IMPETUS

Turning climate commitments into action

D1.2
Co-Creation Process in Demo-Sites – Progress Report

31.01.2024

Deliverable Number: D1.2

Authors: Lisa Andrews, Stefania Munaretto, KWR
with inputs from all Demo-Sites

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[1] PU = Public
CO = Confidential, only for members of the consortium (including the Commission Services)
R = Report
ORDP = Open Research Data Pilot

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Disclaimer

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Abbreviations

Abbreviation / Acronyms	Description
(A)MGA	(Annotated) Model Grant Agreement
BWB	Berliner Wasserbetriebe
CA	Consortium Agreement
CEA	Controlled Environmental Agriculture
CFS	Certificate of Financial Statement
DS	Demo-Site
DSS	Decision Support System
DTh	Decision Theatre
EAB	External Advisory Board
EC	European Commission
ESCI	The European Science Communication Institute
EU	European Union
Eurecat	The Technology Centre of Catalonia
FP	Framework Programme
GA	Grant Agreement
GIS	Geographic Information System
HIPS	Hot-spot Identification and Prioritization Service
ITAS	Gruppo ITAS (Insurance)
GDPR	General Data Protection Regulation
KWR	KWR Water Research Institute
M&E	Monitoring and Evaluation
MoU	Memorandum of Understanding
N&S	Nelen and Schuurmans
NTUA	National Technical University of Athens
NVE	Norwegian Water Resources and Energy Directorate
PC	Project Consortium
PMT	Project Management Team
PSB	Project Steering Board
QH	Quintuple Helix
RKBs	Resilience Knowledge Booster
RP1	Reporting Period 1
SH	Stakeholder
SH Register	Stakeholder Register
SHA	Stakeholder Analysis
SHE	Stakeholder Engagement
SM	Sewer Mining
SVV	Statens Vegvesen (Norway)
TFFK	Troms and Finnmark County Municipalities
ToC	Theory of Change
UdG	Universitat de Girona
UiT	Arctic University of Norway
URV	Universitat Rovira i Virgili
VR	Virtual Reality
WEI	Water & Energy Intelligence
WP	Work Package
WPL	Work Package Leader

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Executive Summary

Deliverable 1.2 (D1.2) is a public report delivered in month 28 (M28) and again in M48 (D1.5) corresponding to Task 1.2. It illustrates the stakeholder engagement (SHE) and co-creation in practice in the 7 project Demo-Sites (DSs). It contains updates on the DSs theories of change (ToCs), SHE, co-creation and communications roadmaps, and it provides an overview of the engagement activities until M28 accompanied by short descriptions and a reflection on the SHE processes and content so far. D1.2 brings together all the lessons learned from the DS SHE to date to better align the engagement with the development of the DSs solutions and the Resilience Knowledge Boosters (RKBs), both the digital and human dimensions, to ensure successful implementation and lasting impact in the DSs' regions.

This deliverable is linked to activities in Work Packages (WPs) 4 (deployment of solutions), WP7 (communication and dissemination) and WP2 (RKBs development), and is also linked to all other WPs as it provides an overview of current SHE and knowledge from the stakeholders (SHs) that can directly contribute to the development of the project tools (WP3 and 5) and legacy of the project (WP6). D1.2 is a public document which is also meant to be used by the project partners for their activities. To this purpose, D1.2 contains links to internal project documents that are not accessible to the public as well as links to public documents, specifically D1.1 available on the IMPETUS website.

This deliverable is broken down into:

- Section 1: Introduction
- Section 2: Recap from D1.1. and SHE and co-creation steps in IMPETUS
- Section 3: Status update from DS SHE Activities (Summaries and Syntheses)
- Section 4: Reflections and next steps
- Annex 1: Updated DS ToCs and SHE Roadmaps

We took the following steps to co-create this deliverable and reflect with the DSs and WPs on SHE:

- Drafted outline of D1.2 and distributed to DSs for their feedback and awareness of upcoming actions to populate the deliverable;
- Delivered an IMPETUS internal project partners Thematic Meeting on how SHE supports the co-creation and implementation of the RKBs with DSs and WPs;
- Hosted a workshop at the IMPETUS General Assembly October 2023 on the human dimension of the RKBs and how to continue engaging SHs to implement the RKBs successfully; and
- D1.2. drafted and finalised by WP1 with input from DSs between October-December 2023.

This deliverable, besides reporting on the SHE activities, is meant as a moment of reflection, co-creation and learning with the DSs and WPs to ensure meaningful support to the project partners and SHs to deliver useful project outputs. Some key insights from this reflection and progress report on SHE and co-creation include:

- The project develops a wide variety of solutions and therefore requires a flexible and adaptable SHE approach that can be tailored to the specificities of the solutions and of the DS regions.
- Despite the variety across DS solutions, SHE and co-creation follows a similar pattern as observed in the DS synthesis tables in subsections 3.1 to 3.7; raising awareness, getting to know the SHs through smaller activities, engaging the hard to reach SHs, filling any gaps in the SH Registers, followed by outreach, and then finally brainstorming and hosting tailored activities.
- The flexible and adaptable SHE approach developed by WP1 is seen by DSs and WPs as useful thus far.
- SHE and co-creation is a process that requires a lot of time, capacity and expertise as well as careful planning.

Following the publication of this deliverable, WP1 will continue to work with all other WPs and DSs to ensure SHE and co-creation is tailored to the needs of the project and the DSs climate adaptation solutions in their biogeographical regions. We will also move into a stage of increased monitoring and evaluation (M&E) across the SHE activities. All this will culminate into a final WP1 deliverable, D1.5 in M48, showcasing the developments as seen in DS ToCs, and the pathways towards impact through SHE and co-creation in the DSs.

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1 Introduction

WP1 aims to support IMPETUS Demo-Sites (DSs) and work packages (WPs) to identify (Task 1.1) and effectively engage (Task 1.2) stakeholders (SHs) throughout the project lifetime to ensure the development and implementation of biogeographically relevant climate adaptation and mitigation solutions, including identification and discussion with SHs of the multi-level governance barriers for the adoption of such solutions (Task 1.3).

Note for D1.2: Throughout this deliverable, there are some hyperlinks to internal project documents on the Eurecat IMPETUS SharePoint and are available only to project partners and/or project officers from the European Commission. The links were created for them to easily access the information reported in this deliverable. The information contained in these hyperlinked documents will not be made available to external parties when published on the IMPETUS website and is confidential (according to GDPR rules). When a document is publicly accessible, the link brings the reader to the public document (e.g. D1.1 on IMPETUS website).

1.1 Overview and objectives

Task 1.2 aims to support effective engagement of quintuple helix (QH) SHs in the DSs biogeographical regions for the development of tailored climate adaptation solutions and the project Resilience Knowledge Boosters (RKBs). Within this task, deliverable 1.2 (D1.2) is a public report delivered in month 28 (M28) and again in M48 (D1.5) reporting on the progress of the stakeholder engagement (SHE).

D1.2 illustrates the SHE and co-creation in practice across the seven project DSs. In particular, it contains updates on the DSs theories of change (ToCs), SHE, co-creation and communications roadmaps, and an overview of the engagement activities until M28 accompanied by short descriptions and a reflection by DSs on the SHE process and content so far (Section 3). In addition, SHE activity synthesis tables per DS are included, containing how their SHE activities took place (per WP4 task, or cross-cutting themes within the DS tasks), how many QH SHs they engaged, elements from the SH Activity Reports and feedback from SH Feedback forms when available. Overall, D1.2 brings together all the lessons learned from the DS SHE until M28 to better align the engagement with the development of the DSs solutions (WP4) and the RKBs, both from the digital and human dimensions, to ensure successful implementation and lasting impact in the DS biogeographical regions, which is reflected on further in Section 4. D1.2 is linked directly to activities in WP4 (solutions), WP7 (communication) and WP2 (RKBs), and is also linked to all other WPs as it provides an overview of current SHE and knowledge from the SHs that can directly contribute to the development of the other tools (WP3 and 5) and longevity of the project (WP6).

In Box 1 and Figure 1, we remind the reader of the definitions of the IMPETUS terminologies – Quintuple Helix Stakeholders (QH SHs) and Resilience Knowledge Boosters (RKBs) – as well as what the RKBs human and digital dimensions entail through a visual depiction (Fig.1), and how the different WPs in IMPETUS interact and connect with each other to deliver on the RKBs via these two dimensions.

REMINDERS – IMPETUS Project Terminology

Quintuple Helix Stakeholders (QH SHs):
Based on the work of Carayannis et al (2012), which comprises 5 main systems (or helices) of stakeholders to be engaged. These include: Academia, universities, and higher education system; Industry, firms, and economic system; State, Government, and political system; Uninformed citizens, media and culture; and the natural environment, and natural environment of society. For the purpose of IMPETUS however, the fifth helice (the natural environment) will be considered as stakeholders across each level of the other groups since the natural environment cannot be represented in and of itself in this case and cuts across all other helices.

Resilience Knowlegde Boosters (RKBS):
IMPETUS Resilience Knowledge Boosters (RKBs) will build a robust QH SH community (human dimension) complemented with reliable data and assessment methods to support decision and policy making (digital dimension). The digital dimension of the RKBs will operate as virtual laboratories for fuelling the generation of ideas, sharing research experiences and promoting data/knowledge exchange on climate change adaptation in each Demo-Site. The

Box 1 IMPETUS Terminology Reminders

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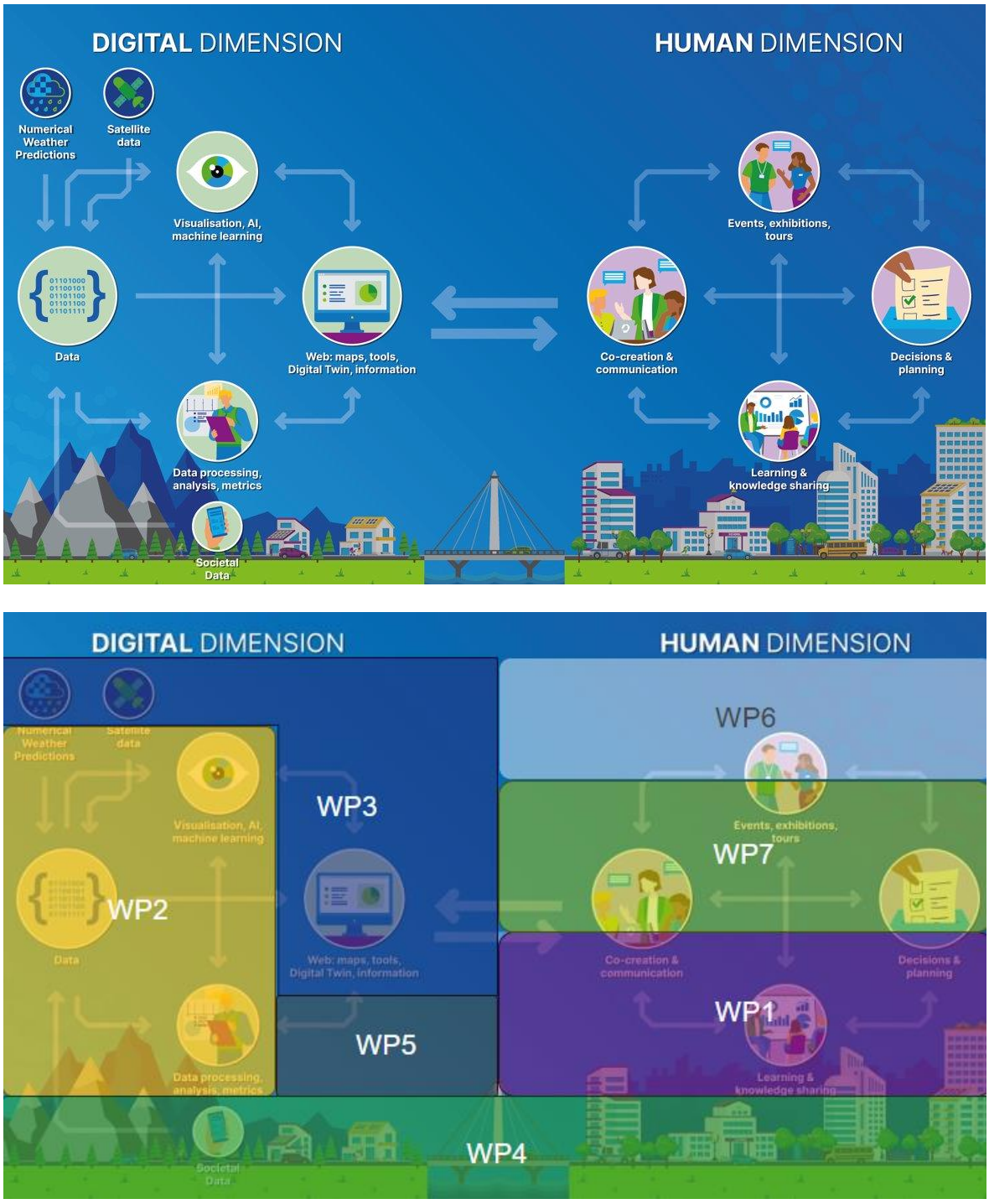

Figure 1 Visual depictions of IMPETUS RKBs digital (left side) and human (right side) dimensions and how the WPs intersect and connect to deliver on the project goals (images from RP1)

WP1 supports DSs in the SHE and ensures coordination, guidance and support of the SHE needs across the WPs and between WPs and DSs. Previous guidance that was shared with all DSs in the first year of the project is described in Deliverable 1.1, including guidance and support documents such as the ToCs, SH Registers, SHE Roadmaps, SHE Activity Planning and Reporting documents, and SHE checklists. These were all included in Guidance Documents delivered to the DSs and also described during training sessions and workshops, as described in D1.1. Since D1.1, project partners are now also using a new SHE support document - a Gantt Chart (see Section 2 Figure 3) – to better coordinate and integrate the DSs and WPs SHE and co-creation activities and needs. This complements the SHE roadmaps and ToCs. The Gantt Chart – a living document – has been updated by the DSs, and WP1 is working with the other WPs to better coordinate SHE to reduce SH fatigue, and ensure the right

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information, data and input from the SHs is coordinated in the most efficient way into the other WPs tools and goals. This deliverable is part of an ongoing process that is based on the principles of **adaptability** and **flexibility** so that any developments are considered in SHE and co-creation, ensuring continuous monitoring, evaluation, exchange of lessons learned and improvements.

Furthermore, since the beginning of 2023, project partners realised that there existed a gap in tasks and responsibilities for delivering on the human dimension of the RKBs, which is inextricably linked to the work of WP1. However, unlike the digital dimension which has specific tasks and responsibilities assigned to it under WP2, the human dimension tasks and responsibilities are unclear in the Grant Agreement. Therefore, to fill this gap and to effectively streamline WPs work on the design of the RKBs, the development of the DSs solutions and the SHE needs, several project partners recommended to set up a working group on the Human Dimension of the RKBs with partners from WP1, WP2, WP6 and WP7, and other project partners when needed. The goal is to further define the Human Dimension as described in the Grant Agreement and assign roles and responsibilities to this dimension across WPs, similar to those outlined for WP2 for the digital dimension. So far, the human dimension working group has had bi-weekly meetings to discuss the goals, activities and modes of interaction and exchange with the rest of consortium. For example, the working group started discussing 'user stories' (forthcoming in D2.4 and D2.5 from WP2) as a method to identify potential users for the RKBs among the SHs and to help define functionalities of the RKBs across both the human and digital dimensions, which was then put into practice by WP2. In further streamlining the human dimension and connecting the WPs that can perform the work, we will be able to deliver a more holistic and cohesive approach for SHE in the design and implementation of the RKBs. The creation of this working group also responds to the RP1 comments about increasing the importance and centrality of SHE and coordination across the project. The results of this process will be taken up in deliverables of the WPs represented in the working group.

For the purposes of D1.2, WP1 has encouraged the DSs and WPs to reflect on the composition of the SH groups, SHE activities, and the data and information they are collecting from the monitoring of the SHE that can support both the DS technologies, tools and methodologies they are developing, and the development, implementation and longevity of the RKBs. As such, D1.2 serves as a reflection moment among DSs and WPs to ensure the project is hosting the most appropriate SHE activities in each DS that deliver on these different goals. We believe that taking the time to reflect on what has been done so far in DS SHE, and how it all relates to the rest of the project will enable a more cohesive approach in the future to ensure the success of the entire project. This is a lesson learned over the last year, as changes in project partners and delays in WP1 and other WPs has required adaptability and flexibility, and as a large consortium, to find the rhythm to deliver impact. This was also a key outcome of the IMPETUS project partners meeting in Brussels in January 2023, which helped to better understand all the interrelated parts of the project and come together as a consortium, which is vital to the overall success of the project.

To support the reflection process, WP1 ensured D1.2 was as co-creative as possible with the DSs and WPs. WP1 organised two co-creation workshops with the DSs and WPs on D1.2. One was hosted at the IMPETUS bi-weekly thematic meetings, and one at the General Assembly in October 2023. Both of these workshops helped to reflect, learn and co-create this deliverable with the DSs and WPs, and provided insights on how best to align project activities and the Human and Digital Dimensions of the RKBs with SHE and co-creation in WP1.

These discussions resulted in the following two additional outcomes:

- Updated SHE and co-creation activity reports to improve links with inputs needed for RKBs development and implementation – the data from these reports can serve other WPs needs for data and insights from SHs;
- Bi-weekly meetings of the Human Dimension working group.

The next sections include a short summary of D1.1, the status updates of SHE across DSs, and finally reflections and next steps.

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2 Recap from D1.1 and new elements for D1.2

To help the reader understand the rest of the report, below we revisit Figure 2 from D1.1 about the tools and documents the DSs have been working with to develop and implement SHE and co-creation activities in their regions. In Figure 2, we have also now added a fourth element, which is the SHE and co-creation Gantt Chart (Figure 3) for coordination with WPs and monitoring and evaluation (M&E) spreadsheet (Figure 4).

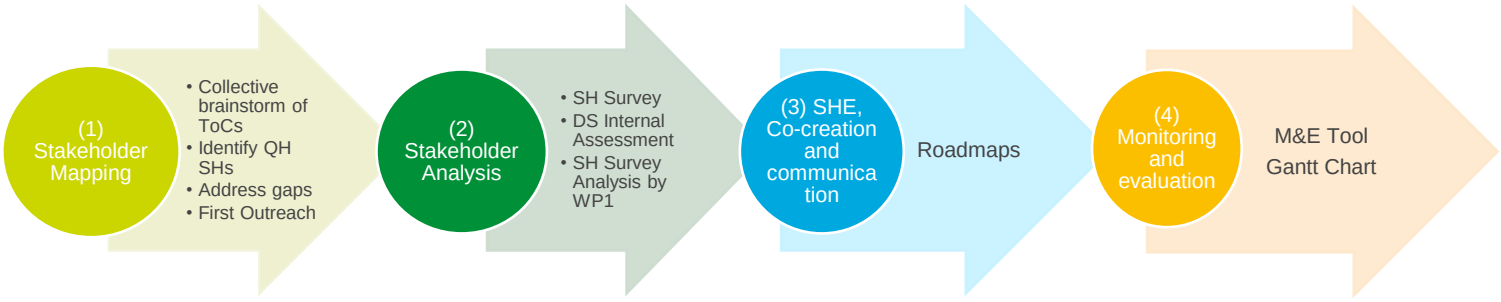

Figure 2 WP1 Steps for Stakeholder Engagement and Co-Creation

Each of the steps outlined below has supported the DSs to reflect on their region, tasks, goals within their contexts, to best identify, coordinate and engage SHs. As DSs in IMPETUS have a diverse array of climate change adaptation solutions and contextual realities, WP1 aimed to support DSs with general SHE and co-creation guidelines (as described in D1.1) that could be adapted and applied as needed to suit the needs of the DS.

(1) Stakeholder mapping:

a. DSs mapping Theories of Change (ToCs) – Collective Brainstorm.

b. Identifying the Quintuple Helix (QH) stakeholders in a SH register.

c. Addressing gaps in the SHs through snowball sampling, focus groups, etc.

d. First outreach to SHs via email, introducing the DS and the upcoming SH survey.

(2) Stakeholder analysis (SHA):

a. Stakeholder survey developed, translated into local languages with DSs, and distributed.

b. DS internal assessment with the Mitchell et al. (1997) framework for SHs power, interest and legitimacy assessment.

c. SH survey data analysis by WP1.

(3) Stakeholder engagement (SHE), co-creation and communications:

a. Bringing together the previous steps into a SHE, co-creation and communications roadmap.

(4) SHE and co-creation monitoring and evaluation (M&E)

a. DSs fill out M&E tool periodically with SHE and co-creation activities and data from SHE and co-creation activity reports and SH feedback forms.

b. Gantt Chart developed to support DSs and WPs collaboration on SHE.

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The last addition to Figure 2, the fourth component of the WP1 SHE and co-creation plans, was introduced to round up the entire process to ensure monitoring, reflection, coordination, and improvement based on lessons learned from SHE. To develop the M&E spreadsheet and Gantt Chart (see Figures 4 and 3, respectively), WP1 consulted with DSs and WPs what would be most useful for them.

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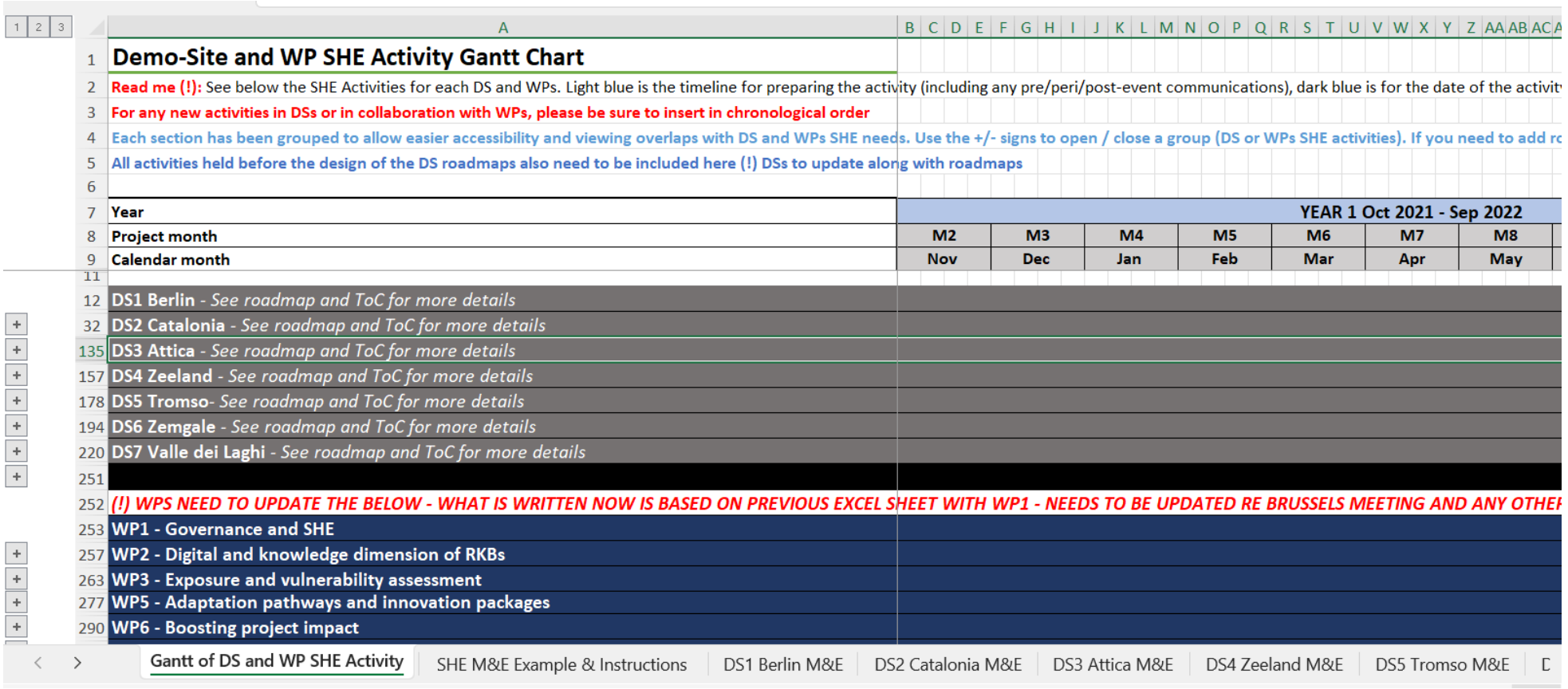

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
1	**Demo-Site and WP SHE Activity Gantt Chart**																												
2	**Read me (!):** See below the SHE Activities for each DS and WPs. Light blue is the timeline for preparing the activity (including any pre/peri/post-event communications), dark blue is for the date of the activit																												
3	**For any new activities in DSs or in collaboration with WPs, please be sure to insert in chronological order**																												
4	Each section has been grouped to allow easier accessibility and viewing overlaps with DS and WPs SHE needs. Use the +/- signs to open / close a group (DS or WPs SHE activities). If you need to add ro																												
5	All activities held before the design of the DS roadmaps also need to be included here (!) DSs to update along with roadmaps																												
6																													
7	**Year**	**YEAR 1 Oct 2021 - Sep 2022**																											
8	**Project month**	**M2**				**M3**				**M4**				**M5**				**M6**				**M7**				**M8**			
9	**Calendar month**	**Nov**				**Dec**				**Jan**				**Feb**				**Mar**				**Apr**				**May**			
11																													
12	**DS1 Berlin** - *See roadmap and ToC for more details*																												
32	**DS2 Catalonia** - *See roadmap and ToC for more details*																												
135	**DS3 Attica** - *See roadmap and ToC for more details*																												
157	**DS4 Zeeland** - *See roadmap and ToC for more details*																												
178	**DS5 Tromso**- *See roadmap and ToC for more details*																												
194	**DS6 Zemgale** - *See roadmap and ToC for more details*																												
220	**DS7 Valle dei Laghi** - *See roadmap and ToC for more details*																												
251																													
252	*(!) WPS NEED TO UPDATE THE BELOW - WHAT IS WRITTEN NOW IS BASED ON PREVIOUS EXCEL SHEET WITH WP1 - NEEDS TO BE UPDATED RE BRUSSELS MEETING AND ANY OTHE*																												
253	**WP1 - Governance and SHE**																												
257	**WP2 - Digital and knowledge dimension of RKBs**																												
263	**WP3 - Exposure and vulnerability assessment**																												
277	**WP5 - Adaptation pathways and innovation packages**																												
290	**WP6 - Boosting project impact**																												

Gantt of DS and WP SHE Activity | SHE M&E Example & Instructions | DS1 Berlin M&E | DS2 Catalonia M&E | DS3 Attica M&E | DS4 Zeeland M&E | DS5 Tromso M&E | D

Figure 3 Screenshot of Gantt Chart used by DSs and WPs to coordinate SHE Activities – DSs and WPs expand their sections using the plus on the left hand side to expand their Gantt Charts and indicate their activities and planning

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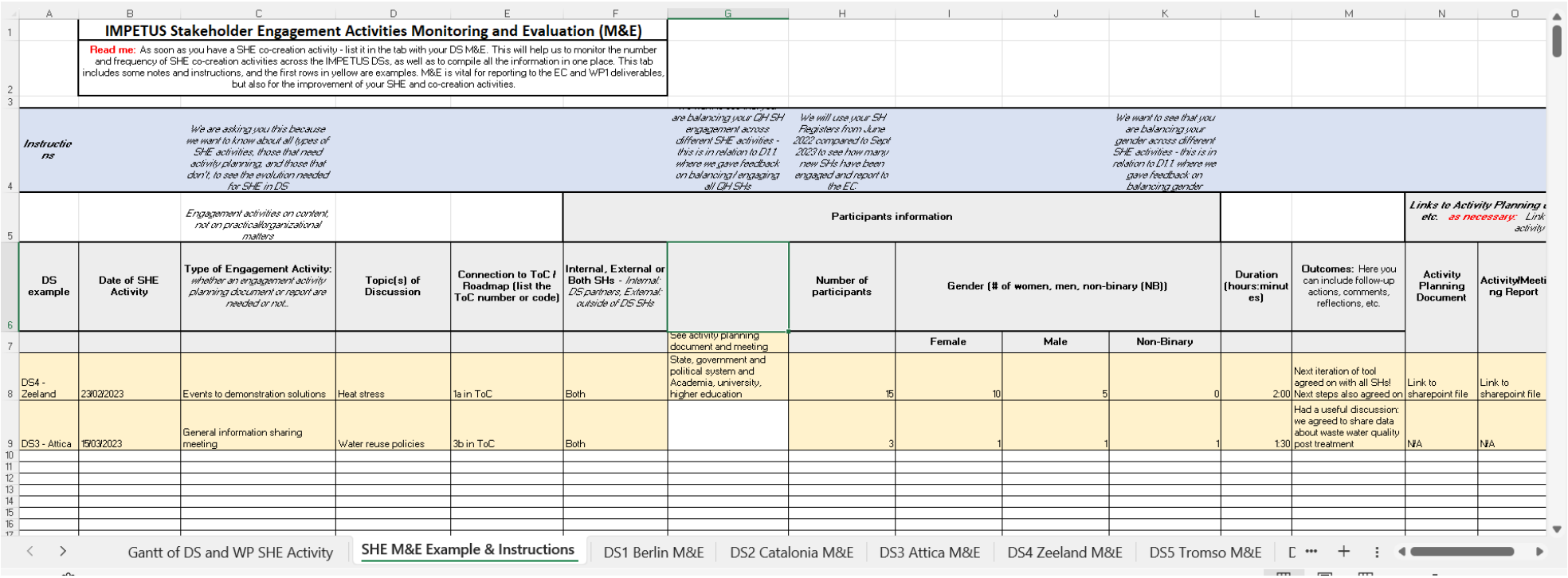

IMPETUS Stakeholder Engagement Activities Monitoring and Evaluation (M&E)

Read me: As soon as you have a SHE co-creation activity - list it in the tab with your DS M&E. This will help us to monitor the number and frequency of SHE co-creation activities across the IMPETUS DSs, as well as to compile all the information in one place. This tab includes some notes and instructions, and the first rows in yellow are examples. M&E is vital for reporting to the EC and WP1 deliverables, but also for the improvement of your SHE and co-creation activities.

Instructions		*We are asking you this because we want to know about all types of SHE activities, those that need activity planning, and those that don't, to see the evolution needed for SHE in DS*				*We will use your QH SH engagement across different SHE activities - this is in relation to D1.1 where we gave feedback on balancing / engaging all QH SHs*	*We will use your SH Registers from June 2022 compared to Sept 2023 to see how many new SHs have been engaged and report to the EC*			*We want to see that you are balancing your gender across different SHE activities - this is in relation to D1.1 where we gave feedback on balancing gender*				
		Engagement activities on content, not on practical/organizational matters			**Participants information**									*Links to Activity Planning etc. as necessary: Link activity*
DS example	**Date of SHE Activity**	**Type of Engagement Activity:** *whether an engagement activity planning document or report are needed or not..*	**Topic(s) of Discussion**	**Connection to ToC / Roadmap (list the ToC number or code)**	**Internal, External or Both SHs** - *Internal: DS partners, External: outside of DS SHs*		**Number of participants**	**Gender (# of women, men, non-binary (NB))**			**Duration (hours:minutes)**	**Outcomes:** Here you can include follow-up actions, comments, reflections, etc.	**Activity Planning Document**	**Activity/Meeting Report**
						See activity planning document and meeting		**Female**	**Male**	**Non-Binary**				
DS4 - Zeeland	23/02/2023	Events to demonstration solutions	Heat stress	1a in ToC	Both	State, government and political system and Academia, university, higher education	15	10	5	0	2:00	Next iteration of tool agreed on with all SHs! Next steps also agreed on	Link to sharepoint file	Link to sharepoint file
DS3 - Attica	15/03/2023	General information sharing meeting	Water reuse policies	3b in ToC	Both		3	1	1	1	1:30	Had a useful discussion: we agreed to share data about waste water quality post treatment	N/A	N/A

Gantt of DS and WP SHE Activity | SHE M&E Example & Instructions | DS1 Berlin M&E | DS2 Catalonia M&E | DS3 Attica M&E | DS4 Zeeland M&E | DS5 Tromso M&E

Figure 4 Screenshot of Monitoring and Evaluation Spreadsheet Example for DSs SHE Activities

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2.1 Recap of WP1 Meetings and Other Meetings related to SHE

In D1.1, we provided a table showcasing all the meetings and activities held to support DSs to develop their SHE, co-creation and communications activities. In this deliverable, we showcase in Table 1 using the same approach as in D1.1 what we have done in the last year to support DSs and WPs in implementing their SHE, co-creation and communications, including also the meetings and discussions of the Human Dimension working group and other relevant meetings that supported the understanding and common narrative for successful SHE across the DSs. The PowerPoints, if available, are hyperlinked for each meeting below.

Table 1 List of Activities related to WP1 and SHE to support DSs and other WPs

Date	Meeting	Goal
October 26th, 2022	Zeeland Demo-Site 4 Meeting at KWR	Presentations on tools from DS4, discussion on SHE, planning for coming year
November 15th, 2022	WP1, 2 and 5 Coordination	Coordination across WPs 1,2, and 5 on tools, RKBs and SHE
November 23rd, 2022	WP1, 2, 3, 5 Coordination	Coordination across WPs
Dec 11-17th	Planning Brussels Face-to-Face (F2F) Meeting	3 Meetings to plan and prepare for a face-to-face meeting in Brussels to coordinate across WPs and DSs in the project
January 6th, 2023	Weekly Planning F2F Brussels	Planning F2F Brussels
January 13th, 2023	Weekly Planning F2F Brussels	Planning F2F Brussels
January 19th – 20th, 2023	2 Meetings for Planning F2F Brussels	Planning F2F Brussels
January 24-25th, 2023	Brussels Meeting	Coordination across WPs and DSs, understanding timelines
February 24th, 2023	First Biweekly IMPETUS Consortium Meeting	Coordination across entire project
March 3rd 2023	WP1 and WP7 on SHE M&E	WP1 and WP7 coordination on M&E
March 31st, 2023	WP4 Meeting	WP4 Meeting, WP1 co-presents on interlinkages with SHE
April 20th, 2023	WP1 Meeting with DSs	Explain last step of SHE: Monitoring and Evaluation
July 5th, 2023	First Human Dimension Working Group Meeting	Discuss Human Dimension, what does it mean, what do we want to do, how can we do it – starting with user stories for the RKBs in a Miro Board
July 19th, 2023	Biweekly Human Dimension Working Group Meeting	Review and discuss actions – user stories in Miro Board
August 2nd, 2023	Biweekly Human Dimension Working Group Meeting	Review and discuss actions, align with WP2 user stories for RKBs
August 23rd, 2023	Biweekly Human Dimension Working Group Meeting	Review and discuss actions, continue to align with WP2 user stories and QH SHs
September 15th, 2023	IMPETUS Internal Bi-Weekly Thematic Meeting	Explain D1.2, get feedback on draft from DSs and WPs, discuss SHE and RKBs
September 15th, 2023	Biweekly Human Dimension Working Group Meeting	Review and discuss actions, how to align WP2, 3, 5 with WP1, 6, 7

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September 27th, 2023	Biweekly Human Dimension Working Group Meeting	Review and discuss actions, how to align WP2, 3, 5 with WP1, 6, 7
October 11th, 2023	IMPETUS and ARSINOE SHE Meeting – IMPETUS and ARSINOE shared General Assembly	Share lessons learned from SHE approaches in both projects, reflect on topics and themes of interest from the DSs
October 25th, 2023	Biweekly Human Dimension Working Group Meeting	Colleagues from WP6 on Multi-Sided-Platform (MSP) (Eurecat) joined – they will now join all future meetings. Discussed alignment across MSP and RKBs and Human Dimension – Human Dimension needs to be at the centre of the project. Each of the WPs in the Human Dimension needs to think of tasks and we write them down in an Excel Sheet to see how to work together.
November 8th, 2023	Biweekly Human Dimension Working Group Meeting	NTUA joined, worked through Excel Sheet of tasks created within the Human Dimension Working Group
November 17th, 2023	Bi-Weekly Synchronisation meeting	Shared with DSs present the updated coordination with WP2 and WP1 and when to have certain SHE Activities
November 22nd, 2023	Biweekly Human Dimension Working Group Meeting	Further discussions on task alignment and the need for more bilateral meetings across project partners after discussing Excel Sheet of tasks
December 1st, 2023	Bi-Weekly Synchronisation meeting	Discussed all DSs and WPs updates, but particular discussion on SHE and WP2 and 3 new SHE activities and reducing SH and DS fatigue – need to combine activities (updated working document, see section 4)
December 7th, 2023	WP1 and WP7 meeting	Discuss workflows, SHE Activity reports and data, as well as revision of T7.5.3 for DSs
December 7th, 2023	WP1 and DS7 meeting	Discuss upcoming SHE activities with DS7 – Valle dei Laghi – explain further what was discussed in bi-weekly meeting on December 1st 2023

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3 Status Update across all DSs Stakeholder Engagement and Co-creation Monitoring & Evaluation

As part of T1.2, WP1 has developed a M&E spreadsheet to monitor and evaluate the progress of SHE and co-creation. For D1.2, we will only be elaborating on the monitoring part, and slightly on the evaluation part with input from the SHE feedback forms and SH Activity Reports (in section 3.1. per DS), whereby SHs have given their feedback to DSs on certain SHE and co-creation activities. The feedback from SHs via the SH Feedback forms is, however, sometimes limited for two reasons: 1) due to the diversity of SHE needs in DSs, not all DSs needed to use SH Feedback forms at this stage because most SHE activities were smaller or more technical one-on-one discussions with certain SHs rather than larger workshops, and 2) some DSs are still building up to their larger SHE activities in the second half of the project where SH feedback is warranted and useful to collect. That is why there are some DSs without any data collected in the tables below. More in depth evaluation will be part of D1.5, looking at DS ToCs and if they achieved their desired outcomes and impact, including feedback from the DSs on their experiences with SHE and further input from SHs via the SH Feedback Forms, and other feedback mechanisms to further understand the impact of SHE per DS. Additionally, communications, monitoring and evaluation (which is part of WP7 and was combined as discussed in D1.1 with SHE, co-creation and communications) is not included in this spreadsheet for now, as there are other specific items that required further detailed measurement that WP7 will work on with the DSs at a later time and included in a WP7 deliverable.

In Table 2, we highlight the current numbers across the DSs SHE and co-creation monitoring based on the following parameters:

- Number of activities
- Number of internal meetings (just project partners), external meetings (with external SHs)
- Average size of SHE activities
- Gender balance across SHE activities

The data in Table 2 is based on SHE activities from the beginning of the project until December 2023, as reported in the DS SHE monitoring spreadsheets. SHE activities include co-creation workshops, internal and external meetings, outreach activities to SHs, etc. We wanted to capture not only the usual SHE activities, but also all the other parallel and smaller activities (bi-lateral meetings, smaller discussions, awareness raising, etc.) that occur to build relationships and engage the SHs to ensure they work together with the DS on their tools' development, as well as in the RKBs co-creation and implementation. The DS monitoring sheets and synthesis tables below in sections 3.1 through 3.7 therefore demonstrate how many different types of activities, big and small, internal and external, have taken place to carefully build relationships in the respective DSs with different SHs, plan SHE activities, to collect data and engage SHs to deliver outcomes and impact down the line. Table 2 captures a quantitative overview of the SHE activities, SHs engaged and gender balance, whereas sections 3.1 through 3.7 capture a qualitative overview of DSs SHE.

270 SHE activities hosted since the beginning of the project

In Table 2, we observe that DSs have hosted a vast number of SHE activities – over 270 activities! – with each DS showing different numbers of activities. For example, DS2 in Catalonia (see Section 3.2), have more tasks than the other DSs, and thus more SHE activities to be hosted to engage the different SHs for each task. Lower numbers of activities as in the case of DS1 in Berlin are a result of different planning for SHE activities, which will mostly take place in the latter years of the project (see Section 3.1 and DS1 SH Roadmap). We also observe the different numbers of internal and external activities hosted across DSs. Internal activities include discussions and meetings among DSs project partners (each DS includes more than one local SH as partner to the project) and sometimes other SHs who are not part of the project to plan SHE activities or discuss a specific topic or issue. External activities are

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those hosted by the DSs for their SHs who are not project partners to engage and co-create on a specific topic or task. Both are listed when both project partners and SHs are involved in an activity; i.e. some project partners can also be considered SHs, as is the case with Berliner Wasserbetriebe in DS1 Berlin, for example. DSs therefore used different planning and coordination techniques to engage SHs effectively within their local contexts. In Table 2, we also see a generally good average of gender balance across all DS SHE activities thus far. We showcase more details of the different SHE activities hosted per DS based on their contexts and tasks in subsections from 3.1 to 3.7.

Table 2 DS SHE Monitoring Synthesis Table

Demo-Site	Number of SHE Activities	Number of Internal (project partners only) and External (with SHs) Meetings		Average number of attendees of SHE Activities	Gender Balance across all SHE Activities	
		Internal	External		Women %	Men %
DS1 Berlin	21	11	10	19	42	58
DS2 Catalonia	98	57	41	7	57	43
DS3 Attica	18	2	16	7	43	57
DS4 Zeeland	16	0	16	2	50	50
DS5 Troms and Finnmark	60	31	29	4	46	54
DS6 Zemgale	30	21	9	12	67	33
DS7 Valle dei Laghi	27	3	24	8	28	72

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Stakeholder Engagement Activity Summaries and Synthesis per Demo-Site

This subsection includes, per each DS, a mostly qualitative synthesis of the DS SHE activities. Each DS first highlights in their own words a "Summary of SHE until now" description. They reflect on which SHE activities they have performed, who they have engaged, as well as challenges experienced and how they plan to overcome them, and successes thus far. Building on this update, we then provide a more detailed SHE synthesis table per each DS including the following parameters from the DS monitoring spreadsheets, SH feedback forms and SH Activity Reports (which are hyperlinked below when available):

- SHE activities per WP4 task or per cross-cutting task groupings;
- Types of QH SHs per activity, task, themes;
- Types of activities;
- Reasoning for these types of activities;
- SH feedback when available; and
- Qualitative data from the SH Activity Reports and event summary sentences when available.

These syntheses showcase all the different types of SHE activities required per each DS depending on their context (biogeographical region), tasks and topics (linked to WP4 solutions), and how much time, relationship building, and resources are required for effective SHE – including the effort required by DSs to navigate their local contexts and engage with their local communities in meaningful ways on climate change adaptation in their regions. The syntheses below showcase the variety of activities and approaches needed to address different problems and solutions with different SHs in the DSs.

Due to the diversity in DS solutions and the broad SHE guidelines offered by WP1 in the first year and a half of the project (as described in D1.1 guidance documents and SHE steps outlined in Section 2), information and data availability varies per DS. This is due to the DSs having either different approaches to SHE in their DS depending on their context and timing of activities, or the types of activities they have hosted up until now. WP1 will continue to work with DSs in this tailored approach. For detailed information, links to each of the DSs monitoring spreadsheets has been included.

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3.1 DS1 Continental – Berlin

Summary of SHE until now

DS1 (Berlin metropolitan area – Germany), representing the continental biogeographical region, focuses on two tasks: T4.7.1, addressing challenges of urban water management utilizing a regional water balance model to assess competing water uses, and T4.18, Decision Theatre (DTh) for regional integrated water resource management that utilizes the results of T4.7.1. A DTh is an innovative format of SHE based on an IT-supported discussion with interactive visualization environments performed with distinct groups of the QH SHs (e.g. public authorities, companies, citizens) to aid decision making. Therefore, the DThs are the most relevant SHE and co-creation activities in DS1, which will be conducted in 2024 incorporating the results of preceding modelling activities carried out in T4.7.1. In addition, the two most relevant SHs regarding DS1 are active partners of the IMPETUS project: Berlin senate as political authority, and Berliner Wasserbetriebe (BWB) being the largest water utility in Germany. Collaborative work (e.g. meetings on modelling activities, scenario definition, etc.) within IMPETUS DS1 with relevant personnel of these key partners is an important part of the SH co-creation activities in DS1, which took place regularly during the first two years of the project. This work especially feeds into the Berlin water management strategic plan ("Masterplan for water") that was proposed by the Berlin senate about one year ago. Other SHE activities address other SH groups, raising awareness of the topic and challenges, and paving the way for the DTh.

Beside these two key SHs, other SHs also play a role when addressing water management issues. From the beginning of the project, a large number of SHs were identified and mapped in a SH register following methods provided by WP1. This included a survey campaign that was conducted along with a press release and social media campaign in order to gain publicity. This initiative appeared to be successful in DS1, as there was a good response to the survey from stakeholder groups representing all QH categories addressed in IMPETUS. Survey participants were also included in the SH register. The register will then also be used as basis for the selection of participants for the DTh in 2024.

Furthermore, various activities were conducted aimed at engaging different SH groups, in addition to the most relevant ones mentioned above, and others in the Berlin region. This included the presentation of the project to the customer advisory board of the BWB, consisting of citizens interested in participating in discussions on water-related challenges. These would also be a good target group for the selection of participants for the DTh performed with citizens as SHs. Two guided tours to a Berlin wastewater treatment plant and waterworks for production of drinking water with project partners and the BWB customer advisory board were part of these SHE activities. The objective of these visits also included a knowledge transfer for partners directly involved in IMPETUS modelling and DTh activities. This helped expand the background knowledge to be applied in the SHE activities, as wastewater and drinking water treatment plants are core facilities for urban water management. Also, exchanges and presentation of IMPETUS activities to other initiatives in the region were conducted (e.g. exchanges with the CliWac project, presentation of IMPETUS and DS Berlin activities at SH workshop on water management challenges, strategies and scenarios in Israel and Germany, participation at final conference of WADKlim project on "Impact of climate change on water availability"). Other activities included the development of an infographic together with WP7 that visually explains water-related challenges in DS1 with a subsequent social media post. This infographic was prepared to be used for easier communication of the topic and challenges to potential SHs, for example, during preparatory communication activities for the DTh.

In summary, various SHE activities were successfully performed in DS1. In the second half of the project (M28 onwards), the most important SHE activities will be related to the realization of the DTh. Another important aspect will be the promotion of the DTh concept. This will represent an important part of the RKB development for DS1 as well as other DS1 RKB tools where user stories will be developed (within WP2 tasks) to make sure that relevant tools will sustainably support decision making in regard to urban water management for Berlin.

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DS synthesis of SHE activities

Link to the Monitoring Spreadsheet DS1

Table 3 DS1 Synthesis of SHE Activities

Activities	Synthesis
Activities on **Task 4.7.1** (urban water resources management) and **Task 4.18** (Decision Theatre (DTh) for regional integrated water resource management): - Both tasks are heavily interlinked - 21 SHE activities, building momentum to achieve the tasks / goals - 8 activities with external SHs, 11 with partners, 3 bringing both partners and SHs together - QH SH: engaged mostly Academic, Industry and State systems	DS1 over the last years has been internally discussing and identifying the right SHs to be involved, raising awareness on IMPETUS and the DS goals, and gathering insights, synergising with other local projects on related topics, and knowledge from key SHs in their region. This supports the goal to launch the DTh in the coming year, as their main SHE activities. The last SHE activities of 2023 included revisiting the goals with the project partners who also double as SHs (BWB and the Berlin Senate) and working on the mock-up for the Berlin water tool which will go into the DS1 RKB.
SH Feedback from events	None collected as main SHE activities – the DTh – will be hosted from M28 onwards
Communications and other relevant engagement activities:	- Launch of the survey on KWB website - Information on IMPETUS and local SHs survey to public via press release and social media posts - Publication of infographics about water-related challenges of DS Berlin on IMPETUS website

3.2 DS2 Coastal – Catalonia

Summary of SHE until now

DS2 (Catalonia – Spain), representing the Coastal biogeographical region, integrates different tasks and a wide range of solutions for water systems, coastal erosion, biodiversity, and tourism. The Catalan coast stretches along 600 km with diverse temperatures, geography and biodiversity. The nine tasks included in this DS represent the variety of climate challenges that this region faces as well as the complexity of SHE. One first step has been identifying shared ideas and concerns of all the SH groups. One common view is the key role of SHE to provide a novel governance structure for coastal management and decision-making towards climate adaptation. As the project progresses, the different views, roles, and power of SHs already involved in each task begin to surface, as do the opportunities for co-creation and co-decision making. This has been particularly evident in the case of local administrators, managers and economists in the agricultural and tourism sectors, and regional policy makers. These three groups of actors have been the first to be engaged, also due to their prominent role in steering decisions. The engagement activities have revealed distinct approaches for each group.

A first approach has focused on identifying uses and users of solutions developed in DS2, which is one of the main concern of administrators. For example, one of the solutions tests the efficiency of constructed wetlands for agricultural wastewater treatment in regard to pesticides removal. During preliminary meetings and seminars with the agricultural community and the regional water authority there was debate on how to use and implement the solution, and even on who the main users would

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and should be. The future meetings will have to further inquire on uses and user identification. In a similar line of debate, the solution to develop a methodology for sand dune restoration has initiated engagement activities mainly with the managers of the Natural Park and the local authorities. These actors have started to provide access to data and monitor the current implemented dune restoration strategies also as a first step to identify uses and users of the deployed solution.

A different story emerges when engaging managers and economic actors. For example, the meetings with SHs involved in decentralised systems for wastewater reuse in Tamarit, in strategies for sediment transport at Ebro Delta, and water quality and its risk after severe storms in the bathing areas in the city of Barcelona, have unveiled an urge to access solutions that can have a direct impact on economic activities, especially tourism. Policymakers have shown particular interest in co-creation as the path for policy design and implementation. This was seen in the meetings with water companies and water authorities when discussing strategies for resilient drinking water treatment plants. It was also the case during co-creation workshops about behavioural change for climate resilient tourism that had the objective of identifying key factors that can determine adaptation policies.

The tools used during preliminary engagement activities in DS2 have been mainly for diagnosis and exploration purposed. In some cases, they have awakened debates on needed and potential users, while in other cases they have focused on co-creation and future implementation of the solutions. A review of the engagement activities so far shows that there is still a story to be told even by traditional decision-makers as to how the solutions proposed in IMPETUS can be used.

DS synthesis of SHE activities

Link to the Monitoring Spreadsheet DS2

Table 4 DS2 Synthesis of SHE Activities

Activities	Synthesis
Activities on **T4.2** (Below sea level multifunctional wetlands): - 5 external SHE activities building on each other - Over 90 SHs engaged from all QH groups	In task 4.2, the task leaders began first with disseminating the IMPETUS project and this task to SHs in different forums and events, e.g. BlueNetCat Forum and to other SHs. Other discussions on synergies occurred in smaller side meetings with 4 representatives from both the irrigation community and the natural park representatives – with the irrigation community, it was to obtain permits, and with the natural park representatives, it was to discuss about the desired project and task outcomes.
Activities on **T4.3** (Sand dune restoration and monitoring to prevent coastal erosion): - 49 SHE activities: 21 external and 28 internal - Over 330 SHs engaged across the QH groups	Internal coordination activities occurred at the beginning to set the stage for the external SHE activities, then external activities to raise awareness and present the IMPETUS project and task goals to different SHs, followed by further internal meetings to discuss inputs from SHs and update technical details, and so on.
Activities on **T4.5.1** (Decentralized hybrid fit-for-use water reclamation systems for increasing water availability): - 3 internal meetings on coordination of the partners and goals in the task, and to follow up on SHE activities - 6 external SHE activities, engaging 35 SHs	In T4.5.1, we see that the task leaders first aligned with each other to align structure, content and ideas, followed by raising awareness among the relevant SHs about dune system resilience. Then the task leaders discussed with relevant SHs about the sampling campaign, its results, and progress.

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Activities on **T4.6** (Sediment transport in deltas)	No activities yet. First activities planned for Spring 2024 – see SHE Roadmap in Annex 6.2.
Activities on **T4.8.1** (Improving bathing water quality after extreme storm events): - 1 activity with external SHs - 5 participants	Collaboration framework for sampling campaign involvement and water quality monitoring data request - Collaboration agreement to be defined and signed.
Activities on **T4.8.2** (Increasing drinking water plants' resilience to water-borne pathogens): - 5 SHE activities: 4 external and 1 internal - 27 SHs engaged	For T4.82, DS2 started off by raising awareness of the project and the activities and goals with local SHs, who expressed their interest to participate in the project. Then they had meetings with the local SHs to inquire about the use of their local installations, followed by individual SH meetings, which resulted in agreements on close collaboration with the local water utility and agreement on next steps. The latest activity was an internal project partners planning activity on the mock-up of the RKB user stories for this task and to define who the users will be and what functionalities can be developed based on discussions and knowledge of their needs.
Activities on **T4.22** (Pursuing behavioural change for climate resilient tourism): - 18 SHE activities, with 1 external SHs, the rest all internal project partners	In this task, URV, UDG, Eurecat and Lobelia are the main project partners and SHs. They first had to define for themselves the means of collaboration and roles of each of the project partners for this task, as well as collect information and define the appropriate methodologies for engaging SHs. Finally, on October 7th, there was a workshop with SHs on 'Pursuing behavioural change for climate resilient tourism' where all QH SHs were engaged and 27 people joined from the region. During this co-creation activity, the project partners worked on behavioural change in resilient tourism in Costa Daurada tourist destination.
SH Feedback from events:	None collected

3.3 DS3 Mediterranean – Attica

Summary of SHE until now

The IMPETUS project in the Attica Region (DS3 – Greece), representing the Mediterranean biogeographical region, provides the tools, methods and tested solutions that increase resilience of the Attica region by integrating various tasks and a wide range of pilot solutions and applications for climate change adaptation. These are: water reuse solutions from sewer mining (SM) technologies (T4.5.2), optimisation of water, energy and material resources through Controlled Environmental Agriculture (CEA) solutions (T4.20), biodiversity and reforestation strategies (T4.4), digital twins of the region (T4.10.4), Attica master and business plans (T4.15), as well as simulation and optimisation models for wastewater systems (T4.5.3). Further, all the developed tools of WP3 (such as the Hot-spot Identification and Prioritization Service - HIPS), as well as the Attica RKB, are deployed and applied in this DS with SHs as policy making instruments. These activities and tasks engage regional SHs in a co-creative process so that the products are of immediate use for the end users, and so that they may support the decision-making process on climate adaptation through a holistic, societally and scientifically sound approach.

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From the very start of the project, a large group of SHs were identified and mapped in the Attica SH Register. As the project progressed, the DS3 team reached out to SHs through a variety of methods to inform them about the project and the expected results and outcomes. Together with the SHs, the DS3 team was also able to explore co-creation opportunities so that the different views and roles of SHs could be incorporated into the DS activities.

A first SHE activity included a survey campaign that was conducted with a press release in order to gain publicity through the media and to raise awareness. This initiative helped increase the visibility of the project in the regional media (e.g. an interview from the NTUA team was performed in the press) and led to an increase in responses in the IMPETUS DS SH survey on climate change adaptation needs and views.

As a next step, individual meetings were scheduled with key SHs that did not respond to the survey. This was done to also engage with these SHs to initiate a collaboration process. During these meetings, SHs were informed about the project and were invited to participate through their own potential initiatives, tools or services, and for example in the online digital twins' environment that is being developed in DS3. The invitation to participate and collaborate in order for their initiatives to gain visibility was a powerful incentive.

The type of SHs engaged belonged mainly to three groups: (a) state, government, regional and local authorities, (b) farmers and local partners, and (c) SME representatives (many from the start-up society through the National Green Innovation Program GreenTech Challenge). The overall SH awareness raising and relationship building process lasted from September 2022 until June 2023.

In parallel, the first regional DS3 IMPETUS newsletter was launched (December 2022) to follow up on the SH connections made. In this newsletter, results of the IMPETUS DS Attica survey campaign were presented along with the new developments in the project in the Attica region, as well as the expected results.

After processing the feedback of the SH meetings and progress with the development of some of the project tools, services and applications, DS3 held a regional participatory workshop in October 2023 to introduce the tools and initiatives (including the RKB platform) to the SHs. This was done to get feedback and further work towards consensus on project ideas. The benefits, limitations and challenges of using the tools and applied solutions were also discussed, and opportunities and methods of leveraging the specific tools in the Region of Attica identified. The purpose of the workshop was to co-define with SHs the short and long-term engagement in the project and to enhance their knowledge and vision on climate change adaptation initiatives as well as to seek potential ambassadors (Subtask 7.3.2., WP7). The workshop was also considered successful because of the variety of key SHs covering most of the QH SH groups and functions who were present and actively participating, including representatives from local, regional and central administration, water companies, the scientific community, SMEs and NGOs.

The next steps of SHE in DS3 will be the second newsletter on DS Attica to be released by the end of 2023 and the next SHE workshop to be held in the Attica pilot sites (Eastern Attica). Furthermore, it is intended to continue updating the SHE roadmap with new activities that work toward implementing the tools in DS3 and to implement the RKB, ensuring its longevity beyond the project. The engagement of the SHs in the process of developing the RKB element is crucial as they have a key role to play and opportunity to share their views and suggestion on how such instruments would benefit policy makers and support the implementation and acceptance of tested solutions and tools.

In conclusion, the tools and methods used during the initial engagement activities have mainly showed that SHs need to be reached out to on a periodic basis. There needs to be follow up and continued communication to keep SH in the loop of new developments, while at the same time avoiding SH fatigue. A review of the engagement activities so far shows that there is a lot of interest in the tools and solutions in DS3, as the interest of SHs is high. At the same time, it is evident that some key SHs are unresponsive, which presents a challenge that needs to be managed. All relevant QH SHs need to be activated in a balanced manner so that the results of the project are sufficiently exploited and used during and after the end of the project.

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DS synthesis of SHE activities

Link to the Monitoring Spreadsheet DS3

Table 5 DS3 Synthesis of SHE Activities

Activities	Synthesis
Overall: - 18 SHE activities focusing on the CEA solution, sewer mining and the digital twin.	- In DS3, the SHE activities focused mostly on engaging the SHs on the CEA and digital twin. - From the beginning, DS3 recognized the importance of first raising awareness of the project and the DS to the local SHs via newsletters and smaller SHE activities, exploring potential collaborations with key SHs, and seeking a balanced involvement of SHs of the QH. After more than a year, the DS was able to engage a vast range of QH SHs in a regional workshop in October 2023 which was a successful event showcasing all relevant tools on climate adaptation in DS3, and the RKBs. (Feedback from this workshop is provided in the last row).
Activities on **T4.20** CEA solutions: - 3 SHE activities - QH SHs: State, government and political system, Uninformed citizens, media and culture	- The context, potential collaborations and where to implement the CEA were first explored. - The right area and requirements, and agreements to implement pilot were identified. - Involvement of SHs in the project (farmers) discussed.
Activities on **T4.5.2** SM technologies: - 2 SHE activities - QH SH: State, government and political system, project partners -	- Discussed where to host the SM configuration and pumping station. - Other requirements for installation discussed.
Activities on **T4.10.4** Digital Twin: - 11 SHE activities - QH SH: State, government and political system, Industry and Economic system, uninformed citizens, media and culture, Academic system	- Raising awareness activities, exploring initiatives and collaboration. - Agreements established; MoU signed between farmers and project partners for data sharing. - Agreements on technical aspects and connecting to DS3 RKB.
SH Feedback from event on October 5, 2023: 25 respondents Feedback on: 1. Meeting logistics 2. Stakeholder Engagement General	The qualitative data below are based on a review and compilation of the questions per each section (as seen in the lefthand column) of the SH Feedback forms. A summary is given for each section on how the SHs perceived each element of the SHE activity overall, including what was perceived as working well, or what

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3. Stakeholder Co-Creation 4. Outcomes and conclusions 5. Value of the meeting 6. Most interesting aspects	needs improvement. A summary sentence of the event is given, which is taken from the DS Activity Reports the DSs write themselves after each SHE activity. 1. Meeting logistics were considered good 2. Improvements can be made for 'During the workshop I improved or created new contacts with other participants', but most believed that 'The workshop had a culture of openness, learning, sharing and listening. 3. Improvements to be made on ensuring all stakeholders were present at the workshop, however respondents thought that the topics were discussed in the right ways during the workshop. 4. Improvements to be made on the time to reflect as a group on this collective experience and function, but respondents through that their participation in the workshop increased their knowledge about the challenges, solutions and opportunities of climate change at the local level. 5. Half of respondents thought the meeting was extremely valuable, and another third thought the activity was very valuable. 6. Half of the SHs surveyed said that the most interesting aspects were: Interact, learn and exchange ideas with other stakeholders., The content of the workshop, topics and related discussions., The presentations by the organisers of the event.

3.4 DS4 Atlantic – Zeeland

Summary of SHE until now

IMPETUS activities in DS4 (Zeeland and Rijnmond - the Netherlands), representing the Atlantic biogeographical region, focus on three tasks: T4.10.1 Heat awareness system, T4.10.2 Integrated decision support tool coupling a flood risk model onto a digital twin, and lastly T4.25 Decision Support Tool to support the decarbonization of industrial clusters.

Despite all 3 tasks in this DS being very technical, SHE remains an essential part of all three tasks and has guided the direction of the technical development. Close to the start of the IMPETUs project in November/December 2021, N&S kicked of the SHE process by planning multiple small-scale SH meetings with different organizations that are involved in heat stress or flood risks (or both) in Zeeland or Rijnmond. During this period, meetings were organised with the municipalities of Dordrecht, Middelburg, Reijmerswaal, Rotterdam, Schouwen-Duiveland and Vlissingen, the Water Authorities of

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Schieland & de Krimpenerwaard and Hollandse Delta, and the Provinces of Zeeland and Zuid-Holland. These initial small-scale meetings were focused on obtaining more insight into the context in which these different governmental organizations operate when it comes to heat stress and flood risks. The organizations were asked about their activities related to both heat stress and flood risks, and the opportunities and challenges that they face. The information and insights that N&S obtained from these small-scale meetings, was documented in an internal synthesis report. This report was the basis for further development of the heat stress tool and the flood risk activities.

From the small-scale SH meetings, N&S concluded that the theme of heat stress is quite new in the Netherlands. In contrast to flood risks, which is a major theme in the Netherlands, there are no strict policies or rules in place yet for heat stress. Many governmental organizations are in the process of defining their goals and activities related to heat stress. This led to the conclusion that it could be useful to develop a heat stress tool that visualizes heat stress geographically. In two different workshops on heat stress, different SHs were invited to brainstorm together on the functionalities that such a heat stress tool should have. The input from these workshops was very valuable input for the development of the heat stress tool thereafter. The heat stress tool that is being developed as part of the IMPETUS project will become available as a demo version in the RKB of DS4.

Related to the topic of flood risks, the initial small-scale meetings led to the conclusion that policy and activities related to flood risk in the Netherlands are quite extensive. There is a lot of information available, and different organizations make use of different types of models and software for the development of flood maps and calamity models. However, most visualizations of flood risks are in the form of 2D maps. With the development of 3D digital twins, there is now an opportunity to visualize flood simulations in 3D as well. This would provide decision makers and policy makers with a strong visual aid to better understand the extent, consequences and causes of a flood event. This conclusion led to the decision to focus on the development of '3D-tiles' in Task 4.10.2. These 3D-tiles will enable the 3D-visualization of flood simulations in a 3D digital twin.

During the project, it became clear that SHE is very important for the execution of project tasks in DS4. Even though the tasks that must be carried out in this DS are very technical, we have seen that SHE was crucial in choosing the direction of each technical development. The goal of each of the tasks in DS4 is to develop something that can be used by the SHs, also after the project ends. Therefore, it is important to involve the relevant SHs during the project as much as possible.

DS synthesis of SHE activities

Link to the Monitoring Spreadsheet DS4

Table 6 DS4 Synthesis of SHE Activities

Activities	Synthesis
General SH meetings, unrelated to specific tasks: - DS4 hosted 11 small group meetings with different SHs in the DS (including a diversity of QH SHs: representatives from municipalities, provinces, water authorities, and universities)	During the first 6 months of the project, 11 different meetings were organised, with different SHs in the DS. These meetings enabled a better understanding of the challenges in relation to both heat stress and flooding in the DS. Also, it led to a better and more complete overview of the different activities and projects that had been undertaken in relation to these climate themes in the region, and the developments that we could expect in the (near) future.
Activities on **T4.10.1** heat stress: - 2 workshops with multiple SHs focused on requirements for the heat stress tool. - 2 one-to-one meetings with municipality of Schouwen-Duivenland	The two workshops focused on the different requirements for the heat stress tool. During the workshop, both SHs from the municipality of Schouwen-Duivenland and the University of Zeeland joined and gave their input. The one-on-one meetings with the municipality of Schouwen-Duivenland were very useful to get a

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- QH SHs: Mostly with State, Government and Political system, and Academic System	better understanding of the context in which the municipality operates in relation to the heat stress theme. A lot of knowledge on the different regional developments related to this theme was gained.
Activities on **T4.10.2** flooding: - Workshop with multiple SHs focused on the challenges and needs in relation to flood risks. - One-to-one session with municipality of Almere - Meeting with Province Zuid-Holland, Water Authority of Rijnland and different municipalities to discuss to use of flood risk information in relation to spatial planning and development. - Different meetings with municipality of Rotterdam - QH SHs: Mostly with State, Government and Political system, and Academic System	– The workshop on flood risk challenges and needs led to a much better understanding of the challenges that different organizations face when it comes to taking flood risks into account in spatial developments. – During the session with the municipality of Almere, clear requirements for the development of 3D-tiles were set. This development will enable the visualization of flood simulations in an online 3D-environment. – The meeting with the province, water authorities and the different municipalities led to the insight that there are no practical guidelines on how to incorporate flood risks in spatial planning processes and developments for municipalities. This need is currently being looked at within the IMPETUS project. – The different meetings with the municipality of Rotterdam are still ongoing and are meant to explore whether or not the 3D-tiles could also be implemented in their digital twin and if so, what this would look like.
SH Feedback from events:	None collected

3.5 DS5 Arctic – Troms and Finnmark

Summary of SHE until now

The DS5 (Troms and Finnmark – Norway), representing the Arctic biogeographical region, focuses on three tasks: T4.11 Climate proofing of Tromsø city centre and of its urban water infrastructure against sea level rise, T4.12 Early-warning systems for geological and avalanche risk sites, and T4.19 Co-design a Marine Spatial Planning framework. These tasks have few overlaps in terms of topics, which means that different SHs are engaged for each task. The difference between the three tasks is a challenge in ensuring a successful SHE for the whole DS, as the IMPETUS team members working in T4.11 are involved in SHE but are not involved in T4.12 and T4.19. Internal communication around SHE between the tasks therefore needs to focus on the planning of future SHE activities (WP1 and WP7). The status of SHE for the three tasks will be presented separately for each task below.

Status for T4.11: Tromsø municipality is a vital SH to engage to succeed with climate proofing of Tromsø city centre as the municipality has the decision and planning authority over land use, including implementation of climate adaptation measures. In addition, the municipality is responsible for technical/infrastructure services like water supply, sewage systems and also local roads and community safety. The municipality has been invited to a series of workshops where the first was held on the 27th

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of April 2023 and the second on Nov 28th, 2023. An identified challenge in communicating with the municipality is that climate adaptation is an issue that spans across different departments within the municipality, and therefore there is no single entry-point for discussion. Ensuring that a large number of different sectors in the municipal organization are present at the workshops is thus crucial for ensuring that the project, and climate adaptation, is sufficiently implemented in the municipal organization. The desirability of, and actual possibilities for, a cross-sectoral climate change adaptation unit in the municipal organisation is also discussed as a topic for the final workshop. We did manage to include also the Harbour authorities in the first workshop, who is one of the central SH related to climate adaptation along the seafront area.

For the more technical aspects, the task is in close collaboration with Troms and Finnmark County Council (TFFK) on the development of a Digital Twin. The consultancy firm SWECO has also developed virtual reality (VR) visualizations of a storm flood event in Tromsø city centre with the predicted sea level rise of 2100. This proved to be a powerful communication tool. The visualizations of a flooded Tromsø city centre were tested out on politicians, the municipal administration and the public during the spring of 2023. Seeing a familiar context being flooded seemed to play a part here in eliciting a reaction and showcasing the potential future devastation to the city due to climate change. The effect of VR-technology as such was also discussed, and how it is a good tool to show the challenges of climate change and enable action. Sea level rise is a gradual and long-term process, and as such it can be difficult to communicate the urgency of adapting to it, or indeed to assess at which point action is urgently needed. As the VR-visualization turned out to be an effective communication tool, the plan is to feed new climate data into the visualization (by early 2024) and be able to use it further in the engagement of SHs. The discussions with SHs when showing the VR-visualizations also clarified that there is a need to get the issue of climate change on the broader public agenda for the issue to get prioritized in the municipality. A potential pitfall here is that there is not much funding left to continue the collaboration with SWECO.

The idea of creating a citizen panel has been discussed with Tromsø municipality. During the citizen panel, a group of citizens would be engaged in a local adaptation issue, informed by experts on climate adaptation, and discuss potential solutions. Although the municipality showed interest, a decision still needs to be made on such an approach. This is an example of how SHE initiatives are not always a fast moving and smooth process.

A mix of QH SHs have been engaged in T4.11 so far including State, government and political system (Tromsø municipality - administration and politicians, TFFK), Industry, firms, economic system (SWECO, inviting someone from the financial sector is also discussed for the final workshop to discuss insurance and cost-sharing issues related to climate adaptation), Media-based and culture-based public (public event, and potentially through a citizen panel in the future).

Status for T4.12: During the design of the slush flows study and development/improvements of a slush flow early warning system, the Norwegian Water Resources and Energy Directorate (NVE) has been consulted. NVE is the home of the national slush flow forecast centre. The study was designed to find methods for potentially improving the national slush flow forecast. Furthermore, Statens Vegvesen (SVV - the Norwegian Public Roads Administration) and the county geologist in Troms and Finnmark county (TFFK) have been involved with providing data aiding in field work and show a general interest in using the results of this study to make the roadways safer. The SHs engaged in T4.12 can so far all be categorized as State, government and political system in the QH model.

Status for T4.19: Working with the technical aspects of the Marine Spatial Planning (MSP) Framework has required DS5 to work with the consultancy firm Geodata AS. Geodata is an expert in GIS software and technology and is frequently being consulted on the design and functionalities of the Marine Spatial Planning Framework and the Digital Twin, which are both planned to be embedded into the DS5 RKB. In addition, TFFK is in close collaboration with UiT – the Arctic University of Norway working on both SHE and the technical solutions. Development of the MSP Framework is a continuous process and data providers are mainly public governmental agencies and research institutes. These stakeholders are providing technical and scientific input to the MSP Framework. At this stage, the majority of data is available for the MSP Framework. However, this might change during development as there might be a need for additional data. Hence, the MSP framework team keep a close dialog with all relevant data providers and stakeholders. All relevant municipalities in the region will be engaged, as they are considered the main stakeholder and user of the MSP Framework. This is related to the current

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application process and dialog involving fisheries and aquaculture industry in the region. These municipalities will be engaged directly when the first version of the MSP framework is available. This will ensure that these stakeholders provide more direct input on data, process and planning, which is most relevant in the MSP framework. These inputs will go directly go into further development and improving the MSP Framework. Other SHs who have, and plan to be involved in T4.19 is the marine or aquaculture Industry, firms, Academia, universities, higher education system (UiT) and State, government and political system (municipalities in the region).

SHE has been done separately for each task as they work towards different climate change and adaptation goals. The type of SHE has also varied depending on what has been suitable for the specific task and SH group. For DS5 tasks, SHE as a process can make it more difficult to control the progress in the project timewise. However, it can lead to more informed solutions related to climate change and adaptation. A common denominator for future SHE is the communication of preliminary results and potentially how SHs can be engaged and influence further development of the tools. Up until this point, the RKB and the different tools developed in the DS has not been thoroughly introduced to the SHs, as there are currently discussions on how SH testing of the RKB will be carried out, and these tests are planned to be carried out in the fall of 2024.

DS synthesis of SHE activities

Link to the Monitoring Spreadsheet DS5

Table 7 DS5 Synthesis of SHE Activities

Activities	Synthesis
Overall: - DS5 hosted 57 SHE activities, ranging from smaller coordination meetings to a few larger SHE activities for all tasks	- DS5 hosted first a series of SHE activities thar supported relationship building with key local stakeholders, and from there, began hosting larger workshops, conferences and BarePrats (discussions) with local SHs to get their input on the climate adaptation solutions - DS5 has also had several meetings with other EU projects, other local projects and attended presentations to ensure synergies across climate change adaptation solutions in the Troms and Finnmark region - DS5 has also engaged university students on the topics for their DS during a two hour lecture and discussion, which resulted in reflections on SHE and nature based solutions
Activities on **T4.11** climate proofing Tromsø city centre: - 40 SHE activities, internal and external, small and large - 21 internal meetings to organise events, build relationships - 5 workshops and larger SHE activities to discuss climate adaptation strategies - QH SHs: Mostly with State, government, political system; Industry, firms,	- For T4.11, DS5 hosted a number of internal and smaller activities to first build relationships, bring in SHs and brainstorm SHE activities. - Then, a series of workshops with local SHs were hosted to discuss climate adaptation strategies, including the digital twin, harbour side adaptation and using VR technology for demonstration purposes.

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economic system; Academia, universities, higher education system.	
Activities on **T4.12** Early-warning systems for geological and avalanche risk sites - 3 SHE activities, all external - QH SH: Only State, government, political system	- Smaller group meetings to discuss slushflows, avalanches observations and data - Discussed research planning and fieldwork
Activities on **T4.19** marine spatial planning framework: - 20 SHE activities, internal and external, small and large - 7 internal and 6 external meetings and activities - QH SHs: Mostly Academia, universities, higher education system; State, government, political system	- Several internal coordination meetings held prior to hosting larger SHE activities targeted to specific SHs - 3 larger activities held – two conferences with minister and one 'BarePrat' to understand the public's views and shifting political climate - Thereafter, several smaller SHE activities to discuss and embed IMPETUS and T4.19 solutions into local planning and coordinating technical solutions
SH Feedback from event on April 27th 2023 – Workshop with Tromso municipality: 6 respondents Feedback on: 1. Meeting logistics 2. Stakeholder Engagement General 3. Stakeholder Co-Creation 4. Outcomes and conclusions 5. Value of the meeting 6. Most interesting aspects SH Activity Reports per event for more information: - April 26th 2023 - April 27th 2023 - Workshop with Tromso Municipality - April 27th 2023 2nd event - Presentation and discussion with public in an arena for urban development	The qualitative data below are based on a review and compilation of the questions per each section (as seen in the lefthand column) of the SH Feedback forms. A summary is given for each section on how the SHs perceived each element of the SHE activity overall, including what was perceived as working well, or what needs improvement. A summary sentence of the event is given, which is taken from the DS Activity Reports the DSs write themselves after each SHE activity. **April 27th event**: Workshop with Tromso municipality **Summary sentence of the event:** Setting the scene for the status of climate adaptation in Tromsø municipality 1. Improvements to be made on ensuring that all SHs receive information about the meeting well in advance of the meeting. 2. Stakeholders thought that all ideas and perspectives were included and recognised in the discussion. 3. Improvements to be made on ensuring that all stakeholders were present during the meeting. 4. Respondents thought that the meeting gave them more knowledge about climate challenges, solutions and local opportunities.

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	5. Two-thirds of the respondents thought this activity was very valuable 6. Most of the respondents thought that "Interaction, learning and sharing with other stakeholders" was the most valuable part of this activity

3.6 DS6 Boreal – Zemgale

Summary of SHE until now

IMPETUS activities in DS6 (Zemgale region – Latvia), representing the Boreal biogeographical region, focus on two tasks: (T4.10.3) Multi-layer integrated flood risk management, Decision Support and Early Warning System for civil protection; and (T4.24) Establishment of a Climate Change Adaptation Plan governing climate risk management. To implement both tasks, collaborating with SHs is of pivotal importance. Therefore, a strategy to involve SH groups representing all QH categories is applied. To ensure involvement a focus is put on informing, collaborating, exchanging information, consulting, and co-creating with SH from local, regional, and national level institutions and organizations.

With the Zemgale region being geographically located in a flat terrain with dense river network, flood risk management issues are continuously placed high on the agenda. Upgrading of the flood early warning system from one municipality – Jelgava – to a regional level involves collaboration of concerned municipalities to agree on operational and maintenance aspects. Another SH group are experts of various fields with whom consulting and exchange of information on flood risk prediction is taking place. End-users of the flood early warning system are an important SH group. They will be informed at a more mature stage of the system development. Such an approach is chosen to address SHs with the exact information they would receive via the system in case of a flood risk event and instructions on procedure and actions to be taken.

The establishment of a Zemgale Regional Climate Change Adaptation Plan should take into account the participation of SHs from various categories and economic sectors as potential consequences from climate change related events will greatly affect the local economy, e.g. excessive or lack of precipitation, increasing temperatures, and more frequent windstorms. Participants from municipalities, national authorities, industry sectors, NGOs, and research centres are taking part in DS SH workshops. DS6 SHE includes a variety of engagement methods: from informing on the process and planning aspects, to the exchange of information on the most important climate change effects in the region, and also via consulting the personal perceptions on climate risks, through working on mind mapping and collaborating on potential climate change adaptation activities. This comprehensive set of approaches has been chosen to gradually involve SHs through sequential steps of co-creation from the simplest level, as being recipient of information, to the most advanced level of collaboration, by suggesting measures to be included in the climate change adaptation plan. The SHE process is therefore structured to evolve from informative towards detailed in-depth reflection of SH readiness and needs towards climate change adaptation at local and regional level.

Engagement with DS6 SHs will increase with the shaping and selection of practical climate change adaptation measures at the regional level and in the DS6 RKB. Co-creating with SHs and defining the user stories for the RKB will ensure that useful tools are developed for the region to adapt to climate change. As such, involvement of SHs throughout the RKB development process in the Zemgale Region has started. The SHE roadmap will be updated accordingly to reflect the RKB development process and SHE activities for the remainder of the project (M28 onwards).

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DS synthesis of SHE activities

Link to the Monitoring Spreadsheet DS6

Table 8 DS6 Synthesis of SHE Activities

Activities	Synthesis
Overall: - 30 SHE activities for both tasks - 4 SHE activities with external SHs, 21 with internal project partners, and 5 with both - QH SHs: Mostly State, Government and Political system and Uninformed citizens, media and culture	- DS6 tasks are interrelated, and therefore their SHE activities are also inextricably linked. - At the beginning of the project, the SHE activities focused on building relationships and raising awareness, as well as general activity planning and coordination. - From August 2022 onwards, more targeted SHE Activities occurred, such as the newsletter on climate change impacts on agriculture in Zemgale, as well as the discussions of technical and practical elements. - Later on, more SHs were engaged during workshops on climate risks, the early warning system and climate change adaptation plan. - From the SHE activities with external SHs, priorities in the region and actions that municipalities can take to adapt to climate change were discussed, along with discussions on the early warning system.
SH Feedback from events on February 15th, June 7th and October 5th, 2023: Feedback on: 1. Meeting logistics 2. Stakeholder Engagement General 3. Stakeholder Co-Creation 4. Outcomes and conclusions 5. Value of the meeting 6. Most interesting aspects SH Activity Reports per event for more information: - February 15th 2023 - June 7th 2023	The qualitative data below are based on a review and compilation of the questions per each section (as seen in the lefthand column) of the SH Feedback forms. A summary is given for each section on how the SHs perceived each element of the SHE activity overall, including what was perceived as working well, or what needs improvement. A summary sentence of the event is given, which is taken from the DS Activity Reports the DSs write themselves after each SHE activity. **February 15th event** **Summary sentence of event:** The workshop participants were informed about recent developments in legislation concerning responsibilities of municipalities to develop local climate adaptation plans, as well as about flood risk early warning system and experience of other countries implementing measures for climate change adaptation.

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	1. Respondents were overall positive about the meeting logistics 2. Improvements to be made on listening to and resolving differences and possible disagreements between participants constructively 3. Improvements to be made on ensuring that all stakeholders were present during the meeting. 4. Respondents thought that participation in the meeting increased knowledge on climate change challenges, solutions and opportunities at local level. 5. Most thought this activity was very valuable 6. More than half of the respondents thought that "Interaction, learning and sharing with other stakeholders" was the most valuable part of this activity **June 7th event:** **Summary sentence of event:** One of the main achievements of the workshop was a discussion about prioritisation of the presented climate impacts vs action capacity, and interconnection between them. Stakeholders pointed out it is very crucial to determine responsibilities and cooperation between national and municipal levels regarding climate adaptation actions. The climate adaptation strategic documents must be connected at all levels; they must flow from each other. 1. Most respondents were satisfied with the meeting logistics 2. SHE in general was perceived well for this activity 3. Improvements to be made on ensuring that all relevant stakeholders were present during the meeting. 4. Respondents were overall satisfied with the outcomes and conclusions of this activity 5. Most of the respondents felt the meeting was very valuable 6. Most interesting aspects for the respondents were "Interaction, learning and sharing with other stakeholders" and "Presentations by the meeting organisers." **October 5th event:**

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	1. Improvements to be made on defining the relevant objectives of the meeting clearly, but otherwise respondents were very happy with the meeting logistics. 2. Again, overall respondents were satisfied, but improvements can be made on supporting SHs to improve or make new contacts with other participants during the activity. 3. Respondents were most satisfied with the way the discussion was facilitated and guided, which helped to achieve the objectives of the meeting and the discussion. However, improvements could be made on ensuring the meeting covered all the relevant topics. 4. Respondents were most satisfied with the participation in the meeting, which increased their knowledge on climate change challenges, solutions and opportunities at local level, but improvements could be made on ensuring the meeting inspired SHs to take further action in their organisation/work/community 5. Half of the participants felt the meeting was very valuable, and another half said extremely valuable. 6. Most interesting aspects were: Meeting content, topics and related discussions and presentations by the meeting organisers.

3.7 DS7 Mountain – Valle dei Laghi

Summary of SHE until now

The SHE in DS7 (Valle dei Laghi – Italy), representing the Mountain biogeographical region, has unfolded across different phases. Initially, a general screening of potential SHs following the QH framework was performed. This step showed that many key actors have regional significance extending beyond the Valle dei Laghi area and into the province. These actors include not only political institutions in the Autonomous Province of Trento but also academia and certain economic actors such as insurance companies and hydroelectric energy utilities. A significant factor in the engagement process has been the support of political institutions at the provincial and municipal levels. For example, one of the local project partners (BIM Sarca-Mincio-Garda) plays a crucial role as an anchor, building and maintaining institutional relationships with the agricultural and water management sectors. This ensures the active and constant participation of these actors as project SHs. Furthermore, narrowing down which SH group to engage is intricately tied to the project's activities. While some SHs are engaged for specific tasks, like farmers and grassroots associations when investigating the link between climate change and cultural heritage (T4.21), institutional and political SHs at different levels play a more overarching role throughout the project activities in Valle dei Laghi.

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Following the initial kick-off event of DS7 SHE in Trento with members of local political authorities and academia, several thematic workshops took place. These workshops focused on applying the Impact Chains methodology (T4.23) to the built environment and agriculture sectors (May 2023), as well as on the efficient and sustainable water management for irrigation (T4.7.2, April 2023). Furthermore, the engagement process included multilateral meetings with mainly institutions (at different levels) and local irrigation consortia (from June to October 2023) to enhance the governance structures, ensuring improved coordination and collaboration (T4.7.2). These activities are also part of the strategic path to develop and co-create with relevant SHs a digital Decision Support System (DSS) (T4.7.2). The DSS aims to facilitate the evaluation of risks in water management considering concurring usages and improve data-driven decision-making based on potential water availability scenarios. Concerning T4.14, after overcoming some initial obstacles, the collaboration with a prominent insurance company in the Trento Province allowed us to initiate discussions on index-based insurance policies. This involved sharing and analyzing insurance coverage and premium data, as well as identifying the primary business risks and opportunities to make climate insurance more effective for the local agricultural sector.

From the strengths and weaknesses noted in the SH Feedback forms of DS7 SHE activities as well as internal conversations in the DS, it has been possible to identify several key aspects that require attention to ensure successful future SHE. One challenge has been maintaining consistent and frequent engagement activities with all relevant SHs. Larger and more structured organisations and institutions show greater commitment compared to individual citizens or farmers. Fortunately, the involvement of irrigation consortia, facilitated by strong local connections and knowledge of the territory from our partners, led to some early success (i.e. improved communication among actors and transparency in procedures) although small-scale governance remains a significant challenge. For example, the fragmentation of decision-making process, the absence of clear indicators for decision-making, and the unequal power dynamics between local actors and larger organizations, which may continue to hinder progress. To address these issues, there is a compelling need to enhance awareness among certain SHs (like farmers) around specific topics, such as water scarcity, to improve collaboration. In terms of lessons learned, the main outcomes have highlighted the importance of building relationships and how smaller but frequent events have effectively framed engagement activities.

A point to still be considered is how to connect engagement efforts (including the onboarding of new SHs) with the development of digital tools. Undoubtedly, there is the need to find new ways to link these initiatives to the RKB of DS7 since all the adaptation solutions developed will eventually be integrated into it. This point will be integrated within the updated planning of SHE events and this integration will ensure that the DS level efforts have a lasting impact and serve as a valuable resource for the Valle dei Laghi community and beyond.

DS synthesis of SHE activities

Link to the Monitoring Spreadsheet DS7

Table 9 DS7 Synthesis of SHE Activities

Activities	Synthesis
Overall: - DS7 hosted 27 SHE activities across their different and interrelated tasks (water management, irrigation, cultural heritage and agriculture)	In DS7, each task builds on each other to support climate adaptation in a cohesive way. In their SHE activities, the initial activities started off with getting to know the SHs views on the different elements (water, irrigation, cultural heritage). DS7 then hosted further discussions and activities that brought these communities together to discuss the overlapping issues of water management, agriculture, cultural heritage and the effects of climate change. DS7 also hosted more specific activities discussing the different tools and technologies to be embedded into the RKB, and also

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	discussing with specific groups of SHs about these tools. Overall, in DS7, the importance of different types and levels of SHE to get the full story in the region concerning climate change, and bringing those insights together in larger workshops to find common pathways for adaptation can be seen.
Internal planning: - 3 meetings with DS7 project partners	Internal discussions on the contents of the DSS, identifying users of the DSS, and functionalities of the tool.
Activities on **T4.21** Activation of Cultural Heritage: - 7 SHE activities building up discussions and explorations of cultural heritage in the region - QH SHs: Mostly with uniformed citizens, media and culture QH SH group, but also Industry and Economic system (wine-making), and State, Government and Political system (Valley Community – intermediate level between municipalities and Province) - 1-4 people engaged per activity	These activities started off the exploratory interviews with citizens of municipalities in the region, which also sometimes linked with understanding perceptions of water risks and agriculture – specifically wine and olive trees – and the perceptions of climate change and how it affects these practices. Later follow-up interviews further built on these discussions and the exploration of possible adaptation solutions.
Activities on **T4.7.2** Irrigation and water management: - 11 SHE activities – understanding water management and irrigations issues separately, linking to agriculture - QH SHs: All helices engaged - 5-40 people engaged per activity	Activities starting off by understanding the issues with irrigation (fragmentation and resource asymmetries), as well as discussing with river catchment and water management authorities to understand the downstream water management, gaps and potential solutions.
Activities on **T4.14** Insurance and agriculture: - 3 SHE activities that helped to collect data and formalise a relationship with ITAS (insurance company) - QH SH: Only Industry and Economic system - 9-10 people engaged per activity	- Starting off with exploratory meetings with ITAS on their involvement in the project. - MoU signed about how work and collaboration will unfold. - Data sharing formalised with ITAS – useful data for climate forecasting.
SH Feedback from events on February 9th (DS7 SHE kick-off), April 11th (**T4.7.2**), May 24th (2 activities – **T4.23**) 2023: 34 respondents across all 5 events Feedback on: 1. Meeting logistics 2. Stakeholder Engagement General 3. Stakeholder Co-Creation 4. Outcomes and conclusions 5. Value of the meeting 6. Most interesting aspects	The qualitative data below are based on a review and compilation of the questions per each section (as seen in the lefthand column) of the SH Feedback forms. A summary is given for each section on how the SHs perceived each element of the SHE activity overall, including what was perceived as working well, or what needs improvement. A summary sentence of the event is given, which is taken from the DS Activity Reports the DSs write themselves after each SHE activity. **February 9th event**: IMPETUS Project – Proposals for climate change adaptation solutions

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SH Activity Reports per event for more information: - February 9th 2023 - April 11th 2023 - May 24th 2023	**Summary sentence of the event:** There is awareness (in different fields and on different levels – provincial and local administrations, and academia) of the seriousness of the water scarcity issue, as well as willingness to contribute for improving the decision-making processes to find effective solutions. 1. Respondents were overall satisfied with the meeting logistics 2. Respondents were most satisfied with the feeling that they could openly share opinions and thoughts 3. Improvements to be made on ensuring that all stakeholders were present during the meeting 4. Improvements to be made on ensuring the time to reflect, as a group, on collective experience during the event. 5. More than half of the respondents thought this activity was somewhat valuable 6. Most respondents thought that "Interaction, learning and sharing with other stakeholders" was the most valuable part of this activity **April 11th event:** Agricultural water management in Valle dei Laghi: Awareness and act **Summary sentence of the event:** Water is a common good: in order to improve water management for irrigation purposes and to respond efficiently to climate change issues such as water scarcity, few collective and shared solutions have to be identified at the valley level. 1. Respondents were overall satisfied with the meeting logistics 2. Improvements to be made on ensuring that SHs improve or expand their knowledge through interaction with the other participants during the activity 3. Most respondents had the impression that the relevant topics were discussed during the meeting 4. Improvements to be made on ensuring that the event was an inspiration to take action in SHs organisation/work/community. 5. Half of the respondents thought this activity was very valuable and extremely valuable

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	6. Half of the respondents thought that "Interaction, learning and sharing with other stakeholders" was the most valuable part of this activity **May 24th event:** Risk assessment applying the Impact Chains approach (divided in 2 separate events for the two groups of SHs – Agriculture and Built Environment, but only 1 SH form and activity report) **Summary sentence of the event:** The main perceived hazards, direct and indirect impacts for both agriculture (mainly focussing on vineyards) and built environment were identified and two impact chains were developed. 1. Respondents were more or less satisfied with the meeting logistics, but some improvements could be made. 2. Improvements to be made on supporting SHs to improve or expand their knowledge through interaction with the participants. 3. Improvements to be made on ensuring that the relevant topics were discussed during the meeting. 4. Respondents were slightly dissatisfied with the outcomes and conclusions, however they were positive about when how the organisers balanced different opinions and perspectives and were able to be flexible to achieve consensus. 5. Less than half of the respondents thought this activity was somewhat valuable, and one-third said it was not so valuable 6. More than half of the respondents thought that "Interaction, learning and sharing with other stakeholders" was the most valuable part of this activity

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4 Reflection and next steps

The following sub-sections of the deliverable include first an overview of the journey until now in the human dimension working group and what has been achieved thus far in coordinating SHE across WPs and DSs. Next, we highlight general reflections of SHE and the results of this deliverable. We end this section with next steps for WP1.

Reflecting on how SHE feeds into the DSs Climate Adaptation Tools and RKBs: The Human Dimension

In the human dimension working group, WPs 1, 2, 6 and 7 collectively reflected further on how SHE can support the design and implementation of the RKBs and to overcome any WPs thematic silos. WPs 2, 3 and 5 need to work with DSs and their SHs to co-create and collect data to design the tools and the RKBs (digital dimension). This has been done via workshops with the WPs and DSs, and also offline with excel sheets in a survey type format. WP1 and WP7 worked with WPs 2, 3 and 5 during the coordination meeting in Brussels (in January 2023) to support them on how to engage SHs in an effective way while reducing SH fatigue, as well as to ensure a coherent storyline when SHs are approached by different WPs and DSs on the unique tools they are developing.

Once the tools and RKBs are co-designed (August 2023 – March 2024), DSs will continue to engage and communicate with their SHs so that they become users of the RKBs, build capacities via learning activities and beta-testing (T7.5.2 – WP7), and reflect on governance barriers aspects to pave the way to climate change adaptation pathways (T1.3 – WP1). WP2 has been working on defining broad user stories and profiles with all the DSs to design regionally desired functionalities of the RKBs for those users since August 2023. WPs 1, 6 and 7 will support WP2 and DSs to link these potential users to the DS SH Registers and to cover all the QH SHs categories if possible. WP2 and DSs will then move from broad user profiles to assigning target QH SHs to those users, along with functionalities in the RKBs, so that they can be engaged in the RKBs.

As such, WP1 is working with all other WPs and DSs to ensure that DSs can follow this pathway from supporting the co-design of the tools and RKBs to ensure effective SHE, and thus the longevity of the project outputs (see Figure 5). Figure 6 illustrates a snapshot of the current planning and coordination concerning SHE needs for the work of the WPs. The planning is more detailed for WP2 than for WP3 and 5 because during 2023 the bulk of the activities have been in WP2, while the bulk of WP5 and (some) WP3 activities that require feedback from SHs only start in 2024-2025 with prototypes of the tools being developed (i.e. T3.4 - WP3 - Resilience Climate Footprint tool). An updated figure will be included in the final WP1 deliverable 1.5 to highlight all relevant SHE activities across all WPs. WP1 will therefore continue to coordinate with WPs to ensure effective and balanced SHE activities across all WPs tasks that require co-creation and SHE (e.g. WP3 Regional Resilience Climate Footprint, WP2 RKBs prototyping with SHs, WP5 adaptation pathways, etc.), thus helping to reduce SHE fatigue and DS fatigue.

In addition, despite the benefits of forming the human dimension working group (internal project coordination, alignment and discussions) and how it has been helping to break down thematic WP silos in the project, the working group is still being fine-tuned in terms of its goals and as such how to balance between RKB development, SHE co-creation and implementation. Together with the WP leaders, a balance on what to share and when with the SHs in the DSs has to be agreed. Furthermore, as not all tasks and tools are going into the RKBs, some issues in terms of ensuring a coherent storyline to engage the SHs and gather their feedback and promote their interest in these different tools will need to be addressed.

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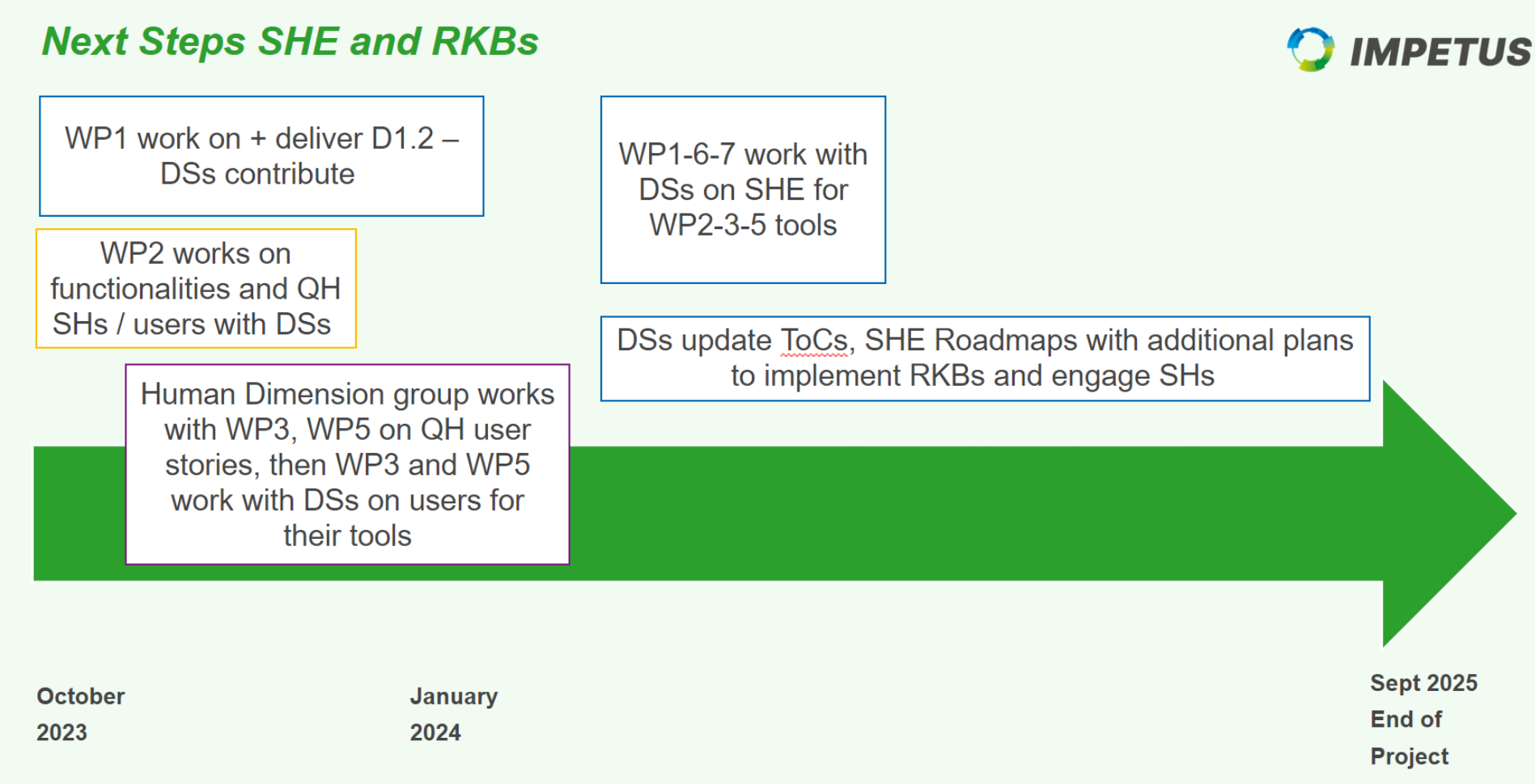

Figure 5 WP1 working with WP2, 3 and 5 internal project planning

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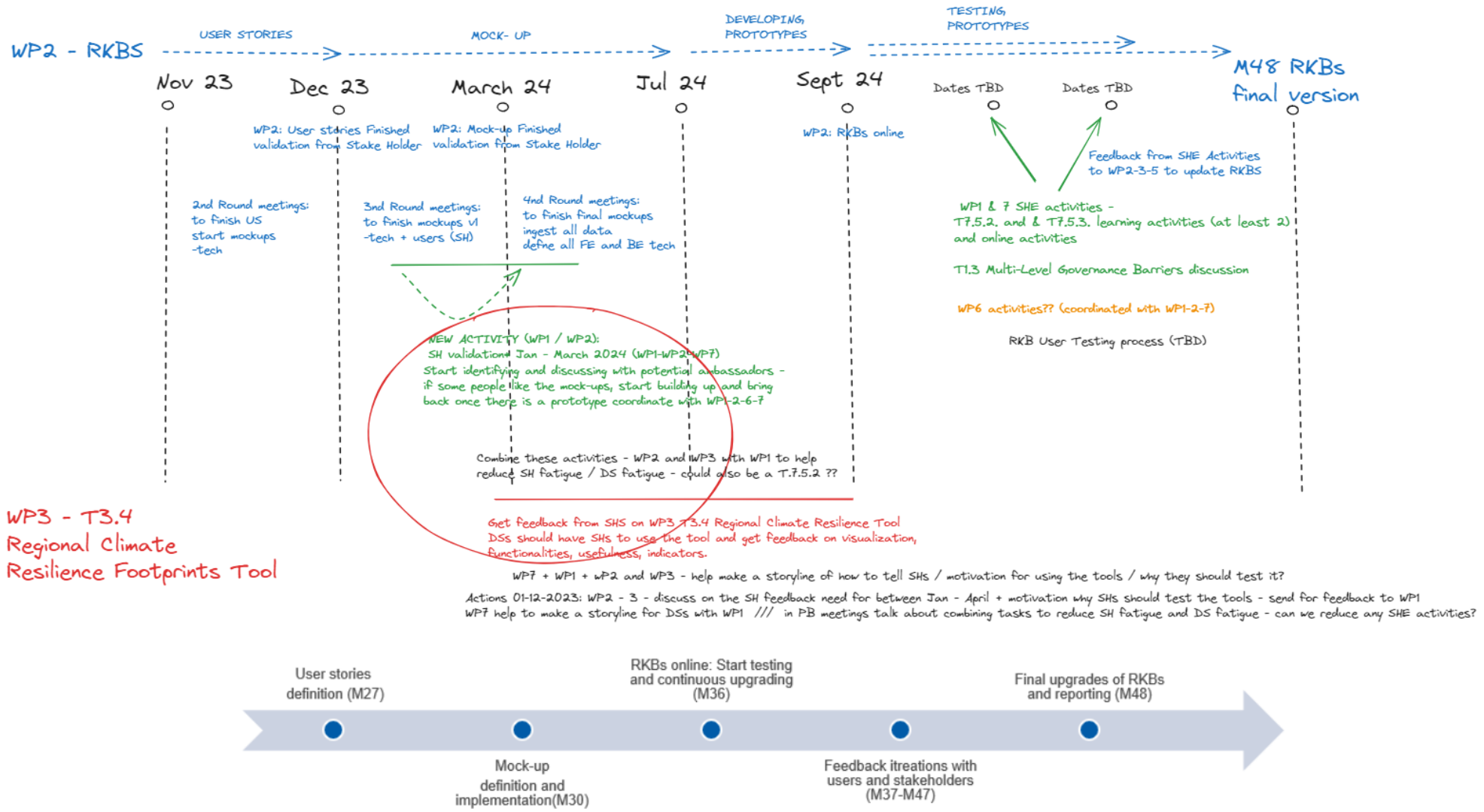

Figure 6 Planning and coordination across WP1-2-3-7

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General reflections on SHE in IMPETUS

The SHE and co-creation activities up until M28 have fulfilled all the requirements of the Grant Agreement (i.e. mapping of SHs, SHs analysis and SHE plans for all DSs as elaborated in D1.1), building up the local communities and awareness for the project, the DS tools, and co-creating the RKBs. D1.2 illustrates the status report of SHE and co-creation in practice since D1.1 (January 2022) until now across the seven project Demo-Sites (DSs). This status report shows that DSs are paving the way to successful SHE for the last two years, through **adaptive, flexible and contextually relevant SHE**, and WPs are getting aligned on this work as well to ensure effective SHE across the project to deliver on the RKBs. It is a work in progress, but as a consortium we have identified the challenges and are working to overcome them.

The main findings of D1.2 are summarized below:

- **There is diversity across the DSs SHE data - number of SHs engaged, types of SHE activities and approaches, and general reporting across the DSs**. The reporting from the DSs in this deliverable shows the diversity of SHE needs for each DS in their biogeographical regions, which, in turn, reflects the diversity of solutions being developed. As mentioned, WP1 offered general guidelines for all DSs (see D1.1) so that they could tailor their SHE activities and outreach based on their regional and local solutions and context (WP4). In IMPETUS, DSs have a variety of climate change adaptation solutions being developed, so a one-size fits all approach to SHE is inadequate. WP1 supported a tailored, flexible and adaptive engagement method style for each DS, and this is reflected in the reporting of the DSs. According to some DSs (DS2 and DS4 for example), it helps to plan multiple smaller-group contact moments over the course of the project to build relationships, trust and collect important information and data for more technical solutions and tasks. On the other hand, other DSs have opted for multiple large-scale workshops, discussions and co-creation sessions to support their policy and governance focused solutions, such regional climate adaptation roadmaps (DS7 and 6, for example). This is also reflected in the varying summaries of SHE until now by each DS, who wrote these sections based on what was most important to mention for their biogeographical regions and solutions being developed. This highlights the important link between the activities in WP4 (solutions in each DS) and the SHE approaches chosen. As such, **SHE approaches vary in size, goal and method, and build on each other – there is not one unique recipe for all DSs**. Not only have DSs tailored their SHE approaches to their realities, but they have also adapted them over time depending on local circumstances. We can see this in the Section 6: Annex 1, where the DSs have discussed the changes, they have made to their ToCs and SHE Roadmaps in the time between D1.1 and D1.2. Some DSs have changed their SHE approaches based on new information and ideas from SHs (DS7 and DS4), and others have included new SHE approaches to reach out to more relevant SHs (DS2). Therefore, based on the progress so far, we can see that SHE and co-creation in IMPETUS, a project that works with a wide range of solutions across different biogeographical regions, requires tailored, flexible and adaptive approaches depending on the context (biogeographical regions) and planned activities in the project (WP4).

- Despite varied SHE, **patterns of engagement methods and relationship building across DSs are similar;** when looking at the DS synthesis tables in subsections from 3.1 to 3.7, and more detailed in the monitoring spreadsheets, there is a recurring pattern observed across building up SHE in each DS. They start off by raising awareness, getting to know the SHs through smaller meetings and activities, engaging the SHs who are more challenging to engage with, filling any gaps in the SH Registers, followed by outreach, and then brainstorming and hosting tailored workshops and activities. SHE therefore goes through different phases, each one important in supporting the other to carefully build relationships among the actors (DSs and SHs) within the local context, enabling knowledge exchange and knowledge co-creation.

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- **SHE and co-creation is a process that requires a lot of time**, **capacity and expertise** from the support side (WP1) and from the side of the DSs. Ultimately, this process and planning should help the DSs and WPs to effectively coordinate and deliver on their goals with SHs. SHE is a process, and the activities need to be planned well in advance while keeping in mind the need for flexibility and adaptability to achieve the goals set out in the DSs' ToCs, which also requires time and reflection. WPs also need to continue to adjust and coordinate their SHE needs to the realities of the DSs and their engagement with SHs. WP1 and the Human Dimension working group are supporting this more effective coordination.

- **IMPETUS SHE and co-creation approach so far perceived by project partners useful.** Preliminary exchanges with the DSs indicate that project partners found the SHE and co-creation approaches from WP1 valuable. All SHE approaches from WP1 supplied to the DSs were designed in a way to be flexible and adaptable based on the DSs needs and based on emerging local conditions. For example, DSs have mentioned that the ToCs as a living document is useful to identify SHs, to support DSs activities and solutions with appropriate SHE activities, to check progress on solutions developments, and capture emerging SHE needs. Annex 1 provides the **updated ToCs and SHE Roadmaps for each DS since D1.1.** Some DSs did not need to update their ToCs, but most updated their SHE Roadmaps with new activities for the coming years as these became clearer. Other DSs needed to delay certain activities due to unforeseen events like climate disasters (e.g. in Greece with the fires, or in Catalonia with lack of/too much rain) or political shifts, or due to lack of capacity. What is interesting to see is that some DSs updated their ToCs and goals based on the needs of the region (see section 6.5 DS5 Tromso) and re-evaluated what is feasible within the timeline of the project (see section 6.7 DS7 Valle dei Laghi). As such, WP1 remains available to DSs and addresses concerns and questions as they emerge on SHE. WP1 has tried as much as possible to be open and flexible to DSs' feedback, and to co-create ideas and approaches with them and other WPs. Because of the nature of this project which includes a wide variety of adaptation solutions across different biogeographical regions, the guiding principles of SHE have always been flexibility and adaptability to the local conditions. During IMPETUS bi-weekly meetings, WP1 consults with DSs and WPs about SHE approaches to ensure the right SHs are engaged, SH and DS fatigue is minimised, and that everyone is aligned and on board with the approach. WP1 solicits feedback from the DSs to ensure that what we suggest to all is useful and relevant. In this type of project where the range of solutions are so diverse, continuous feedback and coordination is needed to ensure success.

- In the first 2 years of the project, **activities across WPs were mostly focused on developing the local DS solutions** and the SHE engagement discussion was focused on this as well. Now, the remainder of the project is about co-developing and implementing the regional RKBs. This entails SHE on design and validation of RKBs but also exploitation of the RKBs and of the local solutions which requires discussion with different SH of the QH, in particular the public and the private SHs. The pathway for these next steps can be seen in Figures 5 and 6, and WP1 will continue to work with all other WPs and DSs to ensure a smooth SHE process to deliver on this project tasks.

- **The goal and the ambition of the project is to engage across QH SHs, however this does not mean that every individual DS SHE activity engages all QH SHs, but across all their activities as a whole QH SHs will be engaged.** For example, DS4 in Zeeland has two tasks; one on floods and the other on droughts. Different QH SHs need to be engaged for both tasks, and sometimes they do not overlap because the topics are different. WP1 has been advocating a flexible and adaptive approach through the living documents (ToCs, SHE Roadmaps, SH Registers) to ensure that SHE activities are coordinated and useful for the specific context, DSs'

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tools and the co-creation and implementation of the RKBs, and attempt as much as possible to engage all QH SHs across activities throughout the project.

- **Collecting feedback from SHs via online SH Feedback forms (Evaluation of SHE Activities) is not always straightforward.** Since most activities with DSs have involved small groups of SH in the first two years of the project, not much formal feedback has been collected across all the DSs. Furthermore, some SH groups, like farmers, may participate in giving feedback verbally, or on paper, which then the DSs need to transcribe which costs the DS a lot of time. Despite the lack of data, the data in the DS synthesis tables do show a mostly positive overview of the SHE activities across DSs thus far. However, the least positive reviews in the SH feedback forms across most DSs was that SHs did not feel that all SHs were present in the activities. Yet, the respondents thought the events as valuable because of the opportunity for "Interaction, learning and sharing with other stakeholders." WP1 will continue to encourage DSs to collect feedback from SHs since it helps to understand what went well, what DSs can improve upon in hosting SHE activities, and how to ensure the most useful engagement for the specific event or SH group. It is important for the SHE activities to be evaluated by the attendees (SHs) as it will also help the DSs to improve the solutions they are building and implementing for the RKBs, and therefore support the overall success and ambitions of the project.

- **Gender balance is an ongoing effort for all DSs across SHE activities.** As shown in Table 2, DSs in their SHE activities thus far have managed to balance the engagement across genders. As described in D1.1 Guidance Documents for SHE activities planning and coordination, M&E and more, striving for gender balance is an important goal. DSs have been constantly reminded to balance gender, and in D1.1, we observed via their SH identification and SH registers whether this was happening from the beginning of the project. DSs are also reminded to consider gender balance and improve it through the SHE activity planning and reporting documents (in D1.1). WP1 also continuously reminds of the importance of balancing gender, along with the importance of balancing other demographics, such as age, ethnicity, cultural, background, etc. – as is also described in D1.1.

- **Involvement of marginalised groups occurs as needed.** During RP1, the reviewers inquired about the involvement of marginalised groups in the DSs and SHE activities. Some DSs are doing this as a result of the specific needs of the region and climate realities; however, we expect more marginalised groups will be targeted by the DSs in WP activities or via SHE activities, as the DSs need to select the indicators for the adaptation pathways (WP3 – D3.1) and the governance barrier discussions (WP1 – D1.3), which may both implicate some marginalised groups. However, many of the tools being developed in the DSs and for the RKBs are beyond the knowledge and awareness of marginalised groups because the main audience and users of the RKBs will likely be decision-makers and technical experts. Therefore, future activities and discussions down the road will need to be targeted to marginalised groups through first capacity building and then discussions across different levels and groups of SHs to raise awareness and co-create climate adaptation plans that are suitable for all.

Next steps

In the coming months and until the end of the project WP1 will:

- Continue to support detailed SHE planning and execution as the project develops, coordinating SHE across DSs and WPs with internal project workshops supporting SHE for both other WPs and DSs.

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  - WP1 to host a lessons learned, sharing and exchange workshop on SHE across the DSs planned during IMPETUS bi-weekly thematic meetings in early 2024 (February), and periodically throughout the rest of the project.

- Align SHE activities with WP2-3-5 to ensure the continued co-creation, design, prototyping and testing of the RKBs. This alignment helps to reduce SH fatigue, and also clarify and balancing the demands placed on DSs for SHE until the end of the project.
  - Discussions planned for during the Human Dimensions periodic meetings, starting early 2024 to discuss WP2 and WP3 SHE needs, and to be continued throughout the rest of the project to ensure a balanced approach. WP5 discussions will take place once new leadership for WP5 has been decided.
  - Present results and ideas of these discussions with DSs during follow-up meetings or during IMPETUS bi-weekly meetings.
- Continue M&E of SHE and co-creation to ensure continued learning, improvement and monitoring and evaluating impact of SHE.
  - Ensure all DSs are sending out SH Feedback forms after relevant workshops and SHE activities to collect feedback from engaged SHs.
  - WP1 to brainstorm with DSs a more general feedback opportunity from SHs since the SH feedback forms can only capture a limited number of reflections depending on the SHE activity type – to feed into D1.5.
  - Host a feedback session or interviews between WP1 and DSs as a collective reflection on the overall SHE process.
- Deliver D1.5 in M48, as second and final update of SHE in the DSs, highlighting the overall impact of SHE in IMPETUS.
  - Showcase the impact of tailored, flexible and adaptive SHE approaches in each DS – highlighting how different approaches across the biogeographical regions and DS solutions development support their goals – as elaborated in DS ToCs.
  - Highlight the impact of SHE in enabling RKBs – human dimension working group and alignment with other WPs.

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6 Annex 1: Updated Demo-Site Theories of Change and Stakeholder Engagement, Co-Creation and Communications Roadmaps

In the below sub-sections, DSs have updated their Theories of Change (ToCs) and SHE Roadmaps since D1.1 (January 2022). All DSs have provided textual explanations of those updates when relevant. As mentioned, WP1 works with the DSs to continually update their ToCs and SHE Roadmaps as the project evolves, and updated ToCs and SHE roadmaps can be expected in the final D1.5 of WP1.

6.1 DS1 Continental – Berlin

Theory of Change

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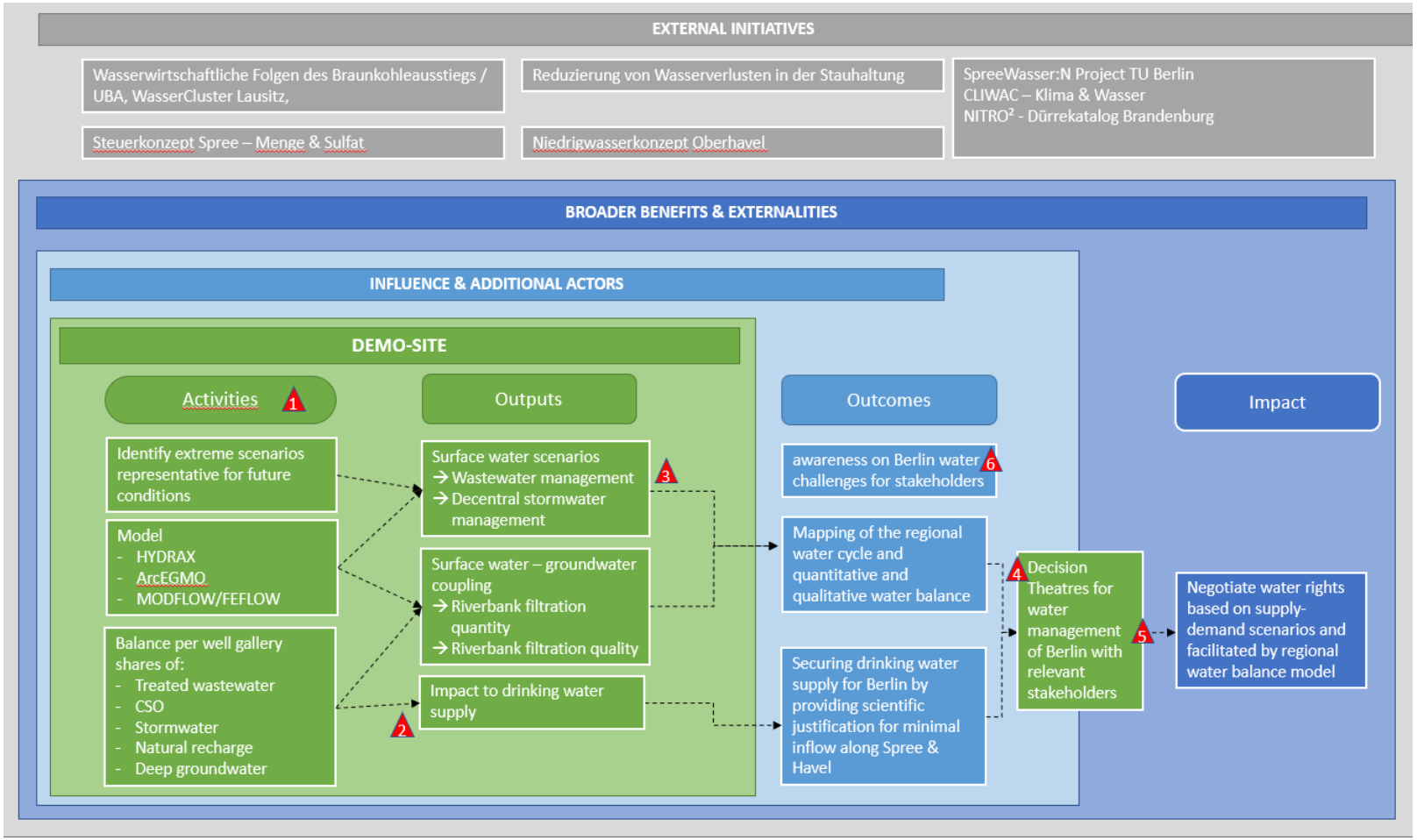

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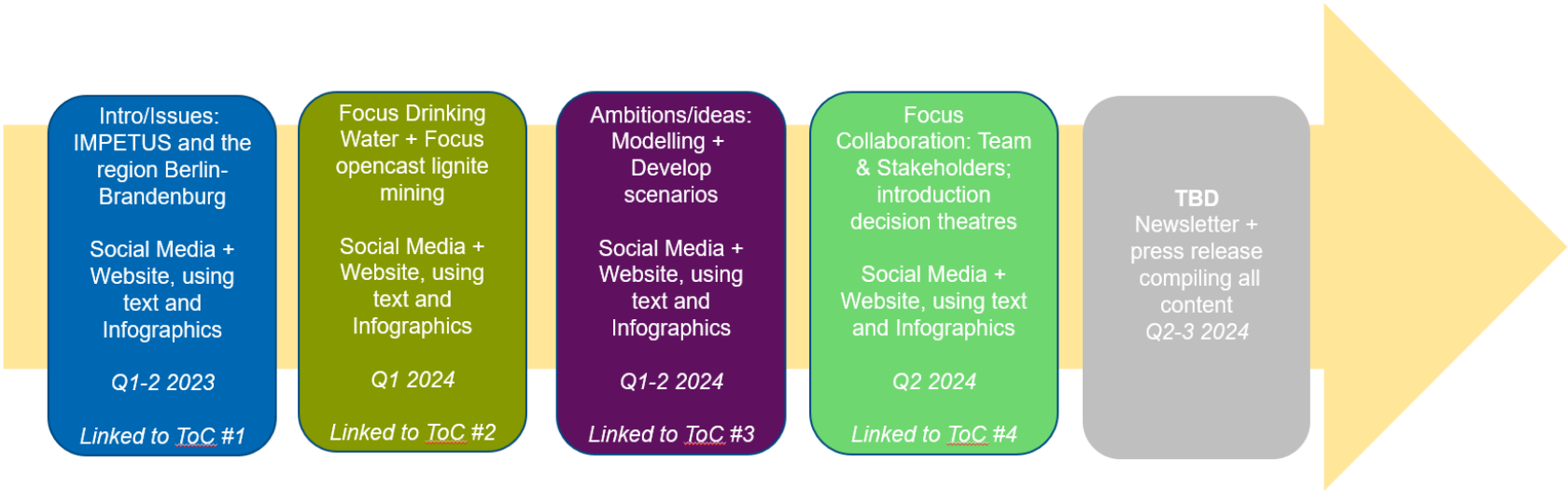
SHE Roadmap(s)

Roadmap has been updated regarding the timing of the communication activities and the Decision Theatres according to the most recent plans. Mainly the communication activities will be conducted a few months later to match the demo site activities. Full roadmap available here.

As per D1.1: DS1 has made 2 roadmaps, signifying the activities that are required to build-up their main SHE activity which are the decision theatres, and during and after the decision theatres. Decision theatres are a specific format of SHE, whereby SHs discuss, learn and co-create knowledge within a "theatre" style setting, with the use of digital tools and live visualisations to facilitate the engagement and collaboration. DS1 also further detailed each step of their roadmap in subsequent slides, but we do not include them here as the below roadmaps showcase the overarching activities in sufficient detail.

Activities roadmap before decision theatres (2023, KWB)

IMPETUS



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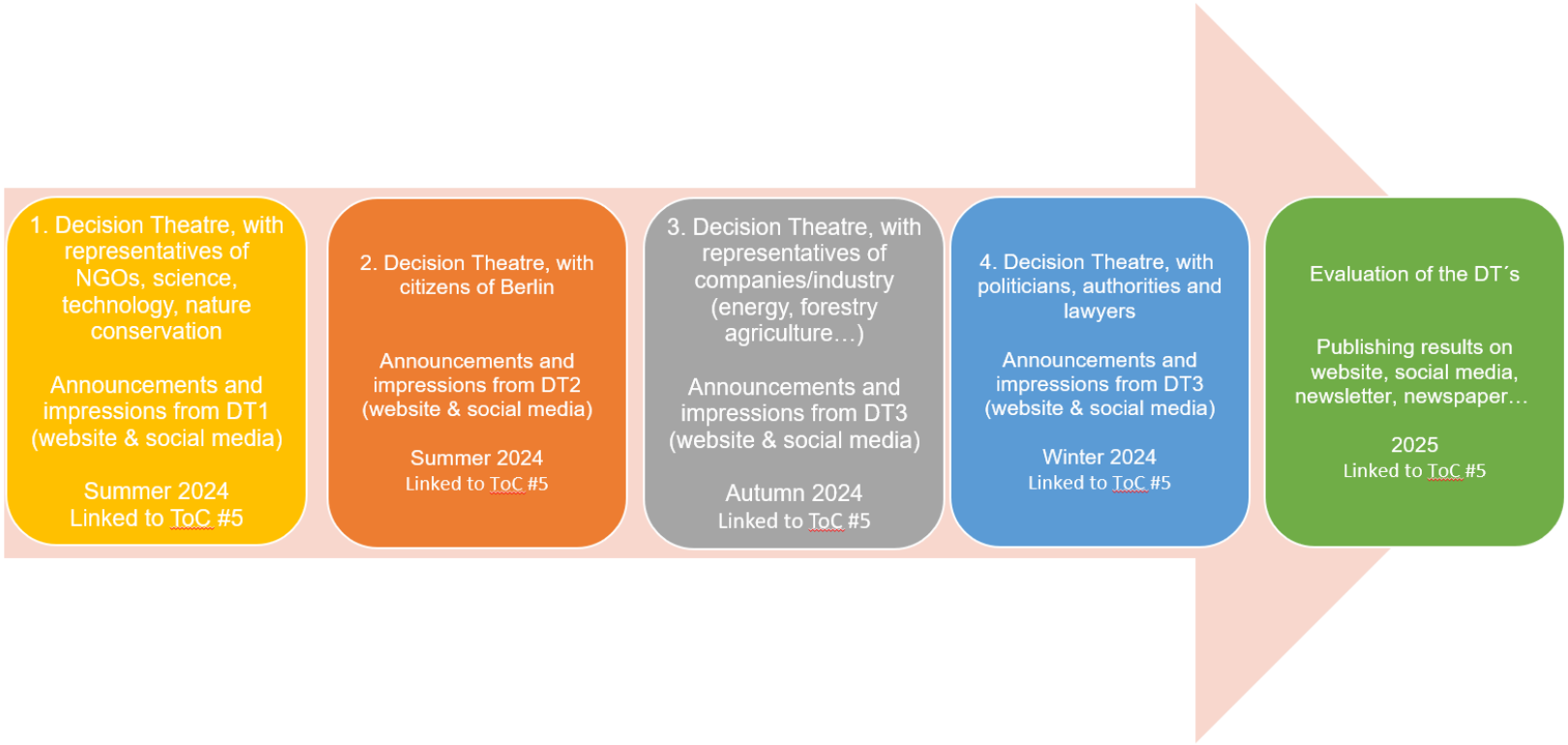
Roadmap decision theatres (2024-2025, GCF)



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6.2 DS2 Coastal – Catalonia

DS2 Catalonia has 9 sub-tasks on a variety of climate related topics, which are managed by different partners in the DS. As such, each DS partner has made their own ToC and roadmap for each task. Each of the ToCs and roadmaps for these tasks can be found below per partner. The DS2 Lead, Eurecat, will ensure that all SHE activities will be coordinated among the DS partners to reduce any potential SHE overlaps or SH fatigue.

- Eurecat Tasks:
  - 4.2 Below sea level multifunctional wetlands
  - 4.5.1 Decentralized hybrid fit-for-use water reclamation systems for increasing water availability
  - 4.6 Sediment transport in deltas
  - 4.8.1 Improving bathing water quality after extreme storm events
  - 4.8.2 Increasing drinking water plants' resilience to water-borne pathogens
- University of Girona Task: 4.3 Sand dune restoration and monitoring to prevent coastal erosion
- Lobelia Earth Task: 4.13 Development of satellite-based coastal monitoring system
- IUCN Task: 4.9 Changes in the spatial distribution of species
- URV Task: 4.22 Pursuing behavioural change for climate resilient tourism

Updates to DS2 ToCs and Roadmaps 2023
The ToCs have mainly remained unchanged, with slight adaptations as reported in the following lines. In general, the original objectives have not changed, so the original ToCs also prevail. There have been SHE roadmap adaptations due to occasional delays in the execution of the technical part that have affected SHE activities that were dependent on data that was not yet available. Another change is the postponement of the DS2 newsletter for SHs (seen on the SHE roadmaps for all Tasks from Eurecat) with updates on the project activities. We had to postpone this activity due to delays in the technical tasks (delays on starting up the technical execution due to unfavourable weather conditions, lack of human resources, delays on materials, thus leading to a lack of information to share) and a lack of time from project partners to elaborate an informative newsletter compiling all relevant information, progress and results. In the SH survey in 2022, a considerable number of stakeholders stated a preference for on-line involvement, hence why we wanted to share updates via a newsletter. We look forward to engaging more SHs both online and face-to-face, and then send the first newsletter with the progress of all the tasks.

Concerning specific adaptations beyond what has already been outlined:
Task 4.2. Below sea level multifunctional wetlands (Eurecat): No changes have been made to the original ToC design. Moreover, we foresee that further investigation may be needed before this solution can be scaled and applied at large scale. During 2024, results of the experiments will be analysed and workshops with SHs organised in order to better define the next steps. Therefore, point 6 may not be feasible during the lifetime of the IMPETUS project, having to adapt the ToC in the following months depending on the outputs of the mentioned workshops and data gathered.
Task 4.3. Sand Dune Restoration (University of Girona): Initially, the task focused on the analysis of the current state of dune systems and the evaluation of ongoing restoration actions. However, following recent collaborations with IUCN and LOBELIA, we have identified complementary areas that will enrich our approach and enhance the project's impact.

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- Activity (A1) Analysis of the present status of dune systems: We have maintained this activity unchanged, as the design and application of multiscale indicators are highly effective for assessing the impacts of climate change and human activities on dunes, aligning closely with our main objective. This activity will enable us to complete the analysis of the current state of dune systems along the Catalan coast, using both on-site and remote sensing surveys. Additionally, we aim to develop and apply these multiscale indicators specifically to evaluate the effects of climate change. This will aid in formulating a comprehensive plan for the large-scale restoration of dunes across the Catalan coastline.
- Activity (A2): Test, monitor, and assess ongoing dune restoration actions in touristic beaches: We have retained this activity as it closely aligns with our project's objectives. Our approach involves testing, monitoring, and evaluating the effectiveness of ongoing dune restoration efforts on tourist beaches. Specifically, we will assess their resilience to marine storms, their contribution to biodiversity enhancement, and their impact on promoting behavioural change among citizens. This will be conducted in two key locations: Calafell on the Costa Daurada (southern coast of Catalonia) and Sant Pere Pescador on the Costa Brava (northern coast of Catalonia). Building on these assessments, we will develop a set of guidelines derived from discussions with experts aimed at enhancing the effectiveness of restoration efforts through monitoring and evaluation via co-defined KPIs. These guidelines will serve as a practical tool for technicians and other SHs working in the field and will be promoted to them during a training session.
- Activity (A3) Identification and classification of the nature-based solutions (NBS) used in dune restoration according to IUCN criteria: Through our collaboration with IUCN, we have recognized the critical importance of aligning our restoration practices with NBS. This alignment not only ensures more sustainable and effective restoration but also strengthens the relevance and robustness of our results, adding significant value to the initial approach.
- Activity (A4) Analysis of the coastal evolution based on natural and anthropic phenomena at a pilot beach: This approach, initially centred on Altafulla, offers a detailed and broad perspective, with the possibility of extending the analysis to other beaches. We believe this expansion will magnify the impact and relevance of our initial objectives.
- We wish to emphasize that the results derived from these complementary approaches will be incorporated into our "Task 4.3" under the designations "Activity 3" and "Activity 4", including their respective outputs, outcomes, and their direct link to the project's final impact (as can be observed in the ToC). We are confident that these modifications will enrich the project's depth and scope while preserving its integrity and direction.

Task 4.13. Satellite-based coastal monitoring system to assess economic impact (Lobelia): The roadmap has been modified, particularly the dates associated with the points: Identification of coastal erosion methods to be applied, and Promotion of the first results of the algorithm. These two activities have been extended by 6 months, as the results of the method developed are not clear and some extra work has to be developed to adapt the method to the coastal sites chosen. This does not impact the part of Development of the economic impact model as it is done by AUEB in parallel to the work of Lobelia.

Task 4.22. Behavioural change for climate resilient tourism (URV): The task has readjusted the roadmap to avoid festive periods in which the territorial agents have a workload that impedes their participation in SHE activities.

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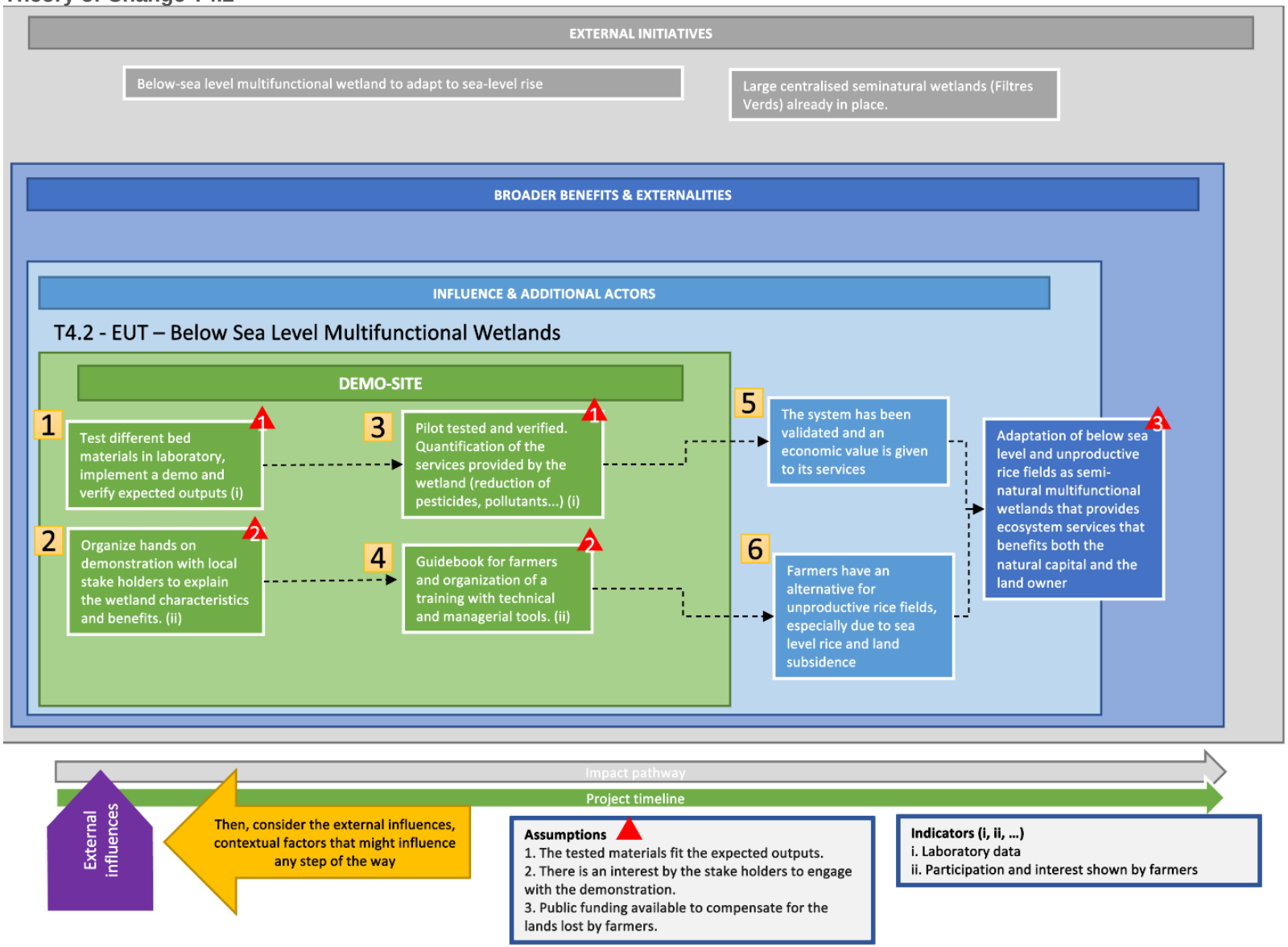
Theory of Change T4.2



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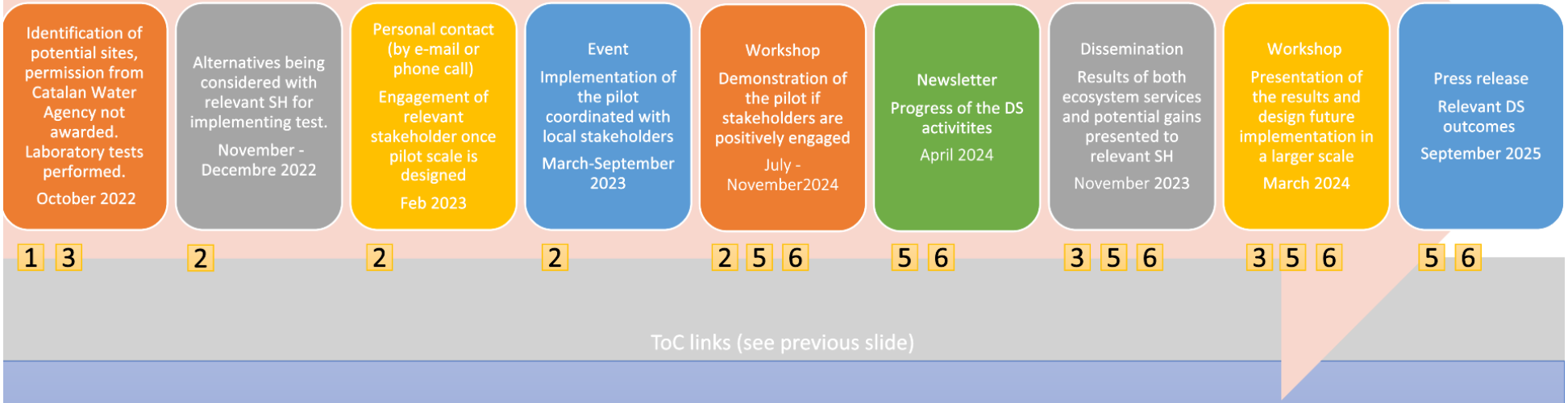
SHE Roadmap T4.2

T4.2 Below-sea level multifunctional wetland to adapt to sea-level rise

Outcomes: Adaptation of below sea level and unproductive rice fields as semi-natural multifunctional wetlands that provides ecosystem services that benefits both the natural capital and the land owner



ToC links (see previous slide)

Identified key stakeholders:
Local: Rice producers, irrigation associations, land owners
Regional/National: ACA, COPATE, SEO BirdLife (NGO)

Newsletter and press release: addressed to engaged DS SH (not only the task specific SH) and other stakeholders not actively involved but show their interest
Workshops: Presentation of the work progress and open discussions with the selected SH

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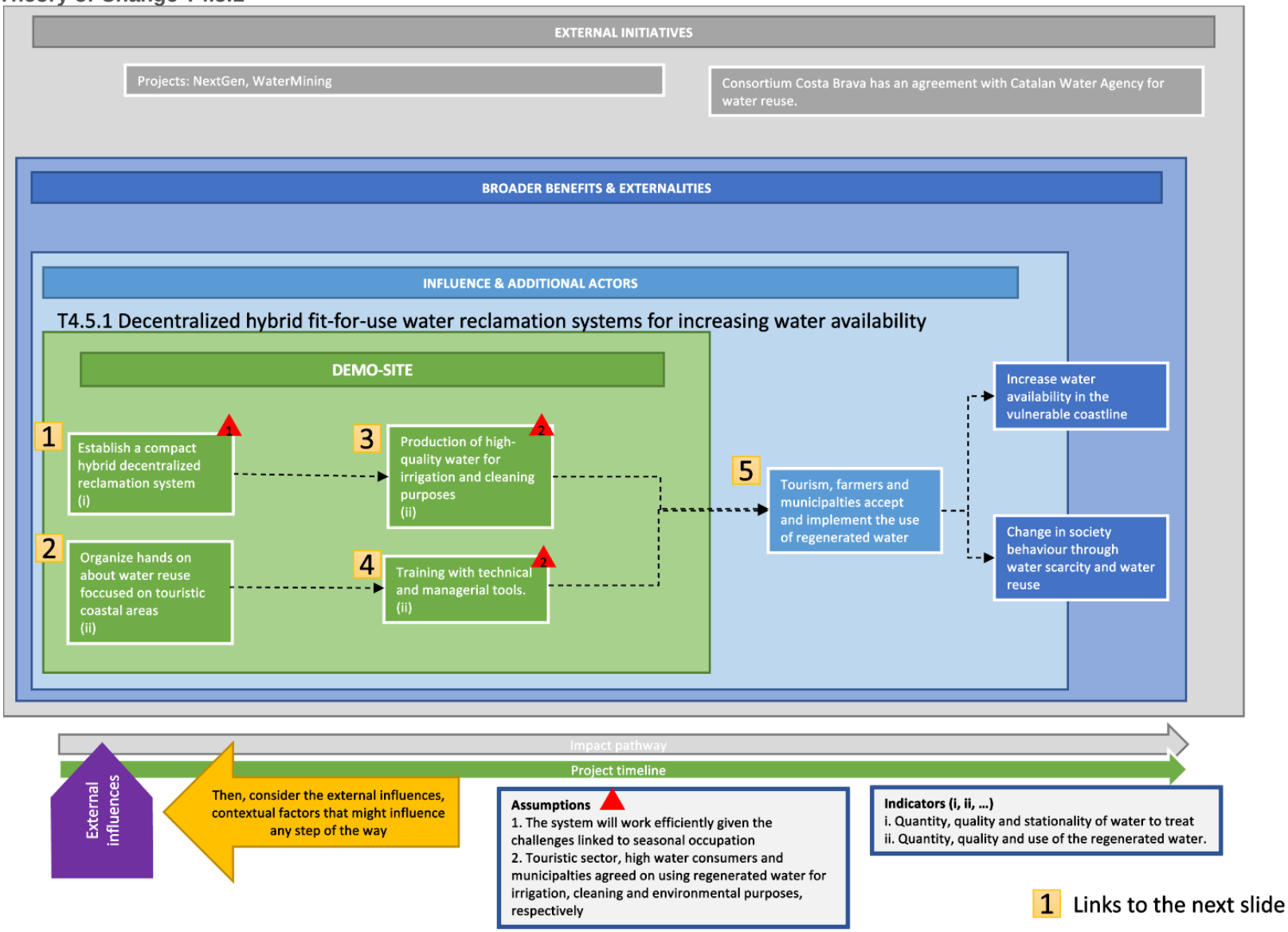
Theory of Change T4.5.1



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Roadmap T4.5.1

T4.5.1 Decentralized system for water reuse

Outcomes:
- Increase water availability in vulnerable coastline areas
- Change society behaviour through water scarcity and water reuse

Event	Workshop	Personal contact (by e-mail or phone call)	Event	Newsletter	Workshop	Newsletter	Workshop	Press release
Identification of potential sources and locations for the system at the campsite	Possibilities being considered and system presentation	Engagement of relevant stakeholder once pilot scale is designed	Implementation of the pilot coordinated with local stakeholders	Progress of the DS activitites	Demonstration of the pilot if stakeholders are positively engaged	Progress of the DS activitites	Presentation of the results and design future implementation in a larger scale	Relevant DS outcomes
Local stakeholders	Local stakeholders			April 2024	September 2024	October 2024	March 2025	September 2025
May 2022	September 2022	May 2023	April 2024					
1	1 2	2	1 2 3 4	3 4 5	2 3 4	3 4 5	3 4 5	3 4 5

ToC links (see previous slide)

Identified key stakeholders:
Local: Càmping Tamarit, Ajuntament Tamarit
Regional/National: ACA, Associació càmpings turisme Tarragona, Consorci d'Aigües de Tarragona, GEPEC Grup estudi i protecció ecosistemes catalans

Newsletter and press release: addressed to engaged DS SH (not only the task specific SH) and other stakeholders not actively involved but show their interest
Workshops: Presentation of the work progress and open discussions with the selected SH

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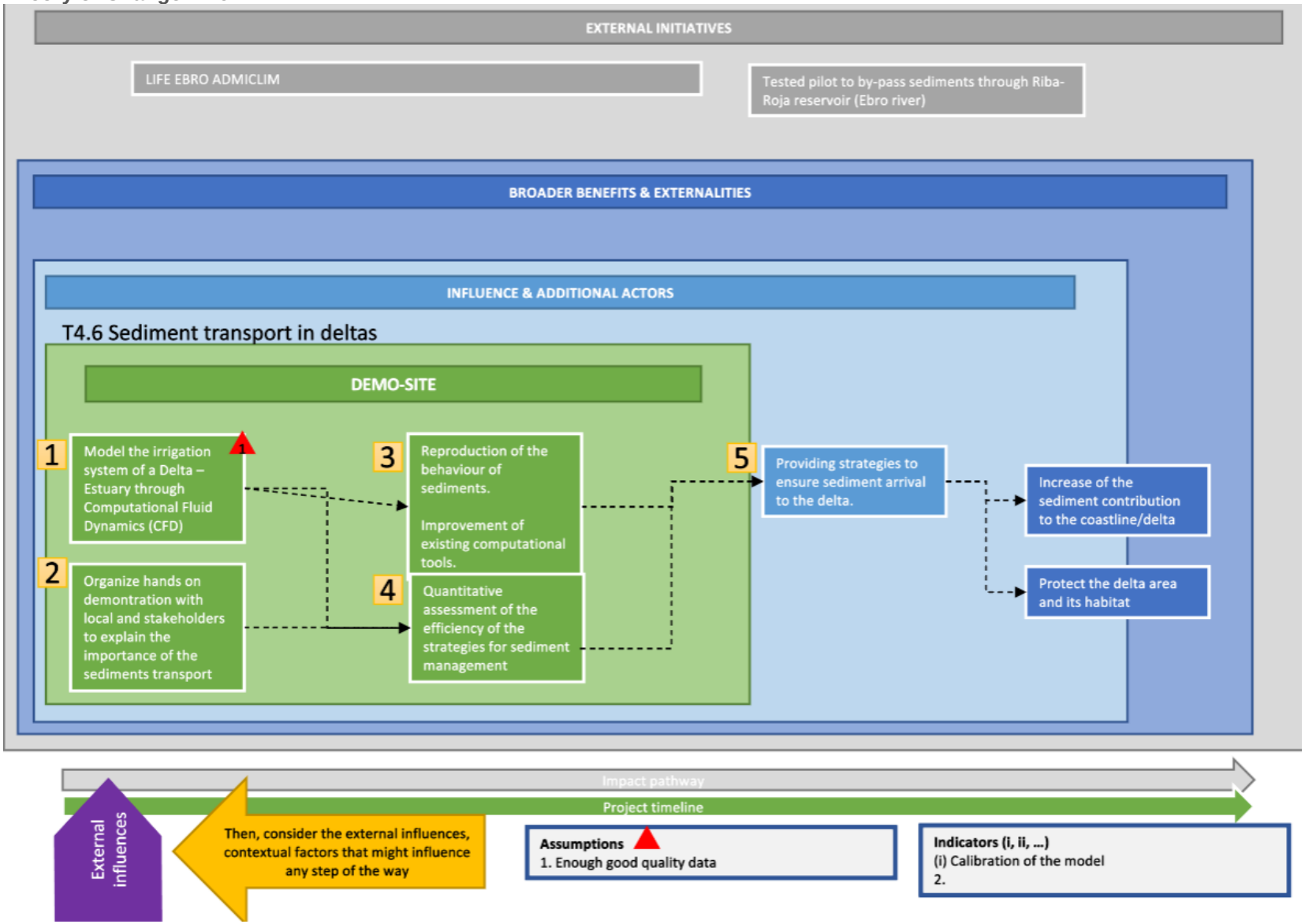
Theory of Change T4.6



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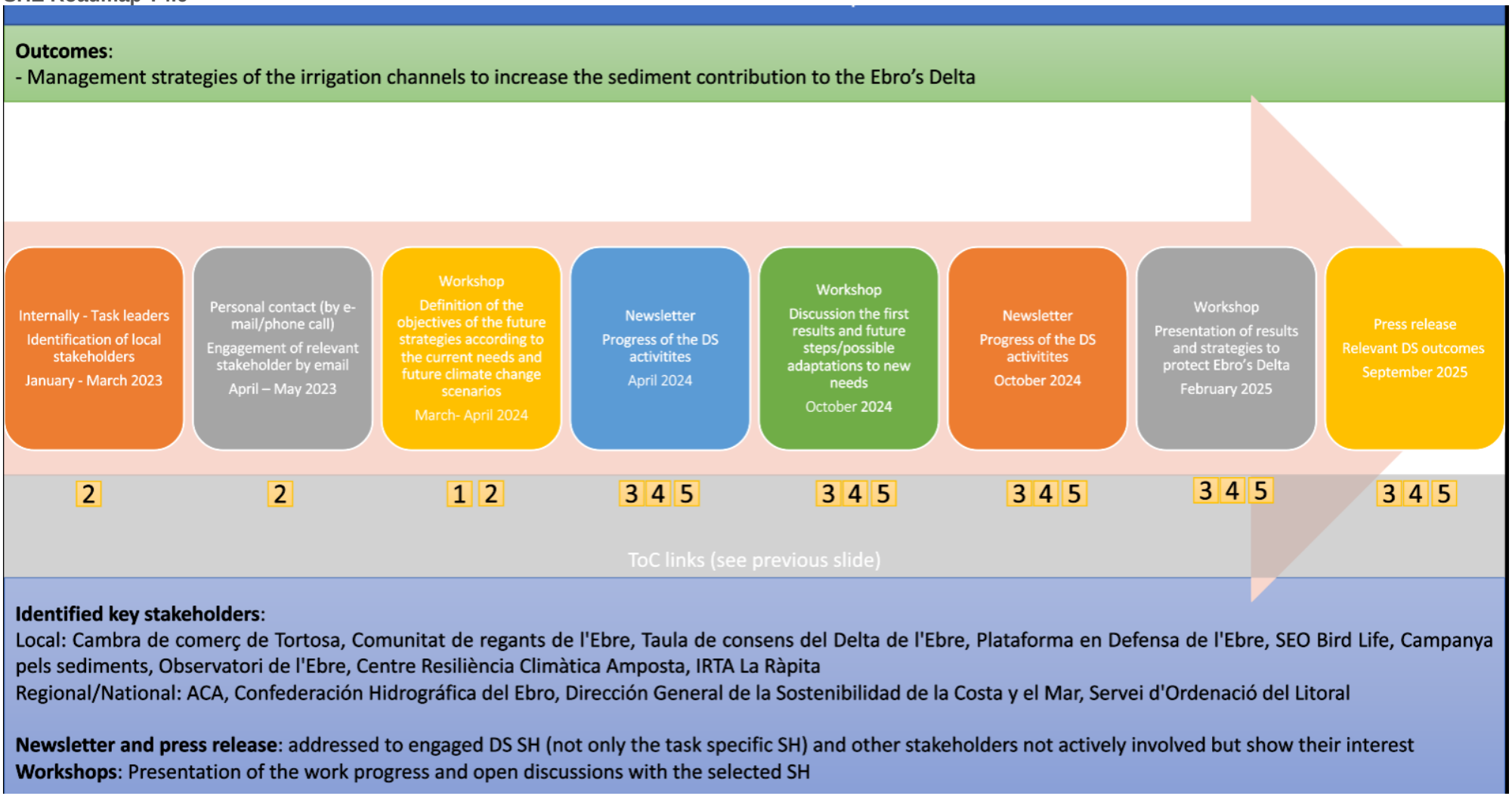
SHE Roadmap T4.6



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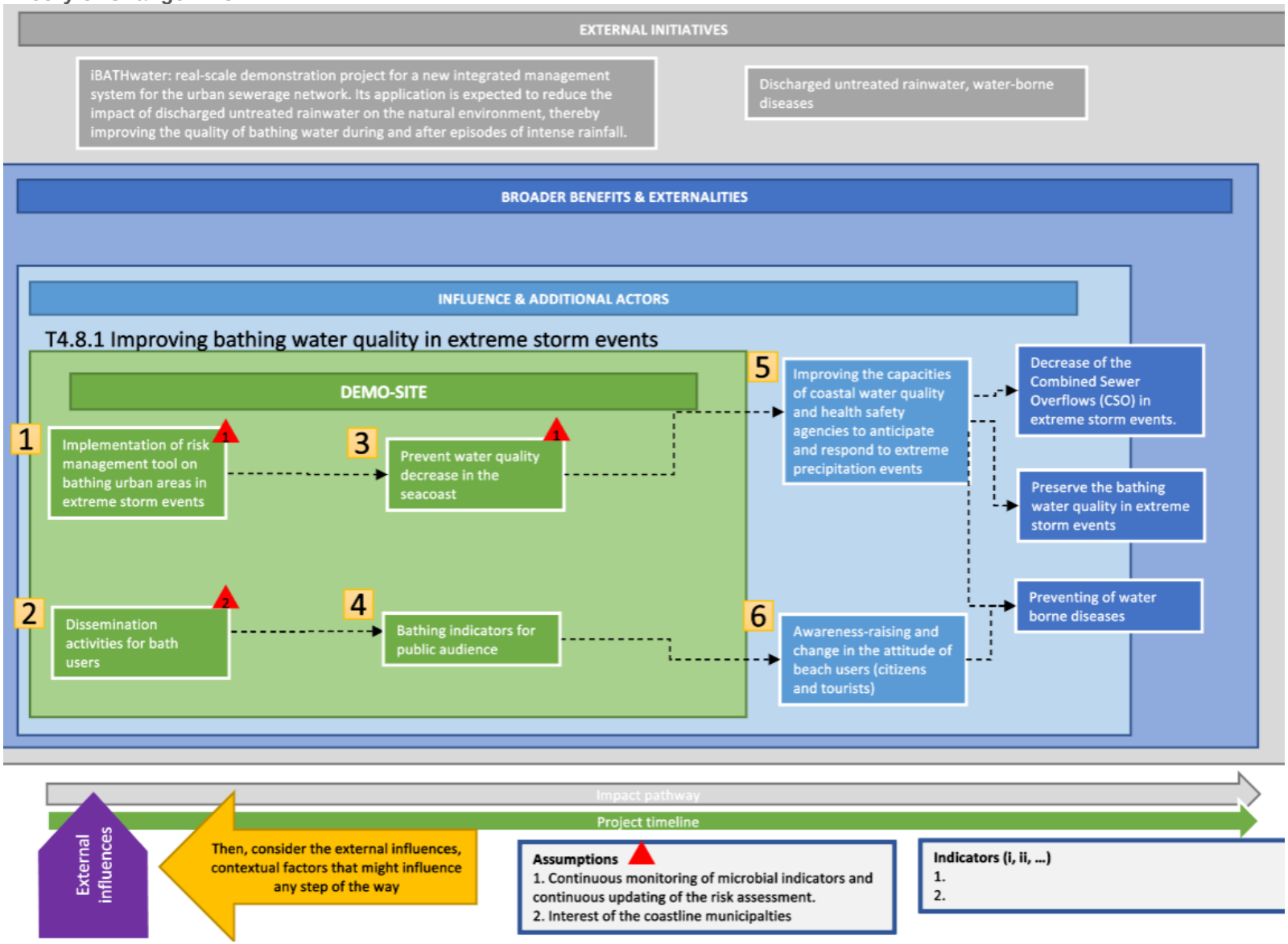
Theory of Change T4.8.1



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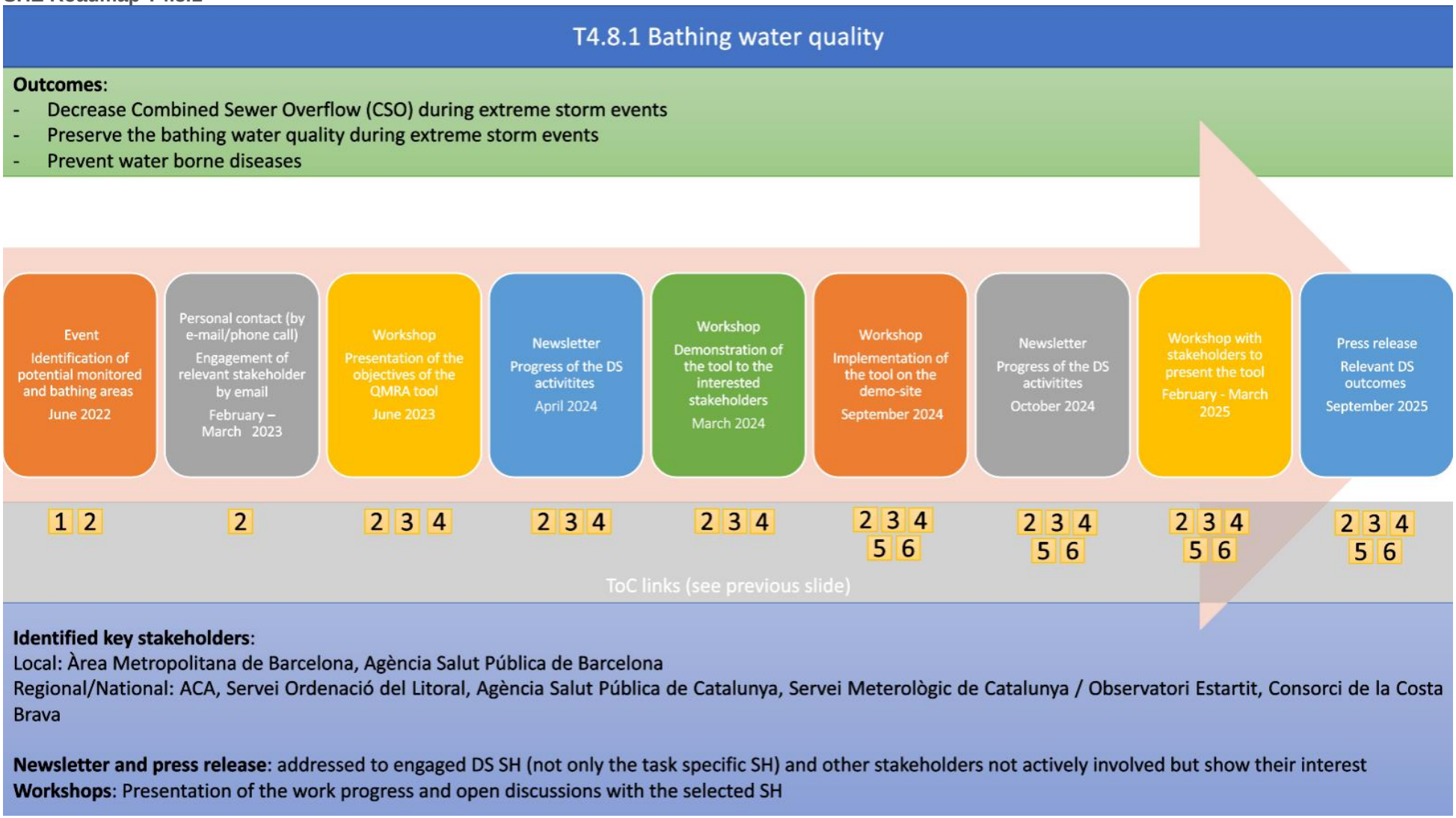
SHE Roadmap T4.8.1



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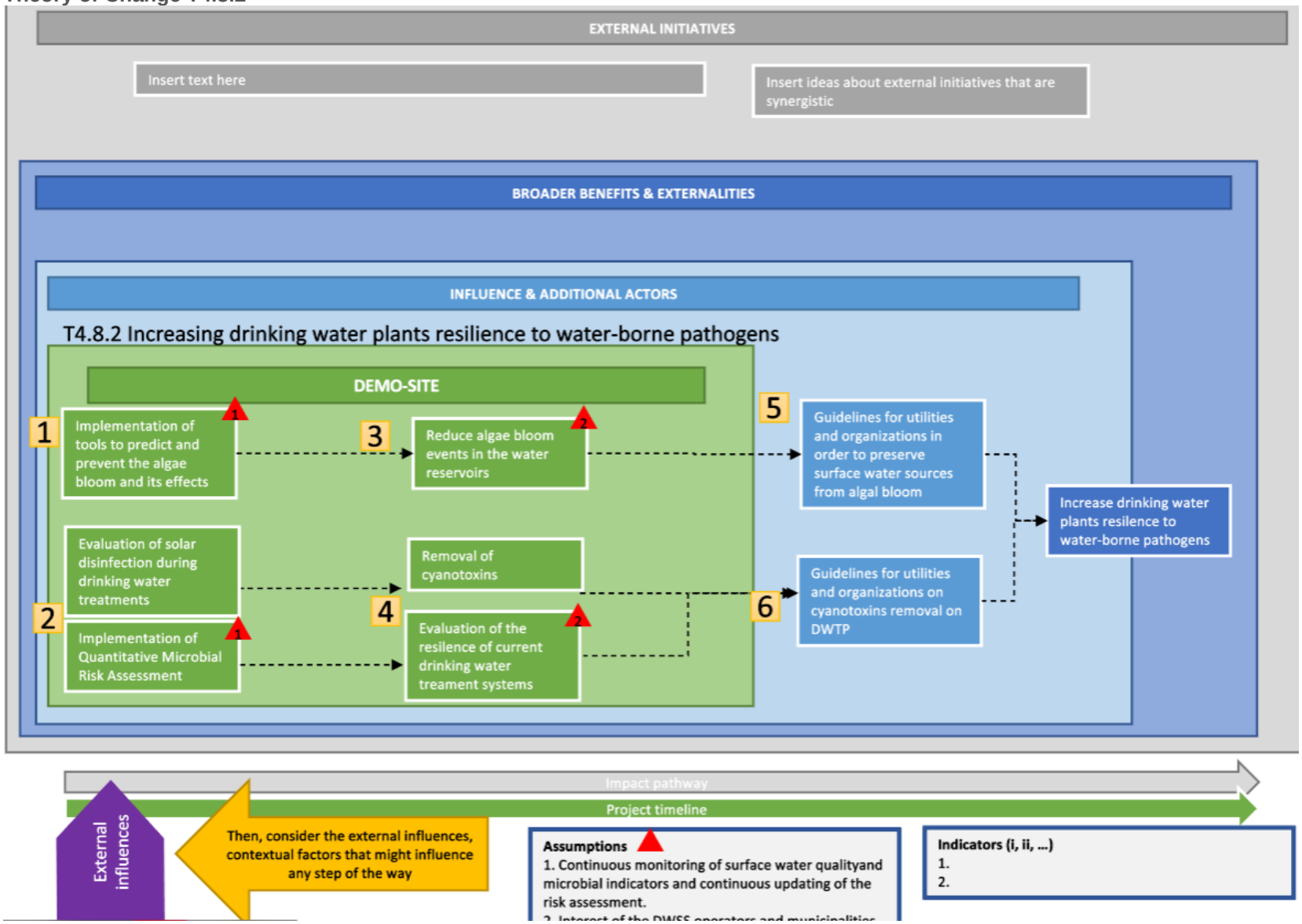
Theory of Change T4.8.2



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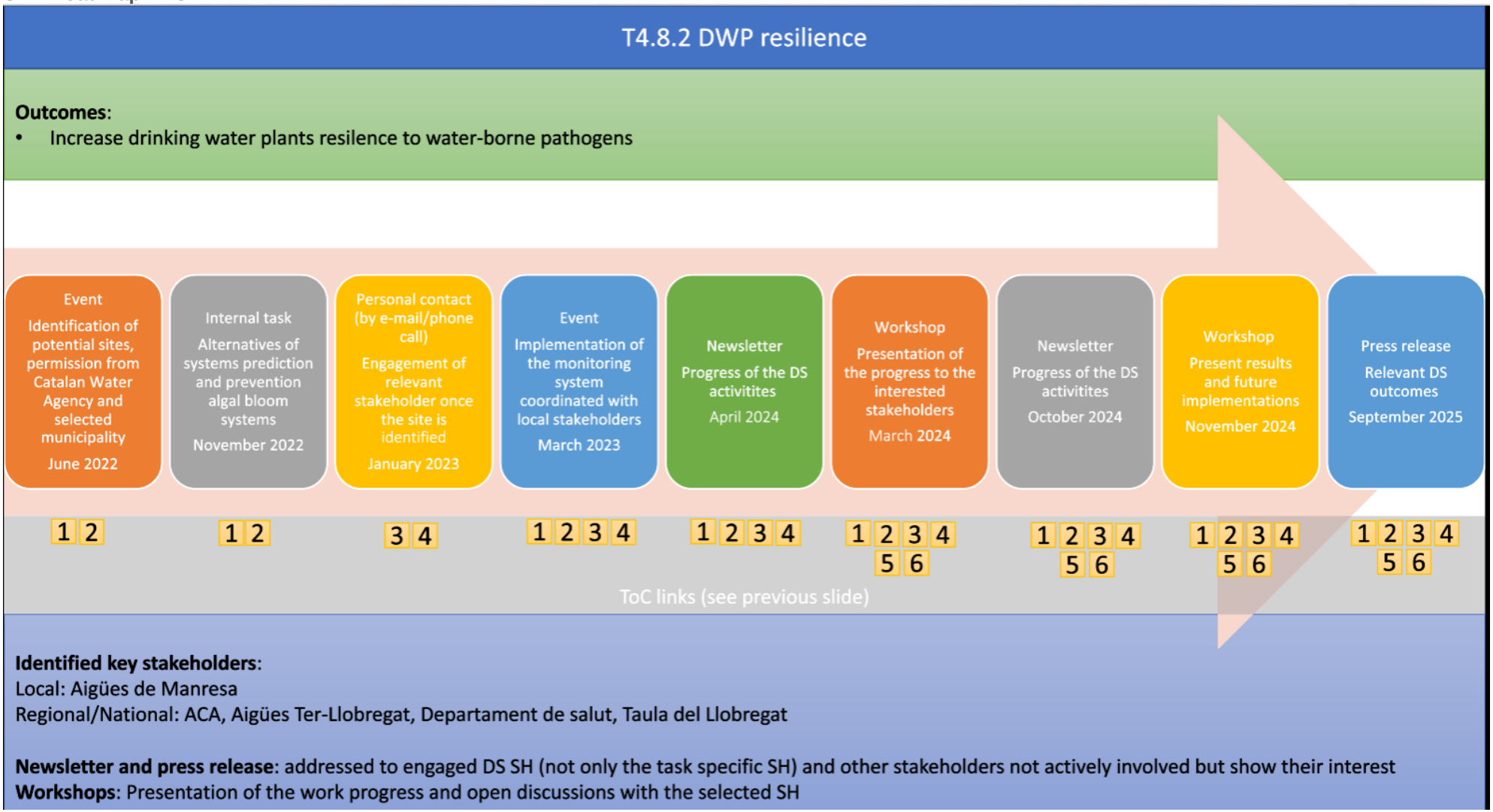
SHE Roadmap T4.8.2.



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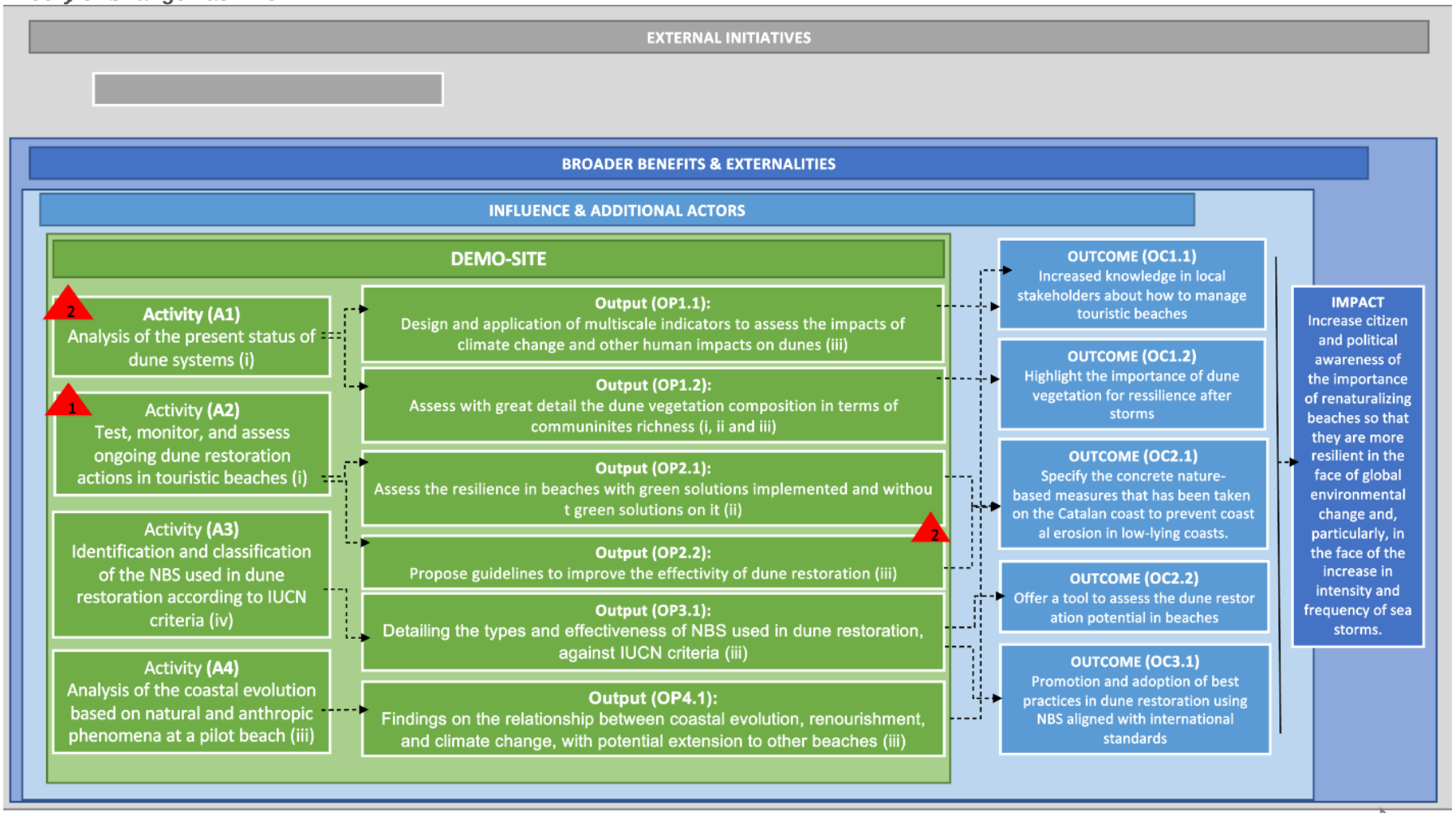

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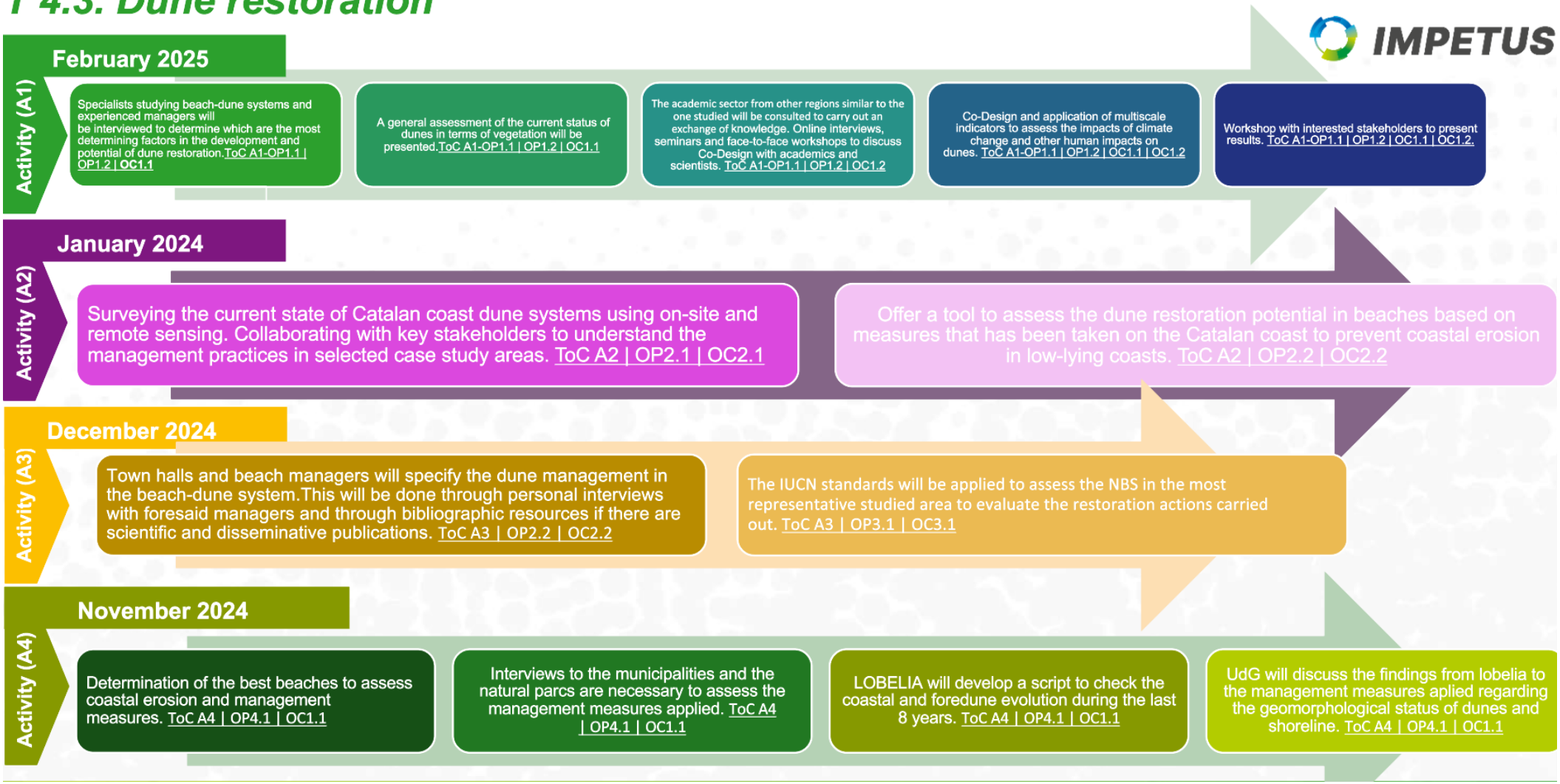
T 4.3. Dune restoration



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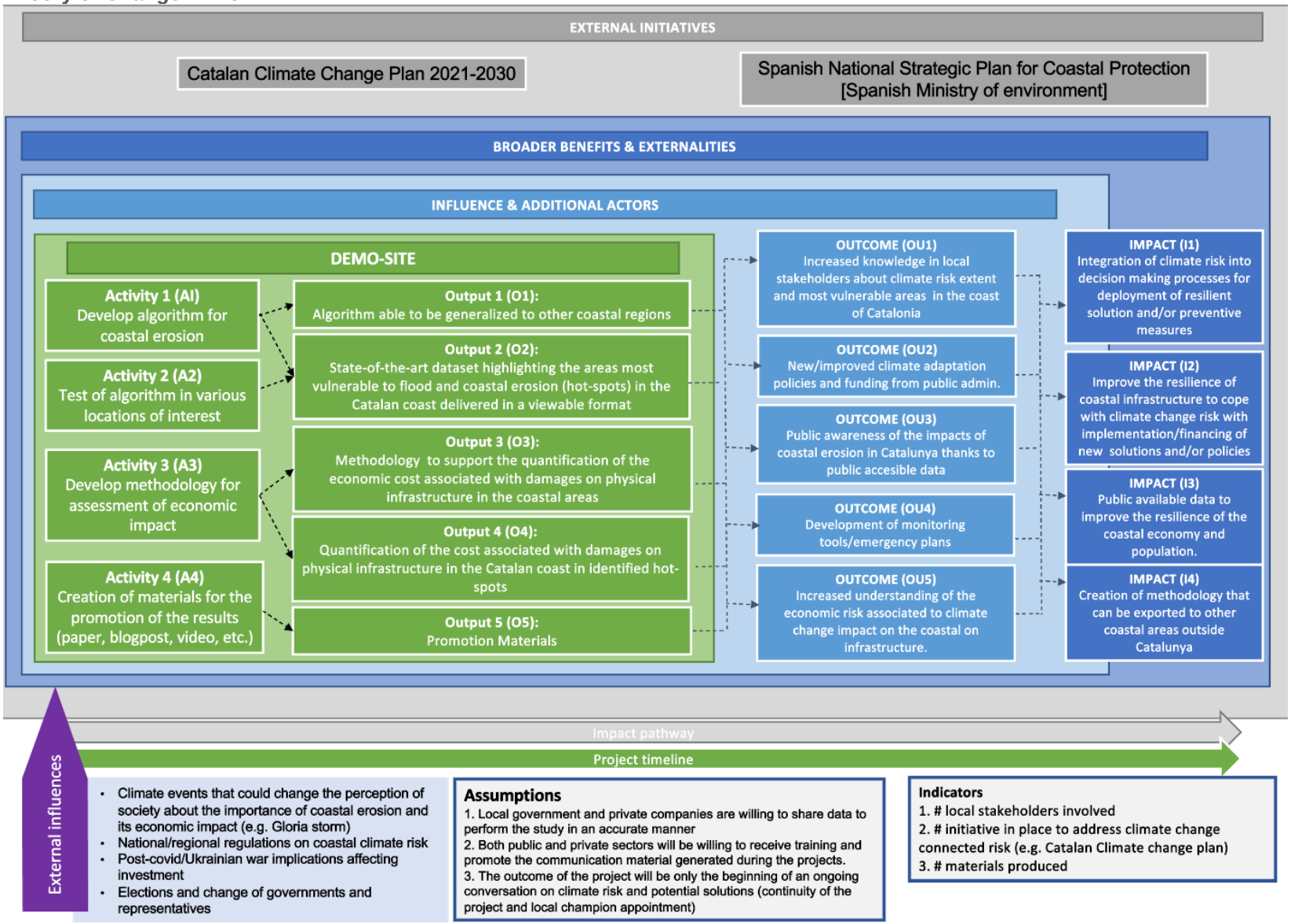
Theory of Change T4.13



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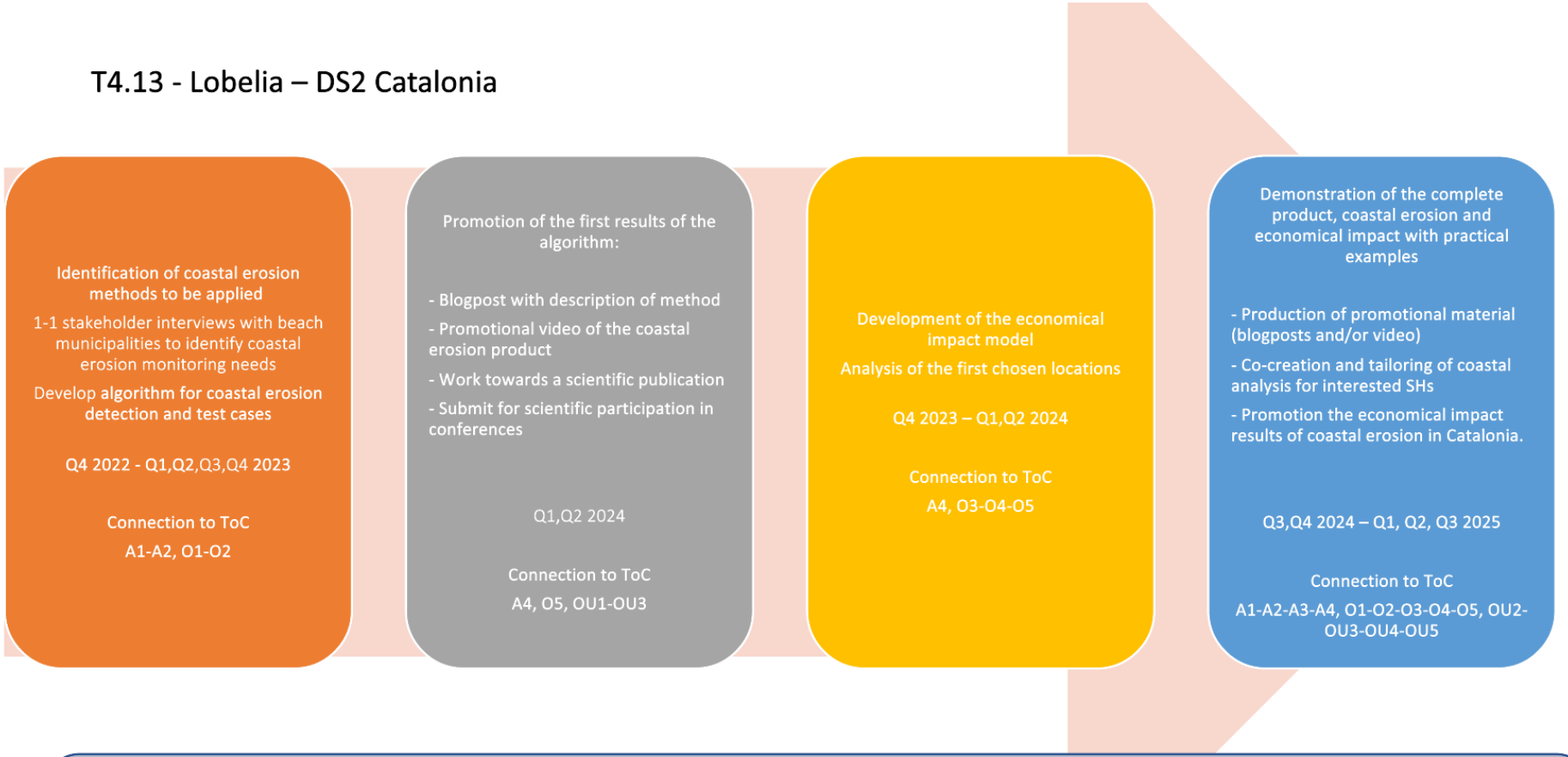
SHE Roadmap T4.13

T4.13 - Lobelia – DS2 Catalonia



•**Key Stakeholders:** Ministry of Environment, Local municipalities in Catalonia, Sociedad Mercantil Estatal parala Gestión de la Innovación y las Tecnologías Turísticas, S.A.M.P (SEGITTUR), European Innovation Council and SMEs Executive Agency, Institut Cartogràfic i Geològic de Catalunya

•**External Initiatives / Strategies:** Catalan Climate Change Plan 2021-2030, Spanish National Strategic Plan for Coastal Protection [Spanish Ministry of environment], EIT Climate-KIC (Knowledge and Innovation Community)

Links to ToC: OU1-OU2-OU3-OU4-OU5

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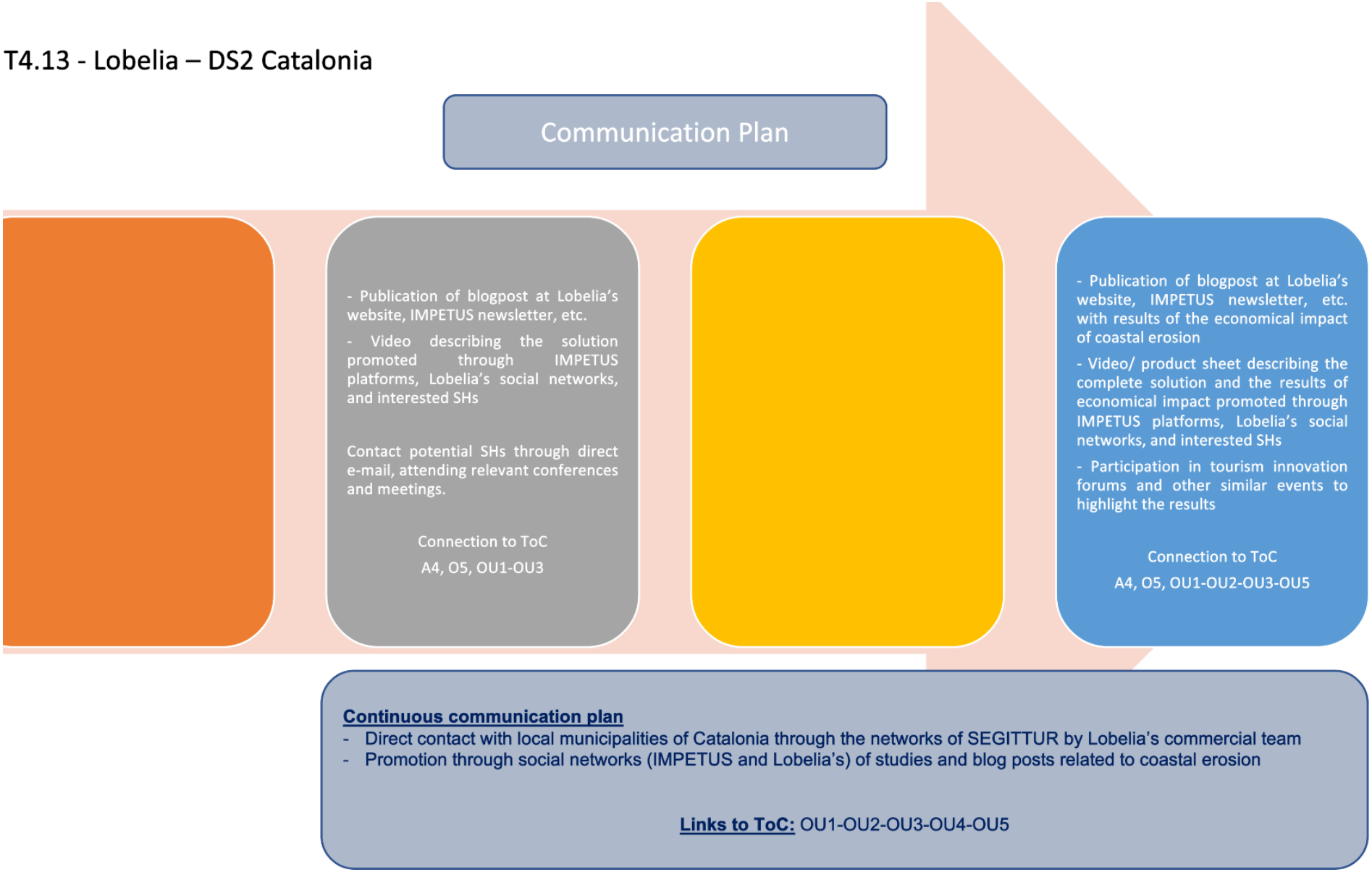
T4.13 - Lobelia – DS2 Catalonia



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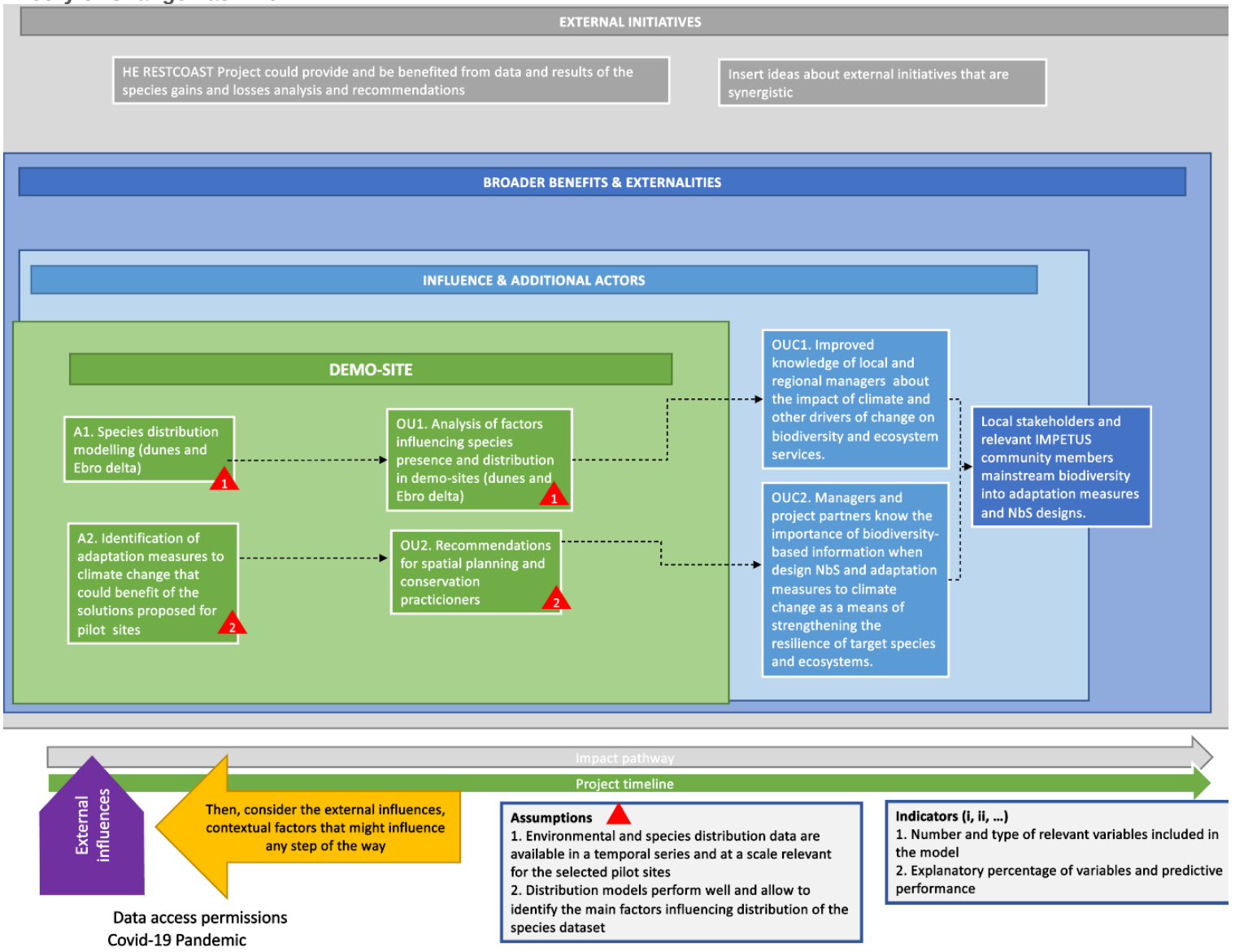
Theory of Change Task 4.9



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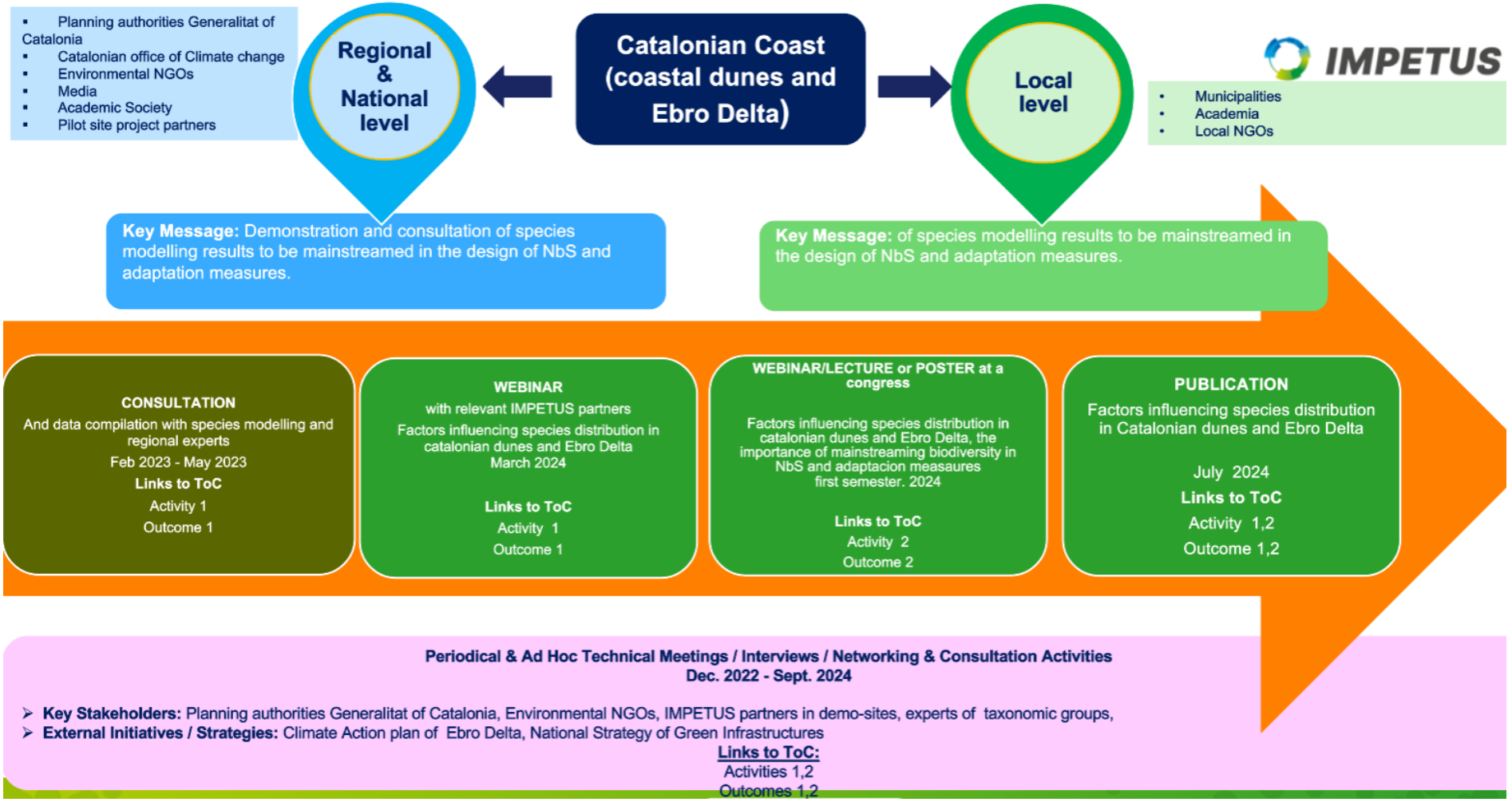
SHE Roadmap Task 4.9



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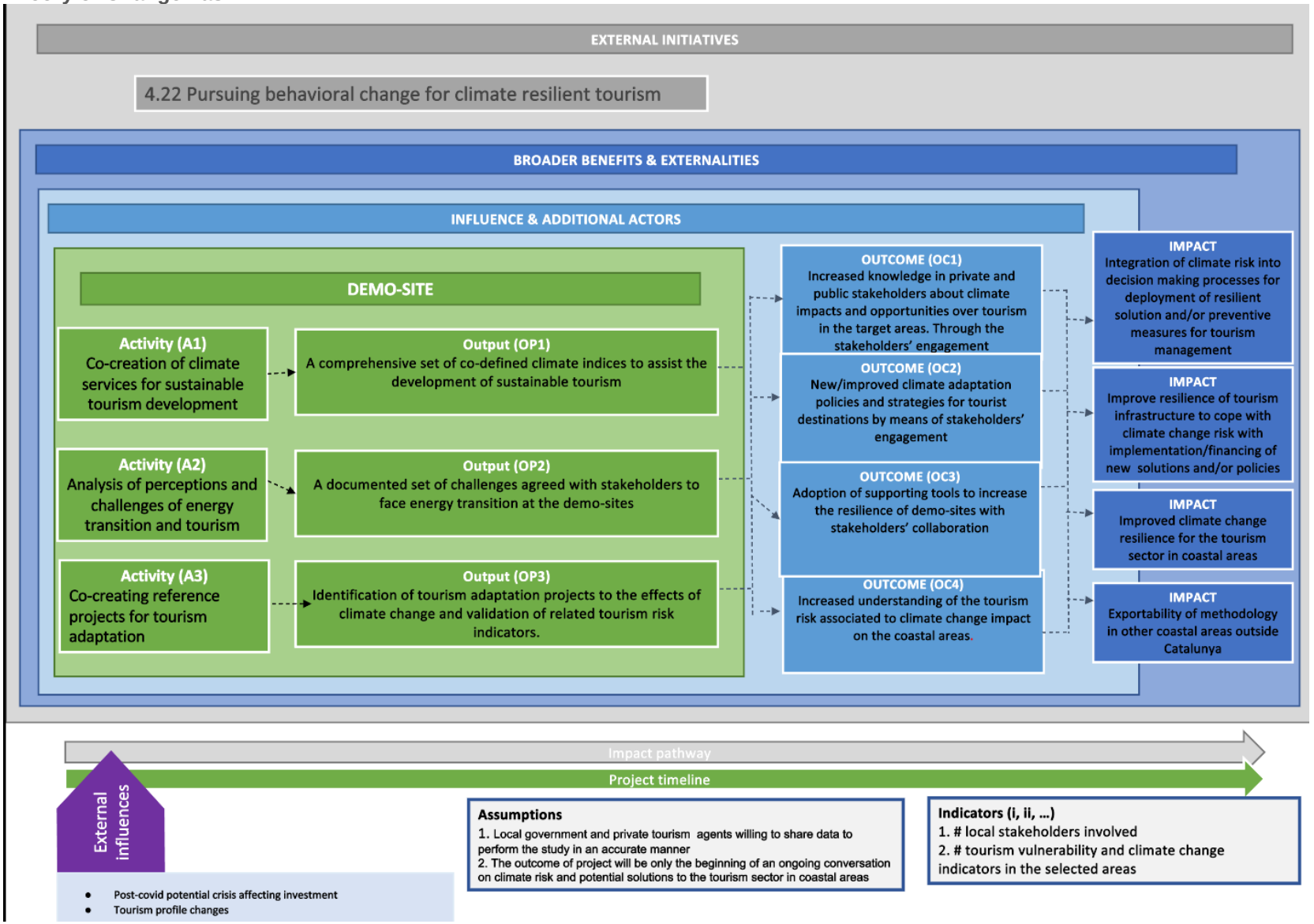
Theory of Change Task 4.22



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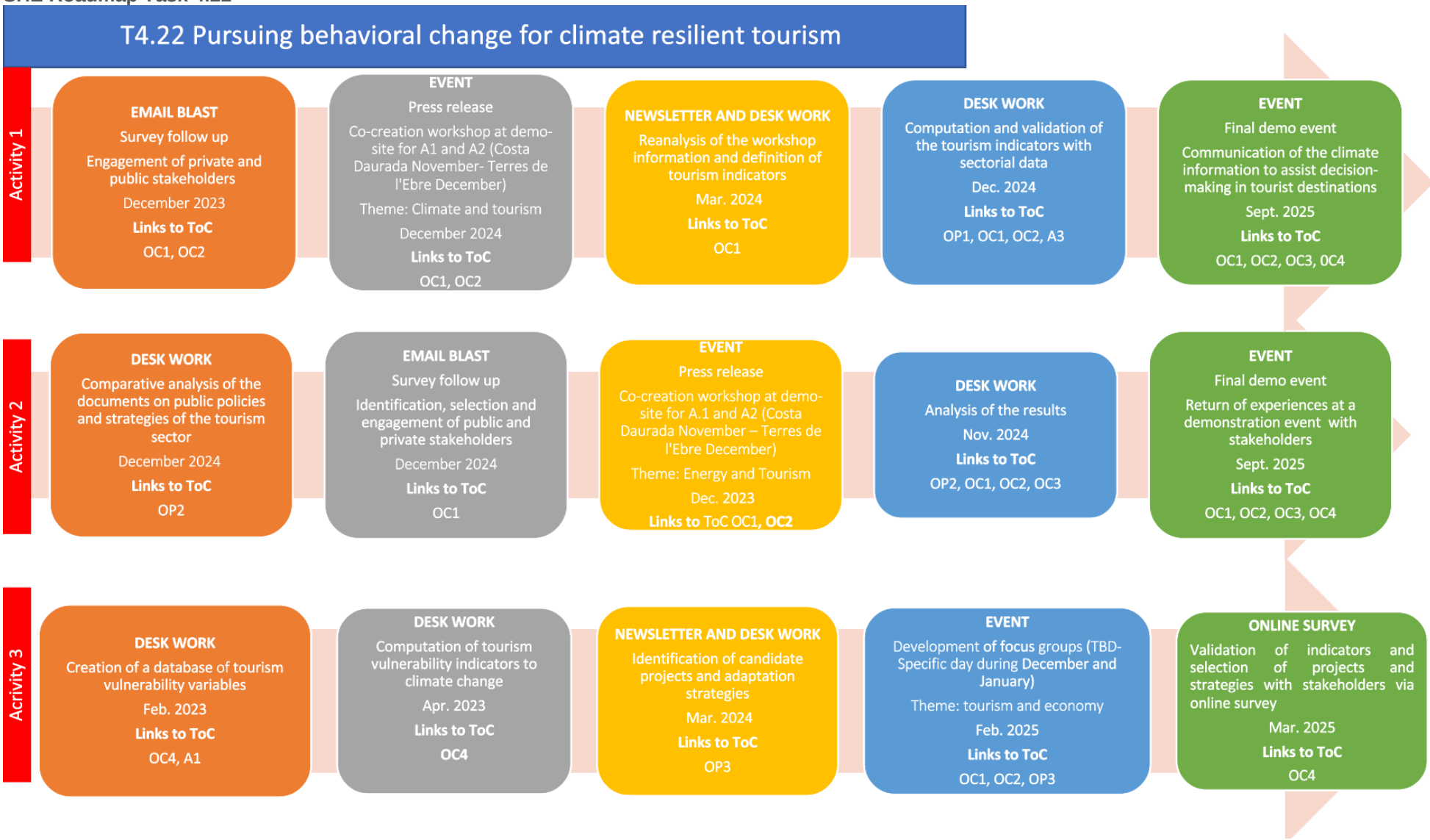
SHE Roadmap Task 4.22



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6.3 DS3 Mediterranean – Attica

Changes in ToC 2023:

- Outputs: 3 main outputs have been added
  - The Attica RKB element along with the user stories
  - Climate Adaptation Pathways Attica
  - Agricultural pilot for Controlled Environmental Agriculture (CEA) solutions
- External influences:
  - There have been changes in the administration due to the recent elections both at a national and at a regional level that might affect procedures. For the pilot case in Markopoulo, apart from some delay in the period before local elections, in progressing with the preparatory activities on site, there was no other delay as there was no change in the administration of the Municipality; thus the pilot continues as expected.
  - However, for the case of the Ministry of Environment, after the elections of June 2023, there were some changes in the Ministries and some new people entered in the General Secretariat; thus new relationships and trust need to be established.
  - With regard to the Covid pandemic influence has been removed as it is not relevant anymore as there are no delays in this aspect.
  - However, there are issues and delays due to problems in purchasing of the equipment as the prices have gone up (due to the prices increase). More market research is needed and the suppliers with lower prices might delay the delivery of the equipment.
- Key assumptions:
  - The Covid-19 situation does not delay the construction works. This assumption is not relevant anymore as the covid crisis is now overcome.

Changes to SHE Roadmap 2023:

- Changes in timeline of actions as updated from the needs of the project and the feedback of the stakeholders.
- Changes in connection with ToC. Connection to output and activities of ToC.

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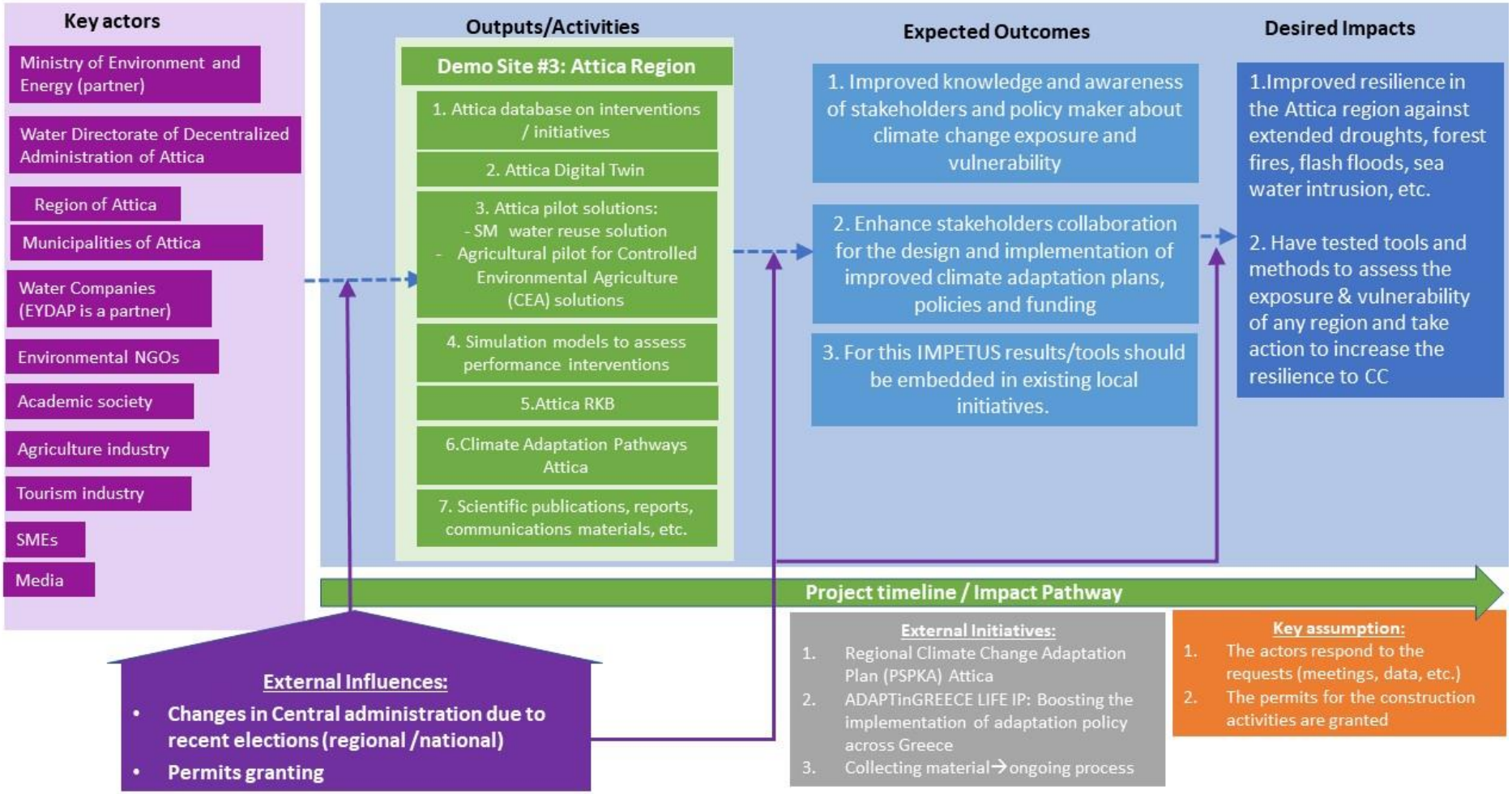
[Theory of Change 2023]

Theory of Change November 2023– Region of Attica



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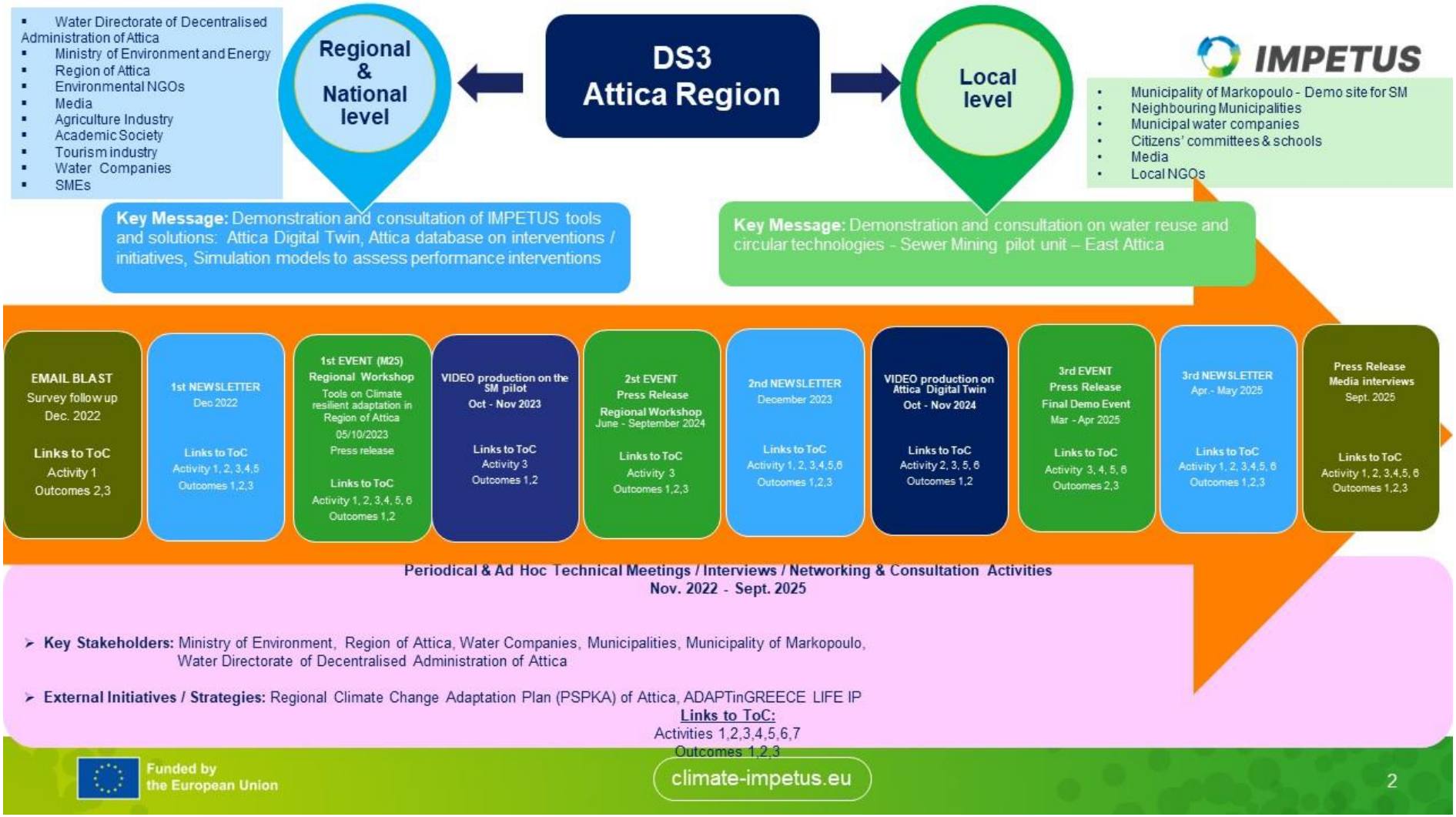
SHE Roadmap 2023



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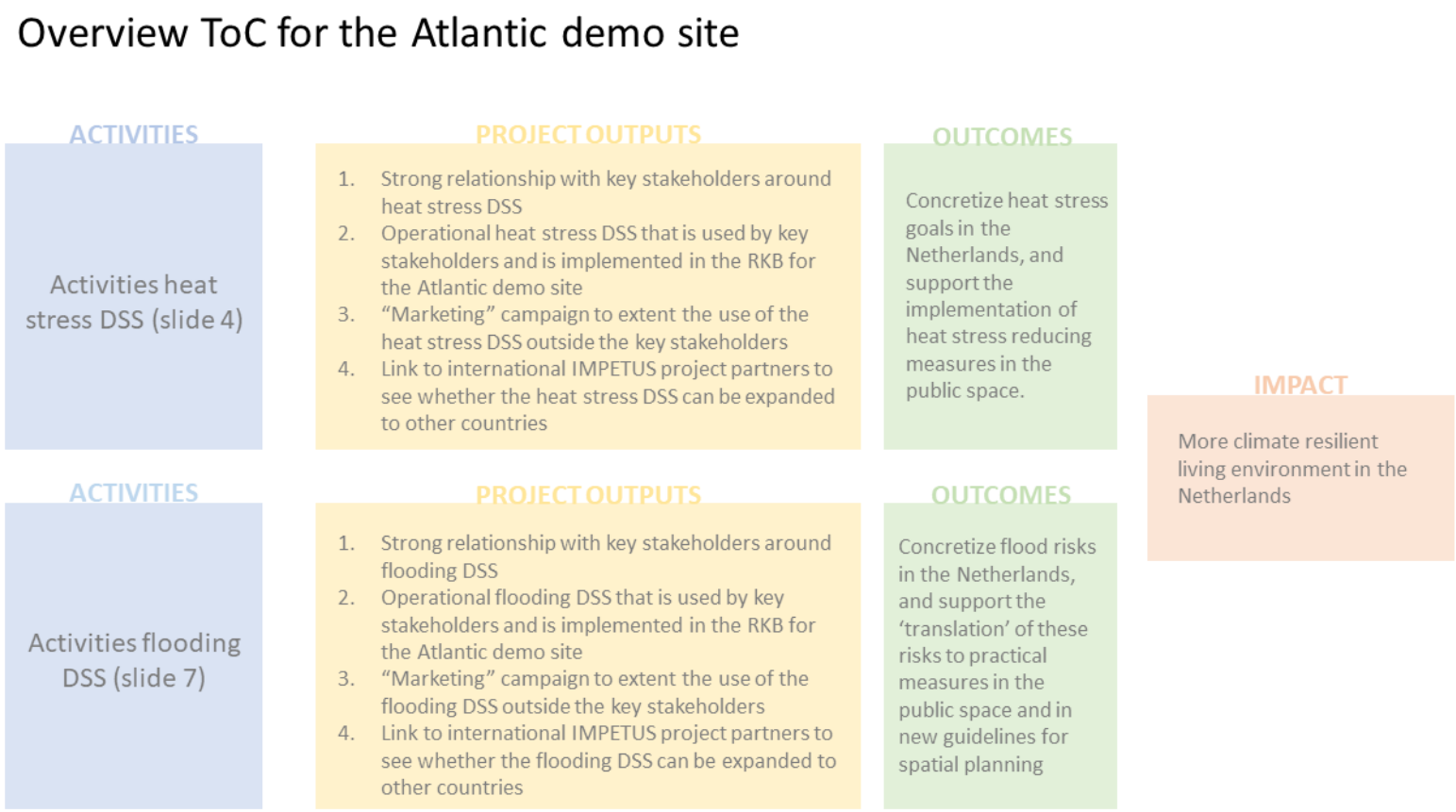
6.4 DS4 Atlantic – Zeeland

Theory of Change: No changes since D1.1.



SHE Roadmap

DS4 Zeeland broke their roadmap into two streams as per their two main activities, which are on heat stress and flooding.

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(1) Roadmap heat stress

*Number of cycles depend on step 2 and 4

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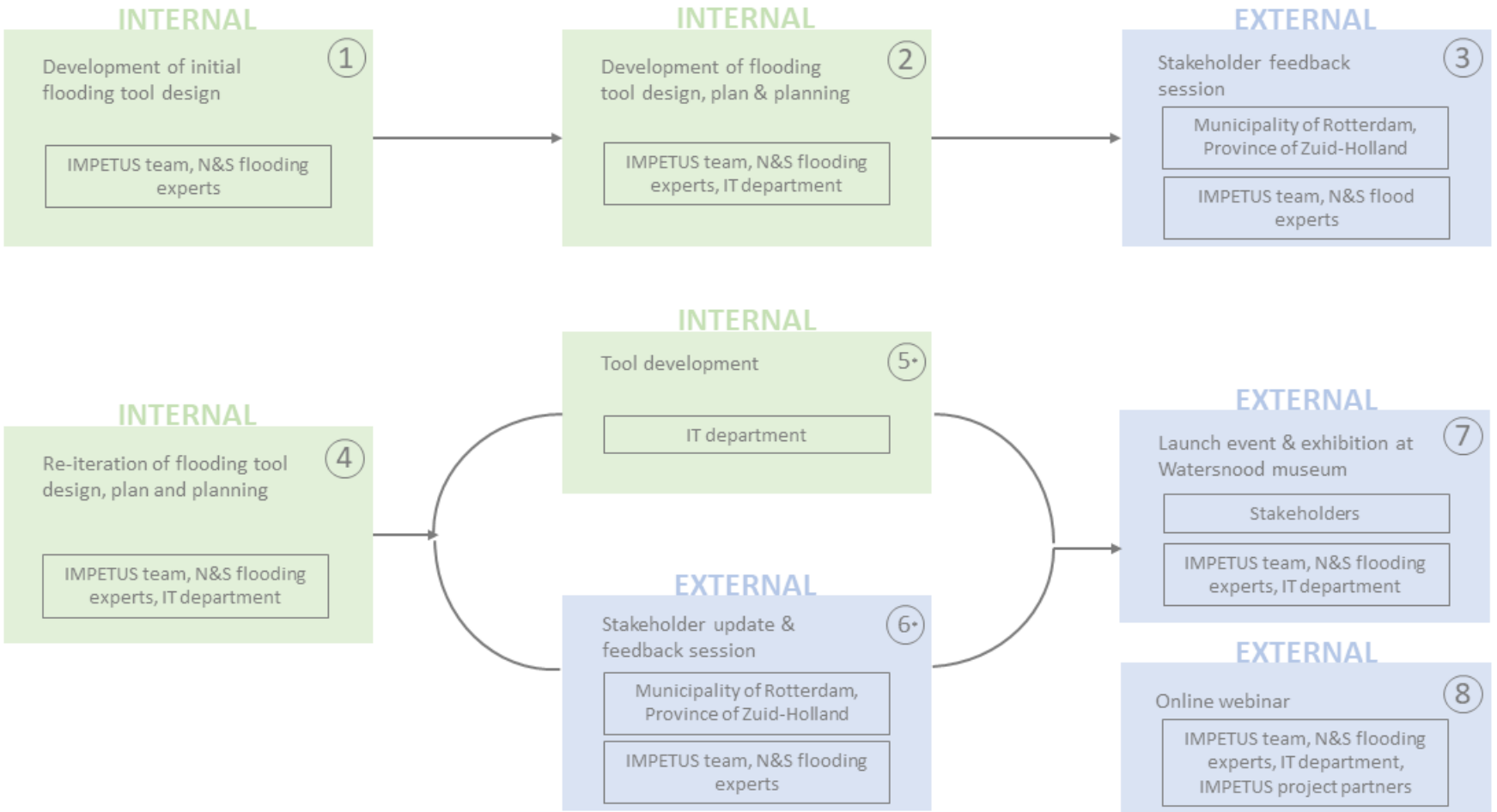
(2) Roadmap flooding



*Number of cycles depend on step 2 and 4

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6.5 DS5 Arctic – Troms and Finnmark

Updates to ToCs and Roadmaps in DS5:
In D1.1, there was only one Theory of Change and one SHE roadmap produced from DS5 - specifically focused on T4.11: Climate proofing of the city center of Tromsø and urban water infrastructure against sea level rise. The limited scope of the ToC and Roadmap was a result of personnel changes in the DS.
For D1.2, the two other tasks: T4.12: Early-warning systems for geological and avalanche risk sites and T4.19: Co-design a Marine spatial planning framework have drafted ToCs. There are now in total three ToCs and SHE Roadmaps from DS5, presented separately for each task due to limited overlap between the tasks.

For the ToC of T4.11, minor changes have been made. Mainly the wording has been altered slightly in many of the boxes to make it better adapted to what will be possible to be carried out in the project. Especially the wording of the result has been changed, due to a realization that an institutionalization of a fully integrated water management system is neither possible within the scope of the project, nor desirable as it would lack in adaptability. Finally, a more clearly communicated visualization of what is the focus in the project and what is beyond the project timeline has been created. For the Roadmap of T4.11, the revised one has been simplified and some activities have been taken out. This is due to a developed knowledge at this point in the process of the right focus of the stakeholder engagement in the task at this point, and a somewhat overambitious amount of stakeholder engagements in the original one.

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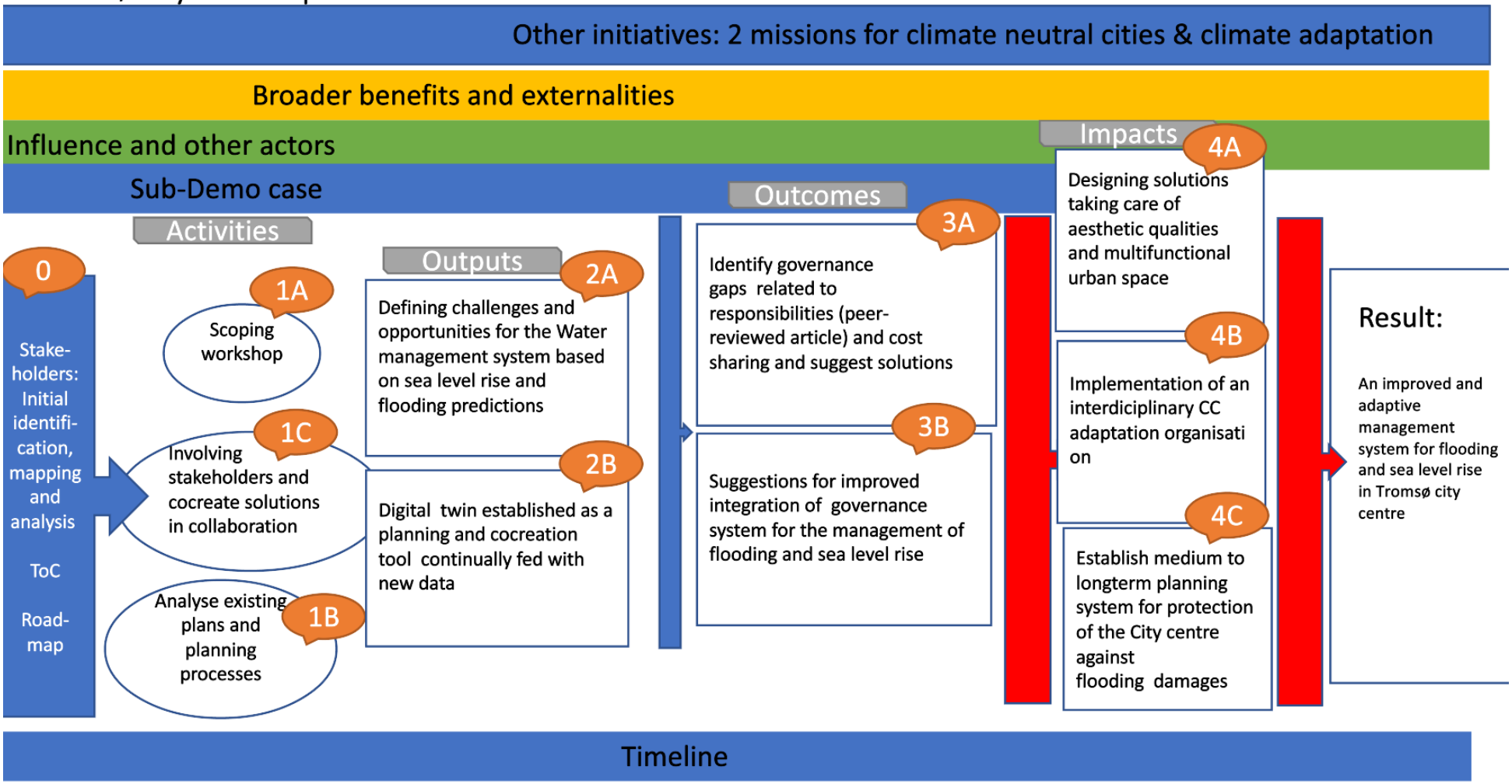
IMPETUS

[Theory of Change T4.11]

Tromsø City Case – Updated November 2023



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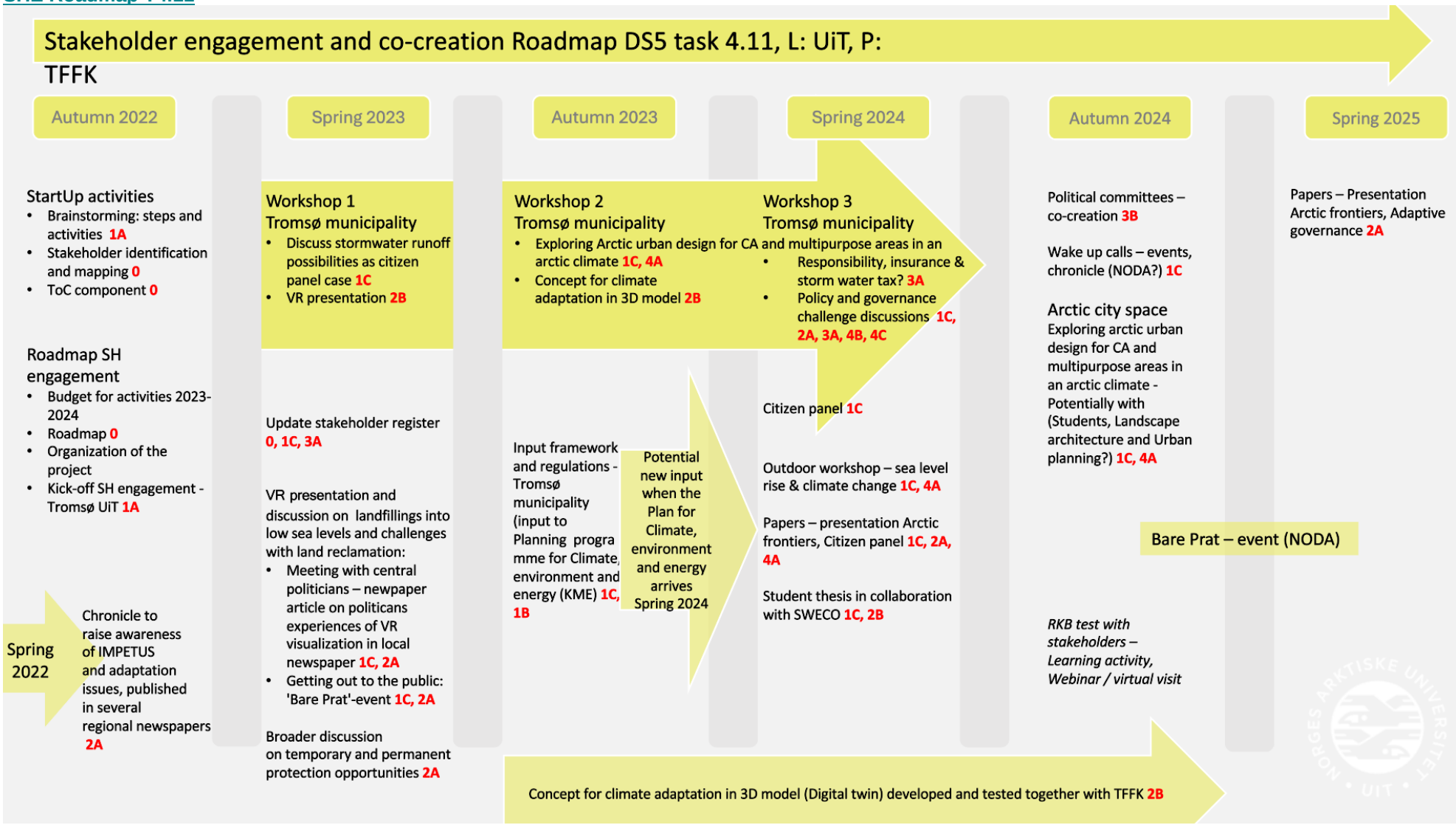
SHE Roadmap T4.11



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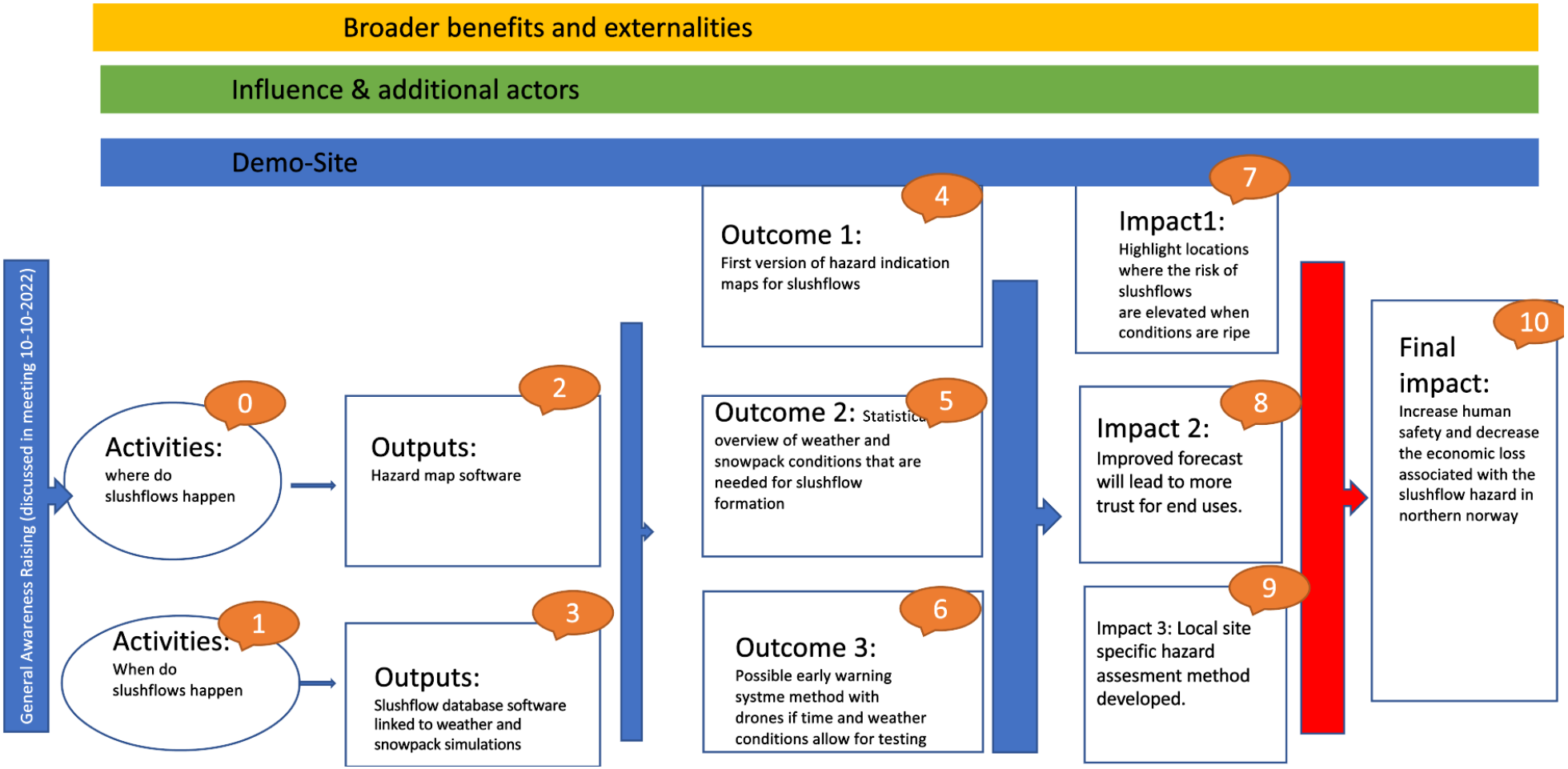
Infographic Theory of Change (ToC): Arctic Demo-Site (DS) Task 4.12



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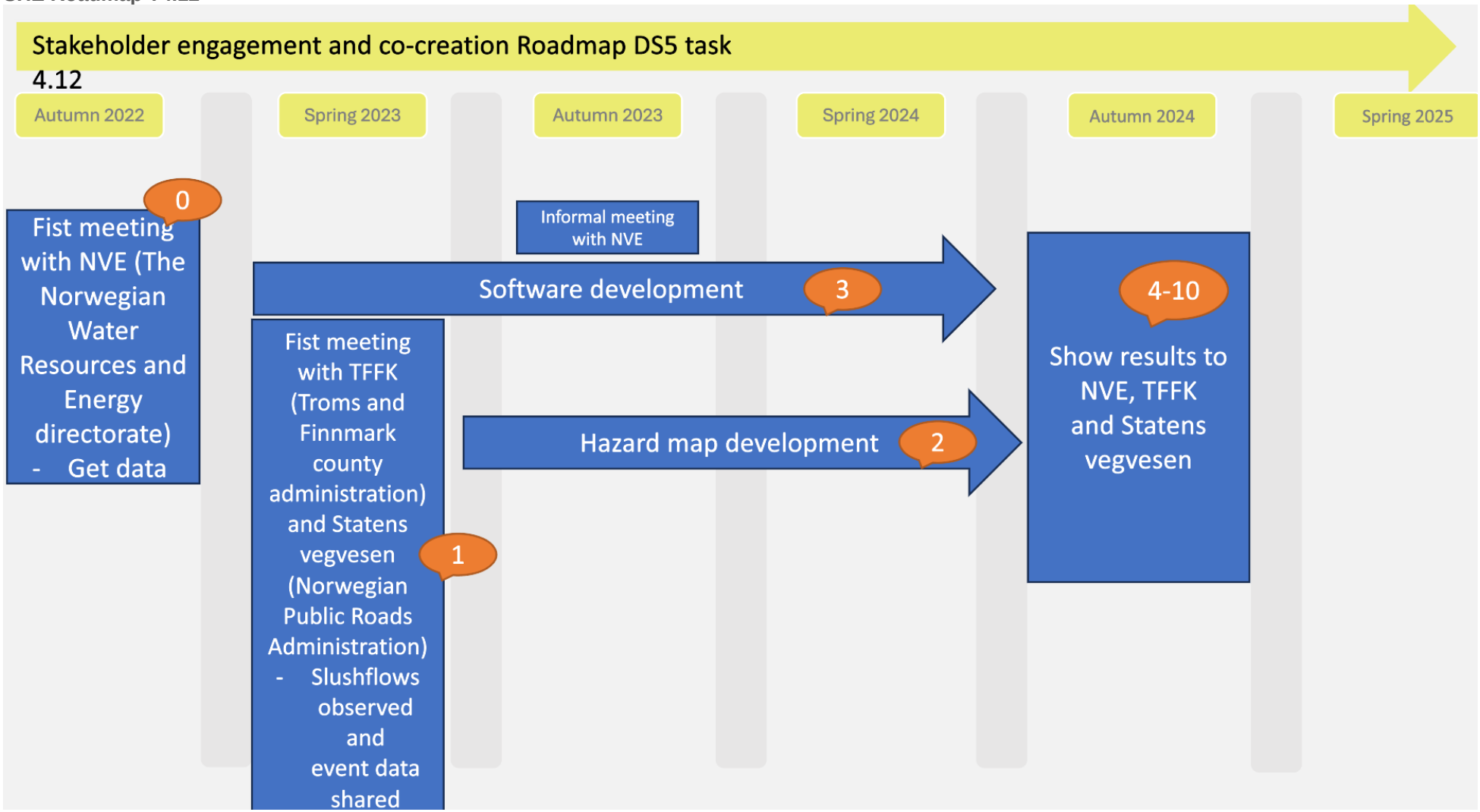
SHE Roadmap T4.12



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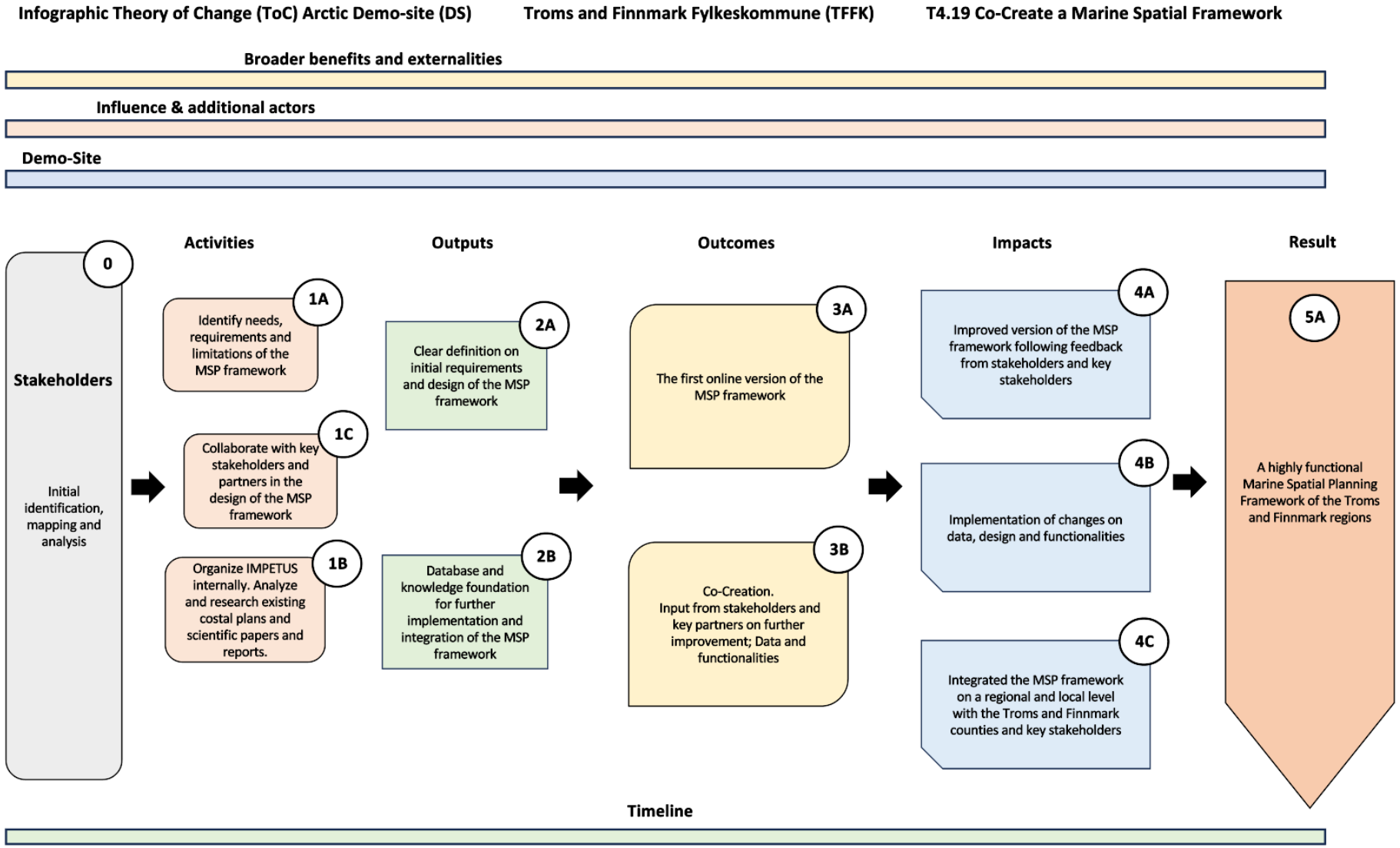
Theory of Change T4.19



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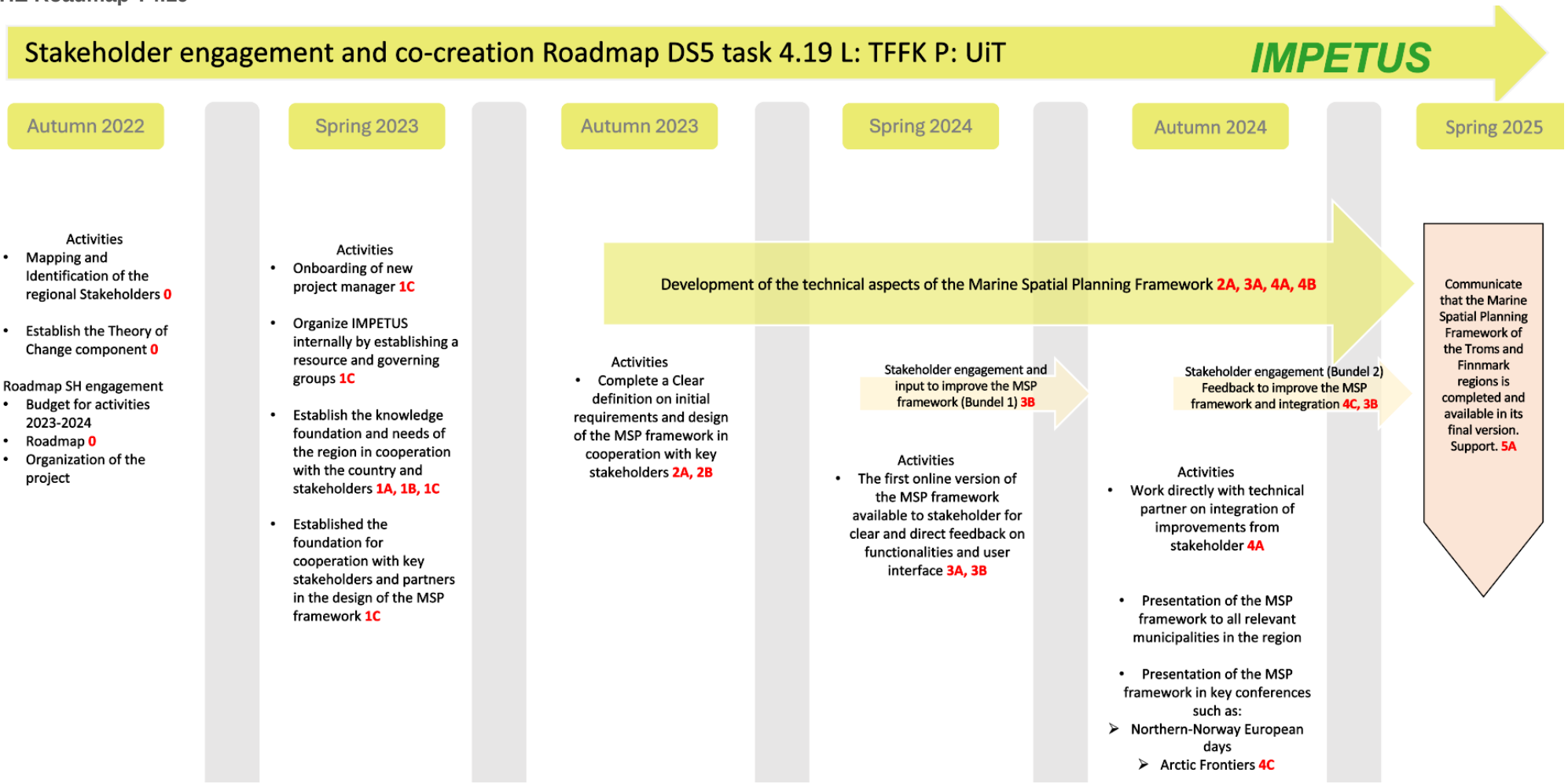
SHE Roadmap T4.19



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6.6 DS6 Boreal – Zemgale

Reflections and updates of ToC 2022- 2023

After the initial drafting of the ToC, there were no significant changes in the later versions as the key aspects, key activities, outputs, outcomes, and impacts are corresponding to implementation path of the two tasks in Zemgale region, namely, upgrading of the flood risk early warning system and development of the regional climate change adaptation plan. Amendments were made for External initiatives by adding relevant regional strategic planning documents: Zemgale Planning Region Sustainable Development Strategy 2015-2030 and Zemgale Planning Region Development Program 2021-2027. On top, acknowledging the importance of climate change effects in the region, Zemgale Planning region has become a signatory of the EU Climate Change Adaptation Mission since 2022, and is taking part in implementation of the related Horizon Europe project “Regions for climate change resilience through Innovation, Science and Technology” (RESIST), 2023 – 2027. Initially identified stakeholder groups in line with the Stakeholder Map are addressed to carry into effect foreseen steps of the ToC matrix. Minor adjustments in names of institutions reflect changes in institutional set-up at national (ministerial) level and at the local (municipal) level.

Regarding the stakeholder engagement roadmap, the originally planned list of key events has been extended in line with unfolding project activities and adjusted to the pace of implementation schedule. The number of meetings and other events with stakeholders at the demo-site has been increased compared to the initial considerations. The reasoning for this change is substantiated by the need for more frequent interaction with stakeholders to ensure the acceptance of planned climate change adaptation measures, better uptake of the extended regional flood risk early warning system, and to sustain efficient feed-back loops on suggested solutions.

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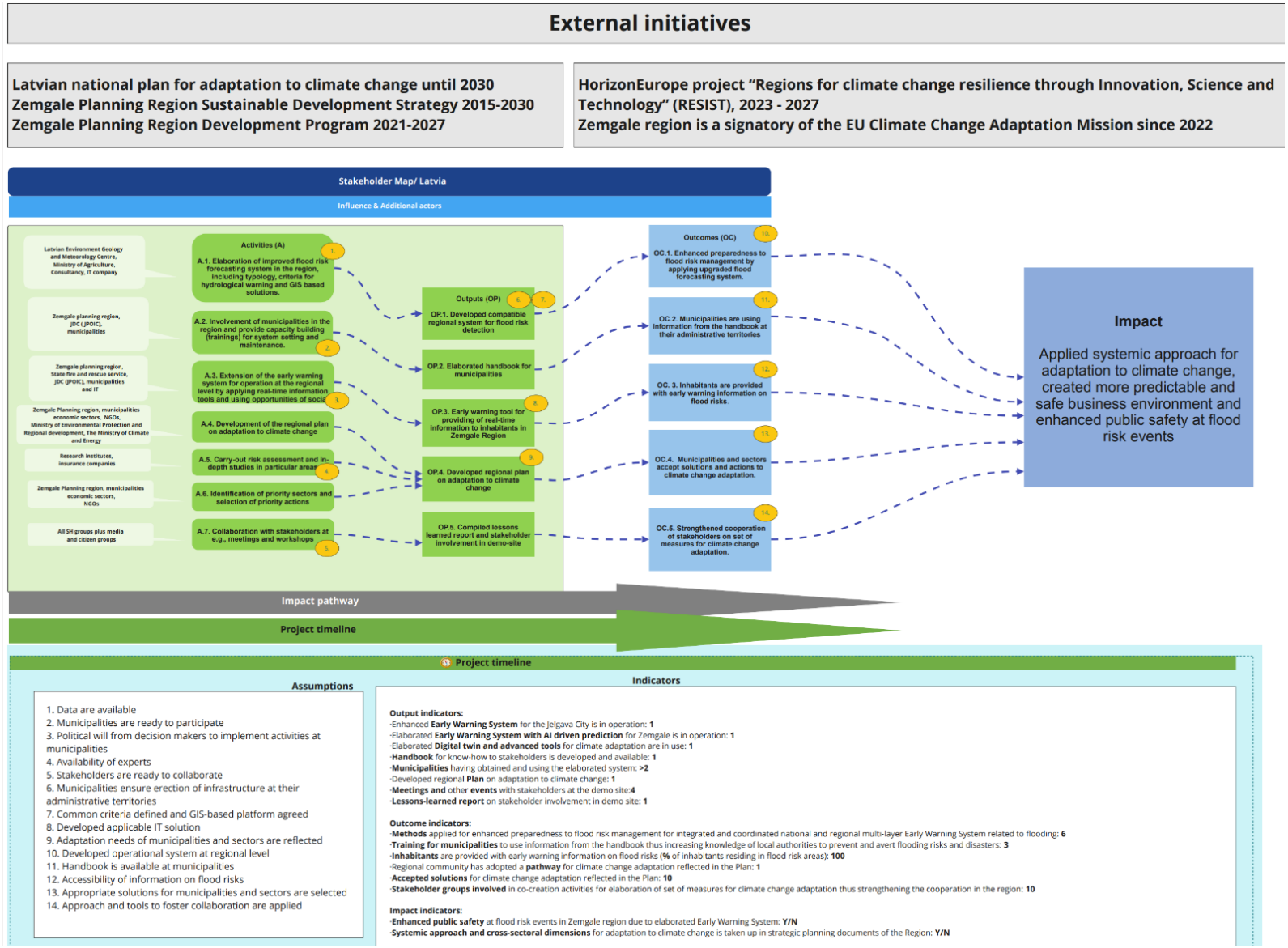
[Theory of Change](#) *(hyperlinked to SharePoint for better visibility)*



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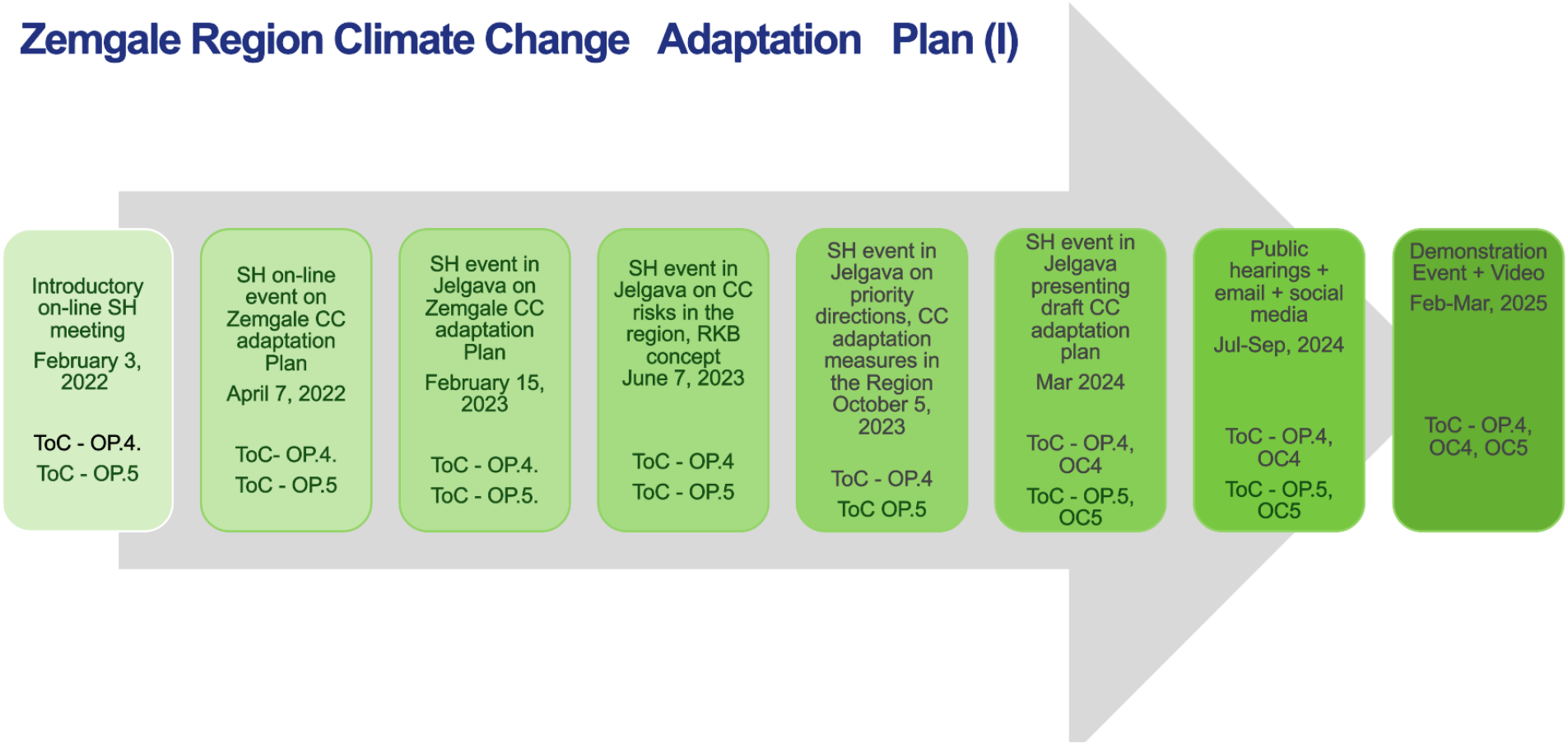
SHE Roadmap(s)

DS6 Zemgale divided their roadmap into two, reflecting their main DS activities: the climate adaptation plan; and the multi-layer integrated flood risk management, decision support and early warning system for civil protection.



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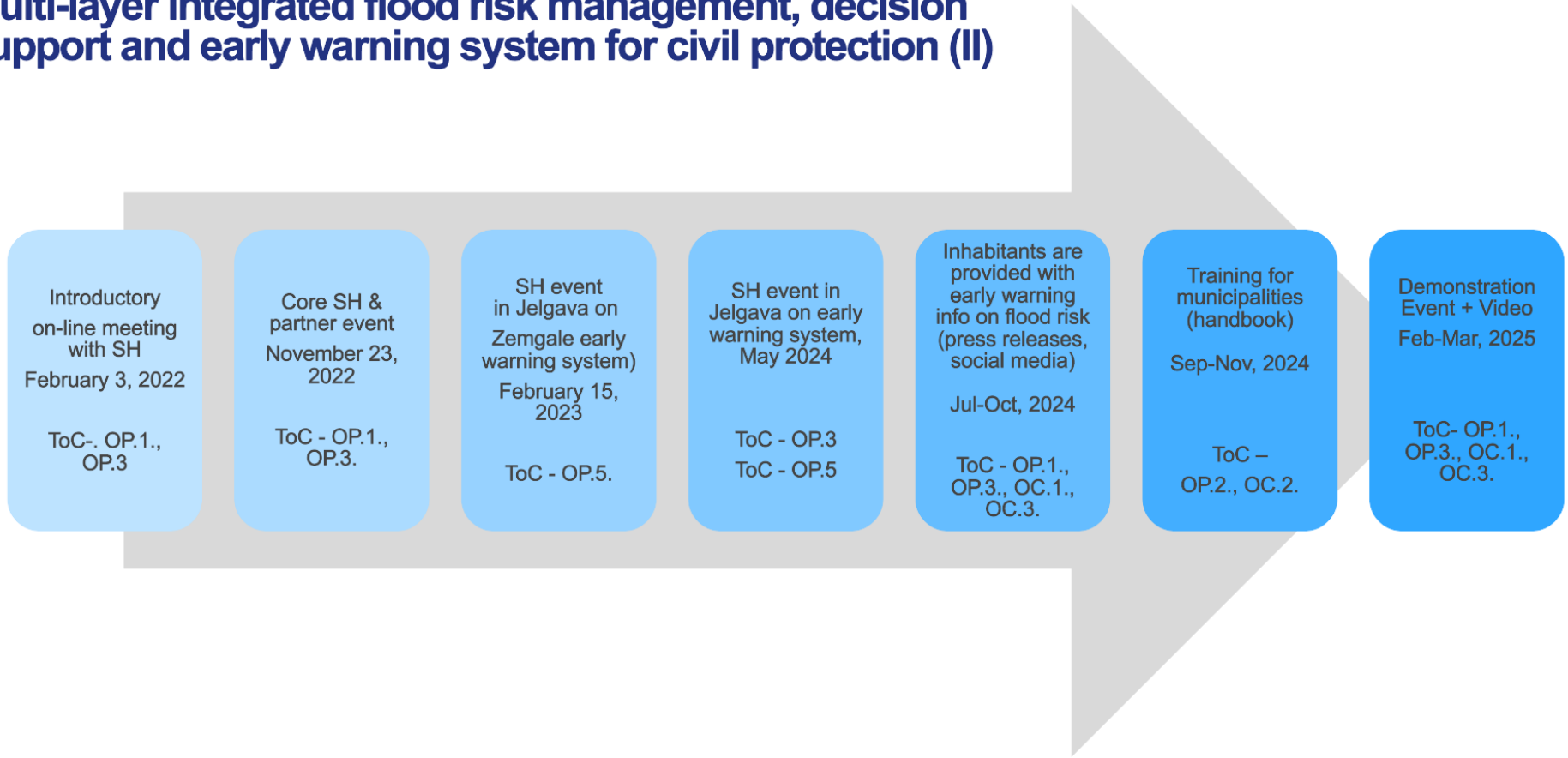
Multi-layer integrated flood risk management, decision support and early warning system for civil protection (II)



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6.7 DS7 Mountain – Valle dei Laghi

Reflections and updates of ToCs 2022-2023
After the initial drafting of the Theory of Change, there were no significant changes in the later versions; the key aspects, including activities, outputs, outcomes, and impacts, remained consistent. However, the departure of one of the original DS local partners from the project led the working group to decide to wait for a new partner to join before making any radical revisions – in particular when it comes to tackle the key assumptions identified at the beginning of the drafting process, along with the main indicators, whose coherence needs to be verified. Adjustments in assumptions resulting from SH events revealed existing data and procedures, but highlighted deficiencies in transparency, accessibility, and effective communication among actors and sectors. Governance fragmentation in water management emerged as a major obstacle, necessitating improved technical and monitoring systems, including new indicators and up-to-date procedures.

The Theory of Change for DS7 underwent significant changes following a dedicated meeting on November 8th, 2023. While the final impact and three out of the four outcomes remained unchanged, one outcome was modified. The original goal of "Building on existing practices, acquire a long-term holistic perspective and a large-scale engagement of citizens and SH" was deemed unrealistic. Instead, it was reframed as "*Setting the stage for a network of citizens and stakeholders for their long-term participation in the decision-making process*". During this meeting, the outputs were refined as well to be closer to the current activities in the different tasks. Starting with "3D models to simulate future water cycles/water availability patterns," the progression led to a "Digital twin of Sarca basin to simulate current and future water cycles/water availability patterns" and ultimately to a "*Decision Support System to simulate current and future water availability patterns*". Similarly, the initial goal of developing innovative agricultural insurance was reformulated after discussions with the local insurance company to "*Enhanced knowledge and data-driven support for insurances related to the agricultural sector*". The original idea of "Designing innovative participatory activities to deliberate on the use of resources and leverage local knowledge and cultural heritage" was replaced with "*Raising awareness and enhancing knowledge on cultural heritage activation for climate adaptation and mitigation*". The activities underwent minimal changes, having been reduced from seven to six some months earlier, with the "Mapping of water-related infrastructure" integrated into "*Gathering, mapping, and analyzing data/info on weather, soil, agriculture, water, spatial planning, and economy*".

Regarding the stakeholder engagement Roadmap, the key future events that were originally planned have undergone changes in schedule following the unfolding of project activities; therefore, a few things have been modified, primarily involving the postponement of specific workshops on insurance and cultural heritage topics. Some follow-up activities were added, especially concerning the work with local water management organizations (irrigation consortia) and institutions. Additionally, the second part of the kick-off event will now take place as an intermediate dissemination public event of the preliminary results of the project. Finally, some initiatives suggested by WP1 and WP7 that are currently underway include both brochures aimed at reaching the general public and cultural heritage interviews.

Valle dei Laghi Theory of Change: Valle dei Laghi has a multi-page ToC with their assumptions, external activities and more, however, we are including only their first page of their ToC for convenience.

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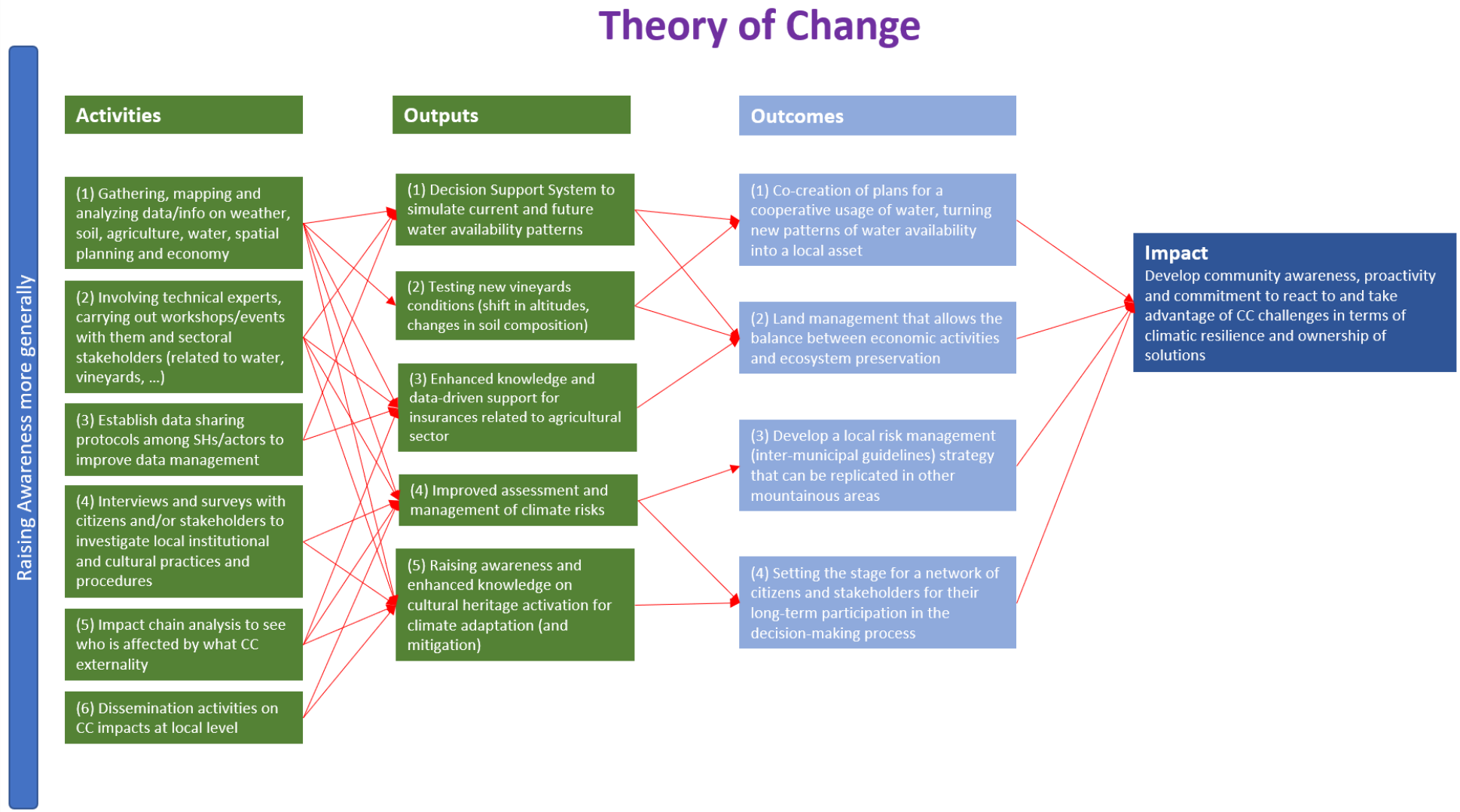
Theory of Change 2023



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SHE Roadmap 2023

When	2023: 9th February	2023: 11th April (first step) and 20th April (2nd step)	2023: 24th May	2023: 24th May	2023: 12th December
Title of workshop/event	**Kick-off event for the SH engagement process**	**Workshop on efficient / sustainable water management for irrigation**	**Workshop for the "risk task" - built environment**	**Workshop for the "risk task" - agriculture**	**Interactive workshop on the digital twin of Sarca river basin (functional to DSS)**
Objectives	To present the project, activities in DS7, SH engagement roadmap; to improve the understanding of the current decision-making process to cope with a water scarcity situation; to gather inputs for the definition of the Decision Support System	2 steps: (1) discussing the critical issues faced by irrigation consortia - facilitate cooperation and collect inputs for DSS; (2) on-the-field event with an agro-ecologist on efficient water management in agriculture. Outcomes crucial for restructuring irrigation consortia governance as well as strengthening their collaboration.	To understand what the main risks are and the measures already in place to address these risks. Strengths and weaknesses of the different phases: prevention, emergency and post-event. Working tables if possible.	To understand what the main risks are and the measures already in place to address these risks. Strengths and weaknesses of the different phases: prevention, emergency and post-event. Working tables if possible.	Presentation of the digital twin in an interactive session where the potential user personas can provide us with feedback regarding the usability of the digital tool aimed to support water-management-related decision-making (Decision Support System)
Where	**Trento**	**Pietramurata (TN)**	**Trento**	**Trento**	**Trento**

2024: (1) learning event* March; (2) April/May	**2024** (March-April)	**2024** Summer	**2024** TBD
Workshop on efficient / sustainable water management for irrigation	**Workshop on integrated water & energy management at the watershed level and impacts on fluvial ecosystem**	**Workshop on the "insurance task"**	**Workshop on hydroeletric sector strategies to face extreme events**
2 steps: (1) present results (implemented measures, software-DSS, etc.) of other projects on efficient use of irrigation water (irrigation systems + soil health & water retention); (2) solar farming (photovoltaic systems for irrigation)	Facilitate cooperation between SH on DMV/ecological flow monitoring and mainteinance in drought periods	•Analyze connection between climate event(s) and impact on agriculture. •Discuss the functioning/effectiveness of existing insurance schemes as well as of existing (if any) index-based policies. •Investigate current needs and risk management practices of farmers. •Identify missing information (data, risk management practices, compound hazards...). •Evaluate drought as main risk (or if other ones are perceived as more urgent/important).	Facilitate cooperation with the hydroelectic sector, stimulate reflection on solutions to face extreme events, inputs for DSS
TBD	**Tione/Trento**	**ITAS HQ in Trento?**	**TBD**

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2024-2025 TBD	**2024** TBD	**2024-2025** TBD	**2025** TBD
Workshop to prioritize future risk assessment for tangible and intangible heritage aspects	**Intermediate dissemination public event**	**Workshop(s) FEM**	**Final project event(s) - dissemination of results (RKB)**
TBD	TBD (combination woth another event also organised by someone else - FEM?)	TBD	Different events according to solutions/topics?
TBD	We can ask for the availability of Sarche theater or Dro theater	**TBD**	**TBD**

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