **complexity** and influenced by climatic and socio-economic drivers. **Cooperation** across nexus sectors can help explore synergies and facilitate policies and decision-making that realise those. In this context, NXG (NXG) intends to develop and validate:

d) a coherent cross-sectoral **policy-making framework** at different scales addressing climate and socio-economic change, as well as stakeholder[1] (SH) behaviour and transboundary matters, developed for and validated by stakeholders, policymakers, and academics;
e) a **Self-Learning Nexus Assessment Engine** (SLNAE) exploiting reinforcement learning, and supporting streamlining water-related policies into the WEFE nexus;
f) a **WEFE Nexus Footprint**, accompanying the SLNAE.

NXG will apply its approach to ***five CS (CS): four European and one in South Africa***. Through a **strong SHE process** and validation of outputs, the project shall improve policies and policymaking processes to enhance cooperation. In NXG, we understand SHE as a **co-creative process** in three phases:

4. Co-exploration phase: Information phase – Exploring the context of the problem, solutions and transformation pathways and raising awareness of SHs.
5. Co-design phase: Consultation and involvement phases – Aimed at a knowledge exchange in which SHs are asked for input and feedback on research methods, approaches and results (consultation) as well as to discuss on certain topics of interest (involvement) to enable understanding of concerns and aspirations.
6. Co-development phase: Collaboration and empowerment phases – Aimed at a co-development of solutions (transformation pathways) based on co-decision (collaboration) and sometimes empowerment in which stakeholders own the decision-making process.



NXG follows a **5-step stakeholder engagement process**: Step 1 – aim setting, Step 2 analysis, Step 3 – planning, Step 4 – management and sustainment, and Step 5 – evaluation. The engagement includes activities and interactions during the workshops as well as interactions you may have with other stakeholders and the NXG project team between workshops. **The following survey supports the evaluation of the stakeholder engagement**

[1] 'Stakeholder' means a person or institution with an interest in and that affects or is affected by the governance of a river basin. Generally, stakeholders are defined as follows in NXG: "individuals, groups and organizations who are affected by or can affect those parts of the phenomenon (this may include non-human and non-living entities and future generations)" (Reed et al. 2009).

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process. It will be administered at the end/after each workshop. This survey will assess your (the stakeholder's) perception throughout the project implementation of:

(1) The **quality** of the stakeholder engagement process (Section 2);

(2) The **quality of the outcomes** of the stakeholder engagement process (Section 3).

Section 1 asks about general information about you, the stakeholder. Section 4 allows you to provide further comments. The project team will analyse the information gathered and consider adjustments to the process. Thank you for your collaboration!

☐ **I consent to allow the NXG project to process these answers and publish results in an anonymised or aggregated form, following the EU's General Data Protection Regulation.**

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(1) General Information

Name: _____ ☐ Prefer not to answer

Gender:

☐ male ☐ female ☐ non-binary ☐ prefer not to answer

Affiliation:

☐ Agricultural authority ☐ Energy authority ☐ Environmental authority ☐ Water authority
☐ Business ☐ Civil society ☐ Media ☐ Public initiative
☐ Policy-maker at local or regional level ☐ Policy-maker at national level
☐ Other: _____

Years of experience:

☐ up to 5 ☐ up to 10 ☐ more than 10 ☐ more than 20

Country of residence:

☐ Lithuania ☐ Latvia ☐ Greece ☐ Bulgaria ☐ Romania ☐ Italy ☐ South Africa

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(2) Stakeholder Engagement Process Quality

In this section, we ask you to provide your **perception** about the quality of the stakeholder engagement process in terms of the **phases of engagement** from information sharing to empowerment. We ask you to rate your perception of engagement both (1) at the **project level** for the time you have had experience in it and (2) for the **current workshop** that you just attended. This helps us tune our engagement activities to your perceptions.

Information (1=Not informed at all, 7=highly informed) To what degree did you feel informed about the project (e.g. through documents, background information, information on the project proposal, results, and activities)? To what degree did you feel informed about the workshop (e.g. invitation, agenda, timing)?								
Project	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7	N/A
Workshop	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7	N/A
Consultation (1=not consulted, 7=highly consulted) To what degree did you feel that you could provide your opinion about/in the project (e.g., meetings, written communication)? To what degree did you feel that you could provide your opinion through the workshop (e.g. time for comments and questions, time for follow-up)?								
Project	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7	N/A
Workshop	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7	N/A
Involvement (1=not involved, 7=highly involved) To what degree did you feel that your feedback was taken up about/in the project (e.g. meetings, written communication)? To what degree did you feel that your feedback was taken up by the workshop? (e.g. comments included in new versions of research results and workshop proceedings)?								
Project	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7	N/A
Workshop	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7	N/A
Collaboration (1=not collaborated with, 7=highly collaborated with) To what degree did you feel that you could provide active input to the content to the project (e.g. defining work packages, deciding on pilot sites or the final version of project proposal, provision of data, designing of the user interface)? To what degree did you feel that you could provide active input to the content through the workshop (e.g.by providing data, feedback to research results, shaping of research outcomes)?								
Project	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7	N/A
Workshop	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7	N/A

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Empowerment (1=not empowered, 7=highly empowered) To what degree were your recommendations taken into consideration in taking decisions about/in the project (e.g. defining work packages, deciding on pilot sites or the final version of project proposal, deciding on river contracts, deciding on further use of SLNAE, deciding on stakeholder platforms for sustainment)? To what degree were your recommendations taken into consideration in taking decisions through the workshop (e.g.by deciding on river contracts, deciding on further use of SLNAE, deciding on stakeholder platforms for sustainment)?								
Project	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7	N/A
Workshop	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7	N/A

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(3) Stakeholder Engagement Process Outcome Quality

Level of importance and expectations met regarding outcomes of the stakeholder engagement process at the project level

In this part, we intend to better understand your view about how to **achieve change in/through NXG**. For this, please indicate how important you find different **potential process outcomes** for your case study such as gaining more knowledge or working better together *(1=not important at all, 7=very important)*. In addition, please rate to what degree the project has to date **met your expectations** for each outcome (*1=not met my expectations at all; 7=fully met my expectations*).

NOTE: This means, for example, that if an outcome is unimportant to you (e.g., '2'), and the process has not focused much on it either, your expectations might still be met (e.g., '7')!

Knowledge Production: Generate credible, relevant, understandable, and usable knowledge. Examples: understanding the state of the river basin; outputs such as models.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Expectations met	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Knowledge Transfer: Communicate existing or generated knowledge to relevant stakeholders. Examples: learning together; 'spread the word' with other stakeholders.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Expectations met	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Capacity Development: Improve stakeholders' abilities to use and apply knowledge to pursue their goals. Examples: increased ability to understand and/or manage problems; increased participation in policy processes.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Expectations met	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Networks: Strengthen the social network among stakeholders to enable them to address emerging challenges. Examples: new networks; strengthened solidarity and trust.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Expectations met	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Process Learning: Generate and share knowledge about collaborative processes to inform similar future activities. Example: gather lessons learned on collaborative processes.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Expectations met	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7

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Process Quality: Produce an engagement process that is a meaningful and valuable experience for stakeholders. Examples: the process is fair, legitimate, and transparent.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Expectations met	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Reframing: Change beliefs/priorities of stakeholders. Examples: changed perceptions of roles and responsibilities; newfound mutual respect and willingness to cooperate.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Expectations met	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Empowerment: Raise stakeholders' sense of empowerment to pursue their goals. Examples: newfound confidence in using knowledge to mobilise for change.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Expectations met	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Social Equitability: Create outcomes that shift power and resources toward the least influential stakeholders. Example: shifts in policies and policy-making.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Expectations met	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Institution Building: Strengthen/create institutions that help govern resources. Examples: new institutions connecting stakeholders; better cross-institutional relations.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Expectations met	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Policy Uptake: Strengthen policies or create new policies that are favourable for the sustainability of the river basin. Example: new or revised legislation or strategies.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Expectations met	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Management Practices: Shift management practices regarding resource use to help address sustainability challenges. Examples: changed land use practices.							
Importance	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7
Expectations met	○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7

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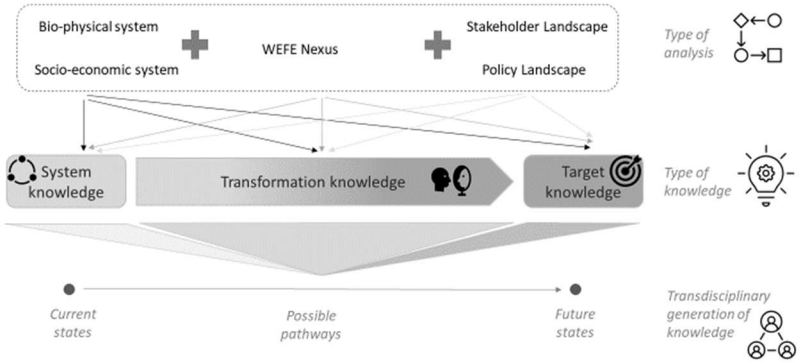
Level of knowledge acquired through the workshop.



In this part, we want to find out how the **current** workshop may have helped you **gain certain knowledge**. In NXG, we undertake different kinds of research through various types of analyses. Each of these types of analyses can lead to co-created knowledge of any or all of these three types of knowledge:

- System knowledge: **knowledge about the current state** of the real-world situation and its context;
- Target knowledge: **knowledge about the desired future state**;
- Transformation knowledge: **knowledge about the pathways** from the current to the future state.

Below we want to find out in how far **this workshop** has helped to create the above-mentioned types of knowledge as per the respective types of analysis. Please tick the number reflecting your perception (*1=not helpful at all; 7=very helpful; N/A=don't know; no answer*).

Biophysical System (Biological and physiochemical components like the effect of precipitation on water flows)	**Socio-Economic System** (Social and economic components like the effect of employment rates on GDP)	**WEFE-Nexus** (Interlinkages across Nexus aspects and the overall footprint)	**Stakeholder Landscape** (The classification of stakeholders, their relationship towards each other and for the problem & solution)	**Policy Landscape** (The classification of policies, their relation to the WEFE Nexus aspects and their role in solving Nexus problems)
System Knowledge: To what degree did the workshop help you understand the current state of the …?				
Biophysical System	Socio-Economic System	WEFE-Nexus	Stakeholder Landscape	Policy Landscape
1 2 3 4 5 6 7 N/A	1 2 3 4 5 6 7 N/A	1 2 3 4 5 6 7 N/A	1 2 3 4 5 6 7 N/A	1 2 3 4 5 6 7 N/A
Target Knowledge: To what degree did the workshop help you understand the desired state of the …?				
Biophysical System	Socio-Economic System	WEFE-Nexus	Stakeholder Landscape	Policy Landscape
1 2 3 4 5 6 7 N/A	1 2 3 4 5 6 7 N/A	1 2 3 4 5 6 7 N/A	1 2 3 4 5 6 7 N/A	1 2 3 4 5 6 7 N/A
Transformation Knowledge: To what degree did the workshop help you understand how to influence the …?				
Biophysical System	Socio-Economic System	WEFE-Nexus	Stakeholder Landscape	Policy Landscape
1 2 3 4 5 6 7 N/A	1 2 3 4 5 6 7 N/A	1 2 3 4 5 6 7 N/A	1 2 3 4 5 6 7 N/A	1 2 3 4 5 6 7 N/A

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(4) Final remarks

Please name any stakeholders that you think we should inform, consult or engage with in NXG going forward. Please indicate why and which capacity these stakeholders would be of relevance to the project:
Do you think you will be able to trust the outcomes of NXG and consider them potentially useful? Why or why not?
Do you have any other comments, questions, or concerns?

Thank you very much for your answers.

Your NXG-Team!

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Annex 5: Template for assessing the modes of co-creation

PURPOSE: WHY SHOULD WE HAVE THIS STAKEHOLDER ENGAGEMENT PROCESS?

SOLVE PROBLEMS: To what degree and how should the process focus on pursuing solutions to the problems in the river basin?

	1	2	3	4	5	6	7
Scale →							
Description →	There should be no focus on solutions.	Solutions may emerge, but the focus should be on dialogue.	The project team may suggest solutions based on the views of stakeholders.	Stakeholders should build relationships, then may explore solutions together.	The project team should help stakeholders negotiate solutions to reach a set goal.	Stakeholders should agree on solutions quickly, so the process can then focus on optimising them.	The project team and stakeholders need to fill some knowledge gaps, so decision-makers can optimise current solutions.
Desirable *(mark applicable with x)* →							
Experienced/de facto (mark applicable with x)→							
Reasoning →							

QUESTION VIEWS: To what degree should the process focus on reflecting on what the problems and appropriate solutions are?

	1	2	3	4	5	6	7
Scale →							
Description →	There should be no reflections on problems and solutions.	Stakeholders should reflect on logistical/technical aspects of solutions (e.g. ways to collect information).	Stakeholders should reflect on how to develop solutions (e.g. policy-making process).	The project team should guide stakeholders through negotiations over solutions.	The project team should help stakeholders consider other views on problems and solutions.	The process should focus on critically engaging with what the problems and solutions are.	The process should mainly focus on critically engaging with what the problems and solutions are.
Desirable *(mark applicable with x)* →							
Experienced/de facto (mark applicable with x)→							
Reasoning →							

POWER: WHAT SHOULD THIS PROCESS FOCUS ON TO BRING ABOUT NECESSARY CHANGES?

ACTORS DIRECTLY LINKED TO THE PROBLEM: To what degree and in what way should the process focus on the behaviour of local actors or resource users?

	1	2	3	4	5	6	7
Scale →							
Description →	Do not focus on local resource users, as they are not at fault for any of the problems.	Do not mainly focus on local resource users, as they are not at fault for most problems.	Help local resource users grasp WEFE-Nexus linkages, and their role in this Nexus.	Enable local resource users to get organised.	Provide information to decision-makers, so that they help local resource users tackle any problems.	Equip local resource users with the right knowledge and tools, so that they can tackle any problems.	Raise awareness of problems amongst local resource users and seek to change their behaviour.
Desirable *(mark applicable with x)* →							
Experienced/de facto (mark applicable with x)→							
Reasoning →							

SYSTEMIC ASPECTS: To what degree should the process focus on core governance aspects (e.g., policy-making, goals, stakeholder relations)?

	1	2	3	4	5	6	7
Scale →							
Description →	Only initiate actions absolutely necessary to adapt to a changing environment.	Provide information to local resource users so that they make necessary changes.	Provide information to policy makers so that they make necessary changes.	Improve the cooperation between local stakeholders.	Improve the cooperation between local, national, and international stakeholders.	Empower local resource users to influence the development goals for the river basin.	Make decision-makers reflect on how they distribute benefits in the river basin more equitably.
Desirable *(mark applicable with x)* →							
Experienced/de facto (mark applicable with x)→							
Reasoning →							

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POLITICS: WHO SHOULD BE INVOLVED IN THE PROCESS, AND HOW?

ENGAGE POWERFUL STAKEHOLDERS: To what degree, and for what purpose, should the process engage powerful stakeholders?

	1	2	3	4	5	6	7
Scale →							
Description →	Do not allow the most influential stakeholders to participate in the process.	Allow the most influential stakeholders to convince others of their plans.	Make the most influential stakeholders aware of other stakeholders' views.	Encourage the most influential stakeholders to join forces with other stakeholders.	Encourage the most influential stakeholders to reflect on their power and what it means for others.	Encourage the most influential stakeholders to reduce their power and control.	Encourage the most influential stakeholders to reduce their own and their peers' power and control.
Desirable *(mark applicable with x)* →							
Experienced/de facto (mark applicable with x)→							
Reasoning →							

ENGAGE LESS INFLUENTIAL STAKEHOLDERS: To what degree, and for what purpose, should the process focus on involving less influential stakeholders?

	1	2	3	4	5	6	7
Scale →							
Description →	There should only be discussions between the project team and the most influential stakeholders.	Provide the least influential stakeholders with information about problems and solutions.	Encourage the least influential stakeholders to explore how to cope with any problems.	Help the least influential stakeholders to get heard by others.	Empower the least influential stakeholders to directly engage with other stakeholders.	Enable the least influential stakeholders to define actions with other stakeholders.	Mainly focus on enabling the least influential actors to define actions with other stakeholders.
Desirable *(mark applicable with x)* →							
Experienced/de facto (mark applicable with x)→							
Reasoning →							

PATHWAYS: HOW WOULD THE PROCESS BRING ABOUT THE GREATEST IMPACTS?

PRODUCE/SHARE KNOWLEDGE: To what degree should the process focus on knowledge production and sharing to generate impact?

	1	2	3	4	5	6	7
Scale →							
Description →	There is no need for knowledge production and sharing.	There is some need for knowledge sharing.	There is a need to fill some knowledge gaps and that key insights are shared.	There is a need to fill some knowledge gaps, but the key is that all relevant knowledge is shared.	There is a strong need for knowledge production and sharing.	There is a very strong need for knowledge production and sharing.	Knowledge production and sharing should be the main focus of the process.
Desirable *(mark applicable with x)* →							
Experienced/de facto (mark applicable with x)→							
Reasoning →							

BUILD RELATIONSHIPS: To what degree should the process rely on building relationships and acting together to generate impact?

	1	2	3	4	5	6	7
Scale →							
Description →	There is no need to for relationship building or joint actions.	There is a need for some relationship building or joint actions.	Create some space for dialogue and relationship building.	Emphasise dialogue and relationship building.	Facilitate learning together, but focus less on initiating joint actions.	Facilitate learning together and initiate joint actions.	Strongly emphasise learning together, relationship building, and joint actions.
Desirable *(mark applicable with x)* →							
Experienced/de factor (mark applicable with x)→							
Reasoning →							

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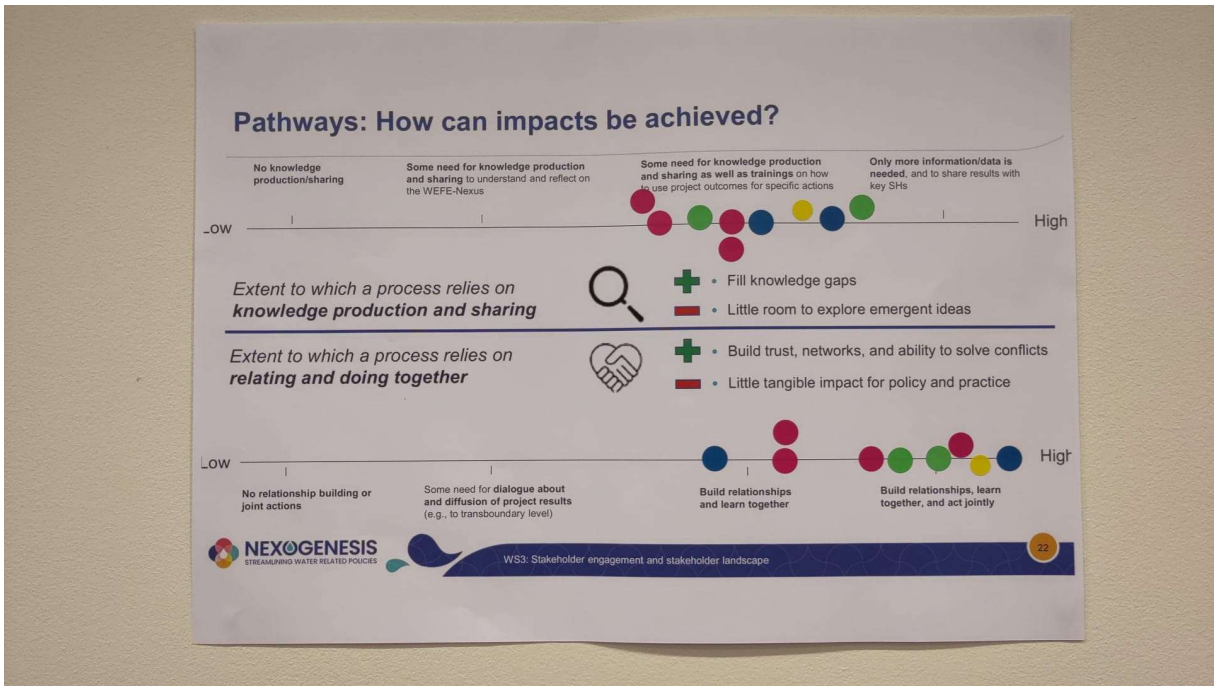

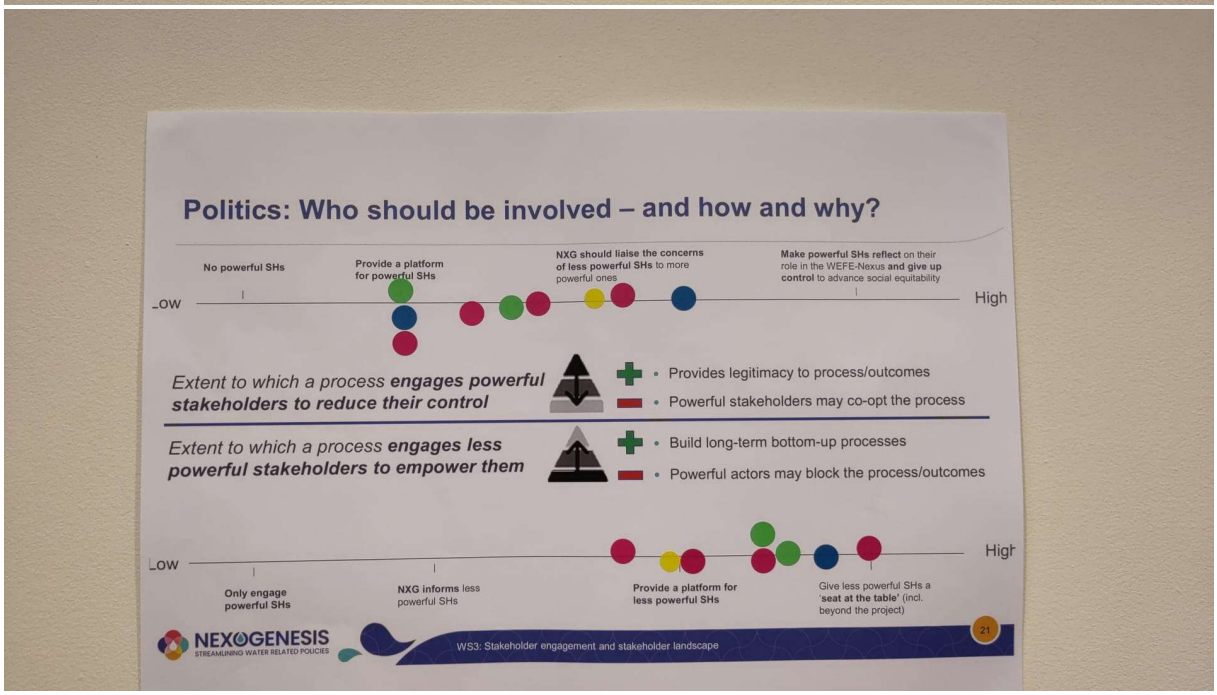

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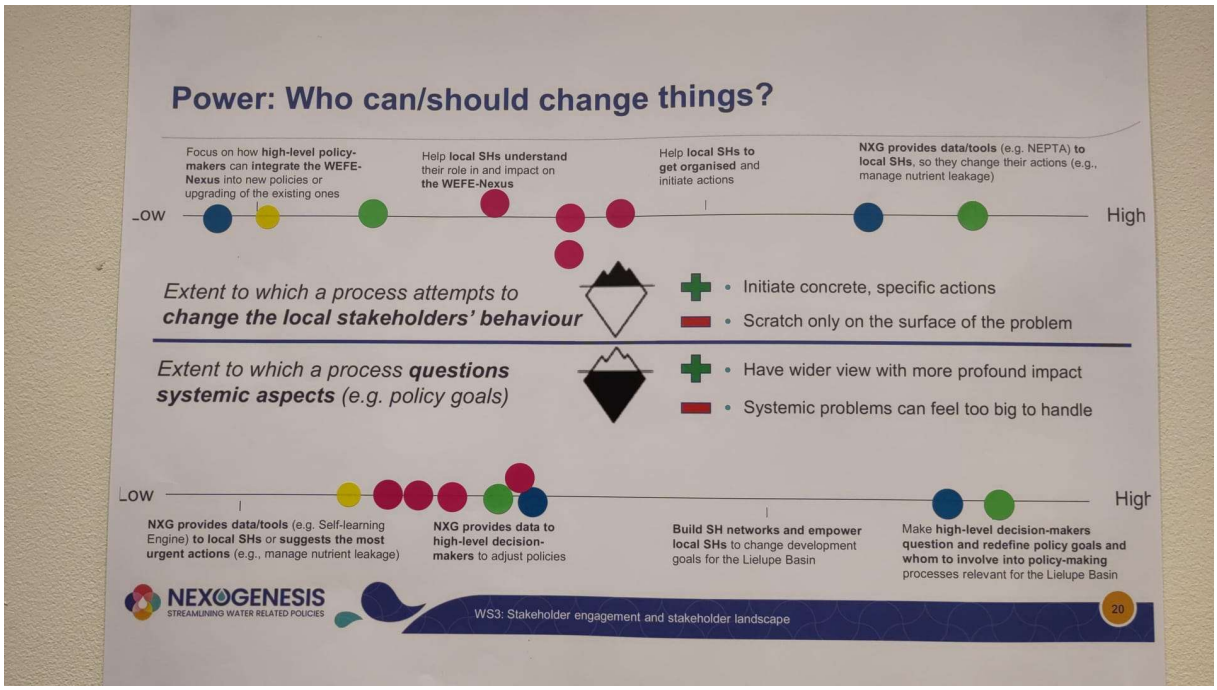

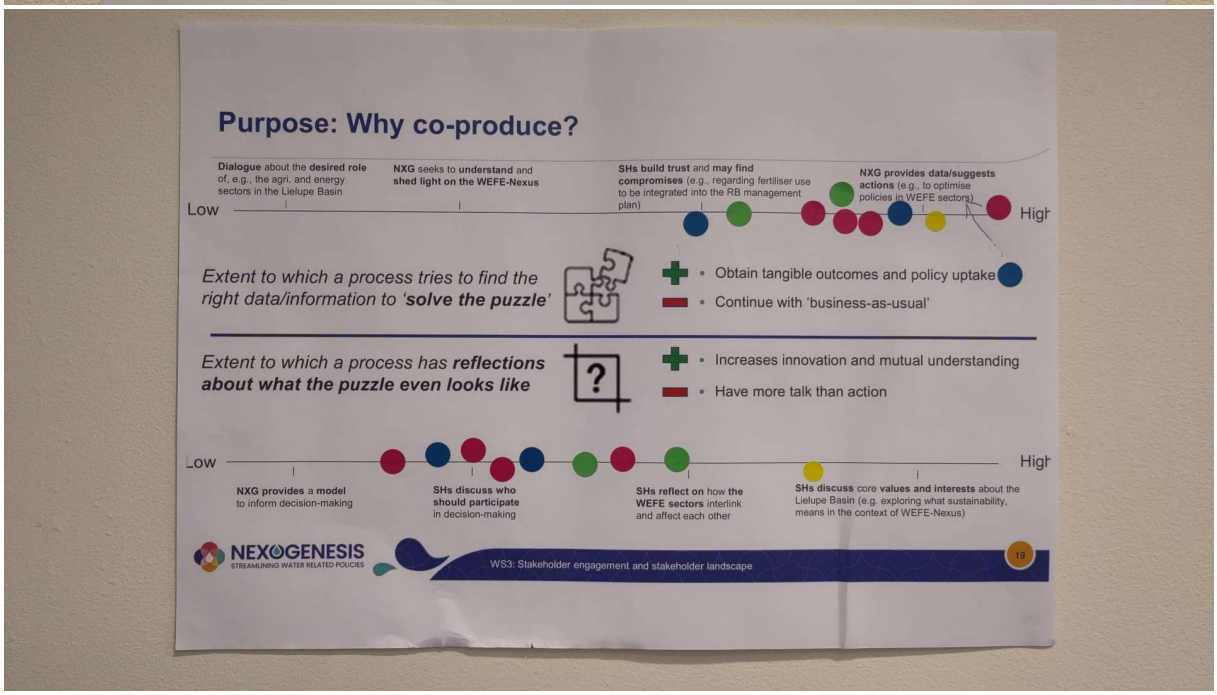

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Annex 6: Workshop guidelines

Content and programme of the workshop

After defining the aim(s)of the workshop, it is time to determine the requirements for their fulfilment, in terms of content and how it should be delivered (programmatically).

To determine the content of the workshop (WS), think about who will inform what to whom. Therefore, in NXG both WPs and CS-Leads are asked about their expectations of the workshops. This step is important to understand (1) what WPs want to inform and consult to which type of SH and with which SH type it is important to collaborate (Table 90~~Table 90~~), and (2) what do CS-Leads think their SHs are expecting to be informed about and what they would like to consult to which WP (Table 91~~Table 91~~).

Table 90: Example of the questions asked to WPs to know about information and consultation content.

What do we want to INFORM/CONSULT the SHs about in this WS?	Which SH group should be INFORMED/CONSULTED?	Comments/Notes
Which of our topics requires SHs to COLLABORATE with us?	**Which SH group should be COLLABORATE?**	**Comments/Notes**

Table 91: Example of the questions asked to CS-Leads to know what SHs want to be informed about and consult.

What do we want to be INFORMED/CONSULT about in this WS?	Which WP is asked to INFORM/ be CONSULTED?	Comments/Notes

Both tables are accessible in the SURFDrive in the folders for general material in each workshop (Events – conferences, etc. > Workshops).

After determining what the content of the workshop is and who will deliver it, it is important to design a programme that ensures an alignment with the aims as well as an appropriate and logic flow of activities that facilitates the exchange with and between participants.

The following points should be considered:

- Based on the content of the workshop, think about a logic flow of the sessions for a better learning and exchange experience of the participants (e.g., What should participants know before starting the discussion? Can they reach the expected conclusions after the 2 morning sessions?)
- Include time to introduce participants so that they not only know each other, but also facilitators and speakers know who they will be talking to.
- Calculate enough time for breaks and keep buffer-times available to adjust the agenda in case of running behind or ahead of schedule.
- Think about potential questions or discussion topics to prepare for a guided dialogue.

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- Consider adding into the programme a slot for surveys. This way participants can count with a designated time to answer them, potentially increasing the response rate.

Organisational Aspects

Invitations

Source: The following section is taken and modified from the SIM4NEXUS guidance document.

Invitations should be sent to SHs and the NXG consortium based on the stakeholder register and the aim of the workshop. The written invitation should describe the workshop aims, general content and the particular involvement of SHs in the workshop.

In order to enrich the workshop discussions and the overall process please consider the following points:

- **Cover most SH categories** represented in your case study (the main working categories are detailed in the milestone report MS-6).

- **Address gender aspects** (further elaboration in section Other Aspects) and make them explicit to invited SHs. This means discussing, for instance, whether it is relevant for the aim of the workshop to have a representation of perspectives independent of gender (e.g., the presence of the major is required or of the head of the technical unit of the water authority – there is no further incidence on the gender) or if the invitation should be accompanied with a special remark/request on gender (e.g., "For gender-balance reason we would appreciate the participation of a [female/male] representative of your organisation").

Participation

To make sure that enough participants show up, here are a few tips:

- Identify the relevant stakeholders for your workshop (from all Nexus sectors you are investigating)
- Advertise widely your workshop (invite as many as possible)
- Advertise as early as possible
- Find out the emails of persons within the organization (do not use the contact address)
- Remind people of your workshop
- Ask people to register (to monitor the number of participants and judge if reminders are necessary)
- If needed, directly call some people to invite them to join your workshop

You will be asked to report on participation to your events. Please prepare a registration document with at least the following information.

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You can find a template for the attendance list in the SURFDrive.

Table 92: Registration document for workshops (Source: SIM4NEXUS)

Name	Organisation	Email	Background	WEFE Sector

The above information will not be shared outside the NXG consortium. Anonymised and aggregated data from the table will be used only for monitoring purposes in the project.

Privacy Policy Consent Form (PPCF) for the stakeholder register

Please make sure to share the PPCF with all new stakeholders that you identify and stakeholders that have not yet filled the form. This is important to have a formal list of stakeholder data with which we can work.

The PPCF can be shared:

- **Before the WS**: Shared together with the invitation to offer more time to fill the form. It can also be linked to the strategy of sharing the link to the WS only with SHs that have consented with the PPCF.
- **During the WS**: Shared before a break of within a designated time slot in the agenda planned for surveys.
- **After the WS**: Recommended only for WS-1 with the aim that SHs are more informed about the project before consenting.

In any case, please keep in mind to constantly check and remind stakeholders to fill the survey.

The PPCFs are developed and managed using the EU Survey platform. Each CS has a specific link to the respective form and a designated person from the CS-Lead team with access to the survey platform (for further edits and management of results). For any questions or requests, please contact WP5.

This PPCF refers only to the SH Register and the data collected and used for it. Any other survey or form requires its own privacy policy note (sentence or paragraph) or document (if necessary) and request for consent (e.g., checkbox). In it, every survey should explicitly mention where and how data will be stored and used, and how results will be communicated, as well as adding a responsible person and contact data. The PPCF for the SH register can be used as an example to adapt to other cases.

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Checklist

For each of the task in the design, execution and post-workshop phases assign **responsible persons** and **realistic deadlines**.

The next tables indicate various tasks and whether they are applicable to face-to-face (F2F) and/or online (OL) workshop modalities (hybrid modalities consider both to a greater or lesser extent on a case-specific basis).

Design and planning phase

Source: The following section is a compilation from the SIM4NEXUS guidance document and the experience of the NXG consortium members.

Table 93: Checklist from six to three months before the workshop

Task	F2F	OL
Develop a concept note of the event determining e.g., goal, expected results and outcomes, target audience, discussion points, funding. *Remember the translations to the local languages	X	X
Choose the date (check other wide-ranging scale or closely related to the theme of the workshop planned)	X	X
Determine a modality of the workshop (face-to-face or virtual). Identify place or platform for the workshop (depending on the number of participants, the small group works, accessibility, price, sound system, etc.)	X	X
Online meeting between WP1 and WP5 to discuss the aim, format, timing and contents of the workshop and the role of particular WPs and the SHs that are to be invited for the aim of the workshop	X	X
Determine team roles (technical assistance, reporter and minute-taker, chairman, and facilitators, registration of participants, etc.)	X	X
Establish a guest list (based on the SH register)	X	X
Determine the type of relevant speakers or facilitators and themes or tools addressed	X	X
Search for experts, speakers (scientists, consultants, politicians, etc.) or facilitators	X	X
Ask for the speakers or facilitators quote and confirmation (in written)	X	X
Establish the budget	X	X
Validate the budget by financiers or sponsors	X	X
Identify venue (and book if possible)	X	

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Task	F2F	OL
Inform the communications team of NXG (WP6 – Impact maximisation: communication, dissemination, exploitation of project results)	X	X

Table 94: Checklist three months before the workshop

Task	F2F	OL
Provide advice for accommodation **Identify accommodation for speakers or facilitators** (if relevant) **Identify and pre-book accommodation for participants** (if relevant)	X	
Ask caterers quote (coffee breaks, meals, closing event, etc.)	X	
Book a translation service (if relevant)	X	
Send a «Save the date» email announcing the theme of the workshop, the interim programme, and the main speakers	X	X
Online meetings to discuss the role of other WPs (discuss the role of particular WPs and SHs before and during the workshop (provision of instructions, presence on the workshop of WP/SH representatives, etc.)	X	X
Creation of the instructions for the workshop (content) (development of instructions for particular sessions of the workshop; draft entry and exit surveys)	X	X
Translation of the evaluation survey	X	X
Design/chose an image for this workshop (optional – additional to the established NXG templates)	X	X

Table 95: Checklist one month before the workshop

Task	F2F	OL
Finalise and disseminate the program of the workshop *Remember the **translations to the local languages**	X	X
Check response rate of SHs (email) and send an invitation reminder - Include the PPCF in the invitation and reminder emails.	X	X
Ask for speaker presentation and print material (if applicable). Verify and notify the	X	X

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Task	F2F	OL
timing and maximum number of slides for the presentation.		
Compile and send material to facilitators	X	X
Finalise redaction of print/digital material (brochure, maps, posters, etc.) including layout *Remember the **translations to the local languages**	X	X
Send print material to the printer 2 weeks before the event	X	
Prepare the content of the participant kit (program, maps, recommendations for organisation, satisfaction survey, etc.) – Consider any digital version of OL modality.	X	X
Check venue preparations (double-check with the venue provider that everything is in order. Adapt to COVID-19 restrictions if needed.)	X	X
Share with the WP6-team a brief description of the workshop and an image for the development of an article announcing the workshop: - Workshop description: e.g., title, date and location, aim, type of participants, why are you organising it? what is the expected outcome of the workshop? - Image: infographic or other – or ask support to WP6.	X	X

Table 96: Checklist one week before the workshop

Task	F2F	OL
Terminate the inscription process and confirm the number of participants (actively check back with invited SHs about their attendance – phone, personal communication)	X	X
Confirm the number of participants to the caterer	X	
Ask speakers to connect 15-10 minutes before the beginning of the workshop		X
Print the NXG material you want to hand out	X	
Prepare participant kit	X	
Prepare badges	X	
Prepare a material check list (F2F: paperboard, markers, cardboards, etc. and OL: polls, conceptual maps, posting platform, etc.)	X	X
Check the material available with the host at the venue (projector, computers, coffee, etc.)	X	

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Task	F2F	OL
Shop missing material for animation and coffee breaks (if there is no catering)	X	
Print programs, satisfaction surveys, participants lists, etc.	X	
Organise the team present during the workshop (welcoming participants, sub-working group animation, notes taking, tweeting, taking photos, etc.)	X	X
Check final venue preparations (double-check with the venue provider that everything is in order. Adapt to COVID-19 restrictions if needed)	X	X
Share with the WP6-team additional information about the workshop and an image to tease the workshop: - Additional information: e.g., agenda, speakers, a few words about how it is organised, who will be attending the workshop. - Image: infographic or other.	X	X
Online and social media/local media announcement about the workshop (create awareness about the workshop aims and invitees to the local but also international audience) - WP6 will take the content provided for the website and adjust it to the social media channel (LinkedIn or Twitter) tagging the relevant actors so that they can also further disseminate.	X	X

Table 97: Equipment list

Item	Quantity	Comments
Computer		
Beamer (video)		
Extension cord		
Multi-socket		
Flipchart + paper for the flipchart		
Scissors		
Stapler + Staples		
Markers		
Tape		
Paper		
Pens / Pencils		

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Item	Quantity	Comments
Post-it		
NXG material: flyer, poster, roll-up or banner, policy brief, summary of achievements		

Execution phase

Table 98: Checklist for the day(s) of the workshop

Task	F2F	OL
Check rooms configuration, and adjust if necessary (also virtual rooms, e.g., use of breakout rooms)	X	X
Put in the equipment (welcome desk, badges, participant list, posters, participant kit, water bottles, etc.)	X	
Check whether the presentations work (F2F: in the designated computer for projection // OL: test video, sound and screensharing features for all presenters)	X	X
Tweet about your event and ask someone in your team to take photos *See remarks on social media section **Other Aspects~~Other Aspects~~**.*	X	X
Welcome participants and ask them to sign the participant list	X	
Welcome participants and ask them for consent to be recorded and to take photos, accordingly.	X	X
Take pictures/screenshots, conduct short interviews with SH and WP representatives (produce content for the web presence of the project; if local media is present, they can follow-up with an article on the workshop) **Further remarks on this in section **Other Aspects~~Other Aspects~~**.*	X	X
Ask participants to fill the planned surveys, at the end of the workshop and collect it. Mandatory surveys: - WP5 survey for the SHE evaluation: sharing strategy to be agreed by WP5 with each CS.	X	X
Mention that a comprehensive survey will be sent to participants after the workshop	X	X

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Post-workshop phase

Table 99: checklist for after the workshop

Task	F2F	OL
Upload or send to participants the presentations and thank them for their participation (provide feedback to SHs and foster trust by appreciating their valuable time!)	X	X
Upload or send to participants the workshop minutes	X	X
Report on your event to the WP5 team and to the WP6 team	X	X
Small summary of WS outcomes on website (using material from the WS provide a small summary of the outcomes)	X	X
Share and follow-up on WPs surveys (e.g., WP5 survey on SHE) - To increase the response rate of the surveys, consider sending reminders after 7-10 days of sharing the surveys.	X	X
Workshop Report (Summary report about the participation and results of the workshop, also critically reflecting about the performance of the workshop – Were the aims achieved? How did SHs perceive the workshop effectiveness? Etc.)	X	X
Share with the WP6-team a text on the workshop execution to present the results of the workshop (e.g., how it went, the conclusions, feedback or quotes from participants).	X	X

Other Aspects

This section refers to other aspects that are important to consider for the planning, design and execution of workshop. It particularly provides details on picture taking and recordings, the use of social media, and gender aspects. Other aspects such as ethics about direct quotes, facilitation activities, and meeting room settings can be found in the guidelines developed by SIM4NEXUS.

Picture taking and recording

Source: The following sub-section is taken and modified from the SIM4NEXUS guidance document.

Do not take pictures/screenshots or record a session without asking for consent. Taking photos is strongly recommended to provide evidence of your work and efforts on stakeholder engagement. However, taking photos is not neutral from an Ethics point of view. Therefore, it is advised to warn your attendance at the very beginning of your workshop that photos will be taken for dissemination purposes.

Tips to announce picture taking, recording or to ask for consent:

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- **Announce at the workshop**: Make it part of the Chairperson introduction speech.
- **Announce during registration**: Mention in the registration of the workshop that photos/screenshots will be taken or that the event will be recorded and by registering people consent.
- **Announce at the moment of the photo**: If no "random" photo taking is planned and, instead, there is designated slot for group photos, it is possible to announce it as part of the agenda. This way participants may choose to skip that point or turn off their cameras (in an online setting).

Should anyone have opposition to photos being taken of him/her, invite that person to share this with the organisation team.

If the workshop takes place in a large venue and they provide their own photographer services, it is recommended that the photographer is present at least for a few minutes to one hour after the start of the workshop.

Social media

Find all information about communicating activities in the "NXG Communication Guidelines" or in the "Summary of Communications Guidelines" developed by WP6.

Gender

The European Commission Horizon 2020 funding highlights the relevance of gender aspects, demanding that research projects aim for gender equality (European Commission - H2020). To support researchers in including this topic into the projects, H2020 refers to useful toolkits:

- Gender Dimension Toolkit developed by Yellow Window
- GEAR Tool – Gender Equality in Academia and Research – developed by the European Institute for Gender Equality (EIGE)

Before addressing specific points that are relevant for the organisation of workshops, Table 100~~Table 100~~ shows a few definitions to keep in mind.

Table 100: Relevant gender-related definitions used as guidance in NXG

Term	Definition
Gender	"***Social attributes and opportunities*** *associated with being female and male and to the* ***relationships*** *between women and men and girls and boys, as well as to the relations between women and those between men."* United Nations Entity for Gender Equality and the Empowerment of Women – UN-Women
Gender Equality	*"**Equal rights, responsibilities and opportunities of women and men and girls and boys**."* *"Equality does not mean that women and men will become the same but that **women's and men's rights, responsibilities and opportunities will not depend on whether they are born female or male**. Gender equality implies that the interests, needs and priorities of both women and men are taken into consideration, thereby recognising the diversity of different groups of women and men. Gender equality is not a women's issue but should concern and fully engage men as well as women. Equality between women and men is seen both as a human rights issue and as a precondition for, and indicator of, sustainable people-centred*

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Term	Definition
	development" EIGE Glossary
Gender Balance	*"**Human resources** and **equal participation of women and men in all areas of work**, projects or programmes"* *"In a scenario of gender equality, **women and men are expected to participate proportionally to their share of the population**. In many areas, however, women participate less than what would be expected based on the sex distribution in the population (underrepresentation of women), while men participate more than expected (overrepresentation of men)"* EIGE Glossary
Gender Mainstreaming	*"**Systematic consideration** of the differences between the conditions, situations and needs of women and men **in all policies and actions**"* *"Gender mainstreaming is the **(re)organisation, improvement, development and evaluation of policy processes**, so that a **gender equality perspective is incorporated into all policies at all levels and all stages**, by the actors normally involved in policymaking. Mainstreaming a gender perspective is the process of assessing the implications for women and men of any planned action, including legislation, policies or programmes, in all areas and at all levels. It is a way to make women's as well as men's concerns and experiences an integral dimension of the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and societal spheres so that women and men benefit equally, and inequality is not perpetuated. **The ultimate goal is to achieve gender equality**. Gender mainstreaming is a complementary strategy and not a substitute for targeted, women-centred policies and programmes, gender equality legislation, institutional mechanisms for gender equality, and specific interventions that aim to close the gender gap."* EIGE Glossary
Good practice for gender mainstreaming	*"Any experience or initiative displaying techniques, methods or approaches which function in a way that produces effects and results coherent with the definition of gender mainstreaming, which are considered to be effective in delivering gender mainstreaming as a transformative strategy, and which, therefore, deserve to be disseminated and proposed to other organisational contexts."* EIGE Glossary

With a strong focus on policy-making, gender aspects and especially gender mainstreaming are relevant for the NXG project. This focus permeates to the engagement of and interaction with stakeholders with the inclusion of gender aspects in the design and planning of workshop activities. To do so, it is important to consider representation, gender balance and inclusive language.

Additionally, the GEAR Tool mentions six useful points for engaging SHs in embedding gender equality within the organisation (in this case it can be the NXG project):

- It is important to have the support and explicit backing from the top level of the organisation as from the start. Such support increases the perceived legitimacy of the actions.

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- While work towards gender equality can start with a small group of motivated people, it is important to gradually and continuously reach out and widen the group of involved actors.
- Know your institution, talk with people, understand what existing structures do and can do, identify where potential allies are and where resistances can be encountered. Start by building strategic alliances and seek win-win situations.
- Creating a feeling of ownership is key to engaging stakeholders in the work towards structural change for gender equality.
- For engaging stakeholders, it is paramount that they know the gender equality objectives and the initiatives being taken. Therefore, internal communication and visibility are crucial.
- Internal legitimacy can be acquired by gaining external support through alliances with stakeholders outside the organisation. Think for example about research organisations with an outstanding reputation for gender equality, internationally recognised gender equality experts, or participation in an EU-funded structural change project.

Representation and gender-balance

Because gender roles determine the responsibilities of people, the knowledge and perception about different topics that can be addressed in the NXG WSs can vary depending on the SH's gender[1]. Also, because gender roles are determined by the contextual social values, it is important to keep in mind the cultural differences among the CS for the workshop settings – what worked in one location might not necessarily be suitable for the other.

To align with a proper stakeholder engagement and representation of different perspectives, consider the following inclusion criteria:

- **Geographical inclusivity**, i.e., people from all the sub-areas within the area.
- **Sector inclusivity** (e.g., urban and rural water users, irrigation sector, forestry sector, agricultural sector, power utility, community-based organisations, NGOs, government – more SH categories in MS-6).
- **Biodiversity of people**, i.e., race and gender.

In relation to the representativeness of different perspectives, think about what the aim of the workshop is and what perspectives are sought. This helps in determining what type of representation is needed, e.g., positions/functions, demography, gender. If the focus is not set on gender representation, try pointing as much as possible towards a gender-balanced participation. This means counting with a participation parity threshold not below 40%.

If this is challenging, it is possible to engage in gender awareness raising informing SHs about the influence of gender aspects on opinions that are relevant for the NXG aims.

[1] Yang, Y. C. E., Passarelli, S., Lovell, R. J., & Ringler, C. (2018). Gendered perspectives of ecosystem services: A systematic review. *Ecosystem Services*, *31*, 58–67. https://doi.org/10.1016/j.ecoser.2018.03.015

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Inclusive language

Considering the points mentioned above, the use of an inclusive language that is gender-neutral and gender-sensitive is recommended. This language should be used for the concept note and advertisement of the workshop as well as in the invitations to SHs. It is also encouraged to use it as much as possible in the interaction with SHs (e.g., email exchanges, meetings).

The EIGE Toolkit on gender-sensitive communication mentions three key principles for the use of inclusive language (in English):

1. **Recognise and challenge stereotypes**.
2. **Be inclusive and avoid omission and making others invisible**.
3. **Be respectful and avoid trivialisation and subordination**.

These principles align with the United Nations best practices within the Guidelines for Gender-Inclusive Language in English as well as with the Interinstitutional Style Guide of the European Union (10.6 Gender-neutral language, available in other languages as well):

1. **Use non-discriminatory language**:
    - Forms to address. When referring to or addressing specific individuals, use forms of address and pronouns that are consistent with their gender identity.
    - Avoid gender-biased expressions or expressions that reinforce gender stereotypes (e.g., “In a manly way”).

2. **Make gender visible when it is relevant for communication**:
    - Using feminine and masculine pronouns. “Pairing” is the use of both feminine and masculine forms (“he or she”; “her or his”). It is a strategy that may be used when the author/speaker wants to explicitly make both women and men visible. It is advisable not to overuse this strategy in English.
    - Using two different words. In cases in which highlighting gender would make the sentence more inclusive, two separate words can be used. This strategy should be used only when popular beliefs or preconceptions may obscure the presence or action of either gender.

3. **Do not make gender visible when it is not relevant for communication**:
    - Use gender-neutral words
        - E.g., ‘humankind’ or ‘humanity’ instead of ‘mankind’; ‘artificial’ or ‘human-caused’ instead of ‘man-made’; ‘chair’ instead of ‘chairman’; ‘firefighters’ instead of ‘firemen’ and ‘police officer’ instead of ‘policeman’ or ‘policewoman’.
    - Using plural pronouns/adjectives
        - E.g., “Before submitting your document, send it to the focal point for *their* review; *they* will return it to you with comments”.
    - Use the pronoun *one*
        - E.g., “A staff member in Antarctica earns less than *one* in New York.” instead of “A staff member in Antarctica earns less than *he* would in New York.”.

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- Use the relative pronoun *who*
  - E.g., “A complainant *who* is not satisfied with the board’s decision can ask for a rehearing” instead of “If a complainant is not satisfied with the board’s decision, *he* can ask for a rehearing”.
- Use a plural antecedent
  - E.g., “Substitute judges must certify that they have familiarized themselves with the record of the proceedings” instead of “A substitute.

Workshop report template

General information about the workshop:

- Workshop number:
- Organizing partner:
- Moderator:
- Meeting Place:
- Date:
- Number of stakeholders attending**:**

Agenda for the meeting

- *Please insert the agenda from your meeting*

Objectives

- *Describe the workshop objectives*

Participants characterization

- The table below shows the number of participants, the respective sector of activity and the level of governance each stakeholder is active in**.**

Overview of stakeholders:

Institution / sector (according to the categories for the SH register)	No. of participants (registrations)			
	In total	Male	Female	Non-binary
Consortium members				
External stakeholders (outside of the project partners):				
1. Civil society				
2. Public initiatives				
3. Policy makers at local level/municipalities				

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4. Policy makers at national level				
5. Agricultural authorities and representatives				
6. Energy authorities and representatives				
7. Water management authorities and representatives				
8. River basin authorities and representatives				
9. Environmental protection authorities & representatives				
10. Business/private or public enterprises				
11. Media/science communicators				
12. Other *(please specify which)*				

Please, include a list of participants as annex to this form.

Description of workshop's activities

- *Provide a summary of activities carried out. Were there plenary or working group sesions? Presentations by whom on what? (Provide presentations as appendices).*
- *Describe the moderation technique/s and method for open dialogue applied.*

Please, include all presentations given at the meeting as annex to this form.

Main achievements

- *Describe briefly the main outcomes and results from the meeting, particularly in relation to the objectives of the workshop (above), as well as any actions to be taken, as agreed upon.*
- *Summarise the perspectives of the stakeholders (i.e. stories as anecdotal evidence).*

Reflection notes

- *Describe your observations on stakeholder engagement (e.g. do we need to add others? Do we need to change our approach? Etc.)*
- *Describe any relevant observations for further steps*
- *Questions such as below can be asked:*
    - *What did you enjoy most/less about this workshop?*
    - *Which methods/tools were successful/not successful?*

In your opinion, what were the positive/negative aspects of the workshop? Pros:

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• xxx • xxx • xxx <u>Cons:</u> • xxx • xxx • xxx
What suggestions for improvement do you have for future workshops? • xxx • xxx • xxx

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Annex 7: Overview of workshop participation

Overview of participation and gender balance at the NXG workshops.

No. of Work-shop	Case Study	Country	Workshop took place in:	Date	Workshop modality	No. of stake-holders that par-ticipated	Gender (m/f)
WS 1	CS1	Greece	Chrysoupoli (GR)	4 March 2022	F-t-F	38	26
		Bulgaria	Gotse Delchev (BG)	07 April 2022			12
	CS2	Latvia	Online	27 January 2022	Online	10	6
		Lithuania	Online	10 February 2022			4
	CS3	Romania	Craiova (RO) & Online	19 May 2022	Hybrid	39	18
							21
	CS4	Italy	Online	4 May 2022	Online	30	23
							7
	CS5	South Af-rica	Online	24 May 2022	Online	29	21
							8
	Average					**29,2**	
	Average male						**18,8**
	Average fe-male						**10,4**
WS2	CS1	Greece	Chrysoupoli (GR)	18 November 2022	F-t-F	27	21
		Bulgaria	Gotse Delchev (BG)	24 November 2022			6
	CS2	Latvia	Riga (LV)	2 November 2022	F-t-F	10	3
		Lithuania					7
	CS3	Romania	Craiova (RO) & Online	13 October 2022	Hybrid	18	6
							12
	CS4	Italy	Trento (IT) & Online	10 October 2022	Hybrid	31	20
							11
	CS5	South Af-rica	Mbombela, Mpumalanga (SA)	20 October 2022	F-t-F	14	9
							5
	Average					**20**	
	Average male						**11,8**
	Average fe-male						**8,2**
WS3	CS1	Greece	Chrysoupoli (GR)	28&29 March 2023	F-t-F	37	27
		Boulgaria					10
	CS2	Latvia	Vilnius (LT)	15 June 2023	F-t-F	10	4
		Lithuania					6
	CS3	Romania	Craiova (RO) & Online	23 May 2023	Hybrid	21	5
							16
	CS4	Italy	Online	3 July 2024	Online	27	18

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							9
	CS5	South Africa	Online	5 June 2023	Online	38	18
							19
	Average					**26,6**	
	Average male						**14,4**
	Average female						**12,0**
WS4	CS1	Greece	Online	21 February 2024	Online	26	18
		Bulgaria					8
	CS2	Latvia	Online	06 February 2024	Online	18	5
		Lithuania					13
	CS3	Romania	Online	21 February 2024	Online	19	4
							15
	CS4	Italy	No participation	No participation	No participation		
	CS5	South Africa	Online	19 March 2024	Online	14	6
							8
	Average					**19,3**	
	Average male						**8,3**
	Average female						**11,0**
WS5	CS1	Greece	Chrysoupoli (GR)	21 November 2024	F-t-F	53	35
		Bulgaria	Gotse Delchev (BG)	22 November 2024			18
	CS2	Latvia	Riga (LV)	02 October 2024	F-t-F	11	4
		Lithuania					7
	CS3	Romania	Bucharest (RO)	17 September 2024	F-t-F	18	4
							14
	CS4	Takes place in conjunction with WS6					
	CS5	South Africa	Online	17 October 2024	Online	19	9
							10
			Mbombela (SA)	28 January 2025	F-t-F	3	1
							2
			Pretoria (SA)	29 January 2025		6	2
							4
	Average					**18,3**	
	Average male						**9,2**
	Average female						**9,2**
WS6	CS1	Greece	Chrysoupoli (GR)	28 May 2025	F-t-F	38	21
							17
	CS2	Latvia	Riga (LV)	02 October 2024	F-t-F	17	5
		Lithuania					12
	CS3	Romania	Multiple small meetings				0
							0

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	CS4	Italy	Bolzano	19&20 May 2025	F-t-F	128	65
							63
	CS5	South Africa	Online	29 May 2025	Online	12	2
							9
	Average					**48,8**	
	Average male						**18,6**
	Average female						**20,2**
All Workshops	**Average**					**27,0**	
	Average male						**13,5**
	Average female						**11,8**

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Overview of sectoral participation at workshops

No. of Workshop	Case Study	Country	Workshop took place in:	Date	Workshop modality	No. of stakeholders that participated	Water	Energy	Food	Ecosystem	Other
WS 1	CS1	Greece	Chrysoupoli (GR)	4 March 2022	F-t-F	38	30	14	14	31	0
		Bulgaria	Gotse Delchev (BG)	07 April 2022							
	CS2	Latvia	Online	27 January 2022	Online	10	6	3	0	5	0
		Lithuania	Online	10 February 2022							
	CS3	Romania	Craiova (RO) & Online	19 May 2022	Hybrid	39	11	4	7	8	9
	CS4	Italy	Online	4 May 2022	Online	30	22	3	3	3	0
	CS5	South Africa	Online	24 May 2022	Online	29	17	4	5	8	0
	Average					**29,2**	**17,2**	**5,6**	**5,8**	**11**	**1,8**
	%						64%	21%	21%	41%	7%
WS2	CS1	Greece	Chrysoupoli (GR)	18 November 2022	F-t-F	27	18	9	8	18	0
		Bulgaria	Gotse Delchev (BG)	24 November 2022							
	CS2	Latvia	Riga (LV)	2 November 2022	F-t-F	10	3	1	1	3	0
		Lithuania									
	CS3	Romania	Craiova (RO) & Online	13 October 2022	Hybrid	18	9	4	0	3	2
	CS4	Italy	Trento (IT) & Online	10 October 2022	Hybrid	31	16	7	3	8	0
	CS5			20 October 2022	F-t-F	14	7	3	2	4	0

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		South Africa	Mbombela, Mpumalanga (SA)								
	Average					**20**	**10,6**	**4,8**	**2,8**	**7,2**	**0,4**
	%						39%	18%	10%	27%	1%
WS3	CS1	Greece Boulgaria	Chrysoupoli (GR)	28&29 March 2023	F-t-F	37	31	16	26	29	0
	CS2	Latvia Lithuania	Vilnius (LT)	15 June 2023	F-t-F	10	5	3	0	4	0
	CS3	Romania	Craiova (RO) & Online	23 May 2023	Hybrid	21	7	1	2	4	6
	CS4	Italy	Online	3 July 2024	Online	27	16	4	7	4	0
	CS5	South Africa	Online	5 June 2023	Online	38	16	6	8	7	0
	Average					**26,6**	**15**	**6**	**8,6**	**9,6**	**1,2**
	%						56%	22%	32%	36%	4%
WS4	CS1	Greece Bulgaria	Online	21 February 2024	Online	26	15	7	7	17	0
	CS2	Latvia Lithuania	Online	06 February 2024	Online	18	6	1	1	8	0
	CS3	Romania	Online	21 February 2024	Online	19	7	0	6	0	5
	CS4	Italy	No participation	No participation	No participation						
	CS5	South Africa	Online	19 March 2024	Online	14	7	1	3	2	0
	Average					**19,3**	**8,8**	**2,3**	**4,3**	**6,8**	**1,3**
	%						32%	8%	16%	25%	5%

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WS5	CS1	Greece	Chrysoupoli (GR)	21 November 2024	F-t-F	53	21	11	10	20	0
		Bulgaria	Gotse Delchev (BG)	22 November 2024							
	CS2	Latvia	Riga (LV)	02 October 2024	F-t-F	11	4	2	0	5	0
		Lithuania									
	CS3	Romania	Bucharest (RO)	17 September 2024	F-t-F	18	3	0	4	5	6
	CS4	Takes place in conjunction with WS6									
	CS5	South Africa	Online	17 October 2024	Online	19	10	1	4	4	
			Mbombela (SA)	28 January 2025	F-t-F	3	3	0	0	0	
			Pretoria (SA)	29 January 2025		6	1	2	2	1	
	Average					**18,3**	**7,0**	**2,7**	**3,3**	**5,8**	**2,0**
	%						26%	10%	12%	22%	7%
WS6	CS1	Greece	Chrysoupoli (GR)	28 May 2025	F-t-F	38	14	7	11	12	0
	CS2	Latvia	Riga (LV)	02 October 2024	F-t-F	17	7	1	3	14	0
		Lithuania									
	CS3	Romania	Multiple small meetings								
	CS4	Italy	Bolzano	19&20 May 2025	F-t-F	128	98	16	14	28	0
	CS5	South Africa	Online	29 May 2025	Online	12	4	1	4	2	1
	Average					**48,8**	**30,8**	**6,3**	**8,0**	**14,0**	**0,3**
	%						114%	23%	30%	52%	1%
All Workshops	**Average**					**27,0**	**14,9**	**4,6**	**5,5**	**9,1**	**1,2**
	%						55%	17%	20%	34%	4%

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Annex 8: Changes in the modes of co-creation and their respective importance to the SHE aims

Case study 1 - Nestos/Mesta River Basin

	Aims for co-creation per type of co-generated knowledge	Intended outcome dimension (information taken from Fig.4 and SI Table 4 of Chambers et al. 2021)	Original mode by CS leads Sep 22 Researching solutions	Mode by SH Spring 2023 (WS3) Brokering power	Desired mode by CS June 2024 Brokering power	De facto mode June 2024 Reframing agency
System	Deepen/improve understanding of the (state of) WEFE Nexus problems (e.g., river basin management, energy transition, water scarcity) and identify pressures	MANAGEMENT PRACTICES Extent the case produces concrete shifts in management actions that help address the sustainability challenge	+	+++	+++	x
	Characterise (social, economic, ecological, and institutional) context	KNOWLEDGE PRODUCTION[1] Extent the case generates new knowledge with the potential to further sustainability outcomes	+++	x	x	+
	Understand the institutional, organisational and political context and river basin management plans (incl. neighbouring countries)	INSTITUTION BUILDING Extent the case strengthens or creates institutions that help govern sustainability challenges	-	+++	+++	--
	Identify conflicts/synergies between SHs as well as actions and strategies	SOCIAL EQUITABILITY Extent the case creates outcomes that shift power and resources away from more powerful actors and	---	--	--	+

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		towards more marginalized actors				
	Get data for model development	KNOWLEDGE PRODUCTION[1] Extent the case generates new knowledge with the potential to further sustainability outcomes	+++	x	x	+
Target	Know about future expectations/perspectives (in general and for assessment tools)	POLICY UPTAKE Extent the case bolsters certain policies or contributes to the creation of new policies that are favorable for sustainability and explicitly prevent misuse of the initiative for political purposes against sustainability	+	-	-	--
	Determine solutions/systems (and their drivers) that balance sectors	PROCESS LEARNING Extent the case generates and shares knowledge about the collaborative process to helps inform their own and other efforts to successfully undertake them	-	+	+	+++
	Diffuse conflicts between sectors (e.g., through the use of a common language), moving towards cooperation and trust	NETWORKS Extent the case changes the social network of connections among actors to aid the ability to address sustainability challenges	+	+++	+++	++

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	Raise awareness of water as a depleting resource	REFRAMING Extent the case changes pre-existing beliefs/values/priorities of people whose actions are linked to the sustainability challenge	+	+++	+++	+++
	Gain knowledge on required infrastructural improvements	KNOWLEDGE PRODUCTION[1] Extent the case generates new knowledge with the potential to further sustainability outcomes	+++	x	x	+
Transformation	Develop and implement formal agreements and aligned policies for a coordinated river basin management	EMPOWERMENT Extent the case changes people's sense of motivation,agency and commitment to pursue their goals	--	++	++	+++
	Design of pathways to enhance awareness of (water) resources management	KNOWLEDGE TRANSFER Extent the case clearly communicates and persuasively frames existing or generated knowledge to relevant actors with the potential to further sustainability outcomes	+++	x	x	x
	(Co-)Design and (co-)validate NXG tools/platform (e.g., WEFE Footprint), and build capacity (e.g., to use the NXG tools)	CAPACITY DEVELOPMENT Extent the case influences people's capacities to use and apply knowledge to pursue their goals	+	--	--	x
	Identify relevant WEFE Nexus components and indicators	ECOLOGICAL OUTCOMES Extent the case produces actual ecological improvements	-	++	++	-

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	Improve communication between SHs and break silos	NETWORKS Extent the case changes the social network of connections among actors to aid the ability to address sustainability challenges	+	+++	+++	++
	Determine the requirements to invest in infrastructure	SOCIAL OUTCOMES Extent the case produces actualsocial benefits	--	++	++	-
	Build trust[2]	PROCESS QUALITY Extent the case produces a process that creates a meaningful/valuable experience for participants	+	+++	+++	+++

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Case study 2 - Lielupe River Basin

	Aims for co-creation per type of co-generated knowledge	Intended outcome dimension (information taken from Fig.4 and SI Table 4 of Chambers et al. 2021)	**Original mode by CS leads Sep 22** Navigating differences	**Mode by SH Spring 2023 (WS3)** Empowering voices	**Desired mode by CS June 2024** *Undetermined*	**De facto mode June 2024** Researching solutions
System	Deepen/improve understanding of the (state of) WEFE Nexus problems (e.g., river basin management, energy transition, water scarcity) and identify pressures	MANAGEMENT PRACTICES Extent the case produces concrete shifts in management actions that help address the sustainability challenge	**++**	**+**	**NA**	**+**
	Characterise (social, economic, ecological, and institutional) context	KNOWLEDGE PRODUCTION[1] Extent the case generates new knowledge with the potential to further sustainability outcomes	**x**	**+++**	**NA**	**+++**
	Understand the institutional, organisational and political context and river basin management plans (incl. neighbouring countries)	INSTITUTION BUILDING Extent the case strengthens or creates institutions that help govern sustainability challenges	**++**	**-**	**NA**	**-**
	Identify conflicts/synergies between SHs as well as actions and strategies	SOCIAL EQUITABILITY Extent the case creates outcomes that shift power and resources away from	**++**	**+**	**NA**	**---**

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		more powerful actors and towards more marginalized actors				
	Get data for model development	KNOWLEDGE PRODUCTION[1] Extent the case generates new knowledge with the potential to further sustainability outcomes	**x**	**+++**	**NA**	**+++**
Target	Know about future expectations/perspectives (in general and for assessment tools)	POLICY UPTAKE Extent the case bolsters certain policies or contributes to the creation of new policies that are favorable for sustainability and explicitly prevent misuse of the initiative for political purposes against sustainability	**++**	**++**	**NA**	**+**
	Determine solutions/systems (and their drivers) that balance sectors	PROCESS LEARNING Extent the case generates and shares knowledge about the collaborative process to helps inform their own and other efforts to successfully undertake them	**+++**	**++**	**NA**	**-**

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	Diffuse conflicts between sectors (e.g., through the use of a common language), moving towards cooperation and trust	NETWORKS Extent the case changes the social network of connections among actors to aid the ability to address sustainability challenges	++	++	NA	+
	Raise awareness of water as a depleting resource	REFRAMING Extent the case changes pre-existing beliefs/values/priorities of people whose actions are linked to the sustainability challenge	+++	+	NA	+
	Gain knowledge on required infrastructural improvements	KNOWLEDGE PRODUCTION[1] Extent the case generates new knowledge with the potential to further sustainability outcomes	x	+++	NA	+++
Transformation	Develop and implement formal agreements and aligned policies for a coordinated river basin management	EMPOWERMENT Extent the case changes people's sense of motivation,agency and commitment to pursue their goals	+++	++	NA	--
	Design of pathways to enhance awareness of (water) resources management	KNOWLEDGE TRANSFER Extent the case clearly communicates and	+	++	NA	+++

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		persuasively frames existing or generated knowledge to relevant actors with the potential to further sustainability outcomes				
	(Co-)Design and (co-)validate NXG tools/platform (e.g., WEFE Footprint), and build capacity (e.g., to use the NXG tools)	CAPACITY DEVELOPMENT Extent the case influences people's capacities to use and apply knowledge to pursue their goals	-	++	NA	+
	Identify relevant WEFE Nexus components and indicators	ECOLOGICAL OUTCOMES Extent the case produces actual ecological improvements	+	+	NA	-
	Improve communication between SHs and break silos	NETWORKS Extent the case changes the social network of connections among actors to aid the ability to address sustainability challenges	+++	++	NA	+
	Determine the requirements to invest in infrastructure	SOCIAL OUTCOMES Extent the case produces actualsocial benefits	++	-	NA	--
	Build trust[2]	PROCESS QUALITY Extent the case produces a process that creates a	+++	+	NA	+

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		meaningful/valuable experience for partici-pants				

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Annex 9: Questions on outcomes and impacts added in the WS6 survey

General outcomes and impacts – all CS:

1) To what degree has the project achieved to:
    a. Identify climate-related criticalities (e.g. increase drought frequency, increased intensity of precipitation) that potentially lead to conflicts at seasonal (up to six months) and multi-decadal timescales?
    b. Facilitate collaboration across stakeholders?
    c. Facilitate your usage of innovative tools?
    d. Identify trade-offs and/or win-win solutions within the WEFE nexus?
    e. Validate user-identified WEFE policies, their goals or instruments?
    f. Enhance your knowledge and understanding of WEFE nexus behaviour?
2) To what degree did the project achieve to work towards:
    a. Tailoring possible mitigation and adaptation measures for the WEFE nexus according to the specific time horizon of the identified climate-related issues?
    b. Establishing a cross-boundary, cross-sectoral water governance accounting for WEFE nexus trade-offs and synergies?
    c. The transferability of the project outputs to EU transboundary river basin in Baltic Sea, Balkan & elsewhere?
    d. Improving water transboundary governance via stakeholder agreements?
    e. Improving restoration of aquatic biodiversity?
    f. Providing policy recommendation based on EU practices within a nexus context?
    g. Providing regional autonomy to stakeholders for WEFE nexus assessments using NEPAT?

CS-specific questions

CS1

1) To what degree has the project achieved to:
    a. Investigate strategic policies and plans for sustainable water management of transboundary river flow upstream that may affect WEFE Nexus components (e.g. water flow and quality, energy production capacity and ecosystem sustainability downstream)?
    b. Enhance collaboration among conflicting stakeholders at national (within the country) and at transboundary level?
    c. Implement local interventions and policies towards the protection of aquatic ecosystems?
    d. Identify economic benefits from nexus sectoral policies to the local communities in either of the two countries?
2) To what degree did the project achieve to work towards:
    a. Expanding the social-economic benefit analysis to all transboundary river basins at national level in either of the two countries?
    b. Implementing policy recommendation of good nexus practices in in either of the two countries?

CS2:

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1) To what degree has the project achieved to:
    a. Facilitate collaboration in the transboundary context from the “up-stream” and “down-stream” perspective, building trust among stakeholders?
    b. Facilitate acceptance of the approach to nexus analysis?
    c. Use the NEPAT and collaborate in the creation of WEFE Nexus Footprint?
    d. Involve SHs in the development of policy suggestions?
    e. Involve SHs to validate the applied framework and results?
    f. Bring benefits for the Lielupe River Basin planning activities by applying a nexus approach and pave the ground for “river contracts”/SH agreement?
    g. Transfer results to stakeholders of transnational river basins in the Baltic Sea Region?
    h. Introduce SHs to the NEXOGENESIS framework and outcomes from the Lielupe Case study at the transboundary (Baltic) workshops?
2) To what degree did the project achieve to work towards:
    a. River contracts that are successfully applied to improved governance arrangements towards sustainable use of resources and improve water quality in a nexus context?
    b. Transnational Latvia-Lithuania cooperation using active consultation platforms (e.g. transnational cooperation commission) that is seen as an element of water diplomacy?
    c. The NEXOGENESIS approach to improved decision-making that is used by policy developers regionally to support water related policy?

CS3:

1) To what degree has the project achieved to:
    a. Test the NEPAT in the Lower Danube to enhance robustness in creating common evidence relevant in local and transboundary contexts for improved water management, identification and evaluation of trade-offs?
    b. Support enhanced trust of different stakeholder categories?
    c. Contribute to successful strategies addressing local development?
    d. Provide improved knowledge on multiple water uses and limited water resources?
    e. Acknowledge the need for balanced public policies and actions to reach the strategic objectives for sustainable development?
    f. Involve relevant stakeholders and water authorities in the use of NEXOGENESIS NEPAT for integrated resource management, reducing vulnerability to climate risks and securing water resources?
2) To what degree did the project achieve to work towards:
    a. Upscaling of the results of the Lower Danube CS to all 11 river basins in Romania and to Bulgaria, Serbia and other similar contexts along the Danube?
    b. Integrating the WEFE Nexus approach and NEPAT for the updating of the River Management Plans and Floods Risks Management Plans in the Danube river basin?
    c. Improving institutional cooperation along the local, regional and national stakeholders?
    d. Regular use of NEXOGENESIS tools for the benefit of sustainable local, national and regional development?
    e. Contributing to the restoration of the Lower Danube river wetlands and improve the Danube aquatic biodiversity and water quality as well as inland biodiversity?

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f. Discussions about the use of the NEXOGENSIS approach in similar trans-boundary basins globally?

CS4:

1) To what degree has the project achieved to:
   a. Create a close cooperation with relevant territorial stakeholders to tackle hotspots of water use tension at cross-sectoral and inter-basin levels.
   b. Evaluate future water availability and demand to provide support for decision-making in water management?
   c. Map stakeholders' formal and informal power relations affecting water allocation and management in a unique autonomy governance setting?
   d. Explore collaborative strategies from participative (e.g. roundtables) and structural levels (e.g. expansion of water savings techniques in irrigation) to address socio-cultural and political features affecting water conflicts that will be exacerbated by climate change?
   e. Support the selection of win-win solutions among stakeholders to be tested in the NEPAT for the assessment of impacts on the water management in the basin?
   f. Develop participative approaches and a River Contract/SH agreement to influence the inter-regional communications and engage stakeholders to improve trust and collaboration within the Adige River basin?
2) To what degree did the project achieve to work towards:
   a. Influencing the national and provincial policy roadmaps for the integration of information on future water availability and demand that are currently not considered in complex governance settings?
   b. Establishing more synergistic, cross-boundary and cross-sectoral regulations on water allocation and management?

CS5:

1) To what degree has the project achieved to:
   a. Impact positively upon the mission of the Inkomati-Usuthu Catchment Management Agency (IUCMA) to be "a pioneering catchment management system that empowers stakeholders to engage in consensual and adaptive decision making."
   b. Contribute to integrated catchment management and inform upstream policy recommendations through the proposed framework?
   c. Demonstrate the necessity of the integrated approach because the Inkomati-Usuthu Water Management Area (WMA) is located within a strategic water source area, downstream of mining activities, and contains high potential agricultural land?
   d. Provide key impact to the identification of upstream policy requirements that contribute to resilient catchment development and regional water, energy and food security associated with SDGs 2, 6 and 7?
2) To what degree did the project achieve to work towards:
   a. Enhanced monitoring abilities of the IUCMA and various government departments of impacts of both the integrated resource management and the policies that they implement(ed)?
   b. Improved capacities to monitor progress of the IUCMA and various government departments in terms of integrated resource management over time?

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