Updated (3rd version) Implementation status and monitoring of the roadmap for the activities and actions at the Case Studies

Deliverable 6.3

WP6: Case studies: Coordination and implementation activities

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EXECUTIVE SUMMARY

ARSINOE develops the methodological framework for the combination of the System Innovation Approach (SIA) with the Climate Innovation Window (CIW) to create an ecosystem for climate change adaptation solutions. The work in ARSINOE revolves around nine Case Studies (CSs), where the implementation of the SIA takes place. The case studies represent a range of environments and collections of (local and regional) stakeholders that are the target for the implementation of the innovation package developed in ARSINOE to strengthen resilience against climate change.

This deliverable D6.3 presents a summary of the activities in WP6 over the period M19 – M36, which are related to the organisation, coordination and execution of the activities conducted in the nine case studies. This deliverable is an updated version of Deliverables 6.1 and 6.2, which reported on the initial activities in WP6 during the first eighteen months of the project. A final version of this deliverable (D6.4) will be submitted in M48. The deliverable is a living document, reporting (a) an updated description of each CS; (b) the stakeholder engagement activities (meetings, actions, etc) within the CSs; (c) the organisation of actions for the implementation of stakeholder participation and modelling activities for the SIA and the technical activities such as the modelling, VR, citizen science, resilience wheel and dashboard developments; (d) the organisation of a monitoring mechanism and plan for all these activities.

During the reporting period the focus has been on the execution of the SIA (Task 6.2), the execution of the modelling and data collection activities (Task 6.3), the participation of all the case studies in the open tenders for innovation (Task 6.4) and the selection of innovators for each CS and start of their implementation.

The main achievements from task 6.2 were the successful organisation of the 2nd and 3rd living lab workshops for each case study. The living labs are instrumental in the implementation of the system innovation approach and are the place where the projects interacts with the stakeholders from the case studies, and the direction of the case studies is determined in co-creation with the stakeholders. In the 2nd living lab workshops, the stakeholders developed a common future vision for 2050, which was subsequently used in the 3rd living lab workshop to define the steps required to achieve the vision, and the milestones and key-innovations required to realise this future vision through back-casting. The outcomes of this back-casting, in particular the needed innovations as identified by the stakeholders were used to define the objectives of the open tender for innovations calls, in which a public tender was used to search for the innovations identified in the 3rd LL workshop in the market.

In the actions under Task 6.3, the data collection and modelling activities have continued. In the ARSINOE case studies, stakeholders from diverse backgrounds and disciplines are brought together to co-design a jointly agreeable and preferable vision of the future. The objective is to enable project partners from diverse disciplines to converge on a unified view, before implementing resilience modelling and assessment frameworks using multi-disciplinary modelling methods. To define the context and map out all relevant aspects, each case study developed a conceptual model of the types of technical/modelling activities that they envisage for their CS. These conceptual models form the basis for all modelling activities. During the reporting period, these conceptual models were refined and updated, and subsequently the necessary modelling tools to assess impacts of climate change have been developed/adapted and validated for the case specific context and, where necessary, have been downscaled to the required granularity. First results obtained with these models are presented herein, such as results for urban heat island effect, sea level rise predictions, hydrological and geohydrological

models, from which the impact of climate change on the case study level is estimated. Particular modelling results that transcend relevance of individual case studies include the MINKA citizen science application and the cascading failure engine, which are being adopted in CS1 and CS8 respectively.

The various resolutions and tools required for the modelling, including supporting activities to connect the modelling work to the stakeholders and their environment are brought together in a framework referred to as the resilience wheel. The operationalisation of this framework is being performed in CS1 (Athens) and CS8 (Torbay) acting as frontrunners in this implementation.

An Open Tender for Innovations has been initiated as a means to identify emerging or mature innovations to be included in ARSINOE's Portfolio of Innovations. The process is undertaken in three phases: i) stocktaking for the identification of relevant solutions well adapted to each local context, ii) preparation and publication of the Open Tenders, and iii) the evaluation and selection of the solutions to be supported. All case studies have participated in the two rounds of the open tender and have selected one or more innovations that will be implemented. A total of 23 innovations has been selected for implementation. The innovations selected are very diverse, and range from purely technical solutions to social innovations. At the end of M36 most contracts with the innovators have been signed, and the implementation of the innovations, a key activity in WP6, is in progress.

In the coming reporting period the case studies will continue to execute the work described herein, in particular the implementation of the innovations selected through the open tenders, the completion of the implementation of the SIA and the resilience assessments. Furthermore, in the last months of the project the focus will shift to finalizing the innovation packages and the collection of the lessons learned and defining evidence based recommendations, which will be validated with the end-users and stakeholders in the case studies before they will be published.

Wider contribution to EU Policies: This Deliverable, in its final version (M48) aims to provide detailed information and experience-based knowledge from the nine diverse Case Studies. It is expected to contribute to regional decisions and EU policies for the implementation of actions leading to enhanced resilience to climate change at the regional level.

Related Deliverables: Deliverable 6.6 (M45) for a detailed report on the SIA implementation in the living labs (updated from D6.5) and Deliverable 3.5 (M30) for the climate projections and scenarios and model selection (updated from D3.4), D3.8 describing the Multi-System Dynamic Modelling Framework (M30), D4.1 on the Visualisation Dashboard for Codesigning Solutions/ Scenarios for Digital Twin (M36), D4.7 describing in full detail the Machine Learning Models for Knowledge Graph data analytics (M36). The previous versions of this deliverable are D6.1 (M4) and D6.2 (M18).

List of Abbreviations

ABM	Agent Based Model
ABS	Agent Based Simulation
AHP	Analytical Hierarchy Process
AMA	Athens Metropolitan Area
C2S	Copernicus Climate Change Service
CI	Critical Infrastructure
CIW	Climate Innovation Window
CNIG	Centro Nacional de Información Geografica
CS	Case Study
CSM	Crop Simulation Model
D	Deliverable, e.g. D6.1 is ARSINOE deliverable 6.1
DMRM&AF	Dynamic Multi-Sectoral Resilience Modelling and Assessment Framework
DTM	Digital Terrain Model
ENC	electronic nautical chart
ESG	environmental, social and governance
EU	European Union
FUA	Functional Urban Areas
GA	Grant Agreement
GCM	Global Climate Model
GDP	Gross Domestic Product
GHG	Greenhouse Gasses
GIS	geographic information system
IHM	Hydrographic Institute of the Navy (Spain)
KPI	Key Performance Indicator
LL	Living Lab
M	Month as counted in the duration of the project, M1 being the starting month of the project
MCDA	Multiple-Criteria Decision Analysis
ML	Machine Learning
MS	Milestones
NbS	Nature based solutions
ROI	Region of Interest

SD	System Dynamics
SDG	Sustainable Development Goal
Sh	Stakeholder
SHVI	Socio-Economic Heat Vulnerability Index
SIA	System Innovation Approach
SLR	Sea Level Rise
SSP	Shared Socioeconomic Pathways
T4T	Training for Trainers
UAV	Unmanned Aerial Vehicle
UNFCCC	United Nations Convention on Climate Change
WP	Work Package
WRF	Weather Research and Forecasting
WS	Workshop

1.0 INTRODUCTION

Adaptation to climate change refers to all approaches taken to adjust, prepare for, and accommodate new conditions that are created by changing climates. Adaptations may be cultural and societal, or financial solutions. As climate change is complex and interconnected with other global challenges, such as food security, water scarcity, biodiversity depletion and environmental degradation, it is insufficient to use traditional approaches to innovation that focus on one aspect of the problem.

ARSINOE develops the methodological framework for the combination of **System Innovation Approach** (SIA) with the **Climate Innovation Window** (CIW) to create an ecosystem for climate change adaptation solutions. ARSINOE creates this ecosystem with a three-tier, approach: (a) using SIA it integrates multi-faceted technological, digital, business, governance and environmental aspects with social innovation for the development of adaptation pathways to climate change, to meet EU Green Deal targets for specific regions; (b) it links with CIW to form innovation packages by matching innovators with end-users/regions via for specific regions; (c) it fosters the ecosystem sustainability and growth with cross-fertilization and replication across scales, at European level and beyond, using specific business models, exploitation and outreach actions. The ARSINOE three-tier approach is show-cased in nine widely varied regions across Europe (case studies), as a proof-of-concept with regards to its applicability, replicability, potential and efficacy.

The nine Case Studies cover a vast area of the European Continent, ranging from Spain to the Black Sea and from Greece to Denmark. In terms of systems complexity, they also cover a wide range including health, energy, transport, forestry, fisheries, farmland, and wetlands, which face challenges such as biodiversity loss, floods, water scarcity, and heatwaves in escalating severity depending on the region. The main challenges and key thematic issues, related to resilience to climate change, addressed for each case study are shown in Figure 1.

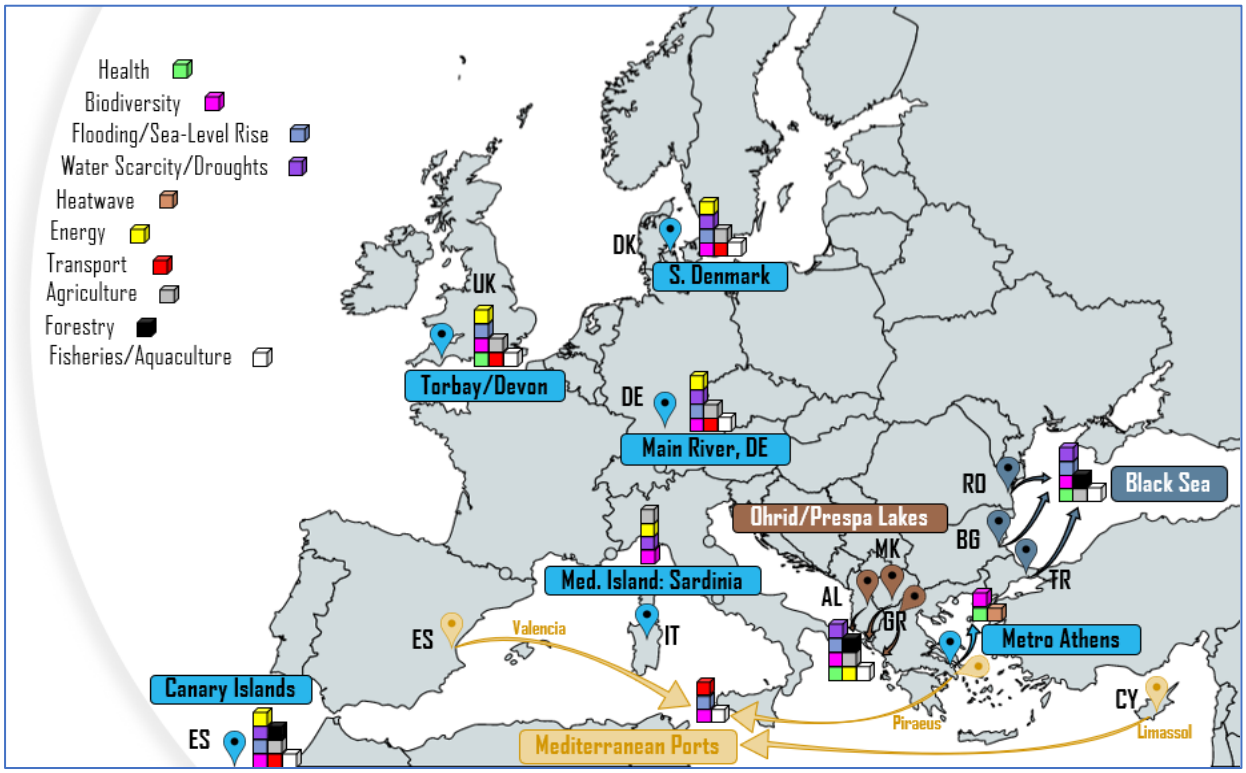

Figure 1: Location and key thematic issues/systems addressed by the CS.

1.1 Work Package 6 - Case Studies: Coordination and Implementation activities

The work nine Case Studies (CSs) represent a range of environments and collections of local and regional stakeholders that are the target for the implementation of the innovation package for resilience and climate change developed in ARSINOE. This package may be designed for implementation in specific region, but its building blocks are transferable and re-usable. In each case study, a number of activities and actions need to take place connected to the development and implementation of the innovation package. Furthermore, there are horizontal activities across the case studies. To ensure a concerted and coordinated action, and sharing of experience and knowledge between the case studies, all case studies are coordinated in Work Package (WP) 6. The overall objectives of WP6 are to:

(i) develop a roadmap of actions for all the CSs;

(ii) coordinate the activities and actions in all the Case Studies;

(iii) guide and monitor the implementation of the stakeholder engagement, the resilience assessment and the innovation packages at the CSs throughout the project;

(iv) develop and monitor Key Performance Indicators (KPI)s;

(v) develop and coordinate the validation procedures for the innovation packages in all the CSs;

(vi) provide evidence-based knowledge and recommendations at EU level.

Figure 2 shows schematically the methodological approach and the research areas to be followed in ARSINOE at a higher and comprehensive level, demonstrating the main methodological approach for the project overall.

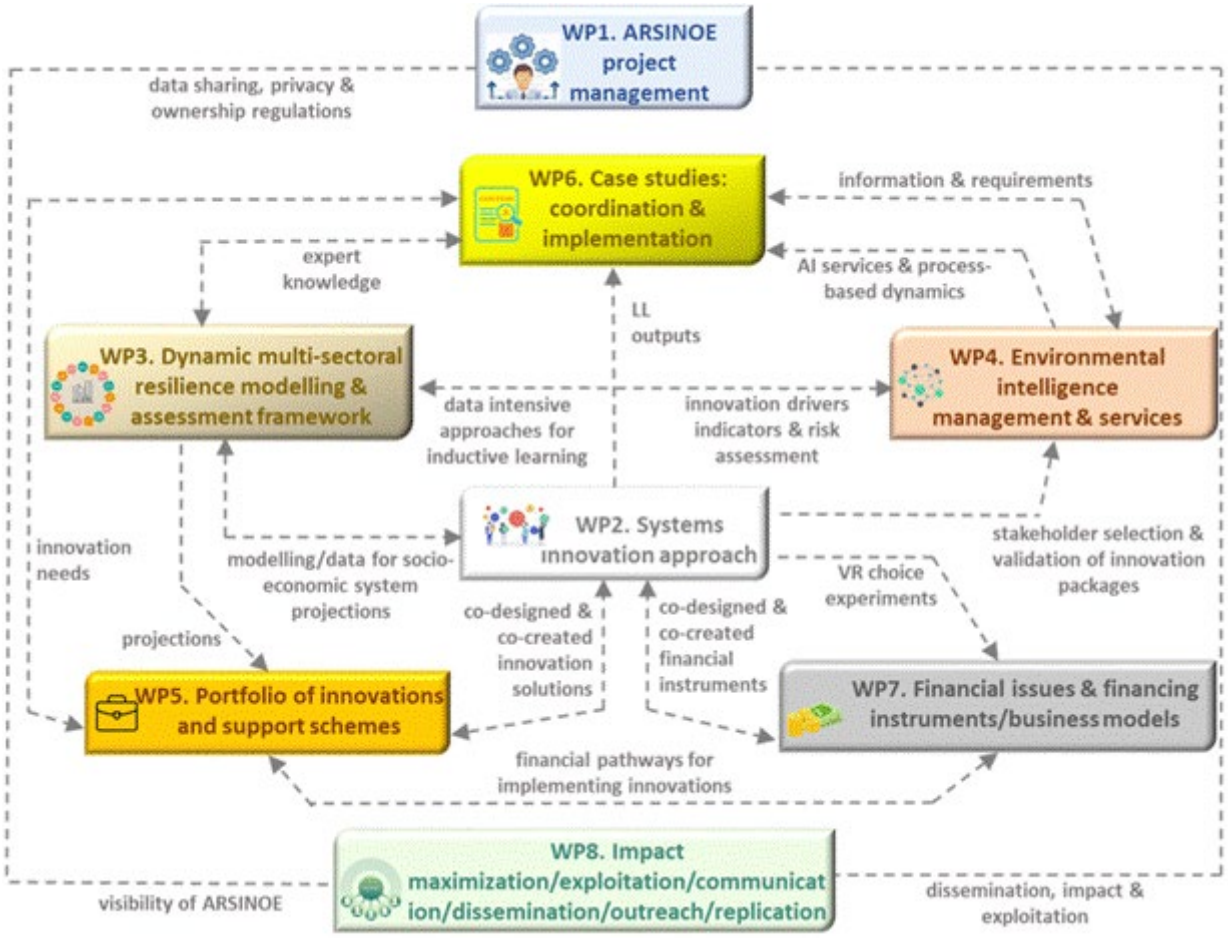

Figure 2: Schematic representation of the interlinkages between WP6 and the other WPs.

WP6 is dedicated to coordinating, planning, assisting and monitoring the implementation of this approach for the CS. WP6 is structured in five Tasks, encompassing all the above objectives.

Task 6.1 Development and monitoring of a roadmap of actions in all the case studies
Task 6.1 develops a roadmap for the collaboration and coordination of the activities for each CS for the implementation of the SIA. It assists and guides the implementation of the activities related to all the WPs linked to the CSs, mapping all necessary activities and timeline for implementation. An initial roadmap was developed in the first 4 months of the project and reported in deliverable D6.1. It also developed a monitoring plan for the activities. The roadmap and monitoring plan are a living document, which will be updated throughout the project.

Task 6.2 Implementation of the System Innovation Approach in each case study.
This task will focus on the implementation of the System Innovation Approach for all the CSs. In particular this task will identify stakeholders through a dynamic stakeholder mapping and will implement the stakeholder engagement activities for co-creation developed in WP2 at each CS. This task will also develop specific KPIs for monitoring the progress of each CS, in collaboration

with the stakeholders. The outcome of this Task will be a deliverable detailing the implementation of the SIA is each CS (D6.5 and updated version thereof in D6.6).

Task 6.3 Resilience Framework implementation in each case study.
Task 6.3 will guide and coordinate the implementation of modelling activities required in each case study for the resilience modelling framework (WP3) and the implementation of the Environmental Intelligence Services (WP4). Each CS has a different content in terms of modelling requirements for the implementation of the resilience framework. Consequently, in every CS modelling activities will include (apart from the generic tools detailed in WP3, WP4) additional case-specific modelling activities. All these actions will be implemented and reported within this task.

Task 6.4 Innovation packages development and validation in each case study
This task will identify the innovations needed for each CS in collaboration with WP5, so as to form a specific innovation package for each CS, which will be validated by stakeholders.

Task 6.5 Lessons learned-evidence based recommendations
In this task, experiences from the work in the CSs from T6.2, T6.3 and T6.4 will be synthesised and based on this, general lessons learnt, and best practices (evidence-based) will be identified to structure and support recommendations for implementing the ARSINOE approach in a multidisciplinary process of co-creation.

(Task 6.5 will start in M37)

The monitoring performed as part of Task 6.1 is reported in a series of deliverables. This deliverable, D6.3, is produced as part of this ongoing monitoring and is an updated version of D6.1 and D6.2. A final (updated) version of this document will be submitted in M48). This third version of the deliverable focuses mostly on the actions performed in M19 – M36 with regards to the activities connected to WP2 (living labs, ARSINOE VR, educational interventions), WP3 (conceptual model, modelling and resilience wheel) and WP4 (data collection and data treatment) and WP5 (open tender for innovations).

1.2 Structure of this document

The deliverable is organised as follows: Chapter 2 describes the organisation of the work package and its monitoring, and presents an updated overview of all the CS. This is followed by a summary of the activities in M19 – M36 in the nine case studies in chapters 3, 4, 5 and 6. Because the activities are strongly linked to the activities in the work packages 2, 3, 4 and 5, this deliverable has grouped the reported progress in chapters dealing with actions connected to the particular work package. Chapter 3 summarises the stakeholder engagement activities (meetings, actions, etc.) within the CSs that are contributing to (especially) WP2, Chapter 4 describes the implementation of data acquisition modelling activities contributing to WP3, Chapter 5 the implementation of the modelling and data management activities connected to WP4 and finally Chapter 6 summarises contributions to the open tender for innovations work in WP5. Chapter 7 presents the planning for the coming 12 months and finally chapter 8 presents a short discussion and conclusions on the progress in the case studies up to M36.

2.0 CASE STUDIES

The work in ARSINOE resolves around nine Case Studies (CS). A methodological approach to be followed by each case study is schematically presented in Figure 3.

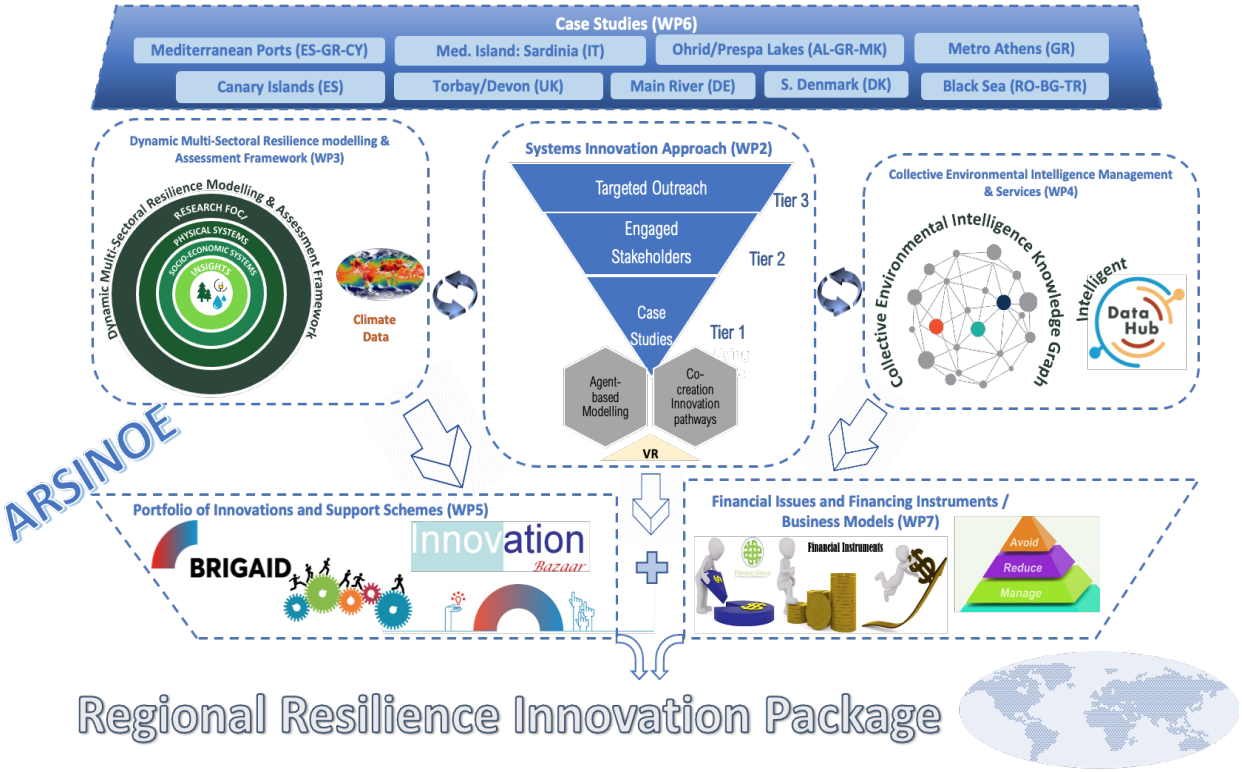

Figure 3: Methodological approach followed in the ARSINOE project for the CS.

Practically all the project partners are involved in activities related to the CS in WP6 and in Task 6.1, which coordinates, monitors and guides them. Moreover, the necessary actions for the implementation of the SIA for each CS are complex and diverse, due to the different key issues of all the CS, but also due to the interlinkages of this WP with all the other WP in the project, which are shown in Figure 2.

Specifically, activities in WP6 are related to:

- WP2 for actions related to stakeholder engagement and the SIA, including activities related to the Living Labs.
- WP3 for specific modelling and data purposes related to the CS.
- WP4 for the co-design of the environmental intelligence tools and visualisation requirements.
- WP5 for the development of specific innovation packages for each CS.
- WP7 for the development of specific business models and instruments for each CS.
- WP8 for outreach and dissemination.

Consequently, regular recurrent virtual meetings, to organise and monitor the actions, were established by the project coordinator (UTH) and the WP6 Leader (KWR). Participation to these meetings is required for:

(i) at least one representative for each CS;

(ii) at least one representative for each of the other WP6 tasks (Task 6.2, Task 6.3, Task 6.4);

(iii) at least one representative from WP2, WP3, WP4, WP5, WP7 and WP8.

These meetings started in M1 of the project and will continue on a weekly basis for the entire duration of the project. The regular weekly meetings occur every Thursday at 14.00 CET. Duration 1 hour. The purpose of the meetings is to record the progress of each CS, foster exchange among case studies and any issues that may arise related to WP6 activities, as well as any changes with regards to the Grant Agreement (GA), related to the CS. The meetings take place in Microsoft Teams, organised by KWR (Lydia Vamvakeridou-Lyroudia and Joep van den Broeke). The invitation list is wider than the persons mentioned in Table 1. At present the invitation to the weekly meetings is being sent to 42 people within the project partners. More may be added as needed.

The standard agenda for every meeting is:

- Update from the project coordinator and the WP leader (KWR, UTH) to all (5min)
- Case Studies: Each CS in turn updates about their activities and issues – 5 min each. No presentations are required.
- KWR-Summing up (5min)
- AOB

Minutes are kept in an online document, which has been placed in the common Microsoft Teams space. All the participants are free to read the minutes and edit them, as needed (edit mode). Thus access, openness and constant update is available for all the persons involved in the project. The participation of the representatives from the other WPS is also very important, because specific issues, organisational or technical can be discussed and resolved during these meetings. The detailed minutes for of M1-M4 were included in Deliverable 6.1 Annex C. The minutes for M5 – M18 are included for information in Annex C of D6.2. The minutes for M19 – M36 are included for information in Annex A of this report.

The list of the primary contact persons is given in Table 1. It should be pointed out that these meetings are open to all project members. For each CS and WP there are at least two persons designated as the main contacts. The request is for at least one of them to be present in the meetings, to update the others about issues related to each CS. This has been successfully continued in M19-M36.

A concise, updated, description of the content and challenges for each CS follows in Table 2.

Table 1: Primary contact persons in the weekly meetings for the CS activities.

Title	Main partner	Other partner(s)	Key person(s) for the meetings
Task 6.1 (**Hosts and WP leaders**)	KWR		Lydia Vamvakeridou-Lyroudia, Joep van den Broeke, Alex Chatzistefanou
CS#1: Athens Metropolitan Area	UTH		Giannis Adamos
CS#2: Mediterranean ports	AUEB		Conrad Landis
CS#3: Main River (Germany)	LMU	VKU	Marion Zilker (VKU)
CS#4: Ohrid/Prespa Lakes	IECE	NECCA	Dijana Likar (IECE)
CS#5: Canary Islands	ULL		Noelia Cruz Pérez
CS#6: Black Sea	AUTH	CTBG	Nikos Theodossiou (AUTH)
CS#7: Southern Denmark	EM	TUD	Bodil Ankjær Nielsen (EM), Martin Drews (TUD)
CS#8: Torbay and Devon County	TC	UNEXE	Dave Stewart (TC)
CS#9: Sardinia	AGRIS	UT, LMU	Marco Dettori (AGRIS)
Task 6.2	UT	AUEB	Isabelle La Jeunesse (UT)
Task 6.3	UNEXE	TUD	Albert Chen (UNEXE), Martin Drews (TUD)
Task 6.4	AUEB		Conrad Landis, Alice Guittard
Task 6.5	KWR		Lydia Vamvakeridou-Lyroudia, Joep van den Broeke
WP2	UT	AUEB	Isabelle LaJeunesse (UT)
WP3	TUD	LMU	Martin Drews (TUD)
WP4	UNEXE	ICCS	Albert Chen (UNEXE)
WP5	BRC		Geraldo Anzaldua, Inna Petrenko
WP7	AUEB		Conrad Landis
WP8	GAC		Lisa Pourcher

Table 2: Short updated descriptions of the nine case studies in ARSINOE.

CS1: Greening the Athens metropolitan area	Lead Partner: UTH

Short description: Athens is the capital and largest city of Greece. Athens Metropolitan Area (AMA) has 40 municipalities, 35 of which are referred to as Greater Athens municipalities and more than 40% of the national Gross Domestic Product (GDP) is produced therein. Moreover, due to its geographical location and the port of Piraeus in each south-western part, Athens is also an area of particular importance for the Mediterranean area as well. The ongoing infrastructure projects, such as contemporary highways connecting Athens with the rest of Greece and Northern Europe through the Balkans, underpin the special role that Athens has as a Metropolitan Region, not only for Greece but also for the wider region.

Attica, the wider region to which Athens belongs, is particularly exposed to extreme weather events. Almost every winter there is at least a heavy rainfall that causes damage to infrastructure, housing, businesses and crops in the suburbs, and causes problems in the traffic and the smooth functioning of the city in general. Wildfires that also occur almost annually during the summer months, in forested areas on the mountains surrounding Athens, further exacerbate the severity of the effects of rainfall and flooding.

Athens vulnerability to climate change effects will have serious negative consequence not only for the city itself but also for Greece as a whole. Therefore, the Athens region must be adequately shielded in terms of its resilience to climate change. ARSINOE project can help to this end, as the implementation of the systemic solutions and innovations developed during the project, will help the Civil Protection and Public Authorities to make timely and informed decisions, thus mitigating the effects of extreme weather events.
Athens is capable of adopting such solutions, considering also the explicit intention of the current leadership of the Municipality of Athens to set both the improvement of green infrastructure and the support of urban biodiversity as two of its Strategic Objectives.

ARSINOE's innovation package introduces a holistic approach to materialize the Athens Resilience Strategy, which was launched in 2017, including the city's **Climate Adaptation Action plan**, updated in 2022. The Municipality of Athens has finalised, with the support of NetZeroCities, the Climate City Contract as a member of the EU Mission Cities (the CCC was approved by the Municipal Council on the 11.09.2024).

The Municipality of Athens has started compiling existing data and combining them with new novel observational and modelling platforms (e.g. satellite data, Copernicus Services, Citizen Science). This allows the mapping of vulnerabilities across different activity sectors of AMA and the identification of **hot spots** and their respective drivers (e.g. heat, flood, soil imperviousness, inadequate housing).

Appropriate indicators are utilized, and a novel methodology is developed to move from the vulnerability indicators to realistic measures, options and means to achieve them. Additionally, **financial instruments** will be mapped, to provide optimal options for investment and facilitate an efficient and timely decision chain, as well as **sustainability options** through connection with **smart and resilient city practices**.

Additionally, equally important is an organized effort to increase the active participation of and to train the new generation of citizens, and ARSINOE adopts three means: citizen science, **youth assemblies** to simulate **local Green Deal** processes and **curation of green practices**, and innovation and science into educational curricula.

Key systems addressed: The key systems addressed in this case study are **environment, health and infrastructure.** In particular, the Athens municipality has a strategic focus to **enhance green infrastructure** and **support urban biodiversity**, in order to best shield itself from, adapt to, and build resilience to Climate Change challenges (extreme heat and flash floods). Considering that Athens faces chronic urban growth issues that amplify climate change impacts, the above key systems are addressed and are expected to deliver several benefits in terms of the resilience of the city. The case study specifically focuses to the mitigation of **heat waves** and other compound hazards, such as **air pollution** and **biodiversity loss**, in a long-term and short-term manner. The long-term manner involves urban planning options and mitigation solutions, whereas the short-term manner involves recommendations for civil protection options.

CS2: Mediterranean Ports	Lead Partner: AUEB-RC

Short description This transboundary CS, consists of the ports of Piraeus (Greece), Limassol (Cyprus), and Valencia (Spain). **Piraeus seaport** (partner PPA)—second maritime cluster globally—is one of the leading European seaports, in terms of coastal shipping, cruise and containerized cargo. Currently, 51% of the port belongs to the Chinese company COSCO, while it is involved in 14 EU-funded projects related to its intention and target to become a "green" and financially independent seaport. **Limassol seaport** handles 90% of the export and import volume of Cyprus and a lively Cyprus passenger traffic, including cruise ships and ferry connections with Greece, Israel, Egypt, and Lebanon. It is managed by DP World Limassol, P&O Maritime Cyprus Limited, and Eurogate. The **seaport of Valencia** is managed by the Port Authority of Valencia (PAV), which trades under the name of Valenciaport. This public body is responsible for running and managing three state-owned ports along an 80 km stretch of the Mediterranean coast in Eastern Spain: Valencia, Sagunto, and Gandía. It is Spain's leading Mediterranean port in terms of **commercial traffic**, mostly containerized cargo, due to its dynamic area of influence and an extensive network connecting it to major world ports. Valenciaport is also the maritime gateway for various **commercial activities** to and from the entire Iberian Peninsula. The port of Valencia is currently involved in over 40 EU projects (partner FV), most of which focusing on environmental impact of the seaport activity.

ARSINOE will assist seaports and adjacent communities to adapt in a changing climate by improving their resilience in a holistic manner: In particular, ARSINOE seeks to:

1. conduct a vulnerability assessment for seaports since it is a prerequisite for enhancing resilience and develop adaptation actions;
2. identify adaptation priority actions and;
3. design tailored adaptation pathways for the seaports considered.

Ultimately, the conclusions will be translated into transformative interventions to enhance the resilience of seaports. The purpose of this case study is to incorporate existing mechanisms and tools developed by the port authorities while actively engaging stakeholders and incorporating financial instruments throughout the process. The vulnerability assessment and subsequent design of adaptation pathways require active stakeholders involvement, effected through the SIA and BRIGAID mechanisms, while existing financial resources and suggested financial instruments will be examined. Nevertheless, policies, as well as administrative adjustments to the designed pathways will be required to support this transformation.

Key systems addressed: Weather phenomena sharpened by climate change can cause extensive damage to **coastal infrastructure**. **Sea level rise** coupled with more frequent and more **intense storm waves** are a menace for seaports and waterways globally; causing **submergence**, **flooding, and coastal erosion.** The occurrence of such incidents does not only have immense economic consequences to the local communities, but could **threaten human life.** Blue Economy with a turnover of €750 billion and 5 million people working in the maritime sector in 2018, is particularly important for the EU. Especially the countries of this CS (Cyprus, Greece, and Spain) have significant **tourism**, fishing, shipping, etc. In Greece, **maritime transport** is a viability prerequisite due to its insularism. Therefore, short sea shipping is also very important. It is crucial that seaport and waterway operators will **strengthen resilience** and adaptation. Natural and human systems need to adjust to new conditions taking advantage of existing competitive advantages. ARSINOE will directly address **infrastructure and maritime transportation** by improving their resilience, **health and well-being** by avoiding **cascading effects** of climate change on human communities, including risk of mortality and relocation. ARSINOE will also indirectly address **primary production**, by improving transportation related to fisheries and aquaculture as well as **environment**, including **biodiversity** adjacent to seaports considered. This case study will consider NBSs as alternative or complement to conventional adaptation measures. Blue carbon approaches, namely seagrass and salt marsh restoration and/or cultivation will be examined in the context of designing tailored adaptation pathways against erosion and flooding.

CS3: Main river, Germany **Lead Partner: LMU**

Short description: The Main is the Rhine rivers' largest right tributary, located right in the centre of Europe and stretching East-West from the mid-altitude mountain ridges of Upper Franconia in the Northeast and the Franconian Alb region in the South towards Frankfurt in the West, covering a total of 27.292km². The river basin is characterized by intense topographic gradient and covers various meteorologically and ecologically diverse

regions. The river has a complex runoff regime. Human settlements, infrastructure and economy are historically acquainted to this habitat in stable climatic conditions. Germany's federalism has established strong municipal responsibilities including infrastructures of services for the public. These take the challenge and the chances to adapt in self response of local governance to expected climate change.

Naturally, all floods occur in winter and early spring, due to snowmelt and prolonged precipitation, while in the summer and early fall, low flows or even droughts are recorded, such as the record-breaking drought event in the summer of 2015. According to the available climate projections for the region, an intensification of the present climatic variability is expected, i.e., moderately increasing temperatures with stronger precipitation in the winter and reduced precipitation in the summer.

The diverse topographic and climatic conditions have led to heterogeneous land use patterns. While Upper Franconia, due to its mountainous character and adverse climatic conditions, is characterized by over 60% forest cover, Middle and Lower Franconia is characterized by intense and very diverse agricultural use. Especially Lower Franconia, with its warm and relatively dry climatic conditions, has become a centre of specialized cultivation, including productive and prestigious viniculture, horticulture or hop growing, including its specific effects on natural habitats, groundwater and alternative land use. The regions along the Main river contribute to electricity supply (22%, Middle Franconia to 28%, Lower Franconia) from renewable energy sources (photovoltaic, wind and biomass installations (www.energymap.info)) in the German/Bavarian Energiewende (energy transition).

The Main River is currently widely used for transcontinental industrial and touristic navigation from the Black Sea to the North Sea, thus, necessary infrastructure is built along the river, such as inland ports, weirs, and locks, equipped with an installed hydroelectric capacity of 127 MW. The Rhine-Main-Danube Canal, which is part of the Franconian Water Transfer System, employs a complex network of artificial reservoirs and rivers to transfer on average 150 Mm^3 per year from the Danube river to augment low flow conditions and related water quality and navigation problems in the Main river system.

There is strong growth in the region, especially in transitioning the energy system towards renewables, which causes substantial conflict and competition for land resources. The River basin already experienced major dependency on Danube water (via the Main-Danube canal) to avoid water scarcity and pollution - this is quite exceptional for Central Europe; projections for intensified winter floods and particularly extreme summer drought are severe and will be troublesome and a real challenge for all "areal" economies (e.g. agriculture, forestry, water resources management); on addition, the urban centres in the basin are not prepared for the expected heatwaves. Despite a generally high adaptive capacity, the region is at risk for being pushed beyond its resilience threshold and will need a new level of responsiveness to cope with climate change. Given the recent climate and socio-economic projections, the expected industrial and domestic water demand (and already licensed water withdrawal from the river) will very soon exceed the continuously diminishing water supply in the basin, turning the Main region from a formerly resilient to a highly exposed and vulnerable climate change hot spot in the heart of Europe and across the European watershed divide.

Key systems addressed: The Main river basin is considered highly vulnerable to the unavoidable effects of climate change. Combined approaches may open windows of opportunity to respond to climate change. ARSINOE will provide the required innovation to build multi-sectoral resilience and adaptive capacity to reach the ambitious emission reduction targets while establishing and maintaining water-energy-food security and ecosystem integrity. Regarding CS3, ARSINOE will focus on six topics: stream and groundwater quality and quantity, examining specifically the impact of anthropogenic activities such as agriculture, energy production, and waste management, on the hydrogeochemical pathways between the terrestrial and aquatic environments, on land resources competition and ecosystem services (air and water quality, habitat fragmentation, erosion), on water quality; land use change and conflicts, examining the effect of agricultural practices and competition with other economic uses, e.g. energy production; high frequency environmental monitoring, developing an intelligent monitoring system with adaptive sampling frequency – in-situ & remote sensing driven and aiming to improve the data availability for resilient infrastructure while supporting environment-aware decision making; hydroclimatic modelling of complex terrain aiming to improve projections, especially for the dynamics of extreme events under climate change; integrated water resources management, assessing effects of climate change, land

uses and forest and agricultural management practices, with its impacts on the development and maintenance of infrastructure and utilities; policy and governance analysis, identifying the relevant regional and local policies in place that determine land and water management, the status of related European Directives (e.g. WFD, FD) in the region and the main economic agents/sectors influencing land and water management policies and vice versa.

CS4: Ohrid/Prespa lakes **Lead Partner: IECE**

Short description: Lake Ohrid is located in the southwest part of the Republic of North Macedonia, on the border with the Republic of Albania. Approximately two-thirds of the lake area belongs to North Macedonia and one-third to Albania. The Prespa lakes system are two freshwater lakes, with the larger shared between North Macedonia, Albania, and Greece, and the smaller shared between Greece and Albania. The two lakes are recognized amongst the most ecologically valuable aquatic regions in Europe. The transboundary area includes six protected areas, three internationally recognized wetlands and a UNESCO Biosphere Reserve. The Ohrid/Prespa lakes form a rare natural interconnected hydraulic system in which the water from Prespa Lake drains into Ohrid Lake. The cascade large hydropower power plants (HPPs) Globocica and Shpilje utilize water from the Crn Drim River, which flows into Lake Ohrid. The hydropower energy production continues downstream, in three cascade HPPs in Albania. Ohrid/Prespa touristic region represents a modern and attractive area for all types of tourism. Special landmark of the region is the large number (over 360) of churches and monasteries from mid-age centuries. Industry consists mostly of textile, food, tobacco and construction materials SMEs. All socio-economic sectors are highly dependent on the water regime of the greater Ohrid/Prespa region and therefore highly sensitive to water scarcity induced by climate change. Existing studies and management plans for the greater region have identified the need for adaptation to climate change impacts and foreseen urgent actions for improvement of quality and quantity of surface and sub-surface water, based on a sustainable and efficient use of water, supported by the appropriate water governance solutions. The 3 countries have an excellent collaboration and experience in common planning and coordination of actions.

The Ohrid / Prespa lakes are recognized as a representative case study for ARSINOE, taking in consideration the following facts:

- the problem of depletion of surface and groundwater bodies, which has been identified and explored for several years, by government bodies, experts and wide social community of the three neighbouring countries sharing the water resources of Ohrid and Prespa Lakes; observations and studies alert that the problem will further expand in severe climate scenarios, along with growth forecasts, unless appropriate measures are undertaken,
- high level of exposure to climate risks, thus vulnerability, of multiple sectors dependent on water: valuable environmental ecosystems (internationally recognized and protected), as well as economy in the region - tourism, fishery, agriculture, small processing industries, hydropower; identified adaptive capacity thereof, by implementation of rational, smart and long term actions,
- need for integrated and coordinated cross sectoral, transboundary and multi stakeholders inclusive actions, to improve climate resilience of the coupled environmental, economy and social sectors.

Deployment of ARSIONE innovative approach in this case study, will result in a resilient, climate adaptive regional water management and governance system, for all stakeholders' benefit, solving the problem of water scarcity and climate vulnerability in this region, being one of the most appreciated environmental and social (ancient cultural and historical heritage) systems in Europe, and on the other hand, mostly affected by the COVID 19 pandemic, due to the composition of economic sectors.

Key systems addressed: This CS aims at improving climate resilience of environmental, economic and social sectors related to water use, having potential of affecting human health and vulnerability of all economic sectors. ARSINOE will achieve this aim by providing an intelligent comprehensive innovation set of long-term planning solutions, allocation and use of sufficient quantity and of adequate quality water for all users, respecting their interests in order to improve human health, food production, conservation of natural environmental systems, clean energy production and sustainable growth of all sectors. Primary production and terrestrial biodiversity in the wider transboundary region of the lakes Ohrid/Prespa, will be analysed to propose a new water governance management framework, adapted to climate change challenges. This CS will contribute to secure a balanced use

of available water resources and bridge the gap between social and economic aspect facing the climate changes impacts on a transboundary surface water ecosystem of Ohrid and Prespa lakes. Aquatic and terrestrial ecosystems featured with rare biodiversity species will be encompassed in this transboundary water governance solution. Clean energy production from five hydropower plants on the Drin River (two in North Macedonia, three in Albania) will be included in the analysis for optimal water allocation and climate adapted usage and management thereof.

CS5: Canary Islands **Lead Partner: ULL**

Short description: The Canary Islands are an outermost region of the European Union belonging to Spain, located approximately 2000 km from the Iberian Peninsula. Due to their insular condition, they are characterised by limited resources and high dependence on the outside world. On the other hand, they are islands rich in renewable energy sources such as wind, sea, geothermal energy or the sun. This archipelago must develop and implement an ecological transition on the islands, so that life on them can develop in a sustainable way in the future. This is key in a region where the population is growing annually and where a large part of the water resources come from the subsoil and from seawater desalination, all framed in a scenario of climate change.

Climate change predicts an increase in temperatures as well as a variation in rainfall patterns, so that without early action, there is a risk of depleting the aquifers' reserves, putting them in a vulnerable situation. All this would lead the archipelago to increase the use of desalination, which has positioned itself as one of the largest consumers of electricity. Therefore, improving the quantitative and qualitative status of groundwater in the Canary Islands is therefore essential for sustainable development in the archipelago.

To establish the starting point of the Canarian archipelago with respect to the vulnerability produced in the insular aquifer by agriculture and livestock, and to define and quantify the limits that should not be crossed in the islands in this aspect. In addition, the energy impact of this nexus on the Canary Islands will also be established, so that it may also be the starting point for reducing emissions related to agriculture in the Canary Islands. In this way, the Canary Islands seek to lead the way in water and energy saving in the agricultural sector, within the Macaronesia region (formed by the Azores, Madeira, Cape Verde and the Canary Islands).

The specific goals are:

1. The analysis of the water cycle (from collection to treatment) in the archipelago linked to fossil energy, thus the carbon footprint of this sector will be established
2. The analysis of the irrigation systems used in the agricultural sector in the Canary Islands and the exploration of new natural purification systems that can be used as irrigation water
3. Since the hydrological cycle and agriculture in the archipelago of the Canaries will be studied, maps of the vulnerability of groundwater due precisely to the use of fertilizers in agriculture and livestock in the archipelago will be created in El Hierro and La Palma
4. The water footprint and carbon footprint of the main crops in the Canary Islands, such as bananas, potatoes, tomatoes and vines
5. All the information gathered in the project will be made available to society through scientific publications in journals, dissemination materials will be created and participation in conferences and seminars presenting the results of the project

Key systems addressed: Regarding the Canary Islands, ARSINOE will focus on the ***ecological transition and vulnerability of aquifers in volcanic islands and will put further efforts to the primary production including agriculture, forestry, water management and clean energy infrastructure.*** ARSINOE will consider the interdependence between water and agriculture. The agricultural sector is the largest water user in the Canary Islands, where wine, potatoes and tomatoes are the main exports. Therefore, greater sustainability within the water will positively affect the agricultural sector and, therefore, the water and energy situation of the archipelago.

Sustainability has three dimensions: ecological, economic and social. The ***Intelligent Specialization Strategy of the Canary Islands (RIS3)*** has green growth and sustainability as one of its priorities, as outlined in the following objectives: Low-carbon economy, industrial development and energy efficiency; Ecoinnovation, agriculture,

fishing and environmental protection; Bioeconomy based on Canarian biodiversity; Integration of renewable energies; and Canary Islands Natural Laboratory.

The Canary Islands are immersed in a process of Ecological Transition, where establishing the starting point from the energy point of view of the main sectors of the archipelago is key to implementing measures that affect in a transversal way. Therefore, the calculation of the carbon footprint and water footprint of the agricultural sector in the Canary Islands as well as the water sector, favours the knowledge of the energy situation in the archipelago to be able to establish effective measures of sustainable governance. In addition, a new challenge is opening up in the Canary Islands in terms of water and agriculture. Furthermore, the implication of a volcanic eruption (2021) on the island of La Palma on the island's aquifer (and, therefore, on the availability of water resources) and on agriculture, including banana plantations and livestock farms, will be assessed.

CS6: Black Sea case study **Lead Partner: AUTH**

Short description: The Black Sea is a unique sea basin that is rich in biodiversity, and natural resources. But it is under increasing pressure from human activities and the effects of climate change, causing the Black Sea marine ecosystem to deteriorate, undergone drastic changes since the early 1970s. The extended watersheds draining into the sea provide nutrients and pollutants, but also transfer the impacts of climate change from the watersheds to the Black Sea itself.

The Black Sea case study comprises elements from different locations placing them within a virtual watershed with distinct Black Sea characteristics, in such a way, that it can easily be expanded and adjusted to similar study areas. Following a "from source to sea" approach, ARSINOE proposes three sub-studies: the headwater, the riverine and the coastal ecosystems, providing a holistic and integrated approach that connects upstream land use with the coastal ecosystems, focusing on climate change adaptation and mitigation measures. NBSs—low-cost, easy to build constructions, compatible with the surrounding environment, with significant results and minimum environmental impacts—will be introduced across the watershed, in order to enhance the protection from soil erosion, river and sea water pollution, flood protection, groundwater replenishment and coastal zone erosion. In the Ropotamo river complex wetland in Bulgaria, the creation and demonstration of an innovative system for constant monitoring of the functional and spatial structure of the formed complex geosystem, will be implemented. In the Danubian Delta, ARSINOE will assess wetland biofiltration capacity, as well as the role that transitional regions such as delta is playing in the river-sea system management in terms of complex processes aggregating hydrology-nutrients-biomass-biodiversity-economics and social behaviours. The Danubian Delta activities will also further develop and assess Innovative methods for farming on salted soils.

Amendment since D6.2:
Finally, two more focus areas will we studied as sub-Case Studies: The Aliakmon River and the Western Coast of the Black Sea (including the Sea of Marmara in Istanbul). The Aliakmon River is the longest river entirely within the Greek Territory. Its waters are used for agricultural purposes, water supplying and electricity production. Through the development of hydraulic and hydrological models and in combination with measurements from existing stations, a Digital Twin is produced, allowing the production of a dynamic and insightful view of the water supply and demand, allowing to identify potential risks in the river water management. As the characteristics (climate, land cover, etc) of the physical watershed of Aliakmon River are similar to the ones observed in the Black Sea Region (Ropotamo River, Danube River, Western Coast), the developed model will serve as the upstream part of the virtual watershed. Furthermore, the dynamic connection between the Black Sea and the Sea of Marmara through the Bosporus Strait in the city of Istanbul will be studied and will act as the final "cross section" of the designed virtual watershed.

Altogether, the CS will aim to provide a holistic regional view of how the region will adapt to climate change, realize its GD transformation and fulfil SDGs with a strong inclusion of state of marine basin - watershed integrative assessments and predictions.

Key systems addressed: The CS aims focuses on the connection between upstream land uses and the **coastal and marine ecosystems** of the Black sea, including the Danube delta, and connections to the western Black Sea marine basin, under climate change and bring out innovative approaches including NBSs. ARSINOE intends to

follow an integrated watershed management approach —**from source to open sea**—and provide climate resilient good practices, which will enhance the adaptive capacity of ecosystems and the local communities involved. This CS will comprise elements from different locations placing them within a virtual watershed with distinct Black Sea characteristics. Black Sea is a unique marine ecosystem that may face serious climate induced problems exacerbated by anthropogenic influences. The watersheds draining into the sea provide nutrients and pollutants including plastic litter. ARSINOE proposes three sub-studies: the headwater, the riverine and the coastal ecosystems. The upstream part introduces NBSs equipped with low-cost sensors, while the transition zone and the downstream parts involve monitoring of a Bulgarian **wetland** and climate resilient applications in the **Danube delta** from Romania. The Danube Delta Biosphere Reserve is the largest protected river-sea macro ecosystem. The **Ropotamo** Ramsar protected **river complex** in southern Bulgarian Black Sea coast includes a downstream stretch and estuary with a significant variety of biotopes. Thus, the wetland is very biodiverse and provides habitat for a number of threatened species. Building on a long history of initiatives for Black Sea marine ecosystem, Blue Growth Initiative for R&I in the Black Sea develops a Joint R&I agenda to guide National and EU policy makers. CS marine responsible partner, METU, has led the drafting of the Strategic R&I Agenda (SRIA) and now coordinates the H2020 CSA Black Sea CONNECT towards SRIA implementation involving multiple stakeholders. BRIDGE-BS (METU leads & AEUB is a partner) and DOORS (METU is a partner) are two additional H2020 projects for the acceleration of SRIA. ARSINOE pools and translates the results of these three projects for an integrated assessment and future pathways under climate and socioeconomic scenarios.

CS7: Southern Denmark **Lead Partner: DTU**

Short description: The Region of Southern Denmark is one of five administrative regions in Denmark with ~1.2 million inhabitants. It covers the island of Funen (Fyn), a number of small islands south of Funen and the southernmost part of Jutland (Jylland), when it borders with the northernmost state of Schleswig Holstein in Germany. Coastal areas dominate the region, which connects to the North Sea, the Baltic Sea and the Inner Danish Waters. All of the major cities in the region are coastal, including the historic city of Odense, one of the most important and third-largest city in Denmark ; and Vejle, which houses the regional capital.

ARSINOE focuses on the south-western part of Southern Denmark bordering the Wadden Sea and aims to provide much needed demonstrations that can be upscaled both within and beyond the larger region. Important cities include Esbjerg and its major port, which serves as the main centre of economic activities, features high-value industry and serves as a hub for vessels deploying and servicing wind turbines in the North Sea (as well as oil and gas extraction); and Ribe, which is Denmark's oldest town and home to irreplaceable cultural heritage. Key primary production in the region includes fisheries, agriculture, and aquaculture.

The Wadden Sea is a transboundary region in the North Sea that is classified as UNESCO World Heritage for its globally unique geological and ecological values, and extends from north of Esbjerg along the Danish, German and Dutch coastlines, covering a total of some 500 km, connecting four of the municipalities in the Region of Southern Denmark. This area is jointly managed by Denmark, Germany and the Netherlands through the Trilateral Wadden Sea Cooperation

Climate change seriously affects all parts of the area in almost every possible way. Flooding from coastal, riverine, pluvial sources and groundwater, including compound events, is a critical issue everywhere. Likewise, sea level rise, storms and even drought have proven to be a serious issue for many socio-economic sectors. Meanwhile, there are many places both rural and urban, where adaptation is currently constrained by conflicting sectoral, institutional and/ or economic interests, physical conditions, lack of knowledge and technological solutions, as well as national and international policies and legislation (e.g., the Wadden Sea area). Also, institutional frameworks are currently less developed. Combined, all of these factors make the south western part of southern Denmark extremely vulnerable to climate change.

Key systems addressed: Flooding caused by extreme sea levels, sea level rise, storms, extreme rainfall and runoff events severely affects most natural and human systems in Southern Denmark, which is a region dominated by low-lying coastal areas, coastal cities and vulnerable natural resources. 7 out of 14 national risk areas identified within the EU Floods Directive are located in Southern Denmark. Due to climate change, multi-hazards and their associated risks to key societal and natural systems are expected to increase. To build sustainable resilience to

both direct and cascading impacts of flooding, ARSINOE will pursue and co-design systemic solutions involving different scales and socio-economic sectors that exploit intelligent water management and other innovative technologies, nature-based solutions, governance models, and financing instruments.

Regarding **flood risk management**, ARSINOE will seek to develop and pilot tools and analyses to underpin the implementation of climate resilient and sustainable adaptation measures to ensure the protection of people, assets and (critical) infrastructure in the face of even high climate scenarios and with deep involvement of civil society. ARSINOE will also strive to identify synergies with **urban development** and **primary production** and for exploiting the potential of the **urban-rural nexus**. Here, **agriculture** and **horticulture, fisheries** and **aquaculture** could be factors. In the Wadden Sea region, the interplay between human activities, coastal protection and the preservation of the Wadden Sea's irreplaceable **ecosystems** and **biodiversity** for the benefit of present and future generations poses as a particular challenge. The nearby port of Esbjerg is of international importance as a nexus for renewable and non-renewable **energy** infrastructure in the North Sea. Finally, ARSINOE will consider relevant aspects of **cultural heritage, residential and commercial buildings, transport, and water and sewage infrastructure.**

CS8: Torbay and Devon county **Lead Partner: UNEXE**

Short description: Torbay is located in South Devon (UK) and covers an area of approximately 62 km^2. The area has suffered from flooding over many years from a number of different sources, including surface water run-off, highway flooding, sewer flooding, main river and ordinary watercourse flooding during intense rainfall events. In addition, the coastal areas of Torbay suffer coastal flooding due to overtopping of the sea defences during high tides that coincide with easterly winds. It should be noted that the surface water, highway, sewer, main river and watercourse flooding is exacerbated in the low-lying areas around the coast of Torquay, Paignton and Brixham during high tidal cycles when the capacity of the surface water outfalls discharging to coastal waters is impeded. In addition to the property flooding, during all of these flood events numerous roads have flooded to some extent, with some of the roads having to be closed to traffic until the flood water has subsided. As sea level is predicted to rise by over 1 m in Torbay over the next 100 years, the frequency and impact of overtopping of the sea defences will increase, resulting in more infrastructure and properties being affected by flooding.

Critical infrastructure (CI) together with many properties within Torbay and Devon are at risk from flooding from different sources including coastal flooding, sewer flooding, surface water run-off, watercourse flooding and main river flooding, affecting resilience to extreme events, due to Climate Change in the region. The objectives of this case study are to analyse the effects of coastal, pluvial and fluvial flooding on CI as a result of climate change over the next 100 years within both Torbay and Devon.

Key systems addressed: Health issues can be assessed to some degree within the case study by identifying residential properties at risk and assessing the effects of this flooding on health. Water will be assessed within the case study by looking at the effects of flooding on the water supply network. Environment, including biodiversity can be assessed as part of the study by investigating the effects of flooding on the local environment. Infrastructure including clean energy and transport will be assessed within the case study by assessing the effects of flooding on critical infrastructure including roads, railways, electric gas, water, telecommunications, etc.

CS9: Mediterranean island -- Sardinia **Lead Partner: AGRIS**

Short description: The Region of Southern Sardinia is divided between the metropolitan area of Cagliari (the capital of the Island), and the province of South Sardinia. This area accounts for 47.7% (total 1.64 million) and 32.3% (24,090 km²) of Sardinian population and surface, respectively (Source: Italian Institute of Statistics - ISTAT). The climate is typically Mediterranean with warm and dry summers and mild winters. The area can be classified as semi-arid owing to a total mean annual rainfall of about 450 mm, mostly concentrated between autumn and early spring. Climate change projections for this region forecast an increase of the average temperature, with longer hot and dry periods, alternated by short but intense rainfall events. **Water scarcity has always been a crucial issue in this region**. Therefore, satisfying the water demand of citizens, agriculture, industry and tourism and finding a balanced management of the water resource are big challenges that need to be addressed, especially considering the future climate conditions. Water supply in Sardinia derives in part from surface water, stored and regulated by several reservoirs spread all over the Island (57%), and in part from

groundwater (43%): 17% of the withdrawn total water is supplied for industrial use, 37% for civil use and 46% for agricultural use. Regarding the latter, 30% comes from groundwater and 68% from surface water. About 45% of the total regional water resource is withdrawn in the metropolitan area of Cagliari and south Sardinia. (Source: ISRI – Institute of Industrial Relations Studies and ISTAT). The Region of Southern Sardinia is the main agricultural area of Sardinia, particularly in the Campidano plain (south-west Sardinia from Oristano to Cagliari). This plain shows a great land variability, due to its ancient geological origin, and a prevalence of alluvial soils with expandable grid clay in the most fertile areas and soils with variable texture in the less fertile ones. The main crops of the area are durum wheat and other cereals (barley and oats), legumes (fava bean), forage (clovers and lucerne) and artichoke and potato in the most fertile areas. Concerning trees, the most important are: vine, olive and almond trees. In terms of integrated productive systems, **the durum wheat chain is the most important in the Campidano plain**. This crop fuels several upstream activities, such as seed production, as well as downstream ones such as milling, bread- and pasta-making. However, durum wheat production and yield stability are seriously threatened by climate change, thus jeopardizing food security and social stability in the whole Mediterranean basin. Concerning Sardinia, a decreasing production trend has been registered due to: (i) the EU decoupling policies; (ii) low commodity price causing low profitability; (iii) unfavourable growing conditions caused by climate change, with projected average yield declines between 16% and 19% in the southern durum wheat growing areas. As a result, the average durum wheat production in Sardinia declined from about 140,000 tons in the 2006-2008 period to 54,000 tons in the 2018-2020 period. Given a demand of more than 160,000 tons, import of durum wheat is necessary. If this imbalance would occur in poor areas of the Mediterranean region, it could generate a **serious threat to food security and trigger migration processes.**

Due to its strategic position, Sardinia is a lab to assess a sustainable food production system based on: new Biofertilizers to preserve soil fertility; innovative use of irrigation and selected genotypes to stabilize yields; focus on local food chains to favour the development of rural areas. Emphasis on durum wheat, the main extensive crop in southern Europe, makes this model highly exportable to the whole Mediterranean areas.

Key systems addressed: ARSINOE's key aspect in Southern Sardinia will be the Water-Food-Energy Nexus (WFE), aiming to enhance staple food production and yield stability in climate change-prone Mediterranean areas.
Increasing air temperatures as well as decreasing and/or more erratic rainfall with increasing land degradation are projected for Sardinia and the Mediterranean Region. This will likely result in decreasing production and yields of the main crops grown in the area, particularly in rainfed conditions. These trends are very likely to negatively affect the stability of local food chains with detrimental effects not only on the primary sector but also on downstream correlated activities at both artisanal and industrial level (e.g. milling, bread-making, pasta-making and trade), including the agro-food sector in tourism. In the long term, even food and social security can be negatively affected, arising the risks of migratory waves from the south to the regions of northern Europe with correlated issues in social security. In this context, ARSINOE will apply an innovative use of water, implying low-input aid irrigation for rainfed extensive crops, coupled with a sustainable land management based on minimum tillage and/or sod seeding, in order to increase yields and stabilize staple food production in local food chains. Due to its agronomic and economic importance in Sardinia and the Mediterranean region, ARSINOE will focus **on durum wheat and its correlated local chains for bread and pasta production.**

Future climate scenarios forecast an increase of long hot and dry periods, with few short and intense rainfall events, and a reduction of the total water volume available. Water required for irrigation is projected to increase, causing groundwater depletion and salinization with detrimental effects on soil fertility in the medium- and long term. ARSINOE will focus on the **optimization of water and land management for agricultural use**, in order to satisfy the different water demands of crops with special attention for durum wheat and preserve soil fertility. A rational and efficient use of water and soil resources, based on saving water for irrigated crops, low-input irrigation water for the rainfed ones and conservation agriculture, will allow yield enhancement and stabilization in order to preserve crop production and soils, food security, groundwater level and water quality both for agricultural and civil uses. Special emphasis will be given to durum wheat with the goal of: (1) optimising the use of irrigation water in some critical stages of the plant growth by monitoring the vegetative state of the crop by means of remote sensing data and with the aid of medium and long-range probabilistic weather forecasts, with proper physical-statistical downscaling; (2) optimising the use of energy required to move the water needed for irrigation in line with the water-energy nexus principles. This activity will be carried out using an existing hillside

reservoir, but the experimental results related to water and energy fluxes will be used for the next point; (3) creating and sizing above-ground water reservoirs in order to develop an irrigation system totally powered by autonomous renewable sources and with green energy storage in order to strengthen the **water-energy nexus in relation to agriculture**. This system will enable to store water and derive energy from renewable sources at the same time. Extensive use of cropland for agricultural purposes may result in reduced land availability both for animal and plant wild species. In contrast, enhancing crop production in the most fertile agricultural areas will save land with beneficial effects for alternative uses of the soil resource. Moreover, the use of new Animal by-products N-fertilizers originating from a physical method based on the use of radio frequencies capable of rapidly changing the highly degradable organic biological material into a stabilized and sanitized product will allow the disposal of animal waste in a framework of sustainable and circular economy. The use of these new organic fertilizers will also enhance the **soil biodiversity** thus improving the environmental impact of agriculture. In this viewpoint, the next CAP 2021-27 will be strongly focused on soil carbon sequestration and ecosystem services.

3.0 Actions related to WP2 (task 6.2) and the Systems Innovation Approach implementation

ARSINOE develops a methodological framework for the combination of System Innovation Approach (SIA) with the Climate Innovation Window (CIW) to create an ecosystem for climate change adaptation solutions. The SIA addresses the growing complexity, interdependencies and interconnectedness of modern societies and economies, focusing on the functions of the cross-sectoral system "as a whole" and on the variety of actors, instead of focusing on specific functions or individual/sectoral benefits.

The work in WP6 connected to the SIA focuses on implementing the roadmap developed in Task 6.1 for all Case Studies. In particular this task will see the identification of stakeholders through a dynamic stakeholder mapping and will implement the stakeholder engagement activities for co-creation developed in WP2 at each CS. Nine living labs (LLs) were be set up, one in each Case Study, implementing the SIA and effectively engaging the varies tiers of stakeholders. In the international case studies, additional national / regional livings labs will also be created.

During the reporting period all case studies organised their second and third Living Lab workshops.

The first workshop focussed on 'Mapping, Scoping and Objective Setting', developing a mental map of the living lab systems. In addition, Workshop 1 saw the definition of the LL objectives as well as the identification of any potential unrepresented stakeholders within the LL. The second workshop validated the mental map and found consensus on the problem statement. Furthermore, the in the second workshops the stakeholders worked on defining the guiding principles for the LL, which were be derived from Sustainable Development Goal (SDG) targets (described in D6.2) and the Stakeholders envisioned a common future in 2050 by developing a future vision using the identified guiding principles. The third workshops subsequently focussed on elaboration of the innovations identified and the definition of innovation pathways using backcasting. The innovation pathways were subsequently used in the call for open tenders in WP5 and Task6.4 (see Chapter 6).

The outcomes and conclusions from the Living Lab workshops organised in the reporting period (M19-M36) will be reported in detail in Deliverable 6.6 – 'Implementation of the System Innovation Approach in all the Case Studies - Intermediate report'. A brief summary per case study is provided below, and the developed future narratives in the 2nd living labs and working groups are provided in (Table 2).

Subsequently in this chapter, the progress on ARSINOE VR and the Educational Interventions are reported in sections 3.2 and 3.3.

Table 3: Overview of the living labs and working groups and the dates of the meetings.

Case Study	Living Lab Name	Living Lab focus	First LL	Second LL	Third LL
CS1	Athens	Mitigating urban heat through nature-based solutions	27/05/2022	6/12/2022	16/06/2023
CS2	Medit. Ports 1 - Piraeus LL	Port Climate change Resilience relative to its core Infrastructure, Operations and Socioeconomic Factors (Workers, Adjacent Communities)	06/09/2022	14/03/2023	20/06/2023
	Medit. Ports 2 - Valencia LL	Climate vulnerabilities on Valencia port	06/07/2022	02/03/2023	20/06/2023
	Medit. Ports 3 - Cyprus LL	Address stakeholder needs, Identify how pollution affects the shipping sector	04/07/2022	02/03/2023	20/06/2023
	Medit. Ports – International WG	"Climate Change (Heatwaves, Wind/Waves, Extreme Events) Negative Impacts to Port Operations, Port Infrastructure and nearby community (Stop operations, increase of accidents, damage in goods, passenger's health, client complaints, Energy Efficiency issues, Air/Water Pollution)."			20/06/2023
CS3	Main River	Water-energy-food nexus	15/07/2022	18/11/2022	26/05/2023
CS4	Prespa / Ohrid Lakes 1 - North Macedonia WG	water scarcity in relation to agriculture & tourism & natural heritage	08/07/2022	25/01/2023	28/09/2023
	Prespa / Ohrid Lakes 2 - Albania WG	water scarcity in relation to agriculture & tourism & natural heritage	10/08/2022	31/01/2023	10/10/2023
	Prespa / Ohrid Lakes 3 - Greece WG	water scarcity in relation to agriculture & biodiversity	08/07/2022	03/02/2023	05/07/2023
	Prespa / Ohrid Lakes - International LL	Impact of water scarcity on water levels in the two connected lakes	23/09/2022	24/02/2023	19/10/2023
CS5	Canary Islands	Impact of temperature raise on the water/food nexus	21/06/2022	24/01/2023	20/06/2023
CS6	Black Sea 1 - Bulgaria WG	Integrated water resources management from source to sea with a focus on the environment aspect of water management	09/09/2022	28/02/2023	05/10/2023
	Black Sea 2 - Romania WG		14/09/2022	23/02/2023	15/09/2023
	Black Sea 3 - Turkey combined with Istanbul BRIDGE LL		15/09/2022	17/03/2023	15/09/2023
	Black Sea - International LL (lead by Greek team)		17/10/2022	31/03/2023	14/11/2023
CS7	Southern Denmark	Emergency preparedness plan in flooding extremes	11/10/2022	30/01/2023	30/10/2023
CS8	Torbay&Devon county	Cascading effects on infrastructures during flooding	22/09/2022	09/02/2023	10/07/2023
CS9	Sardinia	Transforming the food production system based on durum wheat	27/09/2022	07/03/2023	28/09/2023

Table 4: Living lab workshop 2 - summary of future narrative produced.

Case Study	Living Lab Name	Future Narrative produced
CS1	Athens	Athens is a green and cool city! It has established a strategic management of urban nature, integrating green and blue infrastructure to enhance the city's biodiversity and resilience to extreme heat. The management of urban nature ranks high in the city's priorities, implemented with commitment, continuity, and vision. Athens has a revitalised and vibrant city centre, with sustainable mobility and no air or noise pollution. Urban green areas, green and blue corridors are developed and integrated into the city's cultural routes. Athens actively promotes Green Architecture to cool the city: it is abundant with urban gardens, planted rooms, green roofs, vertical gardens and green buildings. Innovative solutions are fully explored, learning from international experience and mobilizing green funding. Athens is an example of inclusion and equity, its citizens are active and well-informed, and there is social welfare for all, especially the vulnerable; the city knows where they are and responds swiftly to protect them.
CS2	Medit. Ports 1 - Piraeus LL	The vision of Piraeus Port for 2050 is to further evolve into a Smart, Green and Blue Port, resilient to climate change, investing in adaptation, upskilling and re-skilling, and being profitable and competitive by adopting smart solutions and modern Governance schemes. The Port shall aim to remain a Hub for Innovation and Education, adopt innovative solutions that will increase its operational and infrastructural resilience, serve the citizens with safety and with raised awareness to public health, increasing social desire and earning public trust by implementing socially responsible initiatives and transparent procedures.
	Medit. Ports 2 - Valencia LL	The Port Authority of Valencia (PAV) is committed to strength the possible impact that the port has in supporting an economy based on the industry, and concerned about limiting the impact has in the city. For this reason, the PAV has environmental mechanism for reducing taxes to the terminals that invest in reducing the environmental impact of their activity. In addition, the PAV has an ambitious plan for being carbon neural in 2030, which includes significant investments in developing onshore power supply to the vessels and deploy renewable sources of energies for dealing with the future expected growing of the port traffic. Actually, 100% of the electricity supply by the port is obtained from renewable sources of energies. In the context of the climate change resilience, the PAV is concerned about the impact that the climate change could have in maintain safe and sustainable port operations, as the climate change could lead to stop operation when the safe limits are exceeded or increasing the energy consumption. The potential impact of climate change in the life span of the infrastructures cannot be ruled out. In general term the port community is requesting early warning systems for

Case Study	Living Lab Name	Future Narrative produced
		supporting port operations planning, as well as collecting and processing data about the impact of climate change for implementing adaptation measure before the impact will be critical. The port community is fully aligned with the PAV vision of promoting a climate neutral operation, improving port skills and port resilience for assuring sustainable grown, manly focused on industrial activities.
	Medit. Ports 3 - Cyprus LL	Our vision for the ports of Limassol is to become a leader in resilience to the effects of climate change. We recognize the increasing frequency and severity of extreme weather events, such as heat waves, dust waves, and intense rainfall, and the potential impacts they can have on port operations and infrastructure. To ensure the resilience of our ports, we will prioritize investments in sustainable technologies and clean energy. We will explore innovative solutions that reduce our carbon footprint and decrease our vulnerability to the effects of climate change. We will implement robust risk management strategies to anticipate and mitigate the impacts of extreme weather events, including the use of early warning systems and emergency response plans. We recognize that financial resources are essential to achieving our goals, and we will actively seek funding opportunities to support our efforts. Overall, our vision for the ports of Limassol is to become a model of sustainable and resilient port infrastructure, setting an example for other ports in the Mediterranean region and beyond. We are committed to working collaboratively with our stakeholders and partners to achieve this vision and ensure a sustainable future for our ports and the communities they serve.
	Medit. Ports – International WG	By 2050, Mediterranean Ports will be leaders in sustainable and resilient port operations and infrastructure, setting an example for the Mediterranean region and beyond. These ports will prioritize attracting investments and create growth, invest in smart trading solutions, end to end logistics, efficient port management, and sustainable technologies to maximize resilience while remaining competitive and profitable. Mediterranean ports will be Smart, Green, Blue, climate neutral and climate-resilient, with increased efficiency. They will be hubs for business ecosystems, innovation, culture and education, serving as models for the development of green ports and fostering a culture of upskilling and re-skilling to adapt to changing technological and environmental challenges. These ports will prioritise risk management strategies that enable them to adapt to the effects of climate change and remain operational during adverse weather conditions. They will take the appropriate measures for securing safety and

Case Study	Living Lab Name	Future Narrative produced
		improving the port-city interaction and ensuring the security of the supply chain and the resilience of the entire value chain, including nearby municipalities and communities. By collaborating with stakeholders and partners, Mediterranean ports will achieve operational excellence, serving as examples of sustainability and resilience to other ports around the world.
CS3	Main River	In 2050 changes in land-use, water-management and cooperation between different sectors as well as societal changes have occurred. The landscape of the region covered by the living lab is characterised by a mix of urban centres and smaller towns, healthy forests, agricultural areas and areas used for energy production. Water bodies have been returned to their natural state. Forests have been preserved and converted to be more resilient to the changing climate. Game populations in forests are well-managed. Forests serve multiple purposes. They store water and provide fresh and cool air. Forests provide timber and serve as recreational spaces. Agroforestry helps protecting soils and contributes to biodiversity. Sustainable agricultural practices are the norm. Crops and cultivation methods are adapted to sites and where resource-efficient agriculture is not possible, sites are transformed and used for other purposes. There is no more intensive animal husbandry. Land take and soil sealing are limited and where necessary reversed. Settlement development prioritises the use and transformation of existing structures over developing new areas. In urban areas blue and green infrastructure compliment grey infrastructure. These changes in land-use result in a high-quality soil, limited risk of soil erosion and improved water-absorption and retention. Energy comes from renewable sources. The energy system has been decentralised: energy is produced, stored and used locally. Energy efficiency has increased. The region benefits from a healthy water balance, the goals of the Water Framework Directive are met and the value of water is recognised. Cascading water-use is the norm and re-use systems are installed at different levels (household, buildings, settlements). Water quality is established according to its use, this allows an efficient use of water and energy resources. Groundwater is primarily used for public water supply. Public water supply is prioritised over other purposes e. g. when establishing water rights. Water for public water supply primarily stems from local sources. Interconnections between water suppliers and long-distance water supply contribute to security of supply. Water is reused, treated locally, and used efficiently. The energy for water treatment comes from renewable sources, whereas rainwater is absorbed and retained by soil or specific systems for water retention. There is a separate sewerage

Case Study	Living Lab Name	Future Narrative produced
		system so that rainwater that reaches the sewer system is not mixed with waste water and can be stored or returned to the natural water cycle. The state of the water balance is transparent and all water-users are aware of the challenges and possible measures for different situations. Different actors are aware of their impact on natural resources and their dependence on them and of their impact on other sectors in the region. They act accordingly: They use resources efficiently and consider the long-term-impact of their actions and communicate with those affected by their actions. Sustainability and resource-efficiency are well understood and used as guiding principles. Actors who implement measures that benefit climate resilience, for example by contributing to the water balance, water quality, biodiversity or soil quality, are rewarded and supported. Resource-management is interdisciplinary. Governance is transparent, quick and decisions are based on a reliable and simple legal footing. Governance structures and regulatory frameworks are conducive to increasing climate-resilience. Permission-processes are not impacted by politics. Standards for resource-efficiency and protection are being controlled. Consumption patterns reflect the shift to resource-efficiency. Regionally produced goods are valued more highly than others. Prices reflect the environmental costs of products: Water withdrawal fees are established. Producers and consumers consider the water and carbon footprints of products.
CS4	Prespa / Ohrid Lakes 1 - North Macedonia WG	Future narrative developed in international LL
	Prespa / Ohrid Lakes 2 - Albania WG	Future narrative developed in international LL
	Prespa / Ohrid Lakes 3 - Greece WG	Future narrative developed in international LL
	Prespa / Ohrid Lakes - International LL	Prespa region in 2050 has a population double its present one, as negative demographic trends are reversed and attractive green jobs for young people emerge. Sustainable growth is based on economic sectors such as tourism, agriculture, fishery and zero-waste light industry, taking advantage of scientific research, modern technologies, and synergies. Economy is

Case Study	Living Lab Name	Future Narrative produced
		based on green jobs and clean E sources. Traditional sectors are improved by modern IT technology. Agricultural production is adapted to climate change through diversification (including revival of old crops), modern technology applications, and improved irrigation efficiency. agricultural technologies are applied in order to be resilient and sustainable across all sectors, through precision agriculture and other types of innovative ways which ensure no waste of materials, water/irrigation efficiency and degradation in biodiversity. Tourism is developed in a sustainable way, paying attention to the carrying capacity for visitors and even distribution in space and time, as well as taking advantage of synergies with other sectors (e.g., fisheries, agriculture This development is based on a transboundary plan, including common labelling of products and improved infrastructure, protection and promotion of cultural and natural heritage) through transboundary events with transboundary collaboration and assistance. There is regular and permanent water monitoring as a pre-condition for ensuring water quality and quantity, based on transboundary co-operation and data accessibility. Monitoring tools innovations are developed within this project so the planning and the development with fit the sustainable development goals. Through scientific research and collaboration between the three countries, a good understanding of the connection between the three lakes and the pressures on them is achieved, leading to reversing the trend of decreasing water level in Greater Prespa and improved water quality in all lakes. Authorities and local citizens hold a high environmental awareness, ensured through social innovations and capacity building, and taking advantage of citizen science applications and local incubators through which they are learning about a resilient way of doing things and passing it on to the generations. Conservation and restoration of biodiversity and water-related ecosystems is achieved, including not only lakes and wetlands, but also forests. There is a joint coordination for protected areas at transboundary/national/regional/local level, bringing different sectors on the same table. A Transboundary Crisis Management Plan related to climate change (covering extreme weather events and natural disasters such as long drought, wildfires, bird diseases) as well as an early warning system allow prediction, effective management and even prevention of such conditions.

Case Study	Living Lab Name	Future Narrative produced
		The natural and cultural heritage in the UNESCO Ohrid region and Prespa region is highly protected, eliminating all anthropogenic impacts on the regime of surface waters, water sources and lakes. The Ohrid and Prespa heritage is protected through sustainable tourism, greater awareness of cultural heritage and the significance of the region.
CS5	Canary Islands	The Canary Islands are a territory that has adapted to climate change and has managed to complete an ecological transition where a greater share of food supply and food security are guaranteed. The society is educated within conscious consumption values where water, food and energy are not wasted and all the waste generated is revalued, becoming a usable product. Agricultural production is 100% ecological and the population values local, km 0 and ecological products over exports. Water is managed in an integrated and efficient way, so the quality of the water is excellent, there are no discharges into the sea or the ground, and reclaimed water is used to irrigate the fields and for street and sewage cleaning. There is no abandoned land, as they have all been recovered, promoting agro-ecology and a mosaic landscape on the islands that allows us to adapt well to temperature changes. There is a fair coexistence between small and large farmers, where everyone has access to the same opportunities, where the sector is monitored, with open, accessible and public databases, with innovative technology that helps in all stages of production, improving work and working conditions in the sector, thus favouring generational change. Tourism is still important, but it is no longer fundamental for the Canary Islands, leaving more room for the primary sector, promoting its development, all under the command of a fair, green, ethical and accessible government.
CS6	Black Sea 1 - Bulgaria WG	In 2050, Ropotamo Reserve will be an example of integrated management that is based on detailed and up-to-date information, ensuring a balance between the needs of the different ecosystems that make it up, as well as between ecosystems, infrastructure and the human factor. At the same time, the necessary information will be collected for the reserve to guarantee its resilience to climate changes and extreme events that are possible within 30 years' time. Protecting the reserve will be a mission not only for the state institutions responsible for it, but also for society as well, which will have the knowledge of why it is necessary to protect this precious place, as well as recognizing its important role in this process. The Ropotamo reserve will not be an isolated element, but part of a whole system built by men to protect the valuable elements of the world around us - integrated data on the state of the rivers flowing into the Black Sea and data from Black Sea monitoring carried out by all Black Sea countries would be an ideal scenario for a better future.

Case Study	Living Lab Name	Future Narrative produced
		In 2050 the Danube Delta is characterized by a good environmental status, pollution flows (excess nutrients, chemicals and solid waste inputs) and extreme events (i.e. floods) are monitored and mitigate throughout the river basin thanks to early warning system and real-time data collection and cooperation across the 8 Danube countries. The well-being of inhabitants is based on fishing, farming and tourism activities which have adapted to climate change and benefits from naturally preserve Danube Delta environment. *The future narrative from this WG was used to inspire the narrative developed in international LL*
	Black Sea 2 - Romania WG	In 2050 the Danube Delta is characterized by a good environmental status, pollution flows (excess nutrients, chemicals and solid waste inputs) and extreme events (i.e. floods) are monitored and mitigate throughout the river basin thanks to early warning system and real-time data collection and cooperation across the 8 Danube countries. The well-being of inhabitants is based on fishing, farming and tourism activities which have adapted to climate change and benefits from naturally preserve Danube Delta environment. *The future narrative from this WG was used to inspire the narrative developed in international LL*
	Black Sea 3 - Turkey combined with Istanbul BRIDGE LL	The southwestern Black Sea is a synonym for Blue Economy. It is well-known for its holistic and integrated planning and management of various sectors functioning in harmony with the natural environment and is highly resilient. Energy demand is met by green sources with a large storage capacity and the region is carbon neutral. Urban centres are placed in the interior parts not to impact the coastline. However, there are engineering structures that protect coasts and ecosystems from anthropogenic and climate change impacts. The only mode of mass transportation is railway. Marine transport is also improved and does not disturb marine life. The industrial fish fleet is halved. Small-scale fisheries are dominant. Gender equality is achieved in the sector and fishermen and fisherwomen actively take part in conserving fish stocks and biodiversity, which is not a concern anymore. As a result of strong efforts, marine biodiversity in the region is back including sturgeon and bluefish. Technology is intensively used for monitoring and conservation activities on land and in the sea. There is an underwater observatory, which is also used for tourism. “Ecotourism” as a term is replaced with “responsible tourism” and is the main sector. It is supported by outdoor sports activities and cultural and historic heritage, and these take place in all seasons. The region is one of the pesca-gastronomy centres. Using marine and coastal products, new and authentic tastes are offered. The region is governed by an international assembly of Black Sea countries. Local governments are also strong so they are efficient in pollution prevention and natural resources management. Citizens are well-informed

Case Study	Living Lab Name	Future Narrative produced
		on sustainability through advanced education and ocean literacy activities integrated into official curricula and are empowered. They participate in the governance of the region as well as contribute to monitoring and conservation *The future narrative from this WG was used to inspire the narrative developed in international LL*
	Black Sea - International LL (lead by Greek team)	In 2050, monitoring and data collection in the Black Sea region is a collaborative effort through the interregional Black Sea Observatory, facilitating the collection of data with common principles and parameters. This includes a common classification system that is continually updated to reflect the current status, with citizens trained and encouraged to participate in the process. The use of AI and machine learning techniques help identify errors and detect missing data, while low-cost monitoring stations and DIY technology are established and connected directly to the common database. Monitoring utilises cross-cutting technologies, including remote sensing/satellite data, UAVs, and AI/deep learning techniques, and data are available under the FAIR principle, incorporating social data to better serve society's needs. Collaboration between the private and public sectors and the communities is strengthened, empowering local governments to make informed decisions based on data analysis
CS7	Southern Denmark	Esbjerg is green, sustainable and climate-resilient, with city and port closely connected. It sets examples for others to follow. Wherever people or assets are exposed to water-related challenges and “water from all sides”, solutions are implemented in close dialogues with citizens, and the public and private sectors. This includes blue-green solutions and land connections for the dual benefit of citizens’ welfare and biodiversity. These solutions unite different urban spaces and strengthens the historic links between the city of Esbjerg, its port, and the marine environment. Associated key and “wicked” problems are handled in robust, sustainable, and multifunctional manners, embracing new technical and other innovations. Citizens, businesses, and public institutions are well-informed and contribute in a coordinated way to solving the challenges of climate change and sustainable development founded in a just, economic model.
CS8	Torbay&Devon county	Climate change impacts are understood and planned for and Torbay is focused on rewilding, greening and water-sensitive urban planning, design and infrastructure (including of buildings, roads, hotels etc) to achieve multiple goals, whilst maintaining Torquay, Paignton, and Brixham’s separate identities. Connection to nature and interconnectedness amongst stakeholders is key, as is shared finance for interventions and access to health services.

Case Study	Living Lab Name	Future Narrative produced
		Communities are educated and engaged, with decisions being made collaboratively and through co-creation, focused on early-warning, preparedness and protection, particularly of the vulnerable. Torbay is a Centre of Innovation, not just technological but also financial, economic (e.g. circular economy), social and cultural. Everyone is empowered to play a part and water is loved!"
CS9	Sardinia	The Sardinia 2050 will be a successful reality for agricultural production. There will be a re-appropriation of agricultural lands by farmers. New crop management techniques will be adopted and new varieties will be selected to tackle increasing temperature and more erratic precipitations due to climate change in Mediterranean conditions. Agricultural technology and machinery as well as more efficient use of water resources and renewable energy will be implemented. New control technologies for extracting ground waters and reducing salinization will be used and interconnected reservoirs to cope with drought periods will be enhanced. Durum wheat and cereals will be more profitable and farmers producing more sustainably will be rewarded. Integrated agriculture and precision farming will be commonly applied, and soil ecosystem services will be valued. Reliable seasonal forecasts will be implemented to optimize timing and crop management interventions. Sustainable agronomic inputs, including the use of organic fertilizers from circular economy, will be widespread. Training for agricultural workers will be provided, dialogue between all actors of the food supply chain will be enhanced, and there will be greater awareness in consumer choices in favour of sustainable, locally-produced foods. Food waste will be minimized through increased information and awareness among producers and consumers. Information to cope with climate change will be free and available for all. Climate-resilient policies will be implemented to lead the sustainable and resilient agricultural development of Sardinia, meeting the challenges of the SDGs.

3.1 Living Lab workshops

Case Study 1

Living lab workshop 2

The second workshop of the Living Lab took place on December 6, 2022, in the Metropolitan area of Athens, Greece. The primary focus of this workshop was to develop the vision for the Case Study by identifying the guiding principles that would shape future activities. Building on the foundation established during the first workshop, the session aimed to refine the work already undertaken and engage stakeholders in meaningful discussions about the direction and goals of the project.

One of the objectives of the workshop was to present the mind map summarizing the key findings from the first workshop (WS1). This mind map captured the main insights, challenges, and opportunities identified during WS1. By presenting these findings to the stakeholders (Shs), the intention was to validate the conclusions drawn in WS1 and ensure they accurately reflected the consensus of the group. The stakeholders were encouraged to engage critically with the mind map, providing feedback, making adjustments where necessary, and confirming that the findings aligned with their understanding of the issues at hand.

In addition to validating the findings from WS1, the stakeholders were tasked with reaching a consensus on the problem statement for the Case Study. This problem statement, which had initially been identified in WS1, served as a critical starting point for shaping the direction of the Case Study. During the workshop, stakeholders collaborated to refine and finalise the problem statement, ensuring it accurately represented the core challenges the Case Study aimed to address. This step was crucial in establishing a shared understanding of the primary issue that would guide future activities and interventions.

Following the validation of the problem statement, the workshop moved on to the next exercise, which focused on establishing connections between the local challenges faced by the Case Study and the relevant Sustainable Development Goals (SDGs). In this exercise, stakeholders worked together to identify how the specific challenges identified in the Case Study aligned with global sustainability objectives. They explored the key drivers of the local problem in relation to the SDGs, examining the broader impact of these challenges within the framework of international sustainability targets.

Through this process, stakeholders identified three SDGs that were particularly relevant to the Case Study: SDG 11 – Sustainable Cities and Communities, SDG 13 – Climate Action, and SDG 15 – Life on Land. Additionally, six specific targets associated with these SDGs were highlighted as being critical to addressing the local challenges. The identification of these SDGs and targets was an important step in ensuring that the Case Study was aligned with global sustainability efforts and that its outcomes would contribute to achieving broader environmental and social goals.

During the workshop, stakeholders were tasked with identifying solutions to promote a climate-resilient metropolis for Athens. This exercise was conducted in small groups, with each group comprising stakeholders from diverse sectors, including academia, industry, government, the public sector, environmental organizations, and finance. The multi-sectoral composition of each group was deliberately designed to foster cross-sector collaboration and ensure a holistic approach to addressing the complex challenges of climate resilience.

By bringing together representatives from all key sectors, the aim was to generate a wide range of innovative solutions that addressed the various dimensions of climate resilience, from urban planning and infrastructure to policy development, economic considerations, and community engagement.

The final task of the workshop involved consolidating all the insights and information gathered to collaboratively develop the vision for the Athens Case Study. Stakeholders worked together to define a comprehensive vision that addressed the challenges and objectives discussed throughout the session. Simultaneously, a graphic representation of this vision was created, providing a visual summary of the key elements. This visual representation was presented at the conclusion of the second workshop, offering a clear and cohesive depiction of the collective vision for a climate-resilient Athens. The vision of the Athens Metropolitan Area is represented in Table 4 and graphically in Figure 4.

Figure 4: Graphical representation of the vision for the Athens metropolitan area.

At the concluding segment of the WS2, stakeholders were introduced to the Virtual Reality (VR) tool and had the opportunity to engage with the VR environment created as part of Work Package 2, Task 2.5 (See also below in this chapter). This presentation allowed stakeholders to experience the VR environment firsthand and provide valuable feedback to the scientific team (Figure 16).

Living lab workshop 3:

The third workshop of the Living Lab was held on June 16, 2023, in Athens, Greece. The primary focus of this workshop was to involve stakeholders in the collaborative development of innovative pathways. The central aim was to foster the emergence of innovations/solutions necessary for the implementation of the vision. This involved further refining and co-developing the steps required to actualize the future vision established during the second workshop.

At the outset, stakeholders were given the opportunity to revisit and validate the vision they had previously developed for the metropolitan area of Athens. This step was essential in ensuring that everyone had a shared and clear understanding of the study area's goals.

The workshop employed a "backcasting" methodology, a strategic planning approach wherein participants work in reverse from a desired future state to the present. In this context, stakeholders were assigned the task of identifying the necessary steps and pathways to achieve the projected future scenario. This process involved beginning with the anticipated future state and methodically tracing back to the current situation. Key milestones (MS) were identified as essential steps toward realising the future narrative and addressing the challenge at hand (Figure 5). This approach helped participants create a more focused and strategic roadmap for realising their collective vision.

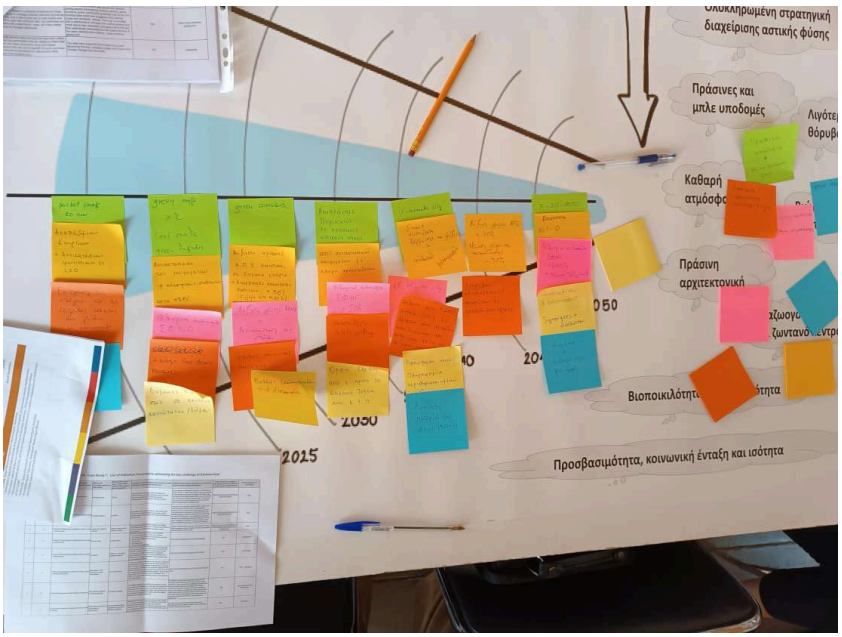

Figure 5: Identification of milestones (MS) for realising the future narrative.

The primary outcomes of this workshop included the preliminary outline of the innovation pathways. These initial outlines were subsequently further developed into detailed draft innovation pathways. Following the identification of the Milestones for years 2030, 2040 and 2050 in relation to the strategic policy of the Municipality as well, effort was given in analysing the barriers and enablers for specific sectors/areas, i.e.: Water Sector, Energy Sector, Urban Greening, Heat Risk Management, Awareness/Social (Health). Under this context an analysis took place per innovation identified and was provided as an input for Deliverable 2.4. The summary of the Political, Economic, Sociological, Technological, Legal and Environmental (PESTLE) analysis with regards to the Innovation Pathway towards the future is presented below.

- Water Sector: The introduction and adoption of innovative solutions presents significant enablers and barriers within the CS1 for the city of Athens. Politically, the topic is high in the agenda and budget is available through national or European initiatives. However, given the high urbanisation that was developed in the in 1960s & 1970s, changing the urban development practices and patterns requires time, engagement, and sensitisation of stakeholders as well as significant financial resources, before significant impact and results can be achieved. The society is ready to

welcome such a course and the technological level of expertise is available. However, changes are needed at legal level to be able to adopt new ways to mitigate the extreme climate conditions within the city.

- Energy Sector: With regards to the energy sector, a key point identified is the "resistance to change"; the established status quo seems quite difficult to be surpassed. Furthermore, changes in the legislative framework are also necessary. Moreover, despite the political agenda being in favour of new agreements on climate and energy issues, a lot of effort is still required before these can be adopted at large scale. Technologically, access to new technologies is there, but budget and wide dissemination knowledge is still missing but are required to produce tangible results.
- Urban Greening: Potentially one of the most mature themes of all presented herewith, at all levels the conditions seem ripe and ready to incorporate new solutions, change practices and incorporate greening practices at urban scale. There is a significant impulse from citizens as well as political leaders towards urban greening, additionally economic accelerators and funds are available, accompanied by technological enablers. This combination can lead to significant change and positive results at urban and peri-urban scale.
- Heat Risk Management (previously entitled Governance): recently the theme of heat risk is starting to be recognised as a priority theme by citizens as well as at the political level. However, significant barriers are to be taken into consideration in terms of both necessary funding and technological infrastructure, as well as the legislative framework. However, the latest climate conditions at urban level (extreme heat waves, prolonged high temperatures throughout the day and night), lead to an increasing urgency and acceptance of this issue at political and social level.
- Awareness / Social (Health): increasing awareness receives increasing priority at city level, as despite the existing framework and established practices, some social resistance to climate adaptation measures is still present. Economically, a lack of resources for social awareness is partially mitigated through funding programmes and existing mechanisms by non-governmental organisations (NGO), however increased actions need to take place, since awareness is the basis for acceptance and hence of critical importance. Last but not least, technological developments offer great opportunities for improvements in this theme and need to be utilised further.

Case Study 2

Living lab workshop 2

The 2nd Living Lab occurred on the 2nd of March for Limassol and Valencia, and the 14th of March for Piraeus. During the Living Labs the stakeholders from the 3 ports have worked on the following:

- Finalising their Mental Maps
- Updating their Problem Statements
- Identification of the relevant SDG targets
- Developing their future Narratives

The number of participants were 18, 31 and 12 respectively, and the location of the meetings: Port of Piraeus premises (Athens; Greece), Fundación Valenciaport premises, (Valencia; Spain) and Nautical Club, Limassol (Limassol; Cyprus).

The future narratives that were draft are represented in Table 4. The future narrative of the Port of Piraeus, as drafted during the workshop by the participants is shown in Figure 6

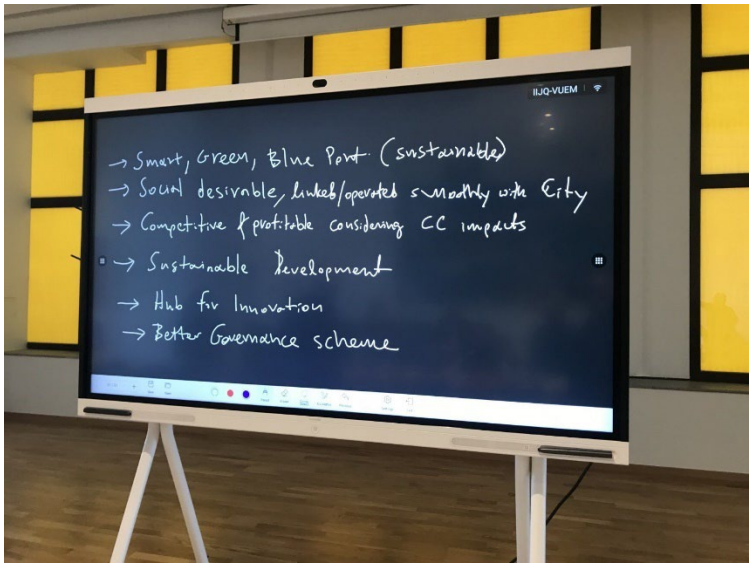

Figure 6: Port of Piraeus – Future Narrative

Living lab workshop 3

For CS2 it was agreed that the 3rd Living Lab, which took place at 20/6/2023 in Piraeus, Athens, Greece (19 participants), would be an international Living Lab and that it would focus on the extra activities of merging:

- the national mental maps into an international version, summarising all important aspects for all 3 ports;
- the three national future narratives into a unique international Future Narrative for mediterranean port to be agreed by all stakeholders.

Figure 7 depicts the Mental Map of the mediterranean Ports validated during the 3rd Living Lab. Figure 8 presents the validation of the common Future Narrative/ Vision.

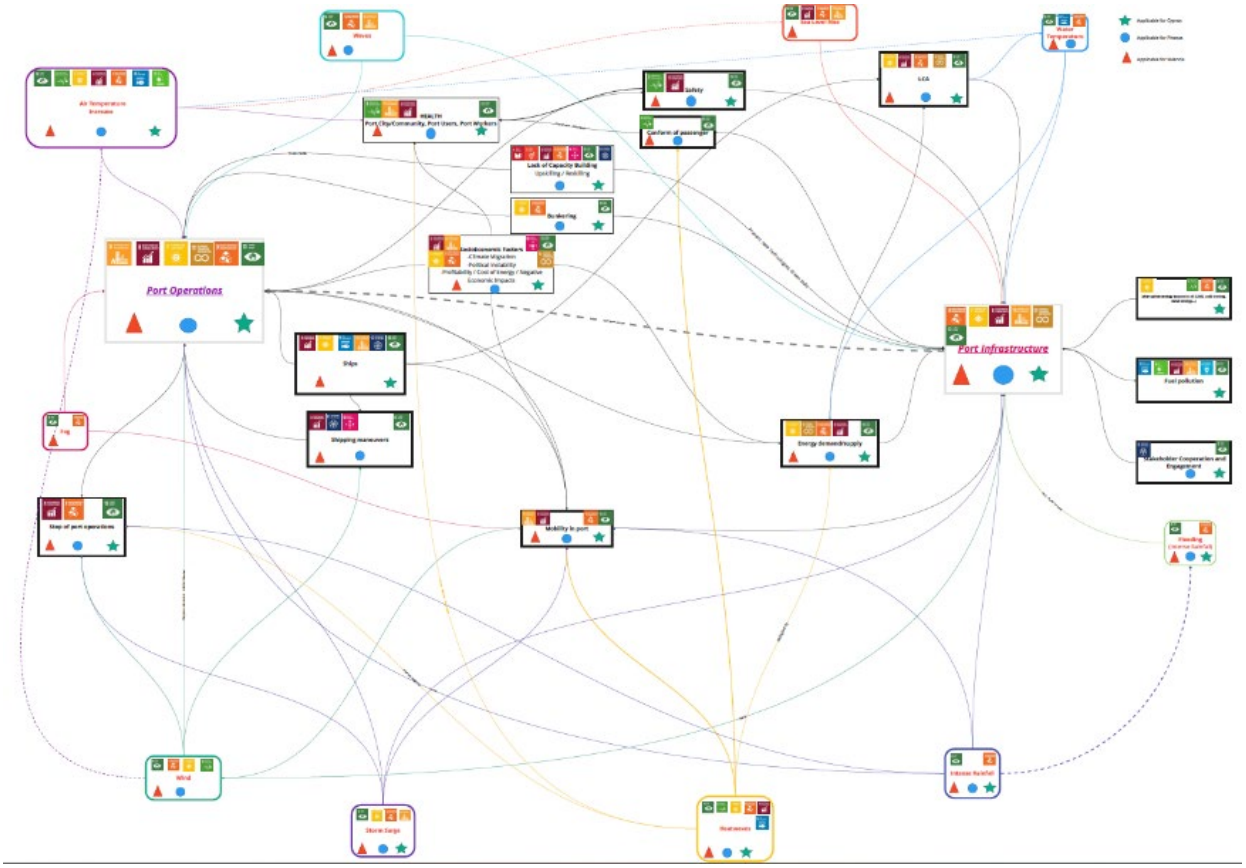

Figure 7: Mediterranean Ports Mental Map as validated in the 3rd workshop.

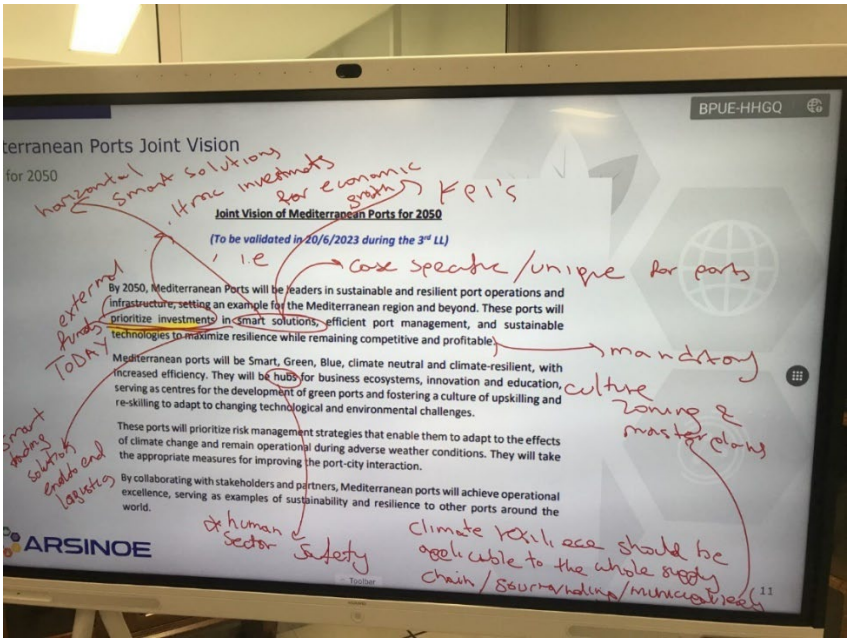

Figure 8: Validation of the Future Narrative/ Vision of the Mediterranean Ports.

Subsequently, using the based on the future narrative as a starting point, the necessary innovations were mapped. These innovations were mapped using the 'backcasting' methodology (Figure 9) and could be attributed to the following sectors:

- Finance / Business model,
- Technology & Trade/traffic,
- Policy / Education / Regulations
- Environment,
- Operations / logistics / Infrastructures

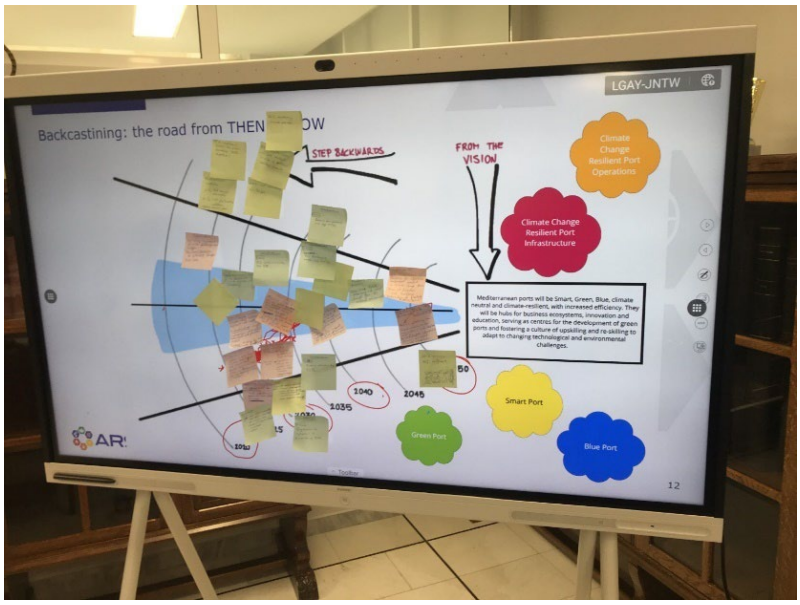

Figure 9: CS2 Back casting tool and identified innovations.

Based on the backcasting exercise, six innovations were shortlisted during the LL. These were the following: ENBIO, OBREC, Rhoe, SOLUMAR, Marine Hound and Road4water. Other identified Innovations, not mapped to the Future Radar Timeline (Figure 9) included: REELEASE, BID2BOARD, 3D Presenting Coastal Protection Reefs, 3c for Cities, Alongroute, Embiodiagnostics, Navisense, Port Transit, Bufferblock, Metronamica, Vertical Gardens, SenZ2, Infosequa.

This set of innovations was selected by the stakeholders, and all stakeholders accepted their inclusion in the radar, while the additional innovations represent the superset of innovations identified.

Based on the above the CS completed a detailed roadmap with the innovation pathways which were identified (Figure 10). For the underlying innovation pathways, a complete analysis including identifying barriers and enablers together with a PESTLE analysis was performed.

ARSINOE- CS2 Mediterranean Ports - Innovation Pathways

Sectors	Innovations (can be more than one)					MS 2030	Innovations (can be more than one)			MS 2040	Innovations (can be more than one		
Port Operations/ Logistics / Infrastructure		Road4Water: road harvesting technology	Ultra-precise, AI-based marine weather forecasts for weather routing software			1. Crucial Infrastructure and technological solutions defined	BID2BOARD: Digitalizing Marine Technical Service.	Port Transit: permeable pavement	Metronamica: vulnerability index which shows which locations might be most vulnerable in the future	1. Crucial Infrastructure and technological solutions developed	3D Presenting Coastal Protection Reefs :to mitigates Coastal Floods .	Hapteron:a Decision Support System & Early Warning Mechanism	Vert incre redu effec cap opt
	EmbioAirBELD. detect and mitigate sources of air pollution (ARSINOE implementation)			CLEVER TOOL (NOW SYSTEMS): Climatic event registry logger applied in ValenciaPort (ARSINOE implementation)	SACIP-Valencia (METEOGRID): Climate Alert and Information System for Port Infrastructures	2. 80% Logistic Chain climate Resilience in Case of extreme weather events				2. 100% Logistic Chain climate Resilience in Case of extreme weather events			
	No innovation necessary to reach this MS --> Management planning at the port level					3. 30% Extention of Cruise Section (Pireaus)							
Green Port (Environment / Emissions)	IoT CO2 cities Monitoring (Everimpact) combines satellite images and measurements, IoT sensors, and AI for accurate measurement of GHG emissions	AirNode and Libelium sensors (AirNode and Libelium Consortium):Air Quality Station The Air Quality Station to monitor key pollution parameters through Artificial Intelligence.	DIORAMA LET-Ports (WaltR) monitoring GHG emissions through remote satelite sensing and images analysis. (ARSINOE implementation)			1. Reduce Emissions by 30%	REELEASE: recycling and upcycling of marine waste.	SOLUMAR (already implement within the previous period)	Marine Hound: Autonomous emissions sniffer system able to detect the use of illegal non-compliant fuel	1. Reduce Emissions by 50%	Navisense: track port activities with AIS and calculate emissions and show optimisation potential.		
										2. Marine Waste Recycling and Upcycling			
Green Port (Environment / Energy)	Obrec (BReakwater for the Energy Conversion) - multifunctional device, which combines harbor protection and energy production.	Rhoe Rhoé optimization software for sustainable mobility solutions				1. Renewable Energy Production covering 50% of Port Needs	Quantum Marineworks: optimize vessel journey for energy & cost savings***.			1. Renewable Energy Production covering 100% of Port Needs	Bufferblock: stormwater drainage and buffering in the urban area. .		
						2. Set Targets Beyond Requirements				2. Reduce Raw Materials Use by 30%			
Finance	AE4RIA metrix Models and Metrics to measure and report sustainability performance at various	Solumar provides new air and gas filtering solutions to directly cut all emissions and collected				1. Explore Funding Sources for Infrastructure / Climate Change Adaptation Plans	BID2BOARD Digitalizing Marine Technical			1. Secure External Funding			
						2 Develop Business model for early							

Figure 10: CS2 Innovation Pathways.

Case Study 3

Living lab workshop 2: The second workshop was organised on 18/11/2022 in Würzburg. Twelve people participated. The problem statement from the first workshop was discussed and refined. SDGs were discussed as guidelines for envisioning the future. A future narrative was produced (see Table 4).

Online-meeting between workshops: Since the preparation for the first open tender (see also chapter 3.5) took place prior to the discussion of innovations in the third workshop an online meeting was scheduled on 20/01/2023 to introduce the tender and discuss necessary innovations and areas of interest. A key challenge was formulated/refined. (Please, see information on the work of case study three on the open tender in D6.2 for more information)

Living lab workshop 3: The third workshop took place on 26/05/2023 in Würzburg. Only eight people participated due to several last-minute cancellations. After reviewing the vision, several key themes for backcasting were chosen: Regional water balance, Water bodies, Soil, Biodiversity, Governance. All are strongly associated with the previously identified challenges. Stakeholders were invited to set milestones for the periods until 2025, 2025-2030, 2030-2040 and 2040-2050. Notably, stakeholders placed most milestones in the near- to mid-term future reasoning that changes had to be implemented soon to ensure climate resilience. Then, stakeholders suggested innovation and identified innovation gaps. Some technological changes and changes to infrastructure were suggested but a significant number of innovations were nature-based solutions or social innovations, regulatory changes and changing political priorities. While working on the pathways after the workshop the key themes combined or changed further, following the advice of the task leaders. Please, see D2.4 for a description of the innovation pathways. The chances of implementing the pathways were further analysed using a PESTLE analysis. The data for this analysis was collected through stakeholder interviews. Please, see D2.4 for results.

Governance analysis (T2.3): A governance analysis was conducted for case study three. As part of the study, stakeholders affected by or involved in water-governance were interviewed. Interviewees were members of parliament, civil servants and representatives from NGOs and businesses. Most interviews were conducted in person and several sites in the region where problems associated with water scarcity can be witnessed were visited with interviewees. Please see D2.3 for more details.

Case Study 4

Case study 4 (Prespa/Ohrid lakes) is a transboundary case. For WP2 this means it is organised in 3 national working groups (WGs) and an international transboundary living lab. Both the working groups and living lab convened their first 2 meetings in the previous reporting period, and the outcomes were reported in D6.2. Below are reported the main findings from the 3rd meeting of the WGs and LL.

Working Group 1 (North Macedonia) – 3rd meeting

Date and Time 28/09/2023, 11.00 -14.00 CET

Location IECE, Skopje, North Macedonia

Participants 13 stakeholders, 3 facilitators

Main findings

15 milestones were defined in the following key themes and key sectors: Water, Environment, Energy, Economy and Industry, Employment, Education- Social Cohesion, Agriculture, Fishery, Tourism, Natural and Cultural Heritage. The timing for reaching the milestones are short term, from 2025 to 2040. The most urgent issues identified comprised research on the water sector, water consumption, agriculture, creating inventory for existing data, creating monitoring system of the water levels, promoting touristic

values and cultural heritage values of the region, improvement of infrastructure, demography and economic issues in the Prespa and Ohrid region. 15 innovations were proposed by the stakeholders as tools and solutions for reaching these milestones, such as a monitoring system with smart equipment, smart irrigation systems, innovative fishing methods, smart tourism practices, educational activities for raising awareness at local stakeholder level. Also, the main associated actors and key stakeholders were identified, these being the Ministry of Economy, Ministry of Environment and Spatial Planning, and three municipalities in North Macedonia: municipality of Resen, Ohrid and Struga.

Working Group 2 (Albania) – 3rd meeting

Date and Time 10/10/2023, 10.00 -13.00 CET

Location Tirana, Albania, Online

Participants 16 stakeholders, 2 facilitators

Main findings

15 milestones were defined in the following key themes and key sectors: Water, Energy, Infrastructure, Industry, Environment, Agriculture, Fishery, Tourism, Protected areas and Cultural Heritage, Education. The timing for reaching the milestones are short term, from 2025 to 2030-2040, with as most urgent ones being identified as the focus on water sector, water consumption, agriculture, collecting and usage of existing data, monitoring system of the water levels and water quality, promoting touristic values and cultural heritage values of the region, upscaling the existing national initiatives, improvement of research infrastructure, in the Prespa and Ohrid region. 10 innovations were proposed by stakeholders as tools and solutions for reaching these milestones, such as smart transboundary monitoring systems, artificial agriculture system, educational activities for raising awareness at the local stakeholders as social innovations, and innovative tourism practices. Also, the main associated actors and key stakeholders were identified, these being the Ministry of Tourism and Environment, Ministry of Energy and Infrastructure, Ministry of Sport and Education, Ministry of Youth Generation, Agency of protected areas and two main municipalities: municipality Pogradec and Korca.

Working Group 3 (Greece) 3rd meeting

Date and Time 05/07/2023, 10:30 -14:30 EET

Location Pyli Thematic Centre, Prespes

Participants 9 stakeholders, 4 facilitators

Main findings

25 milestones were defined, in the following key themes and associated key sectors: Institutional-Legal Framework, Education-Social Cohesion, Water-Environment-Biodiversity, Tourism, Agriculture, Forestry, Fishery, Livestock Farming and Employment. The timing for reaching these milestones ranged from 2025 to 2035-40, with the planning of a transboundary monitoring system, creating an inventory of existing data, research on agriculture and water consumption, promoting grazing around the lakes, improvement of infrastructure specifically in respect to crisis management and accessibility, promoting the touristic value of Prespes, planning of the educational system, being mentioned as some of the most urgent. 13 innovations were proposed by the stakeholders as means for reaching these milestones, such as a transboundary crisis management plan, advanced grazing systems, smart irrigation systems, innovative fishing methods and equipment, educational activities for environmental awareness targeted to professionals, and a transboundary visitors management plan. For some of these innovations also the

associated actors were identified, such as the Ministry of Environment or the Transboundary Prespa Park Committee. In general, innovations with a transboundary aspect were deemed to be the most crucial in moving towards the future vision, which had been defined in the previous workshop.

Transboundary Living Lab 3

Date and Time 19/10/2023, 10:45 -15:00 EET

Location Pyli Thematic Centre, Prespes

Participants 28 stakeholders, 9 facilitators

Main findings

The results of the national Working Groups were brought together in this Living Lab. The facilitators created a common backcasting funnel based on these results, and the stakeholders were separated in groups and were asked to comment and make improvements. The key themes and associated key sectors were: Institutional-Legal Framework-Policy, Education-Social Cohesion, Water-Environment-Biodiversity, Tourism, Agriculture, Forests and Wetlands, Fishery, Infrastructure, Renewable Energy, Cultural Heritage, Funding schemes, Multidimensional hubs in transboundary level. The stakeholders, coming from all three countries, agreed to 46 milestones, which should be reached in a timeframe starting from 2025 and going up to 2045-2050. The most urgent ones were mainly related to issues that are common to the whole transboundary area, e.g. common monitoring methodology, historical survey of water level, protection and restoration of forests and wetlands to guarantee the stability of ecosystems, defining relevant actors across the three countries, building infrastructure to withstand the intensity of extreme weather events associated with climate change. In order to reach these milestones, in total 42 possible innovations were attached to them. Examples of the possible innovations include: advanced transboundary monitoring systems and management plans, an early warning system on transboundary level, smart sensor-based systems, water treatment techniques, raindrop collection, new crop varieties and rediscovery of old ones, sustainable farms linked to tourism, making products out of invasive alien fish, multifunctional hubs including innovative education, funding schemes and business models for irrigation. Associated actors were also identified for some of these innovations.

During the transboundary LL, the draft innovation pathways were shared with stakeholders, who were given the chance to provide feedback on them and add new ones. Innovations originating from the Second Open Tender were also included in the draft. Links to innovations which are already at least partly implemented were added and innovation gaps were identified. The pathways cover many different sectors (Water supply/environmental monitoring; Forest and wetland protection; Fishery; Agriculture; Tourism and cultural heritage; Infrastructure/Renewable Energy; Education-Social Cohesion-Social Awareness & Economy; Institutional Legal Framework-Policy). Stakeholders have identified a mix of technological and social innovations.

Barriers and enablers were identified for each innovation through PESTLE-Analysis, based also on the input from stakeholders in each country.

- Key political barriers are related to the limited knowledge, experience, capacity and human resources to manage, carry out and harmonize reforms in climate adaptiveness and mitigation across sectors, and the delays due to required cooperation of three states (bureaucracy, different systems/methodologies) while the harmonization of national directives in water related issues, with EU Directives and the existing transboundary structures (e.g. Prespa Park Management Committee including Working Group on Water Management), will support the implementation of the innovation pathway.

- In terms of economic factors, the high initial investment costs required, in the context of limited economic resources, can be considered a hurdle. However, the reduced costs of water and energy consumption and also the reduced cost of damages through prediction/prevention of hazards, is currently leading to acceptable return of investment timeframes.
- Main social barriers identified include a reluctance to implementation of new technologies as well as new behavioural models was signalled, especially due to the fact that the young population (main potential users of innovative tools) in the CS region is decreasing and many people still residing in the area are of older age. Also, there is a possible distrust if the population feels being monitored or if results lead to (private) restrictions, which is due to the perception that environmental legislations are not fairly implemented. Nonetheless, raising awareness of personal, community and sectoral responsibility and a shared concern for the water scarcity in the region will favour the implementation of the pathway. Additionally, the active NGOs in three countries with networking between them (e.g. PrespaNet), having ties to local stakeholders will have a positive effect.
- The low level of information about technological development, artificial intelligence, incomplete local infrastructures, and accessibility issues are considered as major technological barriers. But the availability and accessibility of technological innovations are increasing, supported by the existence of ongoing projects which can stimulate the exchange of experience between countries.
- Complicated procedures for land use legal documentation and authorization, and the lack of cohesion between transboundary laws and regulations (e.g. no-fishing season in the lakes) are considered as major legal barriers. But regulatory and law frameworks are improving towards alignment with EU policy framework.
- The main environmental barrier characterizing CS4 is the competition of interest among biodiversity/ecosystems and other water consuming sectors. On the other hand, there is an aspiration for a supportive impact on biodiversity preservation/loss mitigation, and the collected data will be useful to environmental projects and raising awareness.

Case Study 5

Living lab workshop 2: The second workshop of the Living Lab was held on 24 January 2023 in San Cristóbal de La Laguna, Tenerife. It focused on the case study of the Canary Islands, which are vulnerable due to their island status and reliance on external resources. Sustainable development of the islands requires an ecological transition to address population growth, climate change and potential water scarcity. The living lab, and the case discussed, addressed the need to create a quantitative and qualitative, open, participatory and intersectional database that includes environmental, agronomic, economic and social aspects. This intersectional database aims to facilitate cross-sectoral governance for climate change adaptation and the ecological transformation of the primary economic sectors on the islands, which depend on direct exploitation of natural resources, such as agriculture, livestock, fishing, forestry and mining. Limiting agriculture and reducing emissions can lead to water and energy savings in the region.

During the workshop, the main drivers behind the problem statement as defined in the first living lab workshop, were identified, such as temperature rise, crop change and the use of technology, as well as new factors, such as the use of reclaimed water and the reclamation of abandoned agricultural land. The group concluded that the database should also facilitate knowledge transfer and sustainability in the primary sector. Sustainable development goals (SDGs) relevant to this project include the proportion of agricultural land devoted to productive and sustainable agriculture, the level of water stress, increased scientific research and the involvement of civil society in urban planning.

Attendees, coming from diverse sectors such as government, agriculture and technology, worked on creating future narratives for the Canary Islands' primary sector in 2050, highlighting the importance of collaboration and the integration of innovative solutions. Discussions also addressed the need to include all relevant stakeholders in the process, with a special focus on education and social awareness on responsible consumption and sustainability. The result for the future vision is provided in (Table 4).

Figure 11: Pictures of the CS5 second Living Lab in Tenerife.

Living lab workshop 3: The third workshop of the Living Lab was held on 20 June 2023 in San Cristóbal de La Laguna, Tenerife. It was used to define some milestones to achieve the future vision from the 2nd living lab session.

Key milestones include: achieving food sovereignty by 2045, implementing the circular economy, and becoming a sustainable destination. In the short term, education in organic agriculture and sustainable agrotourism will be promoted, along with territorial planning that respects the island's agricultural landscape. The shared use of machinery and technology to reduce waste will also be encouraged. From 2020 to 2027, aquifers will be restored, and by 2034, adequate water infrastructure will be developed. Wastewater treatment will be improved, and biogas production from organic waste will be promoted. Farmers' economic security will be ensured through a minimum income guarantee. By 2040, only organic inputs will be allowed, and innovative farming methods like hydroponics and vertical farming will be supported. The use of plastics will be phased out in favour of environmentally friendly materials.

The workshop reflects a collaborative effort to reimagine the future of the Canary Islands with a strong focus on sustainability, local agriculture, and reduced reliance on tourism. The proposed milestones and initiatives emphasise the need for systemic changes in governance, economic incentives, and community engagement to achieve these goals.

The analysis of barriers and enablers for the innovation pathways drawn by the milestones in different sectors in the Canary Islands has identified several key points.

- In the **water sector,** major economic and social barriers include significant investment in infrastructure and a lack of social demand for renewable energies. However, opportunities exist in the commercialisation of brine and the potential for innovative technologies. Legal restrictions on wastewater use and illegal dumping are obstacles, while CO_2 emission reductions and water savings are important enablers.
- In **the primary sector**, economic barriers to the adoption of monitoring and blockchain technologies stem from a need for public investment. However, offering products based on monthly contributions and online registration of agricultural activities could improve the economic situation of farmers. Blockchain technologies can control regional emissions, while waste management, CO_2 reduction, and product traceability provide environmental benefits and act as enablers.
- In **the research, education, and technology sector**, lack of institutional support and potential pressures from large companies are political barriers. Economic barriers include the initial investment in traditional knowledge and alternatives to plastics, but subsidies could facilitate adoption. Social facilitators include interest in traditional knowledge and shared learning, as well as awareness of microplastics providing opportunities to accept sustainable materials. Environmentally, returning to traditional agricultural practices and using degradable materials in greenhouses can help reduce CO2 emissions.
- In **the tourism sector**, political concerns such as odours from organic waste containers and protecting tourists act as barriers. However, community composting projects and waste management systems in hotels are facilitators. While the tourist tax may not apply to holiday rentals, environmental regulations support sustainable waste management. Despite challenges, community projects and environmental awareness offer opportunities to improve organic waste management and utilize the tourist tax in the Canary Islands.

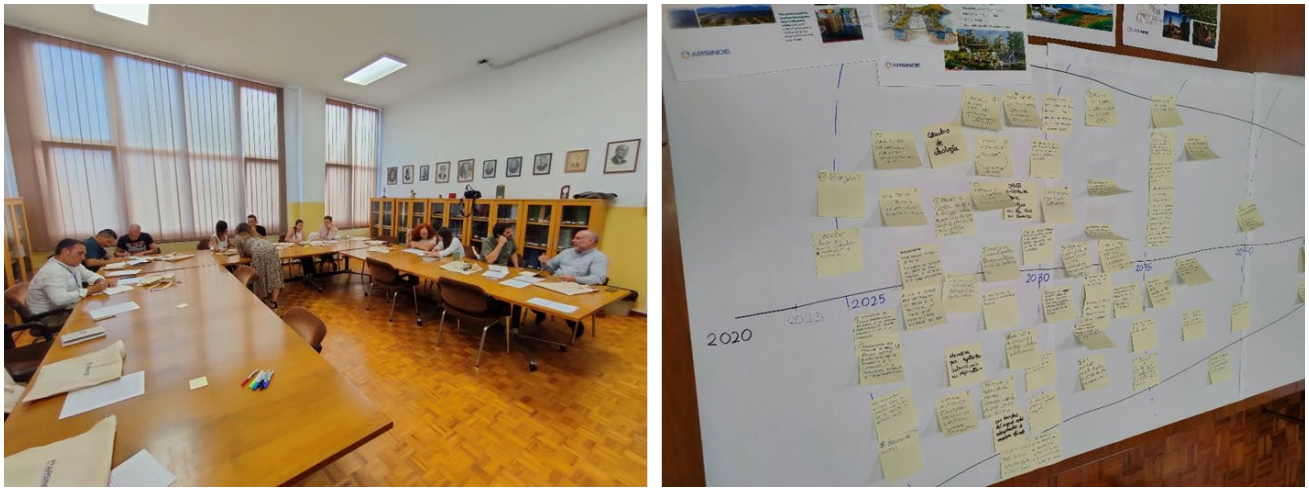

Figure 12: Pictures of the CS5 third Living Lab in Tenerife.

Case Study 6

Ropotamo River (Bulgaria) – 2nd national working group

The second WG for the Ropotamo Reserve took place online on February 28, 2023. The workshop was part of the ARSINOE project's ongoing effort to address the complex climate and environmental challenges in the Ropotamo Reserve. The workshop focused on finalising the problem statement, discussing the guiding principles for sustainable management, and envisioning future scenarios for 2050. Key topics included climate change resilience, sustainable ecosystem management, and the integration of infrastructure with environmental conservation.

The meeting started with a discussion on the challenges facing the Ropotamo Reserve due to climate change and human activities. The attendees reviewed the initial problem statement and reached consensus on its wording, ensuring it encompassed all major concerns. An interactive envisioning session followed, where participants discussed long-term goals for the reserve, focusing on sustainable ecosystem management, data-driven decision-making, and the involvement of local communities. The group also mapped out how the reserve should be managed in 2050, with a focus on creating an integrated system that balances ecosystem needs with human activities. The workshop was attended by representatives from various sectors, including government agencies such as the Ministry of Environment and Water (MoEW) and the National Institute of Meteorology and Hydrology (NIMH). Academia was well-represented by the Institute of Biodiversity and Ecosystem Research (IBER-BAS), while local authorities like the Regional Inspectorate of Environment and Water (RIEW) Burgas also participated.

The process including envisioning exercise with all stakeholders, and Future narrative elaboration in separate group, which then concluded with a joint discussion to align the future narratives into an integrated vision for the territory. The integrated vision for 2050 developed in the working group is provided in Table 4.

Ropotamo River (Bulgaria) – 3rd national working group

The third and final Work Group for the Ropotamo Case Study was held online on October 5, 2023, with its focus continuing to be the refining of the vision for sustainable management of the Ropotamo Reserve. The attendees included representatives from academia (IBER-BAS), local governance (RIEW-Burgas), and scientific research institutions (National Institute of Meteorology and Hydrology). In total, there was a balanced representation of government, science, and local stakeholders.

The primary topics for this session were the validation of the future narrative, identifying key innovation pathways, and discussing data collection and monitoring strategies. Participants revisited the problem statement and explored ways to achieve the vision established in previous workshops. The workshop reviewed the progress made since the second meeting, focusing on, among others, the need for comprehensive data monitoring. Attendees emphasised the importance of a unified approach to gathering and analysing environmental data, which would allow for better decision-making and long-term protection of the reserve. The work group also identified several innovation categories for future development, including water quality monitoring, flood risk forecasting, and vegetation resilience to climate change. Backcasting, as a strategic planning method used to envision a desired future and then work backward to identify the steps needed to achieve that vision, was used to redefine the future vision for the Ropotamo Reserve, focusing on achieving sustainable and integrated ecosystem management by 2050. Once the vision was clearly articulated, the group mapped out a series of milestones that need to be reached to ensure the vision is realised. These milestones represent key steps that move the region from its current state to the envisioned future.

The group identified milestones across 4 major categories, which form the building blocks for the future development of the Ropotamo Reserve. Each milestone is tied to a specific timeframe and aims to address critical challenges related to climate change, water management, and biodiversity conservation. The categories are: Water Quality Monitoring; Flood Risk Forecasting; Vegetation Resilience and Biodiversity; Integrated Governance.

The Innovation Pathways process was then used to outline a roadmap for achieving these milestones. The participants agreed that each pathway should focus on specific innovations required to reach the defined milestones. The pathways identified during the workshop included:

> **Technological Innovations:** Innovations in monitoring technologies, such as advanced sensors and data analytics platforms, were seen as essential for achieving the water quality and flood risk milestones. These technologies will provide high-resolution data, which is crucial for making informed decisions.
>
> **Governance and Policy Innovations:** The participants emphasised the need for innovations in governance structures and policies. Integrated governance, which ensures that all stakeholders are working together effectively, is critical for the success of the reserve's management. Policies that encourage data sharing and cross-sectoral collaboration will be needed.
>
> **Community and Social Innovations:** The success of the Innovation Pathway will also depend on the involvement of local communities. Social innovations such as community-led monitoring initiatives, environmental education programs, and participatory decision-making were highlighted as important factors in building local capacity and commitment to the reserve's long-term sustainability.

After the successful completion of all three working groups, the Cleantech Bulgaria team, in close collaboration with WP2 team, produced the **PESTLE analysis** and **Innovation Pathways** for the target territory:

The PESTLE analysis conducted for the Ropotamo Reserve under the ARSINOE project focused on identifying key barriers and enablers influencing the implementation of innovation pathways. Politically, policy instability and fragmented governance were seen as major challenges, though EU directives and national legislation provided strong support. Economically, high costs and budget constraints posed significant hurdles, but potential long-term savings and available funding opportunities emerged as positive factors. Social resistance to change and a lack of public awareness could hinder progress, yet growing community engagement and awareness of climate change offered promising support for future initiatives. On the technological side, the complexity of new systems required specialised skills, but advancements in sensor technology and data analysis were crucial enablers. Legal challenges, particularly in regulatory compliance, were a concern, though existing legal frameworks supporting environmental protection helped mitigate these issues. Finally, environmental variability, such as extreme weather, posed a challenge, while climate adaptation strategies provided strong environmental backing for the project's goals. This analysis laid the foundation for overcoming key obstacles while leveraging existing strengths to ensure the successful implementation of innovation pathways.

In the Innovation Pathways process, a roadmap was created to guide the Ropotamo Reserve toward sustainable management by 2050 (thus, fulfilling its Integrated Vision). The pathways focused on key areas such as sustainability, awareness, integration, and civil society engagement. Water quality monitoring, vegetation resilience, and fire warning systems were highlighted as crucial innovations to ensure the reserve's ecological balance. Increasing stakeholder awareness through digital tools like forecasting systems, as well as developing standardised data-sharing protocols, was essential to improve understanding and decision-making around climate impacts. The process also emphasised the importance of fostering collaboration between institutions to streamline governance and data-sharing

efforts. It should be noted that the inclusion of civil society through social innovations, such as virtual reality for public engagement and citizen-led monitoring systems, was seen as vital to creating a transparent, participatory management approach. The Innovation Pathways set a clear timeline with milestones, aiming to make the Ropotamo Reserve a model for sustainable management and resilience by 2050.

Danube Delta (Romania) - 2nd national working group

The 2nd national working group meeting in Danube Delta subcase of CS6 was organised online on February 23rd, 2023. The meeting started with agreeing on the problem statement that resulted as a conclusion from the previous workshop. It was highlighted that the problems in the Danube delta are complex, not only as a result of climate change. Due to massive discharge of sediments with different qualities and intensities, the water circulation of the Danube channels has changed over time. Thus, the water quality has gradually decreased in Danube Delta, accompanied by biodiversity loss, which has affected the trophic chain within the ecosystem. The challenge is to ensure efficient water circulation in Danube Delta and pollution control in order to preserve / restore local ecosystem health.

The discussion continued following three guiding principles: Improve water quality by reducing pollution; Reduce the negative impact through better technological (available) solution and early awareness on critical factors evolution; and Protect and restore water eco-systems. Based on these, three future narratives were elaborated, from which, post-working group, one future Vision for Danube Delta was formulated. This future narrative is provided in Table 4.

Danube Delta (Romania) - 3rd national working group

The third national working group in the Danube Delta subcase of CS6 was organised in Tulcea (Romania) at the Danube Delta Institute on the 15th of September 2023. During the meeting, the ARSINOE partners (INCDSB and BSUN) encouraged the stakeholders to actively contribute to the process of identifying the necessary steps, actions and innovations that can lead the Danube delta communities to reach the envisaged vision. An Innovation Pathways chart was produced after grouping the discussed actions and innovative technologies in five sectors: Water quality - Monitoring and data management; Aquaculture and Fisheries; Agriculture; Citizen science and Political initiative. The PESTLE analysis was used to examine the enablers and barriers for implementing the identified innovations in Danube Delta. The major barriers in implementing the innovation pathway for Danube Delta are related to the differences in economic status of delta's communities and aged population that do not have a proper training for using advanced technologies. These might lead to limited adaptation to new production and marketing systems.

The key enablers are linked to protected area status of the Danube Delta. Thus, a structured action plan for biodiversity protection and sustainable development already exists and is regularly updated to improve delta's ability to adapt against the climate changes effects. Being a protected area, strategic agendas developed for Danube Delta management integrates responsibilities for conservation of Danube Delta heritage such as fish reserve, traditional / cultural products or activities. Thus, adapted regulations based on functional monitoring systems distributed across the delta are mandatory for each specific identified challenge, regardless the price or people acceptance.

South-Western Black Sea (Turkey) – 2nd national working group

The working group meeting (living lab) was a co-organisation of H2020 BRIDGE-Black Sea and ARSINOE case studies. 28 participants from NGOs, public and private institutions, and academia attended the LL. With the organizers from the University of İstanbul Institute of Marine Sciences and Management (UI

IMSM), TÜBİTAK Marmara Research Centre (MAM), Turkish Marine Research Foundation (TÜDAV), and Middle East Technical University Institute of Marine Sciences (METU IMS) the total number of people was 43. The event took place in Şile, İstanbul to promote participation of people from fisheries and to motivate all the participants to contribute to the whole process. During the workshop, the participants were asked for their feedback on the problem statement, focusing on tourism and fisheries. The problem statement for the project team was unanimously accepted. Subsequently, the participants discussed their personal vision for the case study area. Based on these visions, a common future narrative was formulated for the case study area. The future narrative is reproduced in Table 4.

The future narrative was jointly developed with stakeholders involved in the BRIDGE-Black Sea project, as the BRIDGE-BS and ARSINOE projects have similar goals, agendas, timelines and participants, the narrative was co-developed to reduce duplication of work and stakeholder fatigue. However, the ARSINOE and the BRIDGE-BS projects have different approaches for their implementation pathways. While the BRIDGE-BS opts for a wider approach to future trajectories ("sustainability transformation" approach) for the sustainable development of the Blue economy in the region, ARSINOE looks more specifically at the role of innovations with the co-design of innovation pathway. Each project will therefore develop its own implementation pathway. The BRIDGE-BS transformative pathways and ARSINOE innovation pathway are complementary approaches to achieve the above vision.

South-Western Black Sea (Turkey) – 3rd national working group

The third working group of the south-western black sea sub-case took place on 15th of September 2023, and was organised as a digital meeting. In the meeting, the backcasting activity was introduced, with a description of its scope, purpose and methodology, as well as the Co-development of Innovation Pathways, for which scope, purpose and methodology were presented.

Innovation Pathway

In the In the context of CS6, it was determined that the emphasis should be placed on monitoring and data collection aspects, as these were identified as a major short coming for climate change adaptation and resilience. The Turkish CS6 innovation pathway is focusing on technological innovations that are able to mitigate present and future human induced impacts on marine biodiversity (i.e. from fishery and aquaculture activities and land-based pollutions), and ensure the blue economy can thrive in harmony with a healthy marine environment. Many technologies are yet to be fully developed, high expectations are put on the possibilities offered by AI related innovations to radically transform data collection and management capacity for marine biodiversity observation and preservation.

2nd International Living Lab

The 2nd International Living Lab was held online on the 31st of March 2023, and was built upon the National Workshops that took place beforehand. In the beginning of the LL, the Mental Map that was developed in the 1st International Living Lab was revisited and participants were asked to validate it. Following the validation, participants were introduced to the following problem statement, which was used to ultimately create the desired vision of the Living Lab:

"Within a source-to-sea approach, how can data collection and monitoring across the Black Sea region support the good environmental/ecological status (as referred in the MSFD) of fresh water and marine ecosystems in a climate change context?"

A discussion followed acknowledging the challenges that exist in the region that hinder data collection and monitoring. Among else, the openness of data along with the need for establishing common databases were discussed.

Afterwards, participants were introduced to the Sustainable Development Goals (SDG) that are relevant to Case Study 6, as it was discussed during the National Workshops (SDG2: Zero hunger, SDG6: Clean Water and Sanitation, SDG13: Climate Action, SDG14: Life below water and SDG15: Life on Land), and then they were allocated into two groups that would formulate the future narratives of the workshop. The two narratives were presented, and as there were no conflicting viewpoints between individuals and/or the stakeholder groups as a whole, the two narratives were merged into the developed vision of the International Living Lab. The final future narrative is reproduced in Table 4.

3rd international Living Lab

The 3rd International Living Lab was held online on the 14th November 2023. During the 3rd International Living Lab, stakeholders were asked to actively contribute in the identification of the necessary steps, actions and innovations in support of an effective data collection and monitoring system across the Black Sea countries, the core principle in the developed vision.

For the vision, firstly key areas of interest were defined: (a) Monitoring/Data collection, (b) International Cooperation, (c) Community Inclusion and (d) AI/Machine Learning. For each area of interest, milestones and innovations were added by the National Workshops that preceded the LL. This input was used by the participants in the international LL to apply focus to the broader vision that was developed in the 2nd International Living Lab. Based on open discussion, new milestones were added and innovations were suggested used backcasting. The Milestones defined connect to a broader spectrum of stakeholders, including research and society. Examples of milestones defined include: by 2040 a system for utilisation of the collected data has been developed, while teams are already well trained and working rules are established for data collection and monitoring. Simultaneously, a system for civic engagement and participation is in place, while a unified database is established, and AI/machine learning is commonly used in the region.

After including innovations and connecting them to the milestones expressed, a PESTLE analysis was used to examine the enablers and barriers for developing/promoting the use of the identified innovations, and ultimately achieving the aforementioned vision. The main barriers identified in the PESTLE analysis include:

- **political inconsistencies and dependencies** on stronger states, which limit independent decision-making and hinder the adoption of sustainability agendas.
- **Economic disparities, inflation, and high initial investment costs** further challenge innovation, particularly in areas like AI and monitoring technologies.
- **Social barriers** stem from varying educational levels, cultural differences, and public scepticism about new technologies, including concerns about job displacement by AI.
- Additionally, **technological barriers** arise from the need for continuous updates, integration with existing systems, and challenges in ensuring data accuracy.
- **Legal barriers** include differing regulations between countries and challenges in complying with international data privacy standards.

Enablers that support innovation include:

- **international cooperation** through alliances and existing governmental initiatives that promote environmental protection and disaster preparedness.
- **Economic enablers** include potential long-term financial benefits and increasing funding opportunities for AI and sustainability projects.
- **Social enablers** are driven by younger generations who are more environmentally conscious and familiar with new technologies.

- **Technological advancements**, widespread internet connectivity, and AI tools offer strong support for innovation
- **legal frameworks** like the EU's AI guidelines help harmonize regulations across borders.
- Finally, **the urgency of climate change** and the increasing frequency of extreme weather events act as powerful drivers for the adoption of new technologies.

Case Study 7

The second Living Lab workshop took place on the 30th of January 2023 as a face-to-face meeting at NorSea House of Innovation in Esbjerg. 16 stakeholders and one consulting engineer participated plus 2 facilitators and 2 assistants. The theme of the workshop was *visioning* - to envision the future of the Living Lab towards 2050 and the final output of the process was the future narrative reproduced in Table 4.

The third Living Lab workshop took place on the 30th of October 2023, also as a face-to-face meeting at the same location as the 2nd workshop. This time 13 stakeholders participated, together with two facilitators. As preparation for the work on innovation pathways that took place during this workshop, input from the stakeholders on technical, social and economic innovations identified for elaboration were collected at a pre-meeting in June 2023. Some of the innovations proposed included technical innovations e.g. machine learning tools as means of predicting ground water levels; social innovations focused on digital communication to involve more stakeholders than "the usual suspects"; and economic innovations focused on new financial instruments for investments in shared storm surge barriers, liquidation of land and generally added value of climate change adaptation. Based on additional innovations identified and the facilitated backcasting process, the following initial innovation pathways were proposed:

Towards 2025

1. Implementation of an online platform for connecting citizens and other stakeholders with the municipality (a matching innovation GoVocal – Climate Ready Esbjerg – was selected for testing as part of the ARSINOE call for tenders – see below).
2. Further improvement of an app for citizens' information ("Climate Ready Esbjerg").
3. Improved concepts of how to involve citizens and business in transformative climate adaptation and preparedness.
4. A multifunctional protection barrier against flooding.
5. Identification of ways to motivate public, private as well as business investments in shared protection solutions.
6. Identification of potentially cascading flood risks.
7. Improved assessment of risk for the electricity supply during flooding events.

Towards 2030

1. New economic model motivating a) civil society, b) public society and c) businesses to contribute economically to shared adaptation solutions.
2. Improved communication for tourists in English and German on water.
3. Improved handling of the general supply security for critical resources.
4. New technologies to handle compounding problems associated with backwater.

5. Increased knowledge on the Wadden Sea and its effect on flood events.
6. Improved models for assessment of flooding and the effects of these.
7. Improved decision-making tools based on new AI/ML technologies

Towards 2050

1. Focus on the education of adults as well as school pupils in climate catastrophes.
2. Education on climate disasters (prevent, prepare) for adults.
3. Education on climate disasters (prevent, prepare) in schools.
4. New multifunctional harbour facilities and systems.
5. Visitor centre for sharing experience and knowledge on climate, offshore, energy, disasters and more.
6. New tools to protect buildings against residual climate risk.
7. New climate resilient off-grid solutions.

The abovementioned innovations collected and validated by stakeholders have subsequently been consolidated by the research team and by expert and key stakeholder elicitation. The resulting set of revised innovation pathways were used as input to the CS7 ARSINOE call for tenders (see Chapter 6).

Case Study 8

Living Lab workshop 2: The second living lab workshop was organised on the 9th of February 2023 at the Brixham Laboratory, Freshwater Quarry, Torquay. A total of 18 attendees participated in this workshop (Figure 13). This Living Lab was focused on the future envisioning for Torbay, looking forward to the open tender for innovations and how the innovations could help support this vision. Workshopping in groups participants were asked to envision a common future in 2050 by developing a future vision using the guiding principles (SDG's). The future combined narrative developed by the workshop group is represented in Table 4.

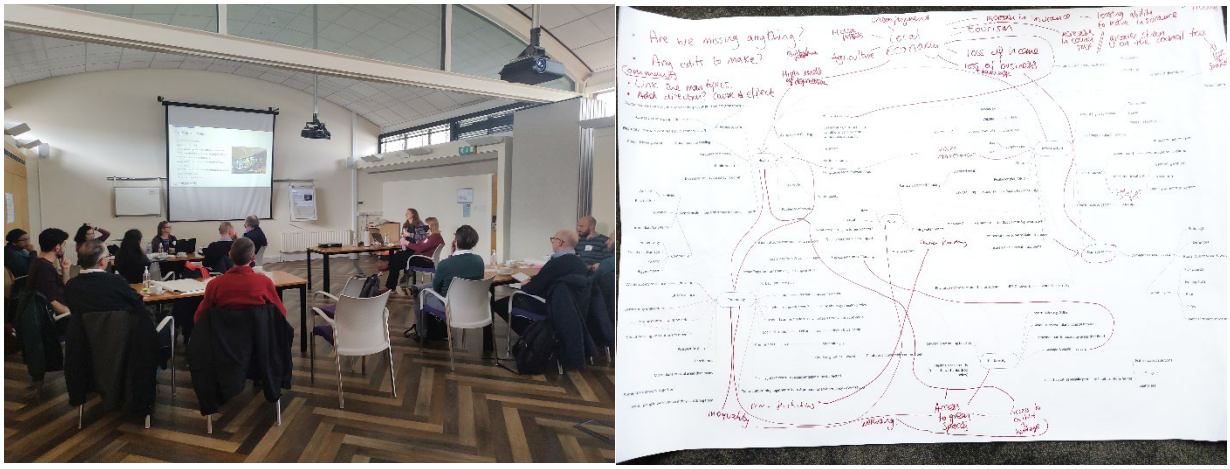

Figure 13: Impressions from the CS8 2nd Living Lab workshop (left) and updated mental map produced during the workshop (right).

Living Lab workshop 3: The third living lab workshop was organized on the 10th of June 2023 at the Brixham Laboratory, Freshwater Quarry, Torquay. The living lab workshop was attended by 5 participants and 2 facilitators. Prior to the LL workshop three online 'innovation spaces' sessions were held where participants could discuss and suggest innovations that may contribute to/achieve the future vision. Participants of the Living Lab workshop came up with measurable actions and changes and suggested achievable timings for achieving these 'milestones'. 35 innovations were defined to achieve the milestones above. These innovations ranged from the creation of job roles specifically for communicating information on floods and flooding, to promoting policy supporting Torbay and its environment; creating business models that create financially sustainable resilience to implementing nature-based solutions within the local area. Many of the innovations were cross sector, having themes from biodiversity, infrastructure, community, health and water/flooding. The key innovations that were highlighted both in the online innovation spaces and during the LL workshop are:

- Running a pilot project, focusing on people's relationship to water (Not just flood events).
- Work with the people in the local area to co-design natural and rewilding solutions and support the implementation of projects through micro-funding initiatives that are selected by a panel from that community.
- Property level flood warning using property sensors that would also be used to give alarms to other residents
- Establishing a roof tax for developments where development cannot reduce flood risk on site.
- Flood sensors for roads
- Workshops and events to engage communities who are fearful about the climate crisis
- Add on in google maps to show flooding and depth in case of danger to life from deep water

The innovation pathway created from this workshop envisions many key milestones being reached by 2025 (Project end). Many of the longer-term milestones look to build on the work of the innovations implemented previously along the pathway, particularly those that look to provide longer term, sustainable support, whether that be financial or through other mechanisms, to support education and infrastructure. The furthest milestone is relating to innovations for automatic flood barriers for the harbour that would stop overtopping and temporary flood barriers or other devices for high-risk roads and locations. This milestone is envisioned to be reached by 2050, completing the future vision.

Living Lab workshop 4: CS8 continued its living lab workshops also beyond the originally planned 3 workshops. The 4th workshop took place on June 20th, 2024 at Paignton Library, Great Western Road, Paignton, with a total of 18 attendees and 1 online participant. The fourth LL was organised to showcase the models and tools that have been developed for CS8 to collect the feedback from stakeholders in order to further improve the model.

The ARSINOE dashboard, cascading failure analysis and serious game ideas, flood modelling and impact assessment approaches were presented to the audience. The participants found the outcomes from ARSINOE would be useful to inform communities the possible flood impact under future climate scenarios in order to facilitate the discussion of adaptation strategies and measures. The ARSINOE tools can be applied to analyse the performance of various interventions and help stakeholders reach consensus on the solutions to be implemented. The information could also alert the regions that are at risk of flooding to take early actions for disaster mitigation.

The two Innovators and the concepts of their projects were also introduced to stakeholders for gathering suggestions at the beginning of the projects to help innovators better understand CS8 to implement the solutions more effectively.

Case Study 9

Living lab workshop 2:

The second Living lab workshop took place on 7 March 2024 in Cagliari from 9.30 am to 15.30 pm. A total of 19 people attended the workshop. This Living Lab was focused on the future envisioning, looking forward to the open tender for innovations and how the innovations could help support this vision. The future narrative produced is represented in Table 4

Figure 14: The second Living Lab in Sardinia.

Living lab workshop 3:

The third Living lab workshop took place on 28 September 2024 in Cagliari from 9.00 am to 15.00 pm, with a total number of attendees of 19. During this workshop, innovations for elaboration were identified, and innovation pathways were developed. These can be summarised as follows:

Summary of Innovations identified for elaboration

- Development of easily accessible digital technologies for farmers to enable adaptation to climate change (weather forecast and decision support systems);
- Development of block chain, panels, participatory certification systems, traceability and supply chain/product certification;
- App and/or platform;
- Sensors and water storage systems with use of Sustainable Energy;
- Regulatory readjustment and incentives, land reorganization;
- Innovative circular economy tools;
- New machines and tools that reduce GHG emissions;
- Optimising control tools (e.g. food production system);
- Early warning systems (e.g. preventing extreme events).

Summary of developed innovation pathways

Four innovations are being tested in the case study:

- Innovative biostimulants for plants (CONCIMI BIOLOGICI);
- smart agriculture technologies (Lobelia-AgroClimate);
- Integrating Rain harvesting and solar pumping (SOLAR PUMPING);
- participatory certification system (COCCOI IGP).

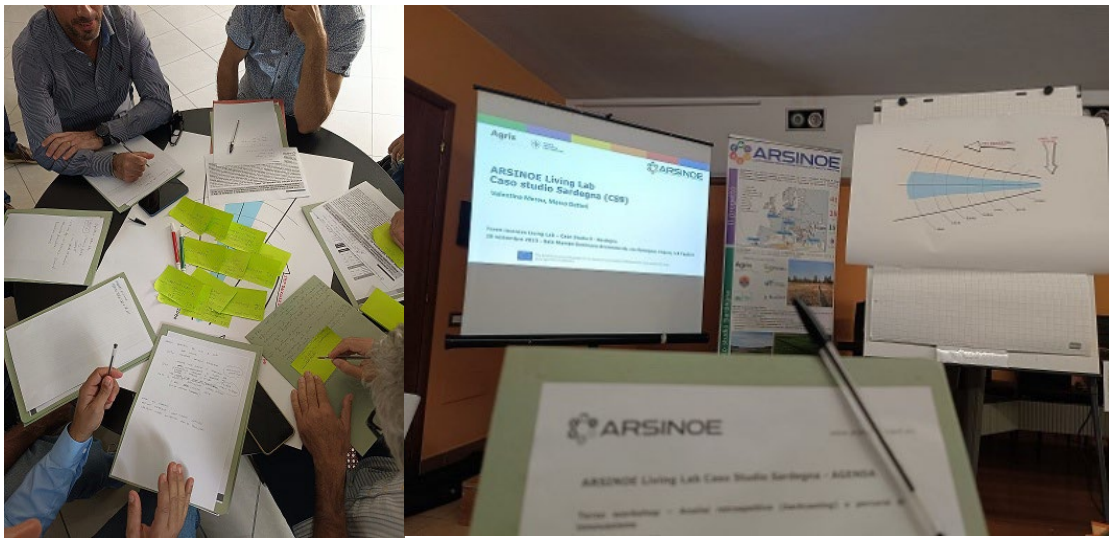

Figure 15: An impression of the third Living Lab in Sardinia and the use of the Future Radar Timeline.

3.2 ARSINOE VR (Task 2.5)

ARSINOE VR

ARSINOE VR was designed by the ATHENA and AUEB team based on the outcomes from Case Study workshops. ARSINOE VR is a virtual reality experience immersing the user in the exploration of alternative futures that can be the result of different paths humanity may take for environmental protection and climate change mitigation. The experience will be available in two versions.

ARSINOE VR for choice experiments

The "choice experiment version" will offer the participants the possibility to fill in a choice experiment questionnaire in VR where they will be asked to record their willingness to pay to ensure climate change mitigation and better future scenarios, in terms of heat, air pollution, biodiversity loss and noise and traffic. The VR experience represents an innovative approach to implementing econometric choice experiments (choice experiment) to determine the economic value assigned to specific characteristics of an environmental good or service under policy analysis.

ARSINOE VR for environmental education

The educational version will allow users to become fully immersed in the alternative, good or bad, futures. The visuals and animations will be complemented by the relevant soundscape, to intensify the sense of presence. The informative content will be presented in textual form on the user's virtual HUD. The work is grounded on existing theory and practice on environmental education, focusing on environmental awareness, citizenship and empathy. The immersive VR application will be combined with a post-experience facilitated dialogue activity, designed to inform on different aspects of the climate change crisis as well as proposed nature based solutions, and engage participants in joint reflection and interpretation. The detailed methodology for the design of the VR experience was described in detail in deliverable 2.5.

During the reporting period we focused on parallel development of both versions of ARSINOE VR, as well as the creation the first version of the facilitated dialogue experience to be combined with ARSINOE VR - education.

In the case of the VR application, the design and script has been presented to the Athens CS team for comments and feedback. The comments have been taken into account for the development of 3D models and animations and the finalisation of the script for the first version. The development with Unity 3D engine proceeded, to create the interactions with the environment. A new Scene for the Pod has been created, to accommodate the choice cards, in the case of the choice experiment version, and the portals to the two alternative future environments, in the case of the educational versions. A tutorial has been added in the Pod scene, to familiarize the user with the controls.

The first version of ARSINOE VR - education has been demonstrated in two events:

- Innovent Forum 2024, 9 - 11 February 2024, Larissa, Greece. ARSINOE VR was presented during a panel talk and demonstrated to the public at the event's exhibition space.
- Athens Science Festival, Technopolis, 16 - 21 April 2024, Athens, Greece, where ARSINOE VR was demonstrated to the public.

ARSINOE VR - education was evaluated in a 4 hour workshop on 17th of June 2024 at the premises of the Athens University of Business and Economics. Four invited educators and four students tested the VR

application and dialogic experience and provided feedback. The participants enjoyed both parts of the experience and provided detailed suggestions for improvement.

Adult participants expressed high levels of engagement and enthusiasm for the immersive VR experience. They found the content of both experiences to be engaging, thought-provoking, and aligned with their interests. However, they expressed concerns about the long duration of the facilitated dialogue. The children who participated enjoyed the VR experience, finding the dystopian alternative particularly impactful. They felt the dialogues were engaging, not forced, and suggested a tighter integration between the dialogue and VR, with more specialised information to stimulate curiosity and deeper conversations. Educators noted the experience's strong potential to raise awareness, especially when combined with their expertise and involvement. However, they found the dialogues to be too lengthy, suggesting it be divided into sections for use in different sessions. They also recommended simplifying the content of the dialogues and making the VR material more concise, possibly adding audio narration. The VR material in video format and the simplification of the dialogic content could cater for younger audiences. These suggestions are being incorporated into the project's second version.

The feedback was subsequently taken into account to proceed with improvements in both applications. Both are currently under development to proceed with the second round of evaluations to take place in September.

ARSINOE VR has also been submitted in the Reimagine Education Awards (https://www.reimagine-education.com/) in the Academic Early-stage award category.

A brief demo of the experience can be found here: https://www.youtube.com/watch?v=-6in2Af8sms

The development of ARSINOE-VR - choice experiment application has also proceeded in the reporting period. Following several rounds of design, in collaboration with WP7, the visualisations and animations for the different alternative environments and “good” and “bad” choices have been finalised. The complete version is scheduled to be used for the VR choice experiments in October 2024.

A brief demo of the experience can be found here: https://www.youtube.com/watch?v=M3bj9AISSD4

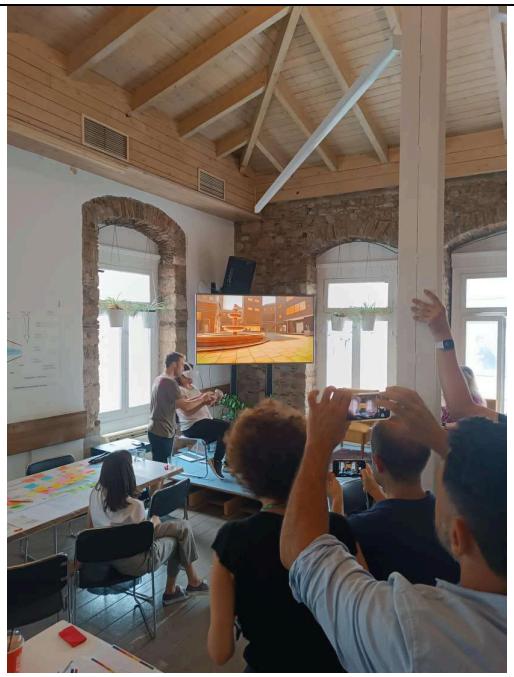

Figure 16: Virtual Reality presentation and demonstration at the 2nd workshop in Athens Metropolitan Case Study.

3.3 Educational Interventions

Educational activities within the Case Study of Athens Metropolitan Area

Educational activities within CS1 are aimed at fostering stakeholder engagement, raising awareness, and building capacity in the areas of urban sustainability, innovation, and policy development. These initiatives seek to actively involve local communities, professionals, and policymakers in structured learning processes that explore sustainable solutions to the region's urban challenges. Through a series of workshops, seminars, and collaborative exercises, participants acquire knowledge on key aspects of extreme heat, biodiversity loss, urban planning, and socio-economic development, tailored specifically to the context of the Athens Metropolitan Area. The overarching objective is to promote a comprehensive understanding of the region's unique challenges while supporting the co-creation of innovative strategies for its future development.

Virtual Reality tool - Testing and Focus Group Session 1:

In the same context, the ARSINOE VR tool was also explored by teachers and students from the Athens Metropolitan Region in a testing and focus group session which took place on July 17th, 2024 (Figure 17). Potential futures resulting from the different environmental protection and climate change mitigation strategies were experienced by the participants, who were then asked for their feedback; in turn, this would further feed the co-creation and co-design of the tool by potential end-users.

Figure 17: Virtual Reality presentation at Testing and Focus Group Session 1.

Educational activities – Citizen Science

Biodiversity, or the diversity of all living things on our planet, has been disappearing at a rapid pace in the past few decades, primarily due to human activities such as changes in land use, air pollution, and environmental degradation. In a UN report (2019), scientists pointed out that one million species, out of a total of eight million, are on the brink of extinction, many within the next few decades. To address this rising global challenge, urgent global action on biodiversity is critical.

Public participation in scientific research, also referred to as *Citizen Science* (CS), is a developing trend that could be a valuable addition to the preservation toolbox (Cosquer et al., 2012; Theobald et al., 2015). CS studies may fill major data gaps over time and space (Isaak et al., 2014), which would not be possible without the engagement of many people, particularly those with regional and popular knowledge (Tengö et al., 2021; Krick, 2022). CS activities can also help increase student engagement when researching biodiversity.

Case Study 1

In the framework of ARSINOE and CS1—Greening the Athens Metropolitan Area — the Department of Civil Engineering of the University of Thessaly (project partner UTH) and the Education Centre for the Environment and Sustainability (E.C.E.S) signed a Memorandum of Understanding on October 16, 2023, which was approved by the Regional Directorate of Education of Attica. Following from this MoU the two parties organised an Attica-wide Awareness Campaign with the theme: "Recording biodiversity in the Athens Metropolitan Area & achieving resilience through participatory practices" for the 2023-2024 school year. The main goal of this campaign was to engage students in the digital collection of observations of plants and animals using citizen science platform MINKA (https://minka-sdg.org/home and Figure 18), with the aim of creating a biodiversity observatory for the Attica region. The MINKA platform was chosen for its potential to facilitate teamwork in an educational environment. As part of the ARSINOE CS1, citizen scientists — students and teachers — uploaded their fauna and flora

observations on the MINKA platform adapted for CS1. Students from 1 primary and 41 secondary educational schools were engaged aiming at recording biodiversity in the Athens Metropolitan Area thus contributing to reaching the SDGs concerning SDG 13 (Climate Action) and SDG 15 (Life on Land). Students and teachers were trained in recording species of fauna and flora (except trees) to create a data repository that will help scientists and researchers find mitigation and adaptation solutions to climate change.

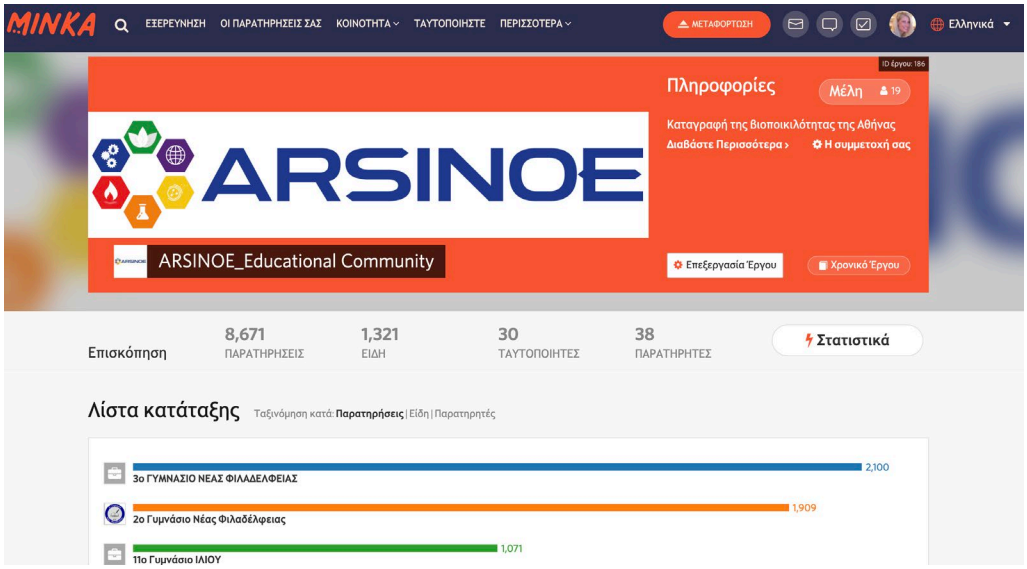

Figure 18: The basic CS1 MINKA project page "ARSINOE_Educational Community".

In MINKA platform a basic project was created named "ARSINOE_Educational Community" (https://minka-sdg.org/projects/arsinoe_educational-community, Figure 18) and 42 subprojects were also created under the "umbrella" of the basic project, each one representing the 42 school teams (Figure 19). Each school team uploaded their observations. Subsequently, at least two experts verified the species of each observation, and the observations are then given a "Research Grade level" label. On 19 and 30 October 2023, two workshops were organised, in person and online respectively, aimed at educating students and teachers about environmental threats and how to create a biodiversity observatory using digital citizen science tools. The online workshop lasted 5 teaching hours and 108 teachers took part.

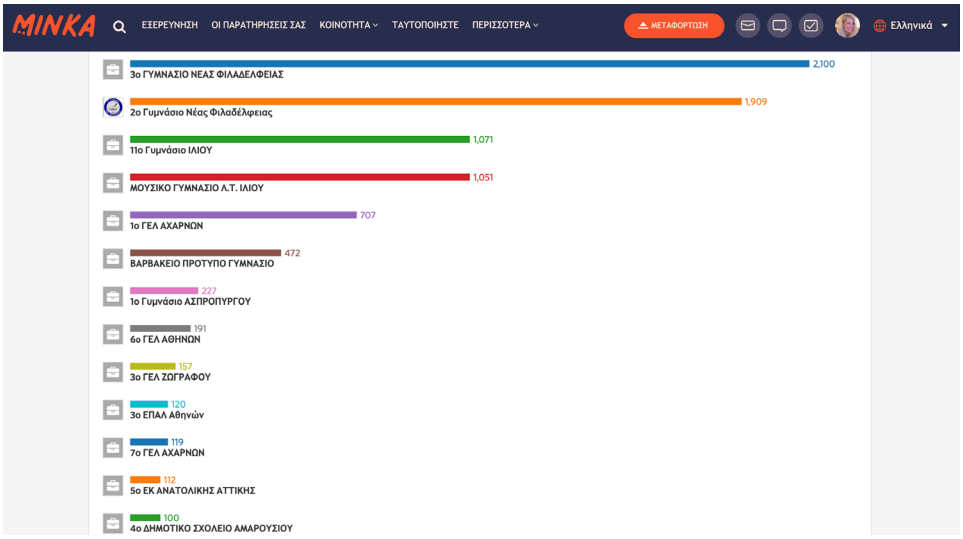

Figure 19: The 42 subprojects of participating schools, under the "umbrella" of the basic project.

The awareness campaign ended on 22 April 2024, and the ten (10) top school teams participated in a celebration on May 27, 2024, organised by UTH and E.C.E.S at the Metropolitan Park "Antonis Tritsis", Athens, where the selected teams presented their work during (Figure 20). The results at the end of this Campaign were rather impressive considering that a total of 8,671 observations and 1,321 species were recorded (validation is ongoing), see also Figure 21. Additionally, the students positively evaluated their experience, praising MINKA's ability to record biodiversity using only their mobile devices, while also giving them the opportunity to get closer to nature.

Figure 20: CS1 event organised for celebrating the Citizen Science Campaign outcomes.

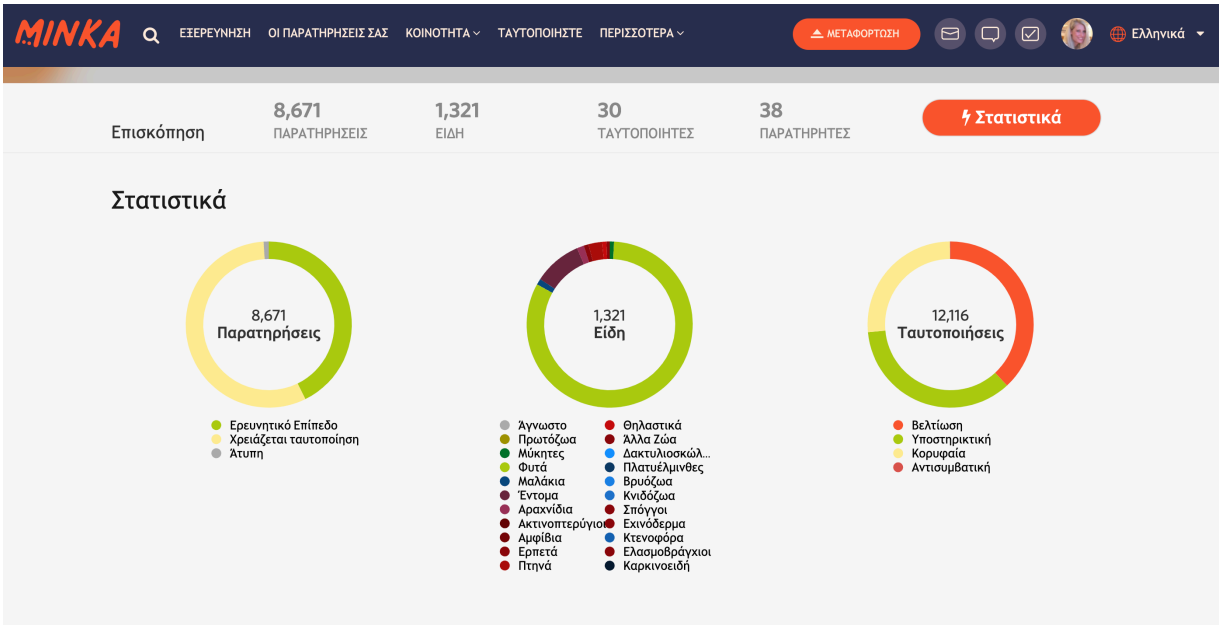

Figure 21: CS1 awareness campaign statistics of the recorded observations.

Case Study 9

In Sardinia, the MINKA platform was introduced through a pilot project in collaboration with the Elmas Agrarian School in March 2024. The pilot focused on training teachers to use MINKA for monitoring macroinvertebrates and plants in the region. The project can be found in MINKA here: https://minka-sdg.org/projects/biodiversita-dell-istituto-tecnico-agrario-duca-degli-abruzzi-elmas

Training for Trainers (T4T) seminars and Youth Assemblies simulations

As part of CS1, the Hellenic Foundation for European and Foreign Policy (ELIAMEP) implements the Training for Trainers (T4T) seminars and Youth Assemblies on Climate Change. Believing that knowledge should always go before action and that, in this context, lifelong learning and formation of educators is crucial, ELIAMEP on a yearly basis trains secondary education teachers on climate change issues. Specifically, the syllabus consists of lectures on the physical problems and challenges of climate change, especially for the Athens Metropolitan Area, as well as existing international, European and national policies regarding such issues. Wanting to go one step further, the T4T seminars also trains teachers on experiential learning techniques, like formal and informal institutions' simulations (e.g. international organisations, citizen assemblies) and how to introduce them in class, specifically on green issues, in order for students to learn in a more effective way. Three T4T seminars (Figure 22) have been implemented since 2021 in different formats (online and hybrid), educating more than 180 (junior) high school teachers.

Figure 22: Hybrid ELIAMEP's T4T seminar session, 2024.

As part of CS1, ELIAMEP has also undertaken the organisation of Youth Assemblies on Climate Change. These activities had a two-fold aim. On the one hand, they build upon and enhance the Citizen Science activities of ARSINOE and, on the other hand, they enhance environmental awareness and knowledge, but also citizenship and citizen participation in environmental matters. Students are, first, required to map environmental problems at a household, school/university, neighbourhood, municipality and regional level; then they are requested to identify relevant barriers in tackling the identified issues; and lastly, they are requested to deliberate with their peers in order to propose realistic and implementable solutions to those problems and to overcome the barriers. The solutions should take the form of Local and Regional Green Deals. Once defined, these Deals need to be presented to local and regional authorities of the Athens Metropolitan Area. Thus, these activities stimulate bottom-up methodologies in environmental policy making.

Six Youth Assemblies have taken place this far, three for secondary and three for tertiary education students. In total, more than 90 (junior) high school students and 70 university have participated in the Assemblies.

Figure 23: Photos of ELIAMEP's Youth Assemblies on Climate Change, 2024.

4.0 Actions related to WP3 (task 6.3) – Modelling and Data Collection

The implementation of modelling and other technical activities, including data collection, for the CSs takes place in Task 6.3. The modelling and data collection work is connected to the activities in the two technical WPs (WP3 and WP4) and are coordinated in meetings with participants from all three WPs involved.

To quantify, model and manage climate risk in a systematic way through resilience analyses co-created and co-designed with the stakeholders, ARSINOE will develop a Multi-System Dynamic Resilience Modelling Framework (MSDMF). The MSDMF integrates tools, methods and techniques from different academic disciplines and facilitates a holistic analysis of results. Each CS will perform systematic and state-of-the-art climate risk assessments and for this purpose will apply its own suite of models to evaluate impacts and associated risks related to gradually changing climate conditions. It is supported in this work by actions in WP3.

All the CS started with technical preparation for Task 6.3 by preparing an initial "conceptual" model of the types of technical/modelling activities that they envisage for their CS. These conceptual models were developed by stakeholders from diverse backgrounds and disciplines in a process of co-design to create a broadly accepted vision of the future for all stakeholders relevant for and/or involved in each of the individual case studies. The conceptual model development, which was undertaken as part of the living labs workshops, enabled project partners from diverse disciplines to converge on a unified view, before implementing resilience modelling and assessment frameworks using multi-disciplinary modelling methods. Subsequently, the conceptual model of each CS forms the basis for all its modelling activities. The conceptual structure places 'in context' the research that is carried out across different disciplines.

These conceptual models were reported in D6.2. In the current reporting period, the focus was on the modelling work based on the conceptual models. The progress with the modelling work will be presented, as well as a short review of the conceptual models and how they were used as the basis for this work. Table 5 provides an updated overview of the models used in each case study.

Furthermore, In WP3 work is also performed on conceptualising the application of computational models for resilience modelling of key infrastructures. This results in a model called the 'resilience wheel'. Case Studies 1 and 8 are lighthouse cases that are developing this approach and leading its implementation. Initial results were reported in D6.2 and this report provides an update on the resilience wheel development work in connection with CS1 and CS8.

Table 5: Overview of models used in the ARSINOE project by the different case studies, reproduced from D3.4. The first column shows the case study, followed by the model's name and a short description, scenarios currently used and planned to be implemented within the project, associated time horizon, input and output data. The last column indicates whether the described model has any dependencies, which implies that the output of a different model previously used by the case study is used as input for the described model.

CS	Name of model	Description	Scenarios (current/planned)	Time horizon	Data needed (input)	Data produced (output)	Depend (Y/N)
CS1	Climatic indicators	climate projections	CMIP5: RCP2.6 - RCP4.5 - RCP8.5	2031-2050 2081-2100	Observations (e.g.: T), climate model data	• Daily data of minimum/maximum temperature, relative humidity • Daily humidex (compound index of temperature and rel. humidity) values • Derived indices (e.g., number of days per year with maximum temperature >35C, number of days per year with humidex >38C)	N
CS1	Indicator Based Climate Change Vulnerability Assessment Framework	An open and interoperable Knowledge Management framework for Climate Change Vulnerability Assessment		2010-2023	Societal data (population, social participation, healthcare services, education), Economic data (financial resources, access, inequality), Political data (quality of political system, government and political situation), Environmental data (green spaces, renewable energy, land cover, fire danger, urban waste water, air pollution) from a wide range of open-source APIs	• Vulnerability indexes on country, NUTS2, NUTS3, city and FUA level	N
CS1	Accessibility to Green Urban Areas	Citizens' Accessibility to Green Urban Areas based on the 15-minute city concept (Network Analysis - ArcGIS	CMIP5: RCP2.6 - RCP4.5 - RCP8.5	2031-2050 2081-2100	Green urban areas, Open spaces, Road network, Population, residential density,	• Accessibility of citizens to green and blue urban areas within a 5- and 15-minute walking distance using only the pedestrian or the entire road network of the city. • Number of citizens with and without accessibility to green and blue urban areas. • The accessibility of citizens per district (for the 7 districts of the city of Athens)	N

CS	Name of model	Description	Scenarios (current/planned)	Time horizon	Data needed (input)	Data produced (output)	Depend (Y/N)
CS1	Connectivity of Green Urban Areas	Connectivity of Green Urban Areas within the city of Athens based on the Morphological Spatial Pattern Analysis (GuidosToolbox)	CMIP5: RCP2.6 - RCP4.5 - RCP8.5	2031-2050 2081-2100	Protected areas, Green Areas, NDVI, Natura 2000 network	Recording habitats and species of Natura 2000 network Protected Areas withing the Attica Region Connectivity maps (revealing landscape fragmentation) for the city of Athens	N
CS1	EPISODE-CityChem (v1.5)	chemistry/transport simulations of reactive pollutants (air quality)	-	-	Initial and boundary air pollution conditions (surface and atmospheric input) Anthropogenic emissions Meteorological (and land) parameters	NO_2, NO, CO, O_3, SO_2, $PM_{2.5}$, PM_{10}, VOCs, etc.	N
CS1	MINKA, MECODA	Urban biodiversity-Citizen Science	-	2022-2025	Date, picture, geolocation, species	Number of observations per user, number of total observations, number of different species reported, percentage of observations with “research grade”. Also, the detection of alien and protected species can be obtained analysing the MINKA dataset with MECODA software.	N
CS1	Hotspot Mapping	Complex Network Analysis for the simulation of the Urban Heat Island effect using multiple layers (Accessibility to and Connecitvity of Green Urban Areas, ...)	-	-	Daily humidex (compound index of temperature and rel. humidity), Daily data of minimum/maximum temperature, relative humidity, wind speed, land uses: Landscape fragmentation including protected areas, Green & Blue infrastructure, Building heights	Average Surface Temperature Difference between Average Surface Temperature at the target location and the peri-urban, which operates as an indicator for the Urban Heat Island effect	Y

CS	Name of model	Description	Scenarios (current/planned)	Time horizon	Data needed (input)	Data produced (output)	Depend (Y/N)
CS1	WRF	Nature based Solutions (NbS) and interventions selection and microclimate simulations (WRF)	-	-	Initial and boundary conditions (surface and atmospheric input), Static input (topography, land use, soils), Accessible green areas, Landscape fragmentation, Areas of low air quality, Trees distribution, Areas of thermal stress and UHI effect	air temperature, precipitation, relative humidity, surface temperature, soil moisture, PBL height, etc.	Y
CS1	Heat waves Vulnerability Index	A composite index of socio-economic vulnerabilities of citizens to heatwaves	-	-	all following attributes are recorded and simulated spatially in under-zip-code granularity: % Elderly % Retired % Living in houses built before 1980 % Living alone % Renting % Living in houses smaller than 60 m2 % Unemployed % Immigrants from developing countries	Heat Vulnerability Index	N
CS2	ALADIN63	Regional Climate model (RCM): CNRM-ALADIN or ALADIN-Climat. Application in Valencia and Piraeus/Limassol	Not specified	2040-2060 2080-2100	Precipitation, Wind, Wind surface, Wave, Humidity, Sea level	Atmospheric and oceanographic climate variables	N
CS2	DMI-HIRHAM5	RCM based on HIRLAM and ECHAM models. Application in	Not specified	2040-2060 2080-2100	Precipitation, Wind, Wind surface, Wave, Humidity, Sea level	Atmospheric and oceanographic climate variables	N

CS	Name of model	Description	Scenarios (current/planned)	Time horizon	Data needed (input)	Data produced (output)	Depend (Y/N)
		Valencia and Piraeus/Limassol					
CS2	SMHI-RCA4	RCM. Application in Valencia and Piraeus/Limassol	Not specified	2040-2060 2080-2100	Precipitation, Wind, Wind surface, Wave, Humidity, Sea level	Atmospheric and oceanographic climate variables	N
CS3	WaSiM	Water Flow and Balance Simulation Model Hydrological model	CMIP5: RCP8.5, CMIP6: SSP1-2.6, SSP3-7.0	2041-2060 (2041-2071) 2081-2100 (2071-2100)	Meteorological forcing (T, P, radiation, rel. Humidity, wind) Topography, land use, soils Water management structures (reservoirs, water transfer)	Streamflow, Precipitation, Temperature, radiation, humidity, wind, Evapotranspiration, Soil moisture, groundwater recharge, snow storage, direct runoff, interflow	N
CS4	IWaMM (Integrated Water Management Model)	Hydrological and integrated water management model across sectors (climate – water –energy – food)	CMIP5: RCP2.6, RCP8.5	2021-2100	Meteorological forcing (Temperature, Precipitation); Hydrological data (inflows), Climate scenarios Static information on land use (agriculture) and water use Information on water consumption by users (households, agriculture, industry, hydro power)	Water level in the lakes Precipitation, temperature, radiation, humidity, wind Evapotranspiration, soil moisture, groundwater recharge, snow storage/melt, direct runoff, interflow, etc. Water consumption per consumer type	N
CS5	GW-EH-LP + FEFLOW	Groundwater models (insular)	CMIP5: RCP4.5 and RCP8.5	2022-2100	Maximum temperature Minimum temperature Precipitation Sea level rise	Water production cost (economic damage cost) Water quality production (saltwater intrusion)	N
CS5	Hydrodynamic Model h2d	hydrodynamic	CMIP5: RCP4.5 and RCP8.5	2015-2046 2080-2100	Wind and sea level	Free surface	N
CS6	HEC-HMS	hydrological	CMIP5: RCP4.5 and RCP6.0	2040-2060	Canopy storage, Constant rate of initial and constant loss correspond to saturated hydraulic conductivity, Meteorological	Streamflow	N

CS	Name of model	Description	Scenarios (current/planned)	Time horizon	Data needed (input)	Data produced (output)	Depend (Y/N)
					data (precipitation, temperature, etc.) Surface slope - EU-DEM		
CS6	NEMO -TURSEM coupled hydrodynamic ecosystem model	3D Coupled Hydrodynamic – Biogeochemistry Model	CMIP6: SSP2-4.5 and SSP5-8.5	2020-2040 2080-2100	Meteorological Forcing, Topography , River Discharges, Air-sea Fluxes, River Ecosystem Forcing, Bosphorus Strait Fluxes, Bosphorus Strait Ecosystem Forcing	Temperature, Salinity, Sea Surface Height, Velocity, Mixed Layer Depth, Phytoplankton, Zooplankton, Nutrients, Oxygen, Organic Matter, Carbonate system	
CS7	DTU Damage Cost Model	GIS-based tool	CMIP5: RCP4.5 and RCP8.5	2050, 2100	Flood depth (height above ground) Land use	Cross-sectorial damage costs Localization of flooded assets including non-monetary ones	Y
CS7	Climate indicators	Climate projections	CMIP5: RCP4.5 and RCP8.5; CMIP6: SSP1-2.6, SSP3-7.0	2050, 2100; 2041-2060, 2081-2100	Domain, climate model data (CORDEX and CLIMEX, IPCC AR6), GIA, precipitation, downscaling method, observations	Temperature, precipitation, wind, downscaled precipitation statistics, regional sea level rise, drought indicator (SPEI)	N
CS7	Extreme Sea Level Model	Empirical-statistical model (developed in WP3)	CMIP5: RCP4.5 and RCP8.5; CMIP6: SSP1-2.6, SSP3-7.0	2050, 2100; 2041-2060, 2081-2100	Tide (model), wind and sea level, training data (model and observed data)	Extreme sea level statistics	Y
CS7	SCALGO Live (ANUGA Hydro, SFINCS)	Flood model	CMIP5: RCP4.5 and RCP8.5; CMIP6: SSP1-2.6, SSP3-7.0	2050, 2100; 2041-2060, 2081-2100	Domain, precipitation statistics, extreme sea level statistics, high-resolution digital elevation model and land surface model	Flood depth (height above ground) and extent	Y
CS8	CAFlood	Flood model	CMIP5: RCP2.6, RCP4.5, RCP6.0, RCP8.5 CMIP6: SSP1-2.6, SSP2-4.5, SSP3-7.0, SSP5-8.5	2021-2040, 2061-2080	LiDAR DEM Precipitation Design rainfall Land cover UK Climate change allowance Downscaled UK climate projection	Water depth, flood extent, flood duration for the modelled domain Water depth hydrograph at selected locations	N

CS	Name of model	Description	Scenarios (current/planned)	Time horizon	Data needed (input)	Data produced (output)	Depend (Y/N)
CS8	SUMO (Simulation of Urban Mobility)	traffic modelling software	CMIP5: RCP2.6, RCP4.5, RCP6.0, RCP8.5 CMIP6: SSP1-2.6, SSP2-4.5, SSP3-7.0, SSP5-8.5	2021-2040, 2061-2080	Road Network Data Traffic Count Data Flood Data	Time-Series Graphs showing Traffic Loading in Network/Cross comparison of Traffic Flows under Dry and Flooded Conditions, Traffic Congestion Maps Emergency Response Service Zone Maps	Y
CS8	Cascading Failure Simulation Model		CMIP5: RCP2.6, RCP4.5, RCP6.0, RCP8.5 CMIP6: SSP1-2.6, SSP2-4.5, SSP3-7.0, SSP5-8.5	2021-2040, 2061-2080	GIS locations of all critical service nodes, flood footprint from CAFlood with resulting traffic integrity from SUMO, demographic, statistical, and employment data from ordnance survey for each output area.	Percentage of output service for each critical service node, as well as integrity of critical services for each output area.	Y
CS9	CERES-Wheat model (implemented in DSSAT software)	Crop modelling	RCP4.5 and RCP8.5 CMIP6: SSP1-2.6, SSP2-4.5, SSP4-6.0, SSP5-8.5	2050 (2026-2075), 2080 (2076-2099)	Daily data of maximum and minimum temperature, total precipitation, and global solar radiation Soil data (texture, pH, soil organic carbon, etc..) Crop and management data	Crop phenology and crop yield Water and nutrient balances	Y
CS9	AQUACROP (AQUACROP-OS and AQUACROP-OSPy)	Crop modelling	ERA5 LAND + RCP4.5 and RCP8.5	1950-2023 & 2024-2050	Climatic data: Daily maximum and minimum temperature, precipitation, potential evapotranspiration Crop and soil characteristics Field management data	Crop yield Maximum yield and Net Irrigation	Y

4.1 Conceptual models

In the ARSINOE case studies, stakeholders from diverse backgrounds and disciplines are brought together to co-design an accepted vision of the future. To define the context and map out all relevant aspects, each case study developed a conceptual model, which forms the basis for all modelling activities concerning the Case Studies. Below the case studies report how the conceptual models were used to guide the modelling activities and how the elements from the conceptual models were integrated.

Case Study 1

CS1 has developed a conceptual model for the interconnected system of hazards, vulnerabilities, exposures and capacities around heat waves which is the main hazard investigated. Related hazards, such as air pollution, biodiversity loss, and violence, have been spotted, as well as their relation to the heat waves, which might be compound or cascading depending on the context. Critical vulnerabilities to the hazard system have been identified, such as health, well-being, tourism, biodiversity, energy and water consumption. The conceptual model differentiates when seen in a long term manner and a short-term manner, since there are vulnerabilities that are relevant to the long-term effects of heat waves, such as the impact to biodiversity and not that relevant to the short-term. The same applies to the mitigation solutions. For this reason, two modelling approaches and supporting tools are developed for the CS. A long-term urban planning tool and a short-term civil protection tool.

The urban planning tool is visualised in a dashboard. It facilitates the mapping of risk hotspots, the combined risk of the long term hazards and it prioritizes the neighbourhoods of Athens Metropolitan Area in regards to their need for mitigation solutions. Different mitigation solutions are modelled, mostly different types of green infrastructure, while the user can test the impact of these different solutions.

The short-term civil protection modelling approach is developed through an agent based modelling (ABM) tool that in a similar manner produces risk hotspot maps. The risk, in this case, does not include the hazard of biodiversity loss, but mostly focuses on hazards that affect human life and health, specifically heat waves and air pollution. The modelling approach's objective is to prioritize resources allocation for the risk crisis days. Different players are involved that offer a variety of resources. Examples of such resources are shadowy places, air-conditioned places, bottled water distribution spots, first aid vans and kiosks, Red Cross volunteers etc.

Case Study 2

The conceptual model for the Mediterranean port was updated after being validated in the 3rd living lab (Figure 24). The results show that extreme weather and waves/overtopping is a common factor of interest for the ports of Limassol and Piraeus, which led to the CS further developing models for these two ports (until M36, the analysis was concluded for Piraeus and it will be finalised for Limassol during the last year of the project). Also, the concerns in relation to impact of climate change in the infrastructure and the operations of the port resulted in an expansion of the vulnerability assessment from the port of Valencia to the Ports of Limassol and Piraeus. Finally, the common concern in relation to environmental, social and governance (ESG) considerations led to the full implementation of the Hybrid Financial Reporting model (WP7) for all 3 ports of the case study. The work was completed for Valencia and is expected to be finalised for all ports by the end of the project.

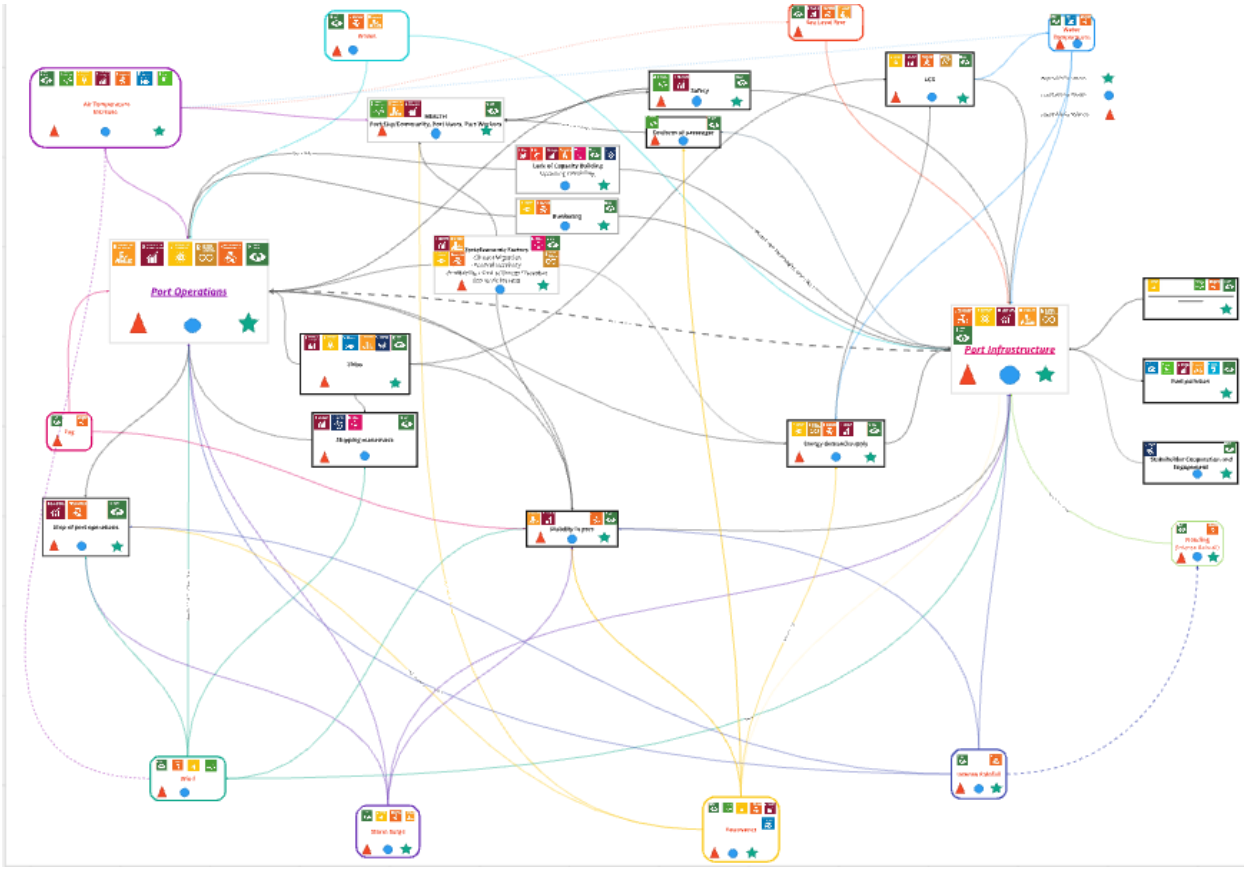

Figure 24: CS2 Conceptual Model.

Case Study 3

The conceptual model outlines the integration of distinct model activities. Hydrological simulations in the case study area are currently taking place with input from the Canadian Regional Climate Model Large Ensemble and observation-based data sets. These simulations provide the basis for water quality, extremes and availability indicators, as well as projection-based water resources management.

Part of the modelling activity in the case study will result in climate services for the region. We understand climate services as the provision of climate information that helps end users to make climate-conscious decisions. Climate information can range from seasonal forecasts (e.g. forest fire outlooks) to long-term projections (e.g. sea level rise). It can be combined with other sectoral information (e.g. population distribution, crop distribution, coastal protection) that can be used to assess exposure and vulnerability to climate hazards. Climate services can also include weather services that focus on short-term forecasts (e.g. hazardous weather conditions). Climate services must be based on scientifically credible information and expertise and meet the needs of users. In the case study we aim to develop climate services that reflect the challenges of the region and enable stakeholders to consider climate information in their decision making (e.g., climatic indicators, indicators of water extremes, quality, availability and demand, as given in the conceptual model; excluding short-term weather forecasting). Different means of including stakeholders in the development of climate services were explored, ranging from one-on-one discussions about data needs and the ability to work with different data, to group discussions and a workshop in late 2023. The participants of the workshop were from public utilities, state and regional authorities, city administration, agriculture and viticulture and environmental NGOs. Notably, knowledge about what climate services are, how they can be used and what is available was very limited among the

participants despite them being interested in or actively working on climate resilience. During the workshop different data needs were identified. In many cases stakeholders did not request generic climate information per se but rather information about how the climatic changes reflected by that data would impact them/their businesses, i.e., very applied and specific needs (e.g., with respect to crop yields or renewable energy potential).

So far, the experience/knowledge from the living labs was not upscaled to case study level (knowledge transfer: innovations/solutions). Other modules of the conceptual model are not directly modelled, but covered in the cooperation with innovators.

Case Study 4

The social, economy and environmental sectors, as well as their needs, connections, interactions, interdependences and individual dependences on water, that had been identified in the conceptual model (presented in the previous report D6.2), were taken in consideration further in modelling activities (Task 6.3.4). The issues suggested by the stakeholders to be addressed in the model were used for understanding of the CS4 specifics, the nature and operation of sub-systems and the overall system dynamics. They were also used to adjust the model to the system needs and objectives, for identification and collection of data needed for modelling, and eventually for model deployment and review, analysis and benchmarking of the outputs. The developed conceptual model identified that sectoral interlinkages were expected to have significant impact on the projections of water consumption in a long term planning horizon, including possible competition and trade-offs related to the available water resources. Projections of water balance of the two lakes, by taking into account projections of the selected climate indicators (sum of mean monthly precipitations and mean air temperature), enabled the assessment of exposure and vulnerability of social, economic and environmental sectors. These could be induced by the forecast water scarcity in the observed region. In addition to the specified sectors, the initial conceptual diagram and its improvements through the interactive sessions of SIA, on national and transboundary level, has provided guidelines not only for recognition of the hotspots that require attention, but also for adaptation measures, their identification, selection and ranking. The criteria for evaluation and selection have been adopted on the basis of interactive sessions and feedback from the engaged stakeholders, as well as the analyses that followed and were guided by WP2 (e.g. PESTLE analysis of innovation pathways, key barriers and enablers for putting innovation in place, etc.).

The development and validation of the conceptual model through the SIA fitted well with the actual modelling methodology applied in the manner in which complementarity analytical, simulation and planning elements are combined:

- Analytical: data collection, sectors identification, diagnosis of water scarcity, baseline setting;
- Simulation: climate / hydro climate modelling enables creation of projections that help understand / forecast availability of water in the region and the observed sectors;
- Planning: identification of endangered sectors, selection of priorities, fair allocation and operation regime, ranking and scheduling of adaptation strategies, for a long term management of water resources in a climate resilient manner

The hydro - climate modelling applied in CS4 is based on a seven - step methodology:

1. Setting the baseline – ANALYTICAL PART
2. Development of hydro – climate projections up to the projecting horizon - SIMULATION PART
3. Water balance projections of the two lakes,
4. Socio – economic projections (GDP, population growth) that impact water consumption,
5. Water consumption projection per social and economy sectors
6. Energy production projection in the HPPs

7. Identification, ranking and selection of adaptiveness strategies of water use across sectors – PLANNING PART

The selection of initial modelling parameters, as well as the analysis of interim results of the model run, have been communicated with the stakeholders and their suggestions and comments taken in consideration on further modelling activities and improvements.

Case Study 5

In the framework of CS5, work is being carried out on the development of two different models. The first model is hydrogeological in nature and seeks to elucidate the circulation patterns of groundwater within the island aquifer system. The objective of this model is to identify the conditions of water recharge and discharge, as well as the lithological and geometric characteristics of the aquifer. Furthermore, the behaviour of the hydrogeological system is analysed, including flow directions, hydraulic gradients, transmissivity of the rocks and the storage coefficient, among other factors. This model is aimed at ascertaining the proportion of infiltrated water that is converted into recharge and to evaluate the potential variability of this recharge in the future, due to reductions in natural precipitation resulting from climate change.

The second model is concerned with the study of sea level rise and its potential impact on the islands, with particular reference to the future scenarios proposed by the IPCC. The objective of this model is to simulate the behaviour of sea level and its effect on the territory, paying special attention to the impact on existing infrastructures and the local population. It should be noted that the majority of the local population is located in coastal areas.

The two models are analytical and mathematical, integrated within a Strategic Response System that employs Dynamical Systems and Qualitative Forecasting techniques. Furthermore, a Living Lab has been conducted, in which the opinions of pertinent stakeholders in both domains have been gathered, thereby further enhancing the development and implementation of these models. The integration of these studies will facilitate not only a more comprehensive understanding of the hydrogeological and climatic phenomena affecting El Hierro and La Palma, but also the prediction and mitigation of their prospective impacts on the territory and the population.

It is crucial to consider the interaction between the two models in order to assess the potential impact of sea level rise on the coastal aquifer of the islands, particularly in terms of saline intrusion.

Case Study 6

Case Study 6 (CS6) focuses on the Black Sea region, a unique marine ecosystem under increasing pressure from human activities and the impacts of climate change. The region is characterized by complex interactions between upstream land use and downstream coastal ecosystems, making it highly vulnerable to environmental changes. The study encompasses several critical areas: the Ropotamo River in Bulgaria (CS6-BG), the Danube Delta in Romania (CS6-RO), the SouthWestern Black Sea in Turkey (TR), and the Aliakmon River in Greece (CS6-GR). The primary objective of CS6 is to implement a "from source to sea" approach that integrates land-sea interactions to develop adaptive solutions for climate change mitigation and ecosystem resilience. Through a combination of nature-based solutions (NBS) and advanced environmental intelligence tools, the case study aims to enhance protection against soil erosion, improve flood protection, and promote groundwater replenishment, while ensuring the sustainability of coastal zones.

A conceptual model was developed for CS6 (see section 4.1.6 and Figure 4-7 in D6.2). Each sub-case of CS6 exhibited progress, regarding modelling and data collection, digital twin development (where applicable) and stakeholder engagement, following the path described in the ARSINOE Dynamic Multi-Sectoral Resilience Modelling and Assessment Framework, namely the resilience wheel (see D3.8). Specifically:

CS6_BG - Ropotamo River, Bulgaria: An in-depth spatial analysis of the area is due, providing insights into key ecosystem components and services. Climate projections with a 50-year horizon, (scenarios RCP 4.5 and RCP 8.5) and are being used to assess future climate risks. Building on the completed three working group sessions and having participated in international Living Labs, important advances on stakeholder engagement were recorded. Automated drone monitoring missions, initiated in 2022, are continuously successfully implemented, and a multi-year monitoring program is ongoing. The team also develops a GIS application, now integrating key data like protected area boundaries, land cover, and habitat maps. Ground sensors are installed as planned, further enhancing monitoring capabilities. Future work will focus on fully utilising the GIS application and sensor data to support real-time monitoring and long-term resilience strategies for the Ropotamo Reserve.

CS6_RO – Danube Delta, Romania: The Romanian sub-case is continuously focused on analysing the adaptive capacity of microbiota in the Danube Delta, emphasising on eutrophication caused by alternating drought and heavy rainfall. Using the SSP1-2.6 and SSP3–7.0 climate scenarios, the team employs a multi-tiered approach that integrates Social Impact Assessment (SIA), resilience assessment, and decision-making frameworks. Climate and socio-economic projections are being combined with environmental and biophysical systems modelling, while the Digital Twin Application and innovative farming models for salted soils are being actively used to enhance adaptive strategies. This ongoing work involves focus groups, expert discussions, and the integration of big data to monitor soil microbiota evolution during plant development, drawing insights from the Metaverse. The Living Lab framework supports the co-creation of innovative solutions, while stakeholder engagement continues through questionnaires, interviews, and public debates. Strategic Response Models are guiding planning efforts, with coordination from the Danube Delta Reserve Administration and Tulcea County Council. Models are informed by insights from the environmental and operational system models. Results are actively disseminated, validated through public consultations, and integrated into the decision-making process, supporting the co-creation of solutions with local communities. The unique legal framework of the Danube Delta further facilitates this ongoing, multi-tiered approach to developing strategies that enhance the resilience of this critical ecosystem in the face of climate change.

CS6_TR – South-Western Black Sea, Turkey: The Türkey sub-case focuses on analysing the factors contributing to the degradation of seawater quality, particularly mucilage events, with the aim of sustaining marine biogeochemical cycles. These cycles are critical for maintaining the ecological balance of the seawater, especially in the context of land-sea interactions, climate change, and fisheries. The work is grounded in socio-economic pathways, using scenarios like SSP1-2.6 and SSP3-7.0 to develop future narratives and identify innovation milestones through Living Labs. Climate and socio-economic projections are integrated into the NEMO-TURSEM Coupled Model, which is used to evaluate the impact of climate change and anthropogenic activities on seawater quality. This modelling includes parameters such as wind, temperature, humidity, and river inputs, with simulations assessing sea surface temperature, salinity, currents, and nutrient levels. Through ongoing Living Lab discussions, the team identifies tools, technologies, and policies needed to build resilience against these challenges. Strategic planning is informed by stakeholder engagement, which has led to the development of an Innovation Pathway, ensuring a holistic approach to addressing seawater quality issues. Additional input from other Black Sea case studies is expected to enhance the model and facilitate a basin-wide approach.

CS6_GR – Aliakmon River, Greece: The Greek sub-case focuses on the hydrologic modelling of the Aliakmon River, developing a Digital Twin of the river. The HEC-HMS based hydrological model is ready as a demo and operates in a semi-automatic fashion. Modelling is supported by an optimisation tool to automate calibration and parameter estimation. Historical precipitation data are daily automatically downloaded by ERA5, while topography, soil, land use and other needed parameters and data were obtained by international and local sources. Open-Skiron supplies a week ahead projections of precipitation. ELGO-DEMETER supplies historical data of streamflow and river water level at specific river locations. These data help calibrate the model, while ADMIE online system provides real-time energy production for the hydroelectric dams/plants. These data are converted into discharge values, indirectly providing real-time streamflow data at the outflows of the dams. At this point, the Digital Twin is operational, but further improvements include better prediction of energy production using machine learning rather than statistical methods, as well better prediction of reservoir water elevation/storage. The more accurate definition of the elevation-volume curve of dams will also enhance the model's accuracy and predictions. The integration of low-cost sensors supports the digital twin for calibration and validation, and improves monitoring. The optimal locations for sensor installation have been identified and some of them have already been installed, testing their operation in both normal and extreme conditions. The finalisation of the Digital Twin will render the week-ahead prediction of streamflow and water elevation in key location of the river including reservoirs more accurate, and will give way to the next steps, namely simulation of flood or drought scenarios based on given climate scenarios, as well as the suggestion of water resources management practices to mitigate their impact. The Digital Twin's outputs are refined through ongoing stakeholder discussions, particularly focusing on historical flood events in the region, and used to enhance decision-making around flood mitigation and climate resilience. Living Labs are an essential part of the process, enabling continuous dialogue about land-water interactions, anthropogenic impacts.

Case Study 7

A conceptual model was developed for CS7 in the first reporting period as indicated by Figure 48 in D6.2 (March 2023). A subset of this model was subsequently used to guide the development of a comprehensive resilience assessment of the city of Esbjerg with a focus on floods following the principles of the ARSINOE Dynamic Multi-Sectoral Resilience Modelling and Assessment Framework, that is, the resilience wheel (see D3.8, March 2024).

In general, detailed modelling activities (ongoing and planned) in this case study follow the CS7 resilience wheel outlined in Section 4.7 and Table 4.11 in D3.8 and cover the domain of the CS7 Living Lab. These include processing of regional climate projections corresponding to RCP4.5 and RCP8.5 from CORDEX (EUR-11) and SSP1-2.6 and SSP3-7.0 from the updated ARSINOE climate scenario baseline (D3.5) for temperature, precipitation, and wind; as well as associated sea level rise projections based on the IPCC AR6, and data provided by the Danish Meteorological Institute. Based on these sources, new storm surge modelling (extreme sea level modelling), overland pluvial and coastal flood modelling is carried out for Esbjerg city and port; and drought indicators (Standardised Precipitation-Evapotranspiration Index, SPEI) are calculated for the entire case study area (Danish Wadden Sea area).

Local stream flow, including extreme runoff, and groundwater are not modelled explicitly but retrieved from existing sources and processed accordingly.

The economic risk and cost of floods within the Esbjerg city and port area are modelled quantitatively using the OS2 Damage Cost model developed by the ARSINOE partners from DTU in collaboration with Danish municipalities, while vulnerability in a broader sense is assessed using a vulnerability model developed by partners from the Danish Coastal Authority. Work done on modelling the social vulnerability to flooding in an ongoing PhD study at DTU supplement this.

The remaining parts of the conceptual model (Figure 48; D6.2) originally developed is assessed in a qualitative sense. These include interlinkages with terrestrial and marine ecosystems and biodiversity, water resources and land use.

All the quantitative and qualitative components listed above are soft linked as indicated by the CS7 resilience wheel (D3.8) and provide input to the overall resilience assessment in CS7.

Case Study 8

The models developed in this case study have been guided by the conceptual model. The conceptual model helped with the realisation of the individual models and the associations between the different models when informing the Dynamic Multi-Sectoral Resilience Modelling and Assessment Framework (DMRM&AF).

The IPCC SSP1-2.6 and SSP3-7.0 climate and socio-economic projection scenario modelling has been used across the case studies to provide climate change predictions to influence the following models.

The CAFlood Model utilises UK LiDAR, EA, Torbay, and Met office data and experimental scenarios to contribute to the understanding of environmental dynamics and hazard patterns. The model outputs inform the following four human and operational systems models:

- RA (Resource allocation) model simulates resource allocation sharing amongst multiple sectors of emergency responders. Existing historic flood information, and the outputs from the CAFlood and traffic model results are used to inform the RA model.
- The traffic simulation model, an Agent Based Model (ABM) uses the SUMO software to assess potential disruptions to traffic flows. OpenStreetMap road network data, traffic count data and the flood data are used in this model.
- Cascading failure engine (Artificial Neural networks) uses secondary data and the flood model/traffic flow model outputs to analyse the domino effects potentially occurring to critical infrastructure following flood events.
- The flood impact assessment model (CORFU) uses critical infrastructure and building use from the DEFRA national receptor database and utilises GIS modelling tools.

The visualisation and dissemination through serious game is yet to be completed. The decision-making element of the model is yet to be fully utilised as the visualisation dashboard is still in development. The discrete event simulation modelling is still in development.

Case Study 9

The modelling activities involved collecting data from satellite imagery, soil moisture sensors, and meteorological stations to calibrate the AquaCrop model for evaluating crop production. This data was processed to analyse the effects of different irrigation strategies, comparing experimental approaches to a reference rainfed situation.

The analysis for the field experiment of the 2022-2023 crop season showed that transitioning to irrigated conditions significantly impacts crop yields. However, the differences in yield between varying levels of irrigation (50% vs. 100%) were minimal, suggesting that emergency irrigation could be reduced, leading to potential water and energy savings. In addition, the minimal differences in yield between full and reduced irrigation can be likely attributed to a good rainfall supply during the grain filling period.

Energy demand assessments indicated that the majority of energy expenditure was associated with fuel for agricultural machinery and fertilizer production, while irrigation energy costs remained modest. To address the increased energy demands of irrigation, the study evaluated the potential for photovoltaic systems to offset these costs. While awaiting the scenario data that will be used in common with all case

studies, another modelling study has been initiated always using AquaCrop to model wheat yields across all the wheat cultivated areas in Sardinia. This simulation aims to evaluate different scenarios of water resource use and assess the potential future irrigation needs for wheat cultivation on a regional scale.

4.2 Modelling and Data Collection progress

Case Study 1

The following Table shows the partners involved in activities related to WP3/modelling and their role.

Table 6: List of CS1 partners involved in activities related to WP3/modelling and their role.

Partner	Abbreviation	Role
Natural Environment and Climate Change Agency	NECCA	Actions related to the Greek version of the Citizen Observatory – MINKA (translation of website in Greek, alignment of the Greek translation of the User Guide and the mobile app to the content of the website).
Institute of Marine Sciences – Spanish National Research Council	ICM-CSIC	Development of the Citizen Observatory MINKA. Development of a specific engagement strategy to recruit and retain volunteers in MINKA (Janus Engagement Framework). Creation of training materials such as user guides, leaflets, step-by-step infographics about how to use MINKA, etc.
Institute of Communications and Computers Systems	ICCS	Development of an open and interoperable Knowledge Management framework for Climate Change Vulnerability Assessment based on the SustainGraph knowledge graph. The framework produces vulnerability indexes at European country level, NUTS2, NUTS3, city and FUA. Indicative results have been presented in the frame of the CS1, while regional data of CS4 and CS6 are currently under integration.
University of Thessaly	UTH	Risk Assessment including the simulation of all relevant attributes that constitute the risk parameters, such as the hazard of heatwaves, air pollution, and biodiversity loss, the vulnerability, i.e. the Heat Vulnerability Index, exposure, i.e. population density, and capacities i.e. green infrastructure.
ATHENA Research Center	ARC	The Virtual Reality model built for conducting the choice experiments, but also for educational/training purposes.
University of Exeter	UNEXE	The dashboard and ABM modelling tools are translating the Risk equations for long term and short term adaptation responses into decision support tools.

Citizens' Accessibility to Green Urban Areas (15-minutes city concept)

The model aims at measuring how conveniently located green urban areas are for the citizens of Athens. The model calculates the surface area of green and blue urban areas (setting various thresholds) within a walking distance of 5 to 15 minutes and the number of citizens with no access to green and blue urban areas. In this way, the proximity of green and blue urban areas for Athens is assessed along with the percentage of people living in Athens with no accessibility to green urban areas. The spatial analysis is performed using ESRI ArcGIS tool, including the toolbox Network Analyst, and scripted using Python language and the ArcPy library for ArcGIS. An impression of a resulting network analysis is provided in Figure 25.

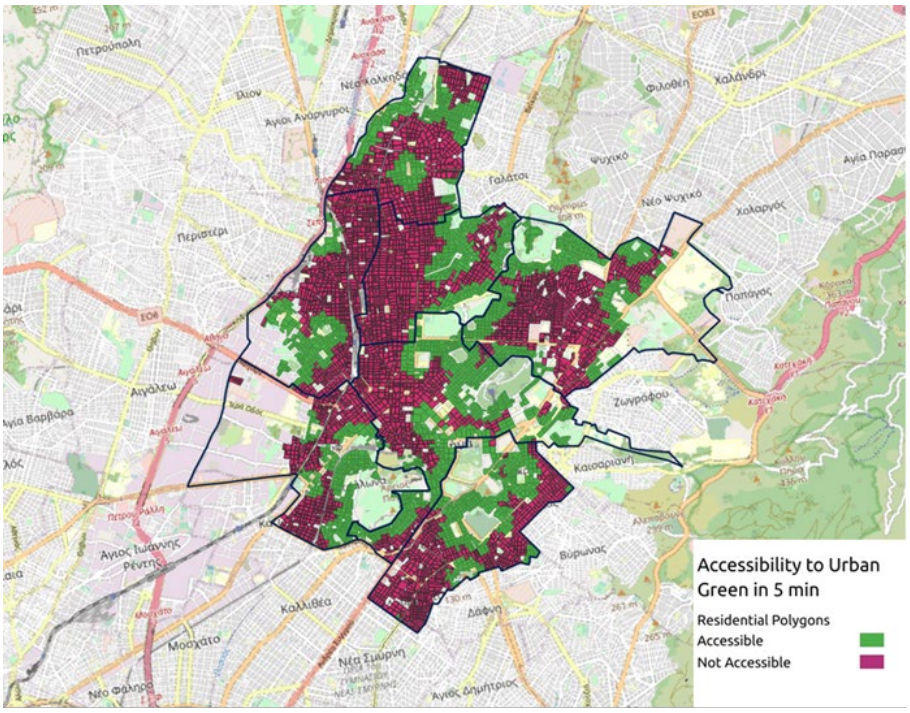

Figure 25: An example of the network analysis depicting the accessibility of residential polygons of the city of Athens to Green Urban Areas larger than 1 ha, within a distance of 5 minutes.

Data collection

Table 7: Model input used for CS1 Citizen's Accessibility to Green Urban Areas.

Model input parameter(s)	Source	Resolution
Green Urban Areas	Urban Atlas class code 1.4.1, 3.1 (Urban Atlas 2018)	50 m
Blue Urban Areas	Urban Atlas class code 5 (Urban Atlas 2018) and Fountains datasets (Athens Geoportal website)	50 m and points (vector dataset), respectively
Urban Areas Residential Polygons	Urban Atlas class code 1.1 (Urban Atlas 2018)	50 m
Road network	OpenStreetMap (OSM)	Polyline (vector dataset)

Connectivity of Green Urban Areas – Landscape fragmentation

The model evaluates landscape fragmentation of the study area by measuring the connectivity of green and protected areas in the city of Athens. The model is a GIS-based toolbox, named GuidosToolbox (Graphical User Interface for the Description of image Objects and their Shapes - GTB) with a wide variety of generic raster image processing routines, including related free software such as GDAL (to process geospatial data and to export them as raster image overlays in Google Earth), and FWTools (pre/postprocess and visualize any raster or vector data). The GuidosToolbox Workbench (GWB) contains the most popular image analysis modules set up as command-line-only scripts for automated mass-processing on Linux 64bit servers. The model is performed using ESRI ArcGIS tool. Though landscape fragmentation in the city of Athens is high, bridges and core areas are identified that could play a prime role in restoration, preservation or improvement urban greenery actions, under the frame of green planning and related interventions.

Data collection

Table 8: Model input used for the CS1 model for Connectivity of Green Urban Areas.

Model input parameter(s)	Source	Resolution
Protected Areas of the Natura 2000 network	Geodata.gov.gr	Minimum mapping unit (MMU): 0.5 ha
Habitats and species of Protected Areas	EEA	Tabular data
NDVI	ESA's SNAP	Sentinel 2 satellite image

Microclimatic model (WRF) validation of land use interventions and NbS solutions

Through a hotspot identification method (Figure 26 - left) the prioritisation of sites with the worst conditions within the Athens Municipality Area (AMA) in relation to urban heat and air pollution, as well as the lack of Green Urban Areas and socio-economic vulnerability levels, were determined. A detailed

evaluation and quantification of the above parameters provides the necessary input framework to determine multi-hazard hotspots at the city-scale. Microclimatic simulations were carried out to assess present climatic conditions and then compare them with the modelled (WRF urban model) impact of the proposed interventions (Figure 26 - right).

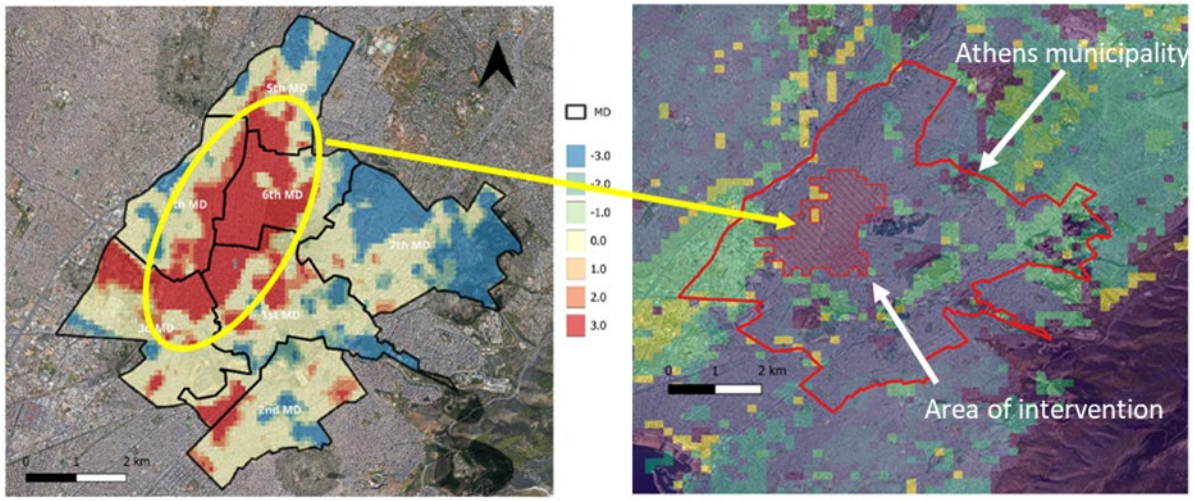

Figure 26: Hotspot mapping and Getis-Ord (Gi*) indicator results for the 7 Municipal Districts of Athens (left). Area of intervention considered by WRF_urban model, model domain grid cells with dimensions of 200m by 200m and borders of the Athens municipality (right).

As a first step, validation of model results was carried out against available observations for the period of simulations, provided by NOA. Comparison of modelled and observed data show that the WRF microclimatic runs perform well and capture the diurnal variability and range of basic variables that characterize a typical summer day in AMA.

Urban surface scenarios are designed based on the local characteristics of the selected hotspots within AMA and take into account the urban modelling capabilities/limitations of WRF in simulating the actual urban morphology and potential interventions over its impervious surfaces (idealized urban canyons, buildings, streets, open-spaces etc.). In the table below, **short descriptions of mitigation technologies and NbS scenarios** simulated by the model to assess potential alleviation of urban heat during the warm period of the year, are given.

Table 9: CS1 short descriptions of mitigation technologies and NbS scenarios.

NbS and adaptation scenarios	Short description	Source of data
A. CR_CS - **Cool roof & Cool Streets**	**UHI mitigation scenario** based on changes in roof surface albedo (higher reflectivity) and thermo-radiative properties of pavements and roads. **Note**: Results show the simulated potential reduction of Land **Surface Temperature** (LST) and **Air temperature** at 2m (T2) during morning/afternoon hours, for typical summer day conditions in Athens.	WRF urban microclimatic simulations (ARSINOE)
B. GR_UG - **Green Roof and Urban greening (NbS)**	**Nature Based Solution (NBS) scenario** based on green roof installations and increased urban green fraction of open spaces. **Note:** Results show the simulated potential reduction of Land **Surface Temperature** (LST) and **Air temperature** at 2m (T2) during morning hours, for typical summer day conditions in Athens. During afternoon hours, no significant cooling effect was simulated.	WRF urban microclimatic simulations (ARSINOE)
C. GR_TREES - **Green Roofs and urban TREES (NbS)**	**Nature Based Solution (NBS) scenario based on green roof** installations and increased urban green fraction of open spaces by replacing low green vegetation with **shade trees**. **Note**: Results show the simulated potential reduction of **Air Temperature of tree canopy** (TAH) during morning/afternoon hours, for typical summer day conditions in Athens.	WRF urban microclimatic simulations (ARSINOE)

Simulation results from the applied NbS and intervention scenarios were analysed, focusing on differences between each scenario (A, B & C) and model results of actual conditions (control run) representing a typical summer day (warm period mean climatic conditions) in the city of Athens.

All three scenarios simulated potential cooling of different intensity and gave helpful insight into the type of interventions that can reduce heat stress. In Figure 27, results from NbS scenario C (GR_TREES - **Green Roofs and urban TREES**) showed the most promising cooling potential at pedestrian level. Specifically, model results show a morning cooling potential in **TAH** (Tree canopy temperature TAH: air temperature at pedestrian height, between ground and tree crown). between **8.00 and 14.00 Local Time** of up to **-3.3** degrees Celsius with a maximum absolute cooling intensity per grid point (200x200m) equal to **-7** °C at **12.00**. During afternoon hours, a predicted cooling potential in **TAH** between **15.00 and 20.00** of up to **-2.0** °C with a maximum absolute cooling intensity per grid point (200x200m) equal to **-4** °C at **16.00**. Therefore, a cooling potential over a total of **11 hours** (mean daylight duration during summer period is

13 h) for a typical summer day due to green roof implementation and road/pavement/open spaces greening with tall shade trees instead of low vegetation, is simulated.

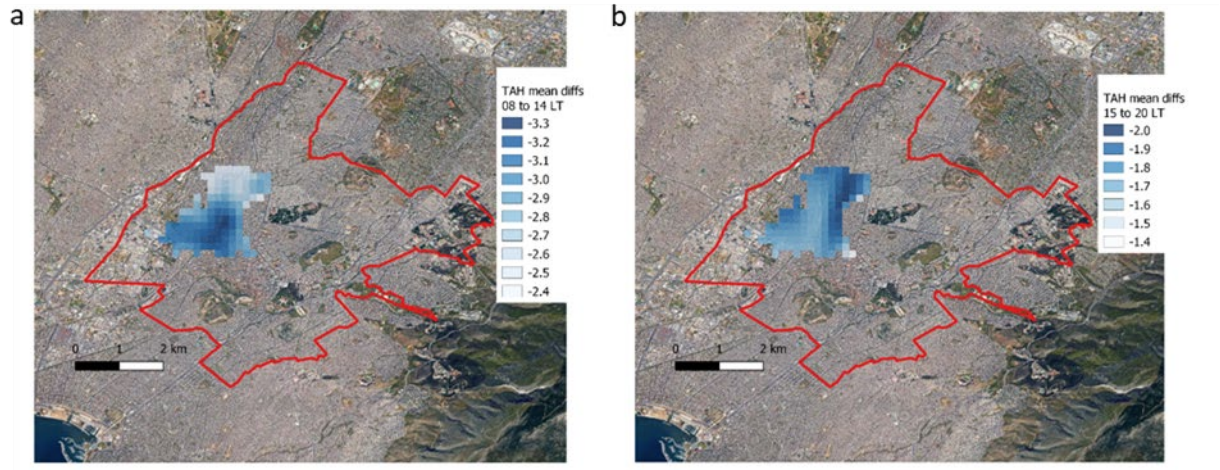

Figure 27: Mean differences between scenario C-(minus)-control microclimatic simulations of tree canopy temperature results TAH (see Figure 10) for morning hours (a) and afternoon hours (b).

A the same time, scenario A (CR_CS - **Cool roof & Cool Streets)** results (not shown) predicted a significant decrease in land surface temperature (e.g., road surfaces, pavements, rooftops) which can benefit the energy efficiency of buildings and indoor and outdoor ambient temperatures during summer days. This, can lead to the assumption that a combination of interventions could also be considered to achieve cooler and energy-efficient cities that are under heat stress.

MINKA Citizen Science Observatory

MINKA is a participatory Citizen Observatory developed by ICM-CSIC and that enables citizens to contribute to biodiversity and environmental monitoring. It facilitates the collection and validation of geolocated observations, such as species identification and environmental data (e.g., temperature), through its web platform and mobile app. MINKA promotes community engagement, collaborative intelligence, and supports the Sustainable Development Goals (SDGs) by involving users in real-time environmental data collection and fostering shared knowledge for research and policy development.

MINKA offers two main interfaces: the web platform and the mobile app. Each version is tailored to different user needs while ensuring that all essential functionalities are available.

- **Web Platform**: The MINKA web platform provides a complete toolkit for users, including features for creating and managing projects, exploring observations, validating data, and interacting with the community. The platform supports multiple languages, including English, Greek, Catalan, Spanish, and others, making it accessible to diverse user groups across Europe. The web platform is also where more complex features, such as advanced project management, are available.
- **Mobile App**: The MINKA mobile app is optimized for users who prefer to engage with the platform on the go. While simplified compared to the web platform, the app allows users to upload geolocated biodiversity and environmental observations directly from their smartphones.

The mobile app prioritizes ease of use, with a streamlined interface designed for quick data capture in the field.

Originally focused on biodiversity observations, MINKA is evolving to include environmental variables, such as air temperature. This expansion will allow users to report a broader range of data, enriching the platform's capabilities for environmental monitoring. This integration was made possible through the ARSINOE project and the collaboration with the ANERIS project, which introduced new environmental parameters into MINKA. The inclusion of environmental data required significant backend enhancements to handle the new types of observations. The MINKA platform will support both biodiversity and environmental observations within the same interface, allowing users to contribute comprehensive environmental data alongside species identification. The environmental observation component is currently at **TRL 6**, it has been demonstrated in relevant environments but still requires further real-world validation. Beta testing for environmental observations is planned for October-December 2024 in Case Study 8 Torbay and Devon Country, which will help move this component towards full operational use.

New technical developments and enhancements in MINKA

ICM-CSIC is currently working in the integration of **Artificial Intelligence (AI)** for species identification. AI algorithms, such as those used in the Pl@ntNet platform, will enable automated identification of species based on images uploaded by users. This will not only enhance the accuracy and speed of species recognition but also help reduce the validation burden on the community and experts. This enhancement is expected to be implemented in early 2025.

Security and data privacy are critical considerations in the development of MINKA. The platform adheres to stringent data protection protocols, including the **General Data Protection Regulation (GDPR)**, to ensure user information is handled securely. The platform uses encrypted communications, secure authentication methods, and strict user consent protocols. Additionally, MINKA now provides various data licensing options, allowing users to choose how their contributions are shared and used, thereby ensuring transparency and trust within the community.

ICM-CSIC is currently working in the User Experience (UX) improvements of MINKA. Efforts are focused on defining the user interface and experience based on user feedback, particularly for the integration of environmental variables, integration of AI and increasing engagement.

ICM-CSIC plans to further develop MINKA and its technology in several key areas:

- **Transition to Cost-effective Mapping Solutions**: MINKA intends to replace the Google Maps API with a more affordable alternative, ensuring long-term sustainability. Deadline: December 2024.
- **Enhanced Offline Capabilities**: MINKA aims to improve its offline functionality, particularly in the mobile app, allowing users to capture data in remote areas without internet access and sync it once connected. Deadline: TBC.

Climate Change Vulnerability Assessment Framework

The Climate Change Vulnerability Assessment framework supports indicator-based approaches for assessing vulnerability across various temporal and spatial scales. The vulnerability analyses supported refer both to hazard dependent and hazard independent approaches, that express vulnerability of areas and population through a final composite index.

The hazard independent vulnerability is associated with the susceptibility of regions and communities, when exposed to hazards and extreme conditions, due to their inherent characteristics. These

characteristics are considered across a broad spectrum of social, political, economic and environmental dimensions, as proposed by the European wide vulnerability framework (Eklund et al., 2023) of the Joint Research Center. Indicators, that are representative of each dimension , are aggregated to a final index that encompasses the hazard independent vulnerability status of each area. This index is calculated for the years 2010 to 2013 for all the 27 Members Stated of the European Union across 5 administrative levels: the Country level, the NUTS 2, urban and rural NUTS 3 areas, Cities and Functional Urban Areas (FUA). The index calculated for each area, is a cross-scale index, that considers the vulnerability indicators of lower and higher hierarchy administrative levels (see Deliverable 3.3). An example of the hazard independent vulnerability index displayed for one dimension (social) is given in Figure 28.

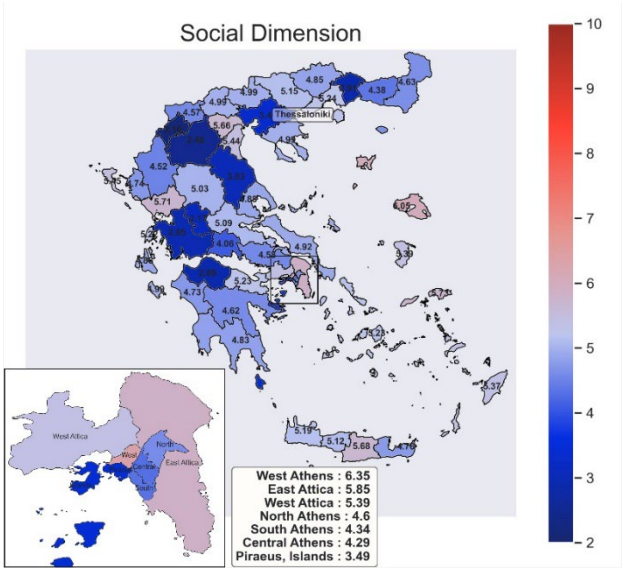

Figure 28: Hazard independent vulnerability index at NUTS 3 level in Greece - Social Dimension.

The hazard dependent vulnerability assessment conducted focuses on the socio-economic vulnerability to extreme heat events (Ziliaskopoulos et al, 2024). The vulnerability study entails selecting and training a model on socio-economic vulnerability indicators at a low administrative level—specifically, the NUTS 3 regions, as presented in detail in Deliverable 3.3. The model's feature importance values are then used to formulate a weighted average composite index, known as the Socio-Economic Heat Vulnerability Index (SHVI). The analysis performed was focused on the region of Attica , and the SHVI was calculated for the Postal Codes in this area (Figure 29).

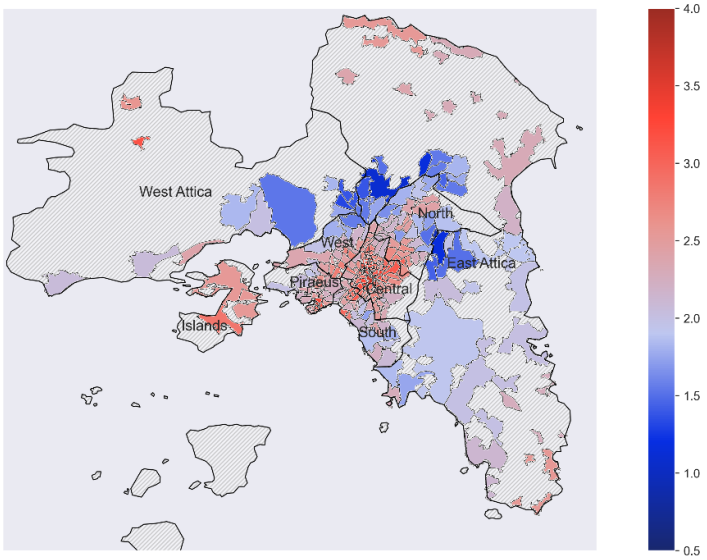

Figure 29: Socio-Economic Heat Vulnerability Index for Postal Codes in the Attica Region – Greece.

Data collection

Table 10: Model input used for the Climate Change Vulnerability Assessment Framework.

Data Layers	Short description	Source of data
Land Surface Temperature	**Land Surface Temperature (LST)**: Mean distribution of summer land surface temperature (Celsius) for the months June, July and August from years 2018-2023	Satellite observations (Landsat – several missions) with a spatial resolution of 100m.
Heat	**Heat**: Refers to the Heat Index (CHT), climatic Index of average number of combined hot days (T > 35 °C) and tropical nights (T > 20 °C) at a spatial resolution of 1km.	1 km x 1 km high resolution daily gridded dataset, covering the period 1981-2000 (Varotsos et al., 2023, https://doi.org/10.1007/s00382-022-06482-z)
Air Quality	**Air Quality**: Refers to the Air Quality Index (AQI), number of hours when the values of European AQI reflect moderate or worse urban air quality conditions (AQI >= 3), for June 2019.	City-scale chemistry transport model (CTM), EPISODE-CityChem (Karl et al., 2019, https://doi.org/10.5194/gmd-12-3357-2019)
Trees	**Trees:** Density of trees per 1000 square meters, at a spatial resolution of 100m.	Provided by Athens Municipality

Habitats for urban biodiversity	**Habitats for urban biodiversity**: Urban nature typology, where each number corresponds to a categorized cluster: 0: Dense urban fabric, 1: Urban Arterial, 2: Low-residential, 3: Urban Green.	Ziliaskopoulos, K., Laspidou, C. Using remote-sensing and citizen-science data to assess urban biodiversity for sustainable cityscapes: the case study of Athens, Greece. Landsc Ecol 39, 9 (2024). https://doi.org/10.1007/s10980-024-01793-4
Vulnerability	**Socioeconomic Heat Vulnerability Index (SHVI):** Combined index of vulnerability indices	Ziliaskopoulos, K.; Petropoulos, C.; Laspidou, C. Quantifying and Mapping Vulnerability to Extreme Heat Using Socio-Economic Factors at the National, Regional and Local Level. Preprints 2024, 2024060830. https://doi.org/10.20944/preprints202406.0830.v1
Accesibility to Green	**Accesibility to Green**: Accessibility of residential polygons of the city of Athens to Green Urban Areas larger than 5 ha, within a distance of 5 minutes (300m).	QGIS model: Network analysis of Urban Atlas (Copernicus) layers and Open street map (OSM) data.
Risk	**Risk**: Normalized combined hot spot risk map from climatic, land surface temperature, air-quality, accessibility and vulnerability layers.	ARSINOE modelling framework – Hot spot identification
Population	**Population**: Density of population, people per 1000 square meters	GHSL—Global Human Settlement Layer—Population Grid 2020https://doi.org/10.2905/2FF68A52-5B5B4A22-8F40-C41DA8332CFE

Case Study 2

The following Table shows the partners involved in activities related to WP3/modelling and their role.

Table 11: List of CS2 partners involved in activities related to WP3/modelling and their role.

Partner	Abbreviation	Role
Athens University of Economics and Business	AUEB	Vulnerability Assessment, Modelling, SDG Mapping
Fundación Valencia port	FV	Vulnerability Assessment, Modelling, SDG Mapping
Piraeus Port Authority	PPA	SDG Mapping
Cyprus University of Technology	CUT	SDG Mapping

Overall, Case Study 2 implements a methodology aimed at identifying and assessing the potential adverse impacts of climate change on port infrastructure and operations for the Mediterranean ports of Piraeus and Cyprus (Limassol). the following steps of the methodology, also presented as a flow chart in Figure 30, have been completed to date:

Step 1 – Input data: The selection and preparation of input data, including geomorphological information (e.g., bathymetry, breakwaters), offshore wave characteristics, and sea level rise data, have been completed and statistically analysed. Specifically:

- Bathymetric data were gathered from marine surveys and supplemented offshore using nautical chart data.
- Metocean conditions offshore each port:
    - Wave characteristics from the Copernicus Climate Data Store for the historical period (1976-2005) and two RCP scenarios for the period 2041-2100 (RCP-4.5 and RCP-8.5).
    - Sea Level Rise Projection Data from NASA for two Socioeconomic Pathways (SSP2-4.5 and SSP5-8.5).

Step 2 – Wave Model Setup: The data utilised used as input for the numerical simulations include:

- Selection of offshore sea-state wave scenarios representing mean annual conditions for the incident wave directions that affect the port basins for the historical wave climate and RCP scenarios (considering both the absence and presence of predicted sea level rise).
- Construction of the bathymetric grid based on the bathymetric data, with the port infrastructure and the adjacent shorelines acting as solid boundaries, assigned with the appropriate reflection coefficients.
- Wave propagation simulation until steady-state is reached.

Step 3 – Numerical Simulations: The numerical wave model Maris HMS is implemented for the simulation of wave propagation and penetration inside the port basins. Numerical simulations have been completed for Medit. Port 1 - Piraeus LL (Figure 31), with the majority of simulations also finalized for Medit. Port 3 - Cyprus LL (Figure 32).

Step 4 – Berth Downtime: After simulating wave scenarios for both the historical wave climate and those incorporating climate change projections, the results are post-processed as follows:

- The significant wave heights are extracted at specific inspection areas inside the port basins (coinciding with berthing positions) and are compared with acceptable tolerance limits.
- Subsequently, the total annual downtime for each inspection area was determined based on the frequency of occurrence of each simulated sea-state.
- The annual berth downtimes for the historical period and for the two periods incorporating climate change projections are intercompared to assess if climate change affects port agitation.

The above analyses have been completed for the passenger port of Piraeus.

For the next steps, annual berth downtime will be estimated for the container port of Piraeus and the port of Limassol. Additionally, the impact of potential flooding due to wave overtopping caused by sea level rise will be investigated in both the passenger & the container port of Piraeus as well as the port of Limassol. These actions will be carried out and completed within the project timeline (months 36-42), with the post-processing of the numerical results to estimate annual berth downtimes expected to last 2 months, while the estimation of flooding due to wave overtopping is expected to last 4 months.

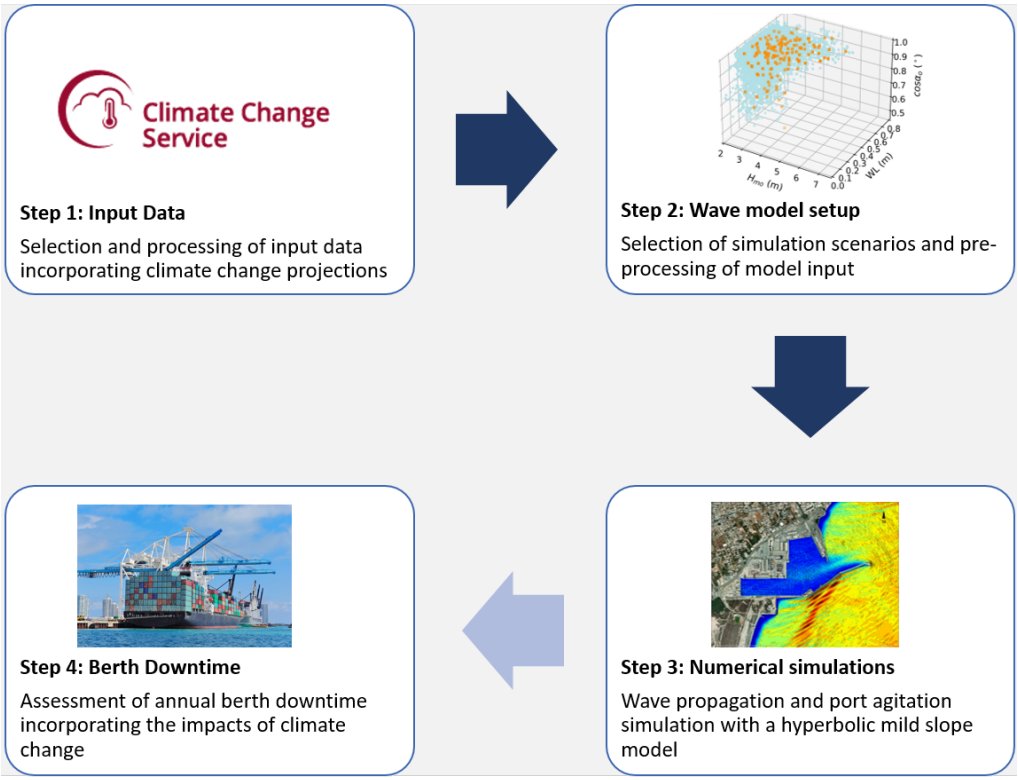

Figure 30: Steps of the implemented methodology.

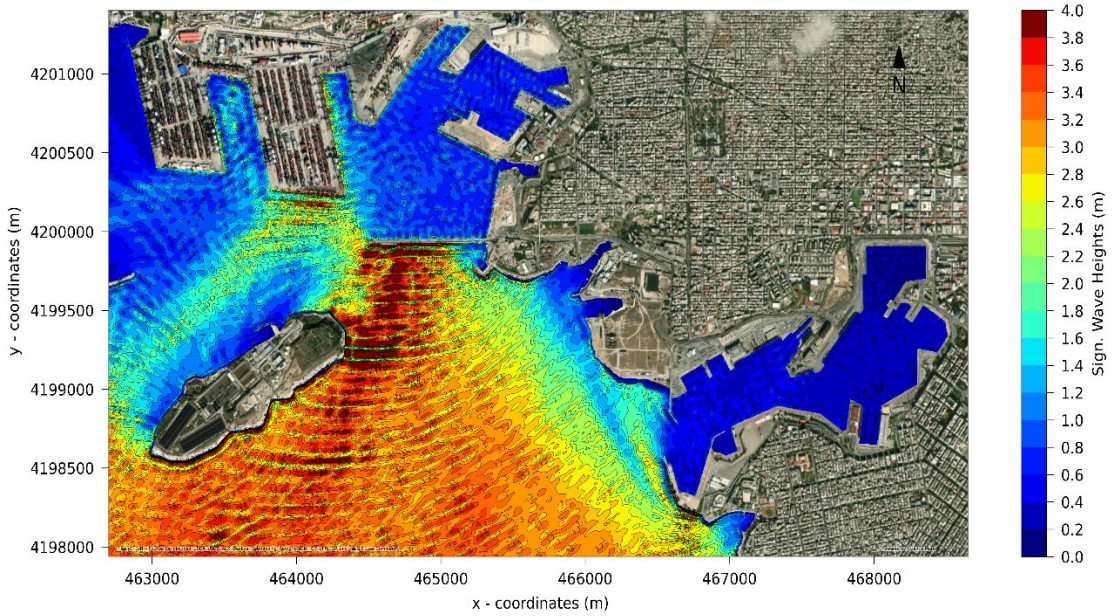

Figure 31: Spatial distribution of significant wave heights for incident wave characteristics: Hs=3.19m, Tp=9.68s, MWaveDir= SSE (147oN), Sea Level Rise = +0.30m (RCP4.5 for 2071-2100) modelled for Mediterranean port of Piraeus.

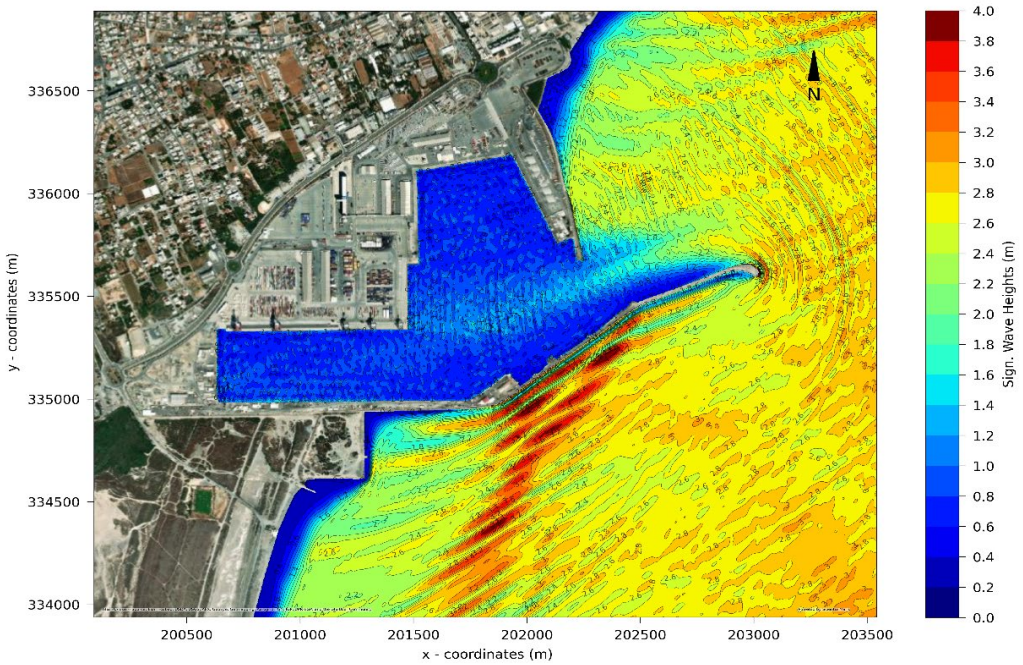

Figure 32: Spatial distribution of significant wave heights for incoming wave characteristics: H_s=3.05m, T_p=7.67s, MWaveDir= E (81°N), Sea Level Rise = +0.62m (RCP8.5 for 2071-2100) modelled for Mediterranean port Cyprus (Limassol).

Case Study 3

The following Table shows the partners involved in activities related to WP3/modelling and their role.

Table 12: List of CS3 partners involved in activities related to WP3/modelling and their role.

Partner	Abbreviation	Role
Ludwig-Maximilians-Universität München	LMU	CS-Lead
Verband kommunaler Unternehmen e.V.	VKU	CS-Partner
Danish Technical University	DTU	WP3-Leader

The main model to analyse the water availability under current and future climate conditions is the physically based and spatially distributed hydrological model WaSiM. This model not only delivers simulated river discharge at specified gauges, but also delivers gridded spatial outputs that can be used to assess changes in the different storage components of the water balance as well as the physical states during extreme dry or wet conditions. Examples of outputs are:

- Evapotranspiration (based on Penman-Monteith)
- Soil moisture in the root zone and the full soil column
- Snow storage
- Groundwater depth
- Groundwater recharge

Low Flow conditions under current and future climate for a selected catchment in the Main River Basin (Itz at gauge Schenkenau) were recently analysed in a Master Thesis. Belonging to an unbalanced pluvial regime, the catchment shows an intensification of the annual (summer) low flow, governed mostly by a reduction of summer precipitation and intensification of evapotranspiration due to strong temperature increases. Single periods of low flow during the warm half of the year, defined as discharge below a certain threshold, are projected to occur more frequently and become more intense under future conditions (end of century, RCP8.5). Due to precipitation increases during the winter half year but less snowfall (i.e., less precipitation storage), low flow trends are more complex in months Nov-May. This master thesis served as a pilot to set up various analysis pipelines for low flow in the Main River Basin and the remainder of Bavaria/Germany. Similar low flow trends are expected in the full CS3 region.

On the full Main River catchment scale, hydrological simulations are currently prepared and performed. For now, the work focuses on bias-adjusting and statistically downscaling the meteorological climate model projections serving as inputs to WaSiM. Hydrological simulations, including holistic land use/land management scenarios, as well as the analysis of climate drivers and low flow results are scheduled to be completed before M44 (see also planned activities section).

Another pilot addressed the simulation of irrigation in a selected catchment in the Main River Basin (Wern at gauge Sachsenheim). It is situated in one of the “focus regions on irrigation” (Schwerpunktregionen landwirtschaftliche Bewässerung) investigated by the Bavarian Environmental Agency (Landesamt für Umwelt, LfU). This Master Thesis focused on conceptual irrigation scenarios (based on crop types representing “worthiness of irrigation” and evapotranspiration ratios representing “need of irrigation”) and tested the implementation of the WaSiM irrigation module. General trends showed increasing irrigation needs owing to changing climate conditions, but also less available water (discharge, groundwater) favouring a stronger potential for water use conflicts in the region. A recently started Master Thesis will now address hydrological responses to irrigation under two more realistic and holistic land use/land management scenarios. Owing to the limited amount of officially available data on irrigation in the region, the studies face(d) several challenges related to evaluating scenario assumptions, module configuration, and results.

Data collection

Table 13: Model input used for hydrological modelling.

Model input parameter(s)	Source	Resolution
Meteorological drivers (temperature, precipitation, shortwave radiation, wind speed, relative humidity)	Observation-based data (Sub Daily Climate Reference SDCLIREF); regional climate model data (CRCM5-LE) for projections	500 m
Digital elevation model (DEM)	European Environment Agency (2013): Digital Elevation Model over Europe (EU-DEM)	1' (~ 25 m), regridded to 500 m
Land use information (both basic and following two land use/land management scenarios)	European Environment Agency (2013): Corine Land Cover 2006 v17 (CLC)	100 m, regridded to 500 m
Soil	Panagos, P. (2006): European Soil Database v2.0 (ESDB)	1:1,000,000, regridded to 500 m
Hydrogeology	Hydrometeorologische Übersichtskarte 200 (HÜK200) v2.5/International Hydrogeological Map of Europe 1:1,500,000 (IHME1500 v1.1) (HÜK200 © BGR & SGD 2011/IHME1500 v1.1 © BGR, Hannover, 2014)	1:200,000/1:1,500,000, regridded to 500 m

In order to stratify high / low flow events, further climatic indicators are calculated and available not only for Bavaria, but for the full ARSINOE region (except Canary Islands and Cyprus).

Table 14: Model input used for conceptual low flow analyses.

Model input parameter(s)	Source	Resolution
Drought indicators (SPI, PNI)	Regional climate model data (CRCM5-LE, Leduc et al. 2019)	12 km (Europe)
Extreme precipitation indicators (e.g., rx1h, rx3h, rx6h, rx12h, rx1d, rx3d, rx5d)	Regional climate model data (CRCM5-LE, Leduc et al. 2019)	12 km (Europe)
Heat indicators (record breaking heat, HWMId)	Regional climate model data (CRCM5-LE, Leduc et al. 2019)	12 km (Europe)

Case Study 4

The following Table shows the partners involved in activities related to WP3/modelling and their role.

Table 15: List of CS4 partners involved in activities related to WP3/modelling and their role.

Partner	Abbreviation	Role
Institute for Research in Environment, Civil Engineering and Energy, North Macedonia	IECE	Leader (data collection, model development and deployment)
Natural Environment and Climate Change Agency, Greece	NECCA	Partner (data collection, following and review of model outputs)
National Territorial Planning Agency	AKPT	Partner (data collection, following and review of model outputs)

CS4 focuses on a long term climate resilient use of water resources in the complex natural ecosystem of the Ohrid and Prespa lakes, considering socio-economic coupled sectors in three neighbouring countries. Actions in the second reporting period included:

1) Completion of collection of data in the observed region;
2) Review of existing studies and plans;
3) Preparation of Baseline and Forecast Scenarios and its presentation in stakeholders workshops;
4) Complex system numerical model adjustment to the observed region needs, software modifications, preparation of databases;
5) Integration of the identified multi sectoral consumption patterns;
6) system modelling and simulation of coupled multi sectors' response in climate risks scenarios;
7) optimization of multi–sector climate adaptiveness.

The integrated water management model across environmental, social and economy sectors. (IWaMM) has been deployed in the Case Study of Ohrid and Prespa lakes. The model estimates a long-term water balance under conditions of climate impacts (affecting both supply and demand side of a hydro system), demographic changes and economic sectors (agriculture, industry, seasonal sectors as tourism) foreseen growth, as well as energy generation (hydropower), while taking in consideration environmental constraints. The following parameters for the modelling were adopted (as reported in D3.7*: Land surface response tools,* March 2024)

- Climate scenarios: RCP 2.6 RCP 8.5, with data downscaled from RCMs, CMIP5 series,
- Socio – economic scenarios coupled with selected climate change scenarios: SSP1, SSP5, respectively,
- Representative climate change indicators: mean monthly sum of precipitations and mean monthly air temperature,
- Time projection horizon: 2100; milestone: 2050,
- Time resolution: mean monthly data,
- Spatial coverage: watershed areas of Ohrid and Prespa Lake in the three countries/

The main outputs achieved by the model first run were:

- Projections of selected climate change indicators (mean monthly sum of precipitations, mean monthly air temperature), for RCP 2.6 and 8.5, in the period 2021 – 2100,
- Water balance results on mean monthly basis, separately for Prespa and for Ohrid Lake (2021 – 2100), for the two selected climate scenarios,
- Lakes' status presented as lake water level on monthly basis, up to the projecting horizon (2100),
- Projections of mean monthly surface water discharge (Crn Drin River) from Ohrid Lake, towards the five HPPs downstream (two in North Macedonia, three in Albania)
- Projections of GDP growth in the region,
- Projections of change of population number for six municipalities in the three countries (2021 – 2100, SSP1 and SSP5).
- Projections of water consumption per explored economy sectors (tourism, agriculture, industry, households)
- Projections of availability of water resources (water quantities, water levels) under selected RCP and SSP scenarios, by 2050 and 2100,

In the second run, the following improvements of registered inconsistency and uncertainty (as reported in D3.10) were applied:

- Variation of the groundwater discharge from Prespa Lake, due to variation of the lake water level
- Variation of the values of the selected climate change indicators (mean monthly sum of precipitations and mean monthly air temperature, in the span of +/- 5% and +/-10%, respectively)
- Variation of the water consumption per sectors (in the span of +/- 15%)
- Variation of forecasts of the economic indicators affecting water consumption.

Findings from the modelling:

The findings from the **first model run**, which was performed in the previous reporting period and that investigated two boundary scenarios including two RCPs and accompanied SSPs, were the following:

1. Both Ohrid and Prespa lakes will be affected by the climate changes,
2. A decrease of the water level can be expected at Prespa Lake, in a more severe way for RCP8.5
3. To maintain the water level of Ohrid Lake, discharge will have to be more limited, which will lead to a decrease of hydro power generation,
4. The most affected sectors will be the environment, agriculture, and energy sectors,
5. Adaption strategies have to be developed in a Water Energy Food Environment nexus approach, using a multi – criteria analysis and decision making approach
6. Cross - sector and transboundary trade – offs will be further explored, leading to consensus based sustainable, long term solutions in the interest of all countries and sectors.
7. This will be applied In the model further runs, for identification and selection of measures for adaptation of the involved sectors, to the forecast water scarcity.
8. Sectoral trade-offs have been identified:
    - between water supply from groundwater sources (households, agriculture), in Prespa lake watershed area,
    - between environment and energy (hydro power generated), at Ohrid Lake watershed
9. No transboundary issues concerning common water use and allocation of water resources have been identified.
10. Likewise, no issues are expected in the future, taking in consideration what has been established by SIA implementation:
    - awareness, concern and shared responsibility of all parties and sectors, as well as a good, consensual cross sectoral long term management plan that allocates priorities of

water use on the principle of not having ability to be replaced by other resources (e.g. biodiversity versus hydro power generation)

The main findings from the **second model run**, including the sensitivity analysis were:

1. **Variation of the groundwater discharge from Prespa Lake, due to variation of the lake water level**
   There were no precise previous measurements that could be used to accurately model the groundwater discharge from Prespa Lake to Ohrid Lake. In order to model this discharge, , the theory elaborated in the LOWMPP (https://www.gwp.org/globalassets/global/gwp-med-files/list-of-programmes/gef-drin-project/drin-docs/lake-ohrid-watershed-management-plan.pdf, figure 4.10, page 58), was used. Using the span of variations of the groundwater discharge from 7 to 13 m^3/s, for the span of elevations in Prespa Lake from 846 to 848.5 meter above sea level it was established that there would be no significant (specifically: less than 5%) variations in the total water balance of Ohrid Lake on annual basis, due to the impact of varying groundwater inflow from the Prespa lake. The impact of an increase in air temperature, causing increase of evaporation and evapotranspiration, is more significant for the Lake water balance.

2. **Variation of the values of climate change indicators (precipitation and temperature) in the span +/- 10%**
   Variation of the sum of mean monthly precipitations in the range of +/-10% led to results that were not feasible (the water balance would be beyond the physical limits established by the observed data in the past 20 years). Therefore, the range of variation of input data for sum of precipitations, for the needs of the sensitivity analysis, was limited to +/-5%.

   By running the simulation with these values, it was concluded that if the deviations of the input data for precipitations would be within the limits of +5% to -5%, there wouldn't be significant deviations of outputs (represented by available lake water volume and water levels) in the water balance equation for Prespa Lake for the climate scenario RCP2.6 and RCP8.5. The same applied to Lake Ohrid - if the precipitation remains within these limits, the deviations of the outflow from Lake Ohrid would not be meaningful compared to the baseline (no variations of the initially projected data).

   The temperature input directly affects the evaporation and evapotranspiration, but if the error in the temperature input is from +10% to -10% , the deviations of the Prespa lake water, for the two scenarios, RCP2.6 and RCP8.5 will be less than 5%. Potential temperature deviations within the permitted limits will not make a significant difference in the outflow from the Lake Ohrid (less than 6%). Representative outputs from this section of sensitivity analysis are presented on the two figures below.

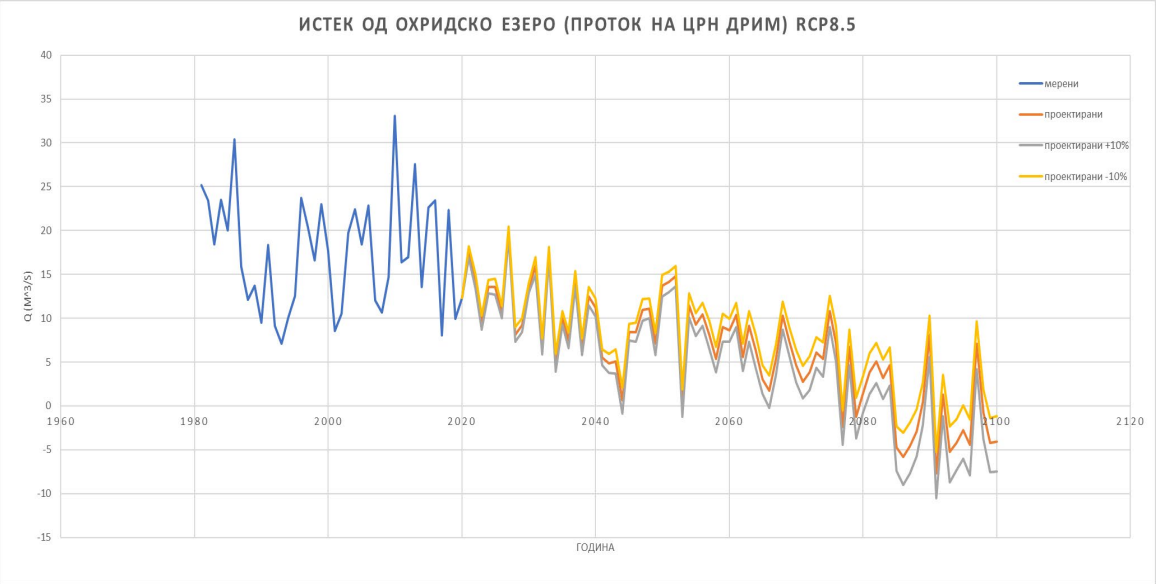

Figure 33: Outflow from Lake Ohrid (river Crn Drim) RCP8.5, impact of variations of input data on air temperature of +/-10% (blue line: measured data; red line: basic downscaled data; yellow line: temperature data decreased by10%; grey line: temperature data increased by 10%).

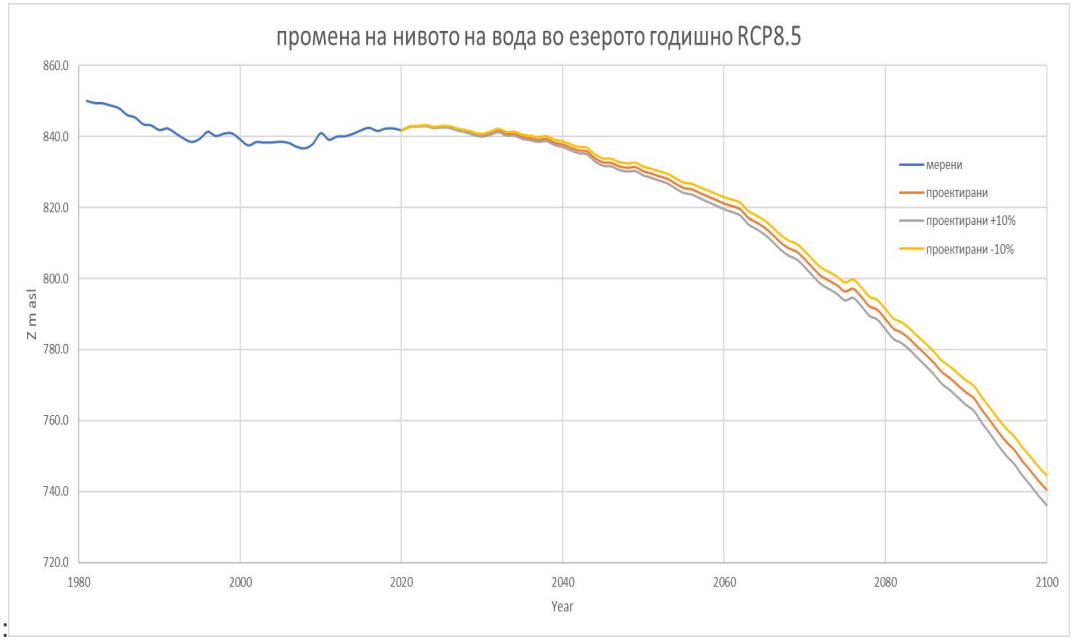

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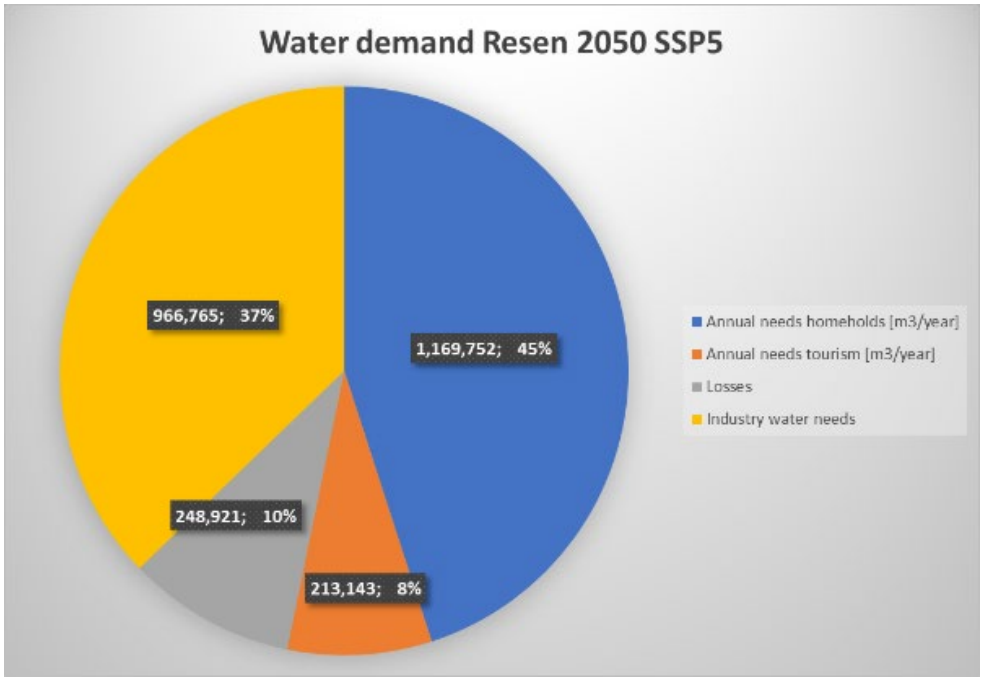
Figure 34: Projection of Prespa Lake water level for RCP8.5 (blue line: measured data; red line: basic downscaled data; yellow line: temperature data decreased by 10%; grey line: temperature data increased by 10%).

3. **Variation of the water consumption per sectors (in the span of +/- 15%)**
The changes of the input data for water consumption by economy sectors presented in relation to the total water balance of the observed watershed area, are of a quite small impact, i.e. their impact is more relevant for the design and evaluation of adaptation measures and as such has been considered. Figure 34 illustrates the simulations of water consumption in the sector tourism, in 2050, for the scenarios with a consumption increase and decrease by 15%.



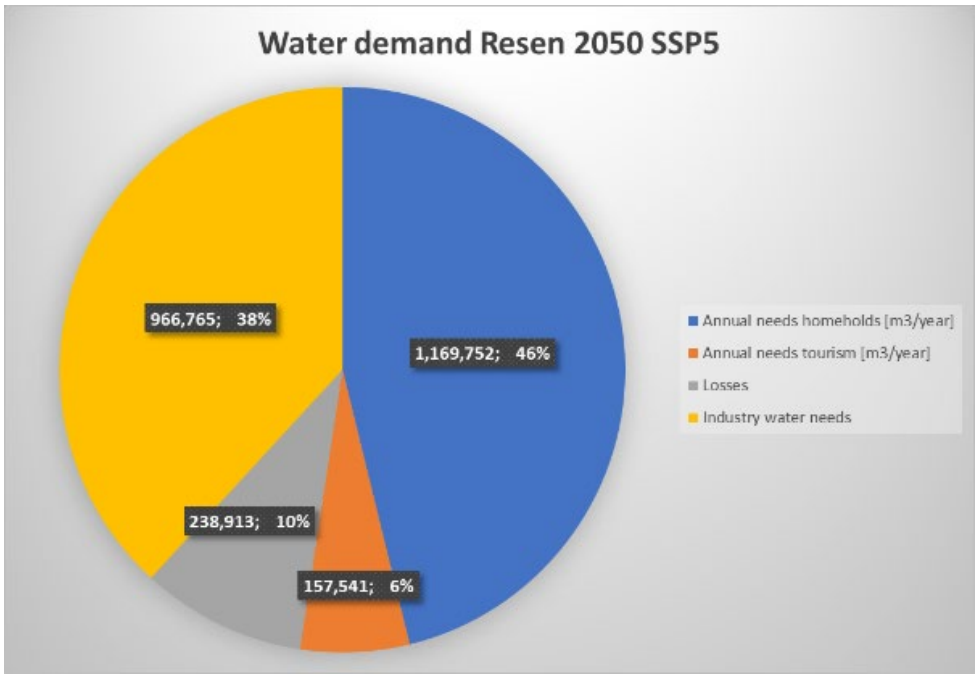


Figure 35: Water demand in Resen in 2050, by the SSP5 scenario, sector tourism water demand increase by 15% (top) and decrease by 15% (bottom).

4. **Variations of forecast of economic indicators affecting water consumption** (change of population number, change of GDP)
   The main finding is that variations of the input data about the population growth and the GDP increase (as selected indicators of economic sectors development), and the corresponding increase in water demand, in the span of +/-15%, in reference to the downscaled values from SSP1 and SSP5 scenarios for the region, affect proportionally the initial total water consumption. The impact of population growth indicator is lower than that of an increase in GDP, since the forecast growth of population in both scenarios reaches a peak value around the mid-century (2050) and then drops (unlike forecast continuous growth until 2100 in GDP). This effect is explained by the limitations of geographical boundaries of the observed region. However, economic indicators 'growth' and consequently 'water demand growth 'still have a low impact on the watershed water balance, remaining below 2% of the total water amounts contributing to the balance. On the other hand, the induced and increasing water demand justifies the need for design of adaptation measures for a more rational and effective use of fresh water by the involved social and economy sectors.

As a part of the Water Allocation module of IWAMM (please refer to the Chapter 3.2.1 *Resilience Wheel Progress* of this report), projections of water consumption (2021 - 2050 - 2100) per economic sector (industry, irrigation, tourism, households) in two municipalities (Resen and Ohrid, selected as the ones with the highest number of population in each watershed) separately, have been carried out, taking In consideration the changes in economy indicators. Thereby, adaptation measures were included, in order to find the optimal alternative for future management plan of water resources of transboundary relevance.

Based on the SIA applied in 3 consecutive sessions, the following groups of adaptation measures (alternatives A1, A2, A3 and A4) have been identified:

- A1: Improved measurement and monitoring of water resources, especially of groundwater
- A2 Improved measurement and monitoring of water consumption
- A3:: Improved (innovative) technologies for effective use of water in sectors
- A4: Improving capacity, awareness, knowledge and skills of stakeholders and water sector actors, for a rational and effective use of water in adapting to water scarcity

Based on the SIA applied in 3 consecutive sessions, the following groups of adaptation measures have been identified:

- Improved measurement and monitoring of water resources, especially of groundwater
- Improved measurement and monitoring of water consumption side
- Improved (innovative) technologies for effective use of water in sectors
- Improving capacity, awareness, knowledge and skills of stakeholders and water sector actors,

For evaluation and ranking, the module of MCDA (Multiple-Criteria Decision Analysis), based on the AHP (Analytical Hierarchy Process) approach, has been applied, as a subroutine of the WA (Water Allocation) module of IWAMM. The criteria for evaluation have been adopted by taking in consideration the KPIs declared in the GA:

- Climate resilience (improved sectors' independence on fresh water),
- Cost effectiveness and grounds set for increase of green investments
- Environmental positive impacts (more water available for bio systems)
- Social and economic progress (demographic growth, employment, GDP growth)
- Area of coverage of the measures – the span of affected sectors and systems

The main outcome of the process of identification, analysis, selection and ranking of recommended adaptation measures (alternatives) is shown on the figure below.

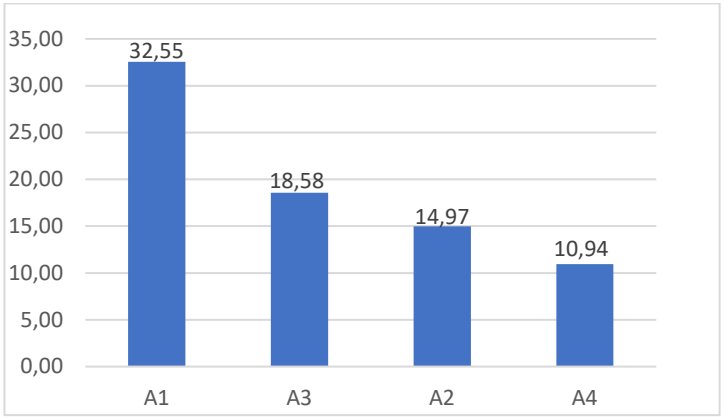


Figure 36: CS4 Adaptation measures ranking.

In summary:

- Measures for water resources (both surface and ground water) monitoring are the highest ranked set,
- Measures leading to a more efficient and rational water consumption (such as: recycled water use in tourism and industry, up to 30% of the sector total consumption; use of advanced irrigation techniques and technologies, to reduce water consumption by 49%), are second placed in the ranking,
- Third-ranked are the measures concerning improved water measurement and monitoring of consumption (they impose reduction of losses in water distribution network up to 15%),
- Measures for raising awareness take the fourth place in the recommended implementation schedule.

The ranking was in compliance with the outputs of the SIA third session of co-design with the stakeholders, which resulted in innovation pathways co-creation and decision making on selection of innovations to be applied through the Open Call for Innovation procedure, led in conjunction with the WP5.

Once the updates of the common climate baseline will be established within WP3, the modelling will be run finally and the outputs achieved will be subject of communication with the transboundary group of stakeholders and, along with the received feedback and improvements based on that, reported in the deliverable 6.4 (M45).

Data collection

Table 16: Model input used for the integrated water management model.

Model input parameter(s)	Source	Resolution
Hydrological data	(Bureau for Hydrological and Meteorological measurements in North Macedonia (UHMR)), Ministry of Environment and Energy & NECCA (local management unit) in Greece	Mean monthly river flows, mean monthly lake water levels 1980 – 2020
Meteorological data (precipitation, temperature)	Bureau for Hydrological and Meteorological measurements in North Macedonia and in Albania; National Meteorological Service & Meteo.gr - National Observatory of Athens in Greece	Mean monthly values, 1980 – 2020
Water consumption data	Six municipalities in the three countries, Ministry of Environment and Energy in Greece	Annual consumption in cubic meters. per sectors, for 2020
Population number, GDP	Public statistical data for the region considered (Hellenic Statistical Authority ELSTAT)	In the boundaries of municipalities of the region

Most of the data required for modelling had been provided in the first reporting period, as described in D6.2. In addition to the data presented in D6.2, in the second reporting period the following sets of data were included in the Data Catalog:

- River flows in the wider watershed area,
- Discharge of Crn Drin River from the Ohrid Lake, at the town of Struga.
- Consolidation and completion of series of hydrological data (filling of gaps of measured data)
- Consolidation and completion of series of meteorological data (filling of gaps of measured data)

Case Study 5

The following Table shows the partners involved in activities related to WP3/modelling and their role.

Table 17: List of CS5 partners involved in activities related to WP3/modelling and their role.

Partner	Abbreviation	Role
Universidad de La Laguna	ULL	Leader
Instituto Geológico y Minero de España	IGME - CSIC	Development of the model of the aquifer of La Palma and El Hierro, through the network of sensors installed on both islands, with the aim of estimating recharge and being able to make future water management predictions
Elittoral Estudios de Ingeniería Costera y Oceanográfica, S.L.N.E.	Elittoral	Development of a model of sea level rise in two selected cities on the island of La Palma and El Hierro. In addition, development of a crop quality index to serve as an indicator of groundwater quality

In the framework of CS5, work is being carried out on the development of three different models. The first is a hydrogeological model of the islands of El Hierro and La Palma. This model will allow for the understanding of the circulation of groundwater within the aquifer, identifying the conditions of water recharge and discharge, the lithological and geometric characteristics of the aquifer and its respective hydrogeological conditions (flow directions, hydraulic gradients, transmissivity of the rock, storage coefficient, among others). The second model will study the sea level rise, considering the future scenarios of the IPCC, on the islands of El Hierro and La Palma. This will help to establish a future scenario that will allow us to simulate the behaviour of the sea level and its effect on the territory. The third model provides a crop quality index as an indication of groundwater quality.

Hydrogeological modelling

The main objective is to obtain a hydrogeological model of the aquifer. This model is crucial to understand how water moves through the geological formations of the aquifer, as well as to be able to estimate the amount of water that is available for sustainable use. To build the hydrogeological model, several types of data were required. These include:

- Geological maps showing the characteristics of rock formations and their capacity to store or allow water to pass through.
- Information from installed sensors, which monitor in real time parameters and variables such as water table, water pressure and water quality.
- Historical data provided by the Island Water Board, which includes records from previous years on variations in the amount of water available and its use

The main expected outcome of this process is to be able to reliably estimate the natural recharge of the aquifer. Natural recharge is the process by which water from rain, rivers or other sources infiltrates into the ground and replenishes the aquifer. With this estimate, sustainable water use can be planned, ensuring that abstraction does not exceed natural recharge.

This workflow to develop a hydrogeological model of the aquifer, will serve as a model to be replicated in the rest of the Canary Islands, to ensure sustainable water resource management throughout the

region, was completed in the reporting period. The hydrogeological model of the island of El Hierro has been validated and published by Garcia-Gil et al, 2023 (Figure 37).

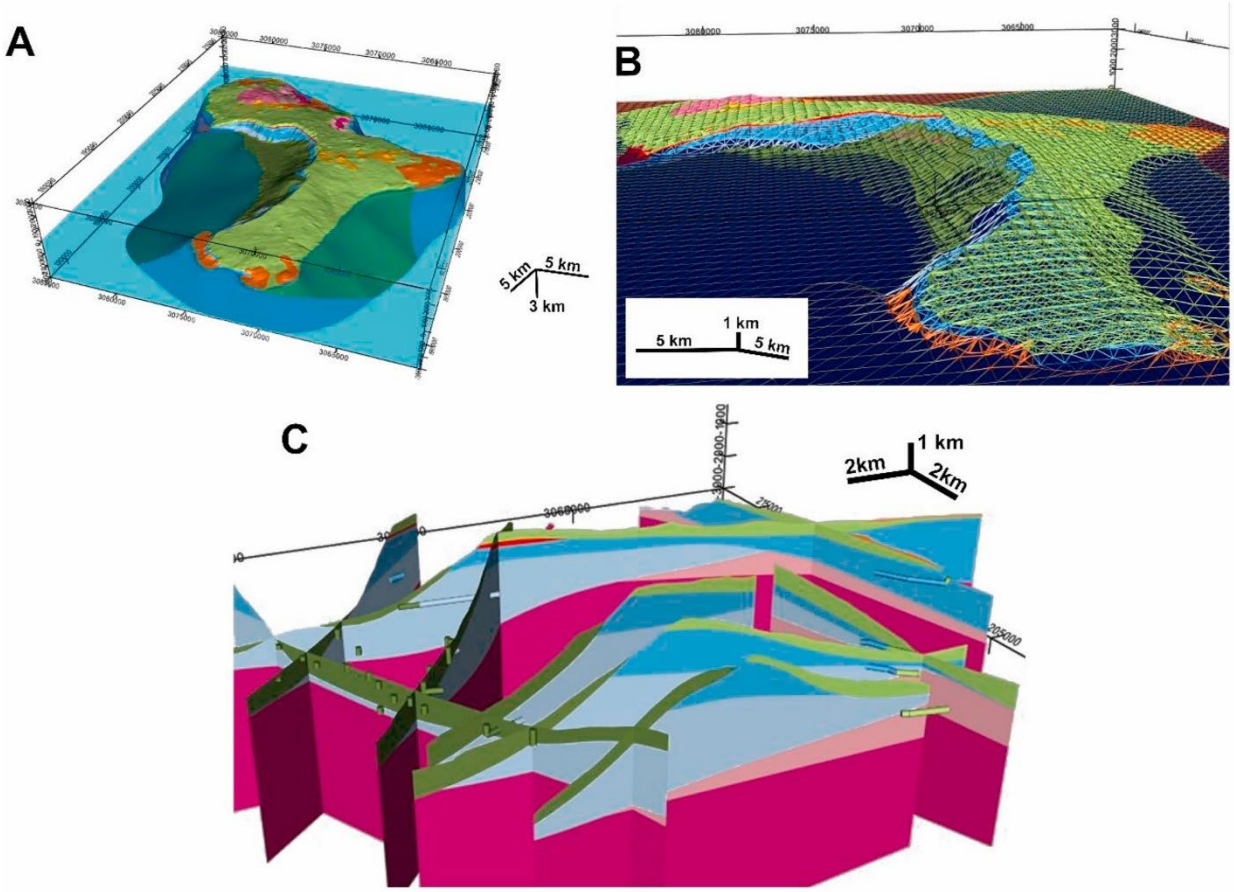


Figure 37: Obtained fully 3D geological model of *El Hierro Island*. (A) 3D projected cross-sections with opaque surfaces for the geological sub-units and transparent for the water body, in (B) 3D wireframe view, and (C) as a fence diagram (source Garcia et al., 2023).

Sea level rise modelling

Global models enable studying the consequences of climate change; however, most are developed at global level with low spatial resolution, which leads to the need for a detailed study of coastal zones generating high spatial resolution information. In CS5 we characterise oceanographic specific for the variables resulting from the climate change projection for the Canary Islands, emphasizing El Hierro and La Palma islands. The variables studied are sea level, wind velocity and direction, and significant wave height, direction and frequency. For each variable, information is extracted from selected points in the studied area, and the average regime of the climate change projection is studied. Finally, after the steps mentioned, creating modelled flood scenarios at a local level is possible.

The first step is Topo-bathymetric processing. In this task, we obtain the study area's topography and bathymetry in raster format. Then we interpolate to create de Digital Terrain Model and define the most relevant outlines and geographic elements.

The second step is to validate the model stability using instrumental data (historical records) to reconstruct the previous sea level rise (SLR) and then develop the SLR projections for the region of

interest (ROI). Once the numerical scenarios are running correctly, finally, we introduce the effect with the average and extreme tide regimen effect to obtain the forecasting intensity for overwash events.

Previously, the team ran the complete wind data series from the ERA5 satellite from 1959 to 2021 and parallel ran the forecast from 1959 to 2015 to validate the methodology and find a good match between the historical and forecast data. Figure 38 presents a three-dimensional view of the morphological structure of a part of the Canary archipelago, which is a relevant factor in modelling processes.

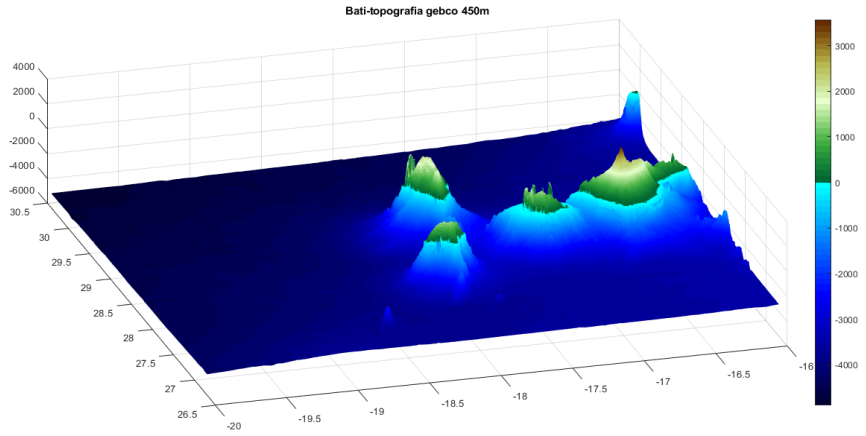


Figure 38: 3D bathymetry of the Canary Islands considering GEBCO information at 450m.

The input data was: i) Sea state (12th highest significant wave height of the historic series (H_{S12}), associated mean direction (θ_m) and peak period (T_P)); sea surface elevation (sea level 99.5 percentile ($SL_{99.5}$)) and wind conditions(12th highest wind speed of the historic series (W_{S12}) and associated direction (W_D)); ii) MDT + Bathymetry; iii) Coastline form.

The proposed scenario for flooding in climate change projection is based on the following:

a) the sea state in the most likely direction, depending on the 12th most extreme wave height (normally used H_{S12}),
b) the sea level with the highest probability of non-exceedance ($SL_{99.5}$) and
c) the wind of the most likely most extreme speed (W_{S12}).

Table 18: Input parameters for the combined scenario modelling of wave height, sea level and wind speed.

Sea state	H_{S12} (m)	T_P (s)	θ_m (°)
La Palma Island	3.73	20.18	N
El Hierro Island	3.47	20.58	N
Sea surface elevation	$SL_{99.5}$ (m)		
La Palma Island	1.39		
El Hierro Island	1.38		
Wind conditions	W_{S12} (m/s)	W_D (°)	
La Palma Island	8.77	NNE	
El Hierro Island	9.00	NNE	

When projecting the official coastline shapefile on ortho-territorial pictures from the Canary Islands, it was clear that it did not represent the actual limit between sea and continent. Thus, the results obtained from the coastal flooding model for the sea surface total elevation would have inherent errors as it depends on the coastline shape.

For our Case Study, we concluded that the Centro Nacional de Información Geografica (CNIG) coastline (the official coastline) was inaccurate, even though on the CNIG it states that it is up to date. This lack of precision was investigated, and it was determined that the coastline acquired from CNIG is extracted from the electronic nautical charts (ENC) for purpose 4 and 5 of navigation published by the Hydrographic Institute of the Navy (IHM) of Spain. Quoting the official website *"It should be noted that, in general, the geometry with which each line is inscribed in the RCC has a geometric uncertainty due, fundamentally, to its age, since they were obtained from very small-scale cartography and also in ED50 datum, forcing their transformation to the ETRS89 datum."* [1] Hence, with the intention of eliminating this uncertainty, it was decided among the team to carry out the coastline digitisation from the most recent ortho-territorial image available from the islands of interest – La Palma y El Hierro (for an example Figure 39).

When the work was done, the team later needed to decide which coastline would be more suitable to use for the coastal flooding modelling.

[1] https://www.idee.es/csw-inspire-idee/srv/spa/catalog.search?#/metadata/spaihmLC

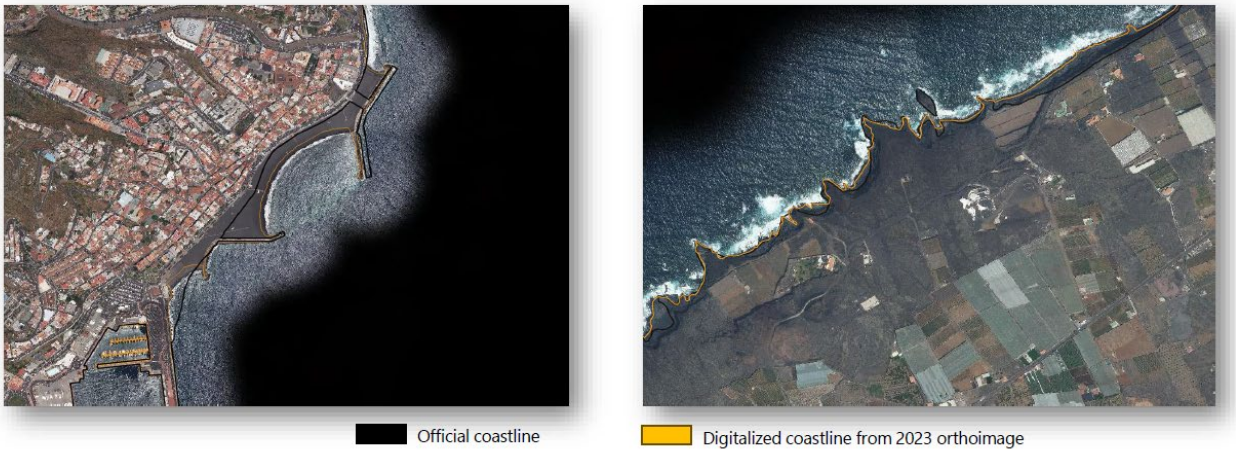


Figure 39: Comparison between coastline digitised by orthophoto (IDECanarias Orthophoto Territorial Campaña 2022-2023) and CNIG coastline (10/2022).

Model employed: MIKE21 HD

The spatial discretisation of equations is based on a finite volume scheme. The model uses dynamic time steps to optimize simulation speed while ensuring numerical stability with Courant-Friedrichs-Levy (CFL) and considering the Coriolis forces of barotropic density that vary in the domain. The HD model uses an unstructured mesh. With finer resolution near the coast (in the flood zone up to about ~40 m).

The islands were divided into smaller regions in order to focus on specific area that are more vulnerable and at risk, and to decrease the computational load to execute the model. For each one of those areas, the beach profile was calculated to analyse the coastline transgression with the sea level rise. For less vulnerable regions, the coastline did not present variation as the coastline is meanly delimitated by cliffs, hence, those areas present lower vulnerability and risk of being affected by the sea level rise. The results for La Palma east, La Palma west and El Hierro north are presented below.

La Palma east

Table 19: Average values for the climate change scenarios for La Palma east.

Projection	Wave (SSP5-8.5)			Total water level (SSP5-8.5 and RCP 4.5)	Wind speed / direction (SSP5-8.5)
	Hs	Tp	θ_m		
2050 (SSP5-8.5)	4.20 m	20.64 s	NNE	0.26 m	8.80m/s / NE
2100 (RCP 4.5)	4.20 m	20.64 s	NNE	0.56 m	9.18 m/s / NE

Hs: Significant wave height; T_P: Wave peak period; θ_m: Mean wave direction.

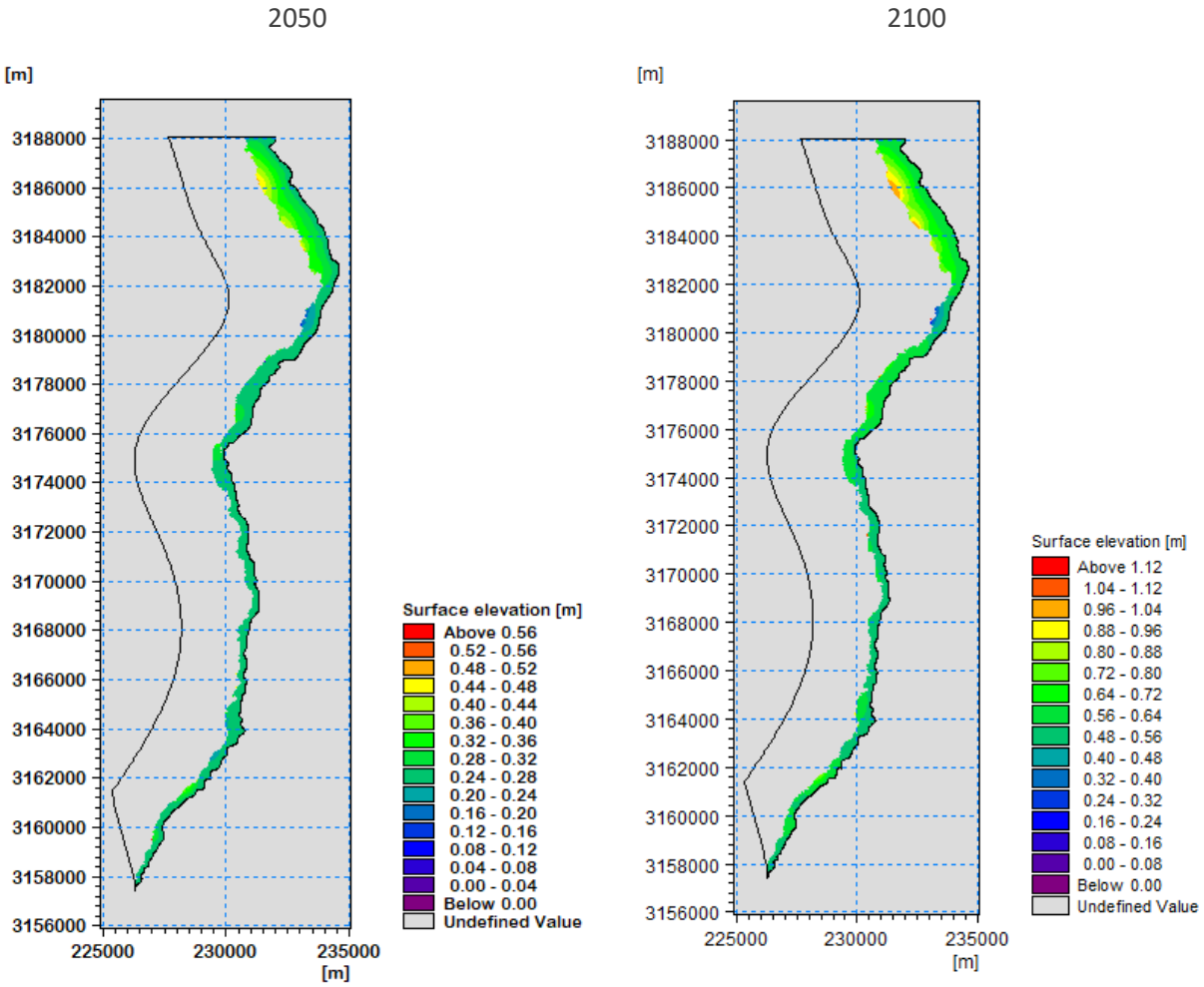


Figure 40: Water level projections in 2050 and 2100 for La Palma east.

The sea level rise will most likely change the coastline for several beach areas in La Palma. For example, the Santa Cruz beach the projection for 2050 and 2100 coastlines areas show in Figure 41. The average coastline transgression for 2050 is 23.87 ± 12.73 m and 75.07 ± 54.32 m for 2100.

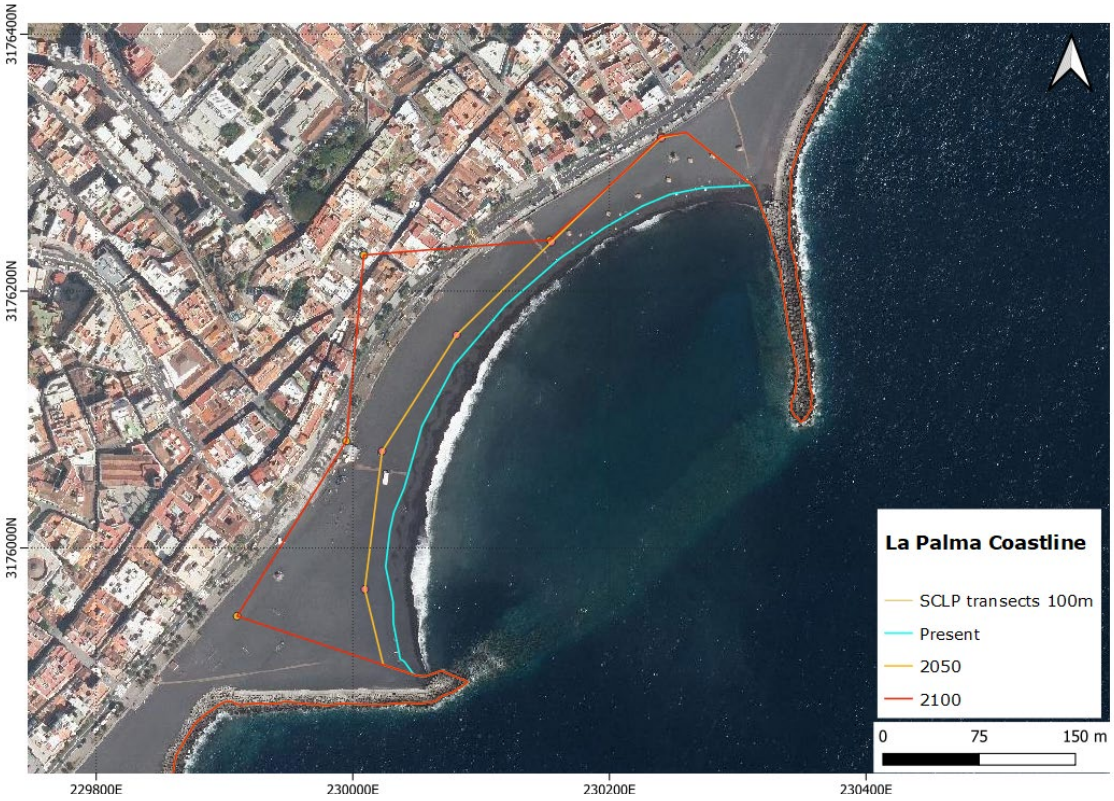


Figure 41: Coastline change for the modelled scenarios in Santa Cruz beach.

La Palma West

Table 20: Average values for the climate change scenarios for La Palma west.

Projection	Wave (SSP5-8.5)			Total water level (SSP5-8.5 and RCP 4.5)	Wind speed / direction (SSP5-8.5)
	Hs	Tp	θ_m		
2050 (SSP5-8.5)	3.17 m	20.03 s	N	0.26 m	9.01 m/s / NE
2100 (RCP 4.5)	3.17 m	20.03 s	N	0.56 m	8.91 m/s / NE

Hs: Significant wave height; T_P: Wave peak period; θ_m: Mean wave direction.

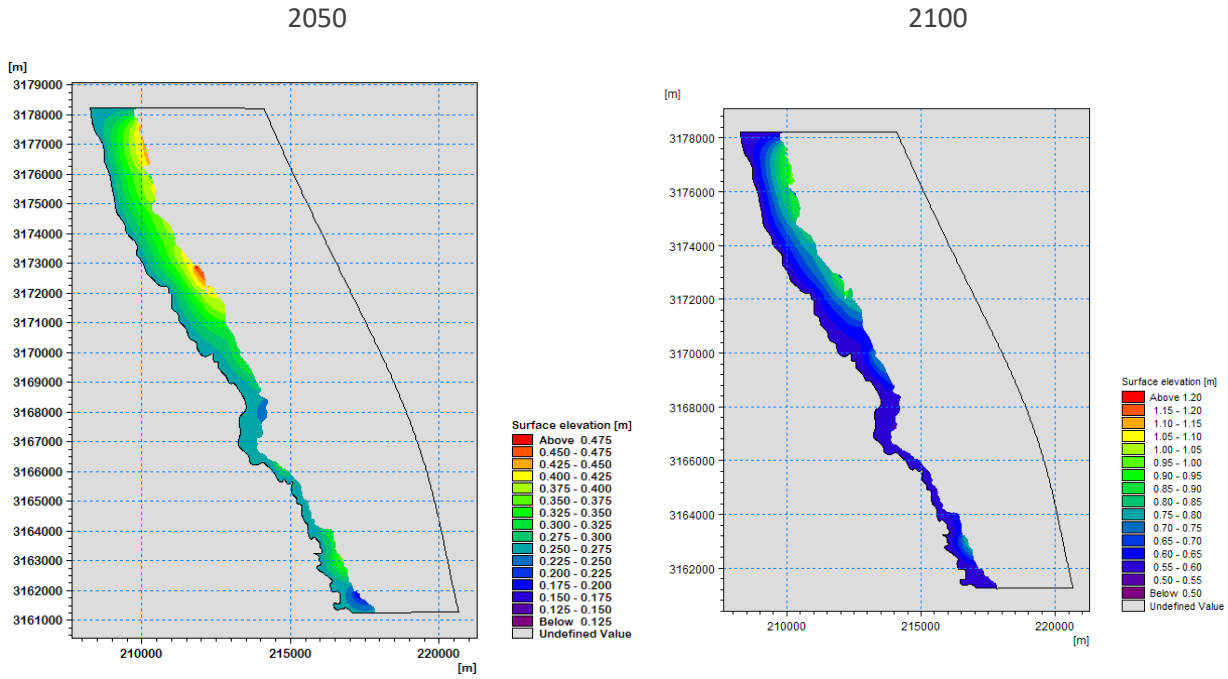


Figure 42: Water level projections in 2050 and 2100 for La Palma west.

As an example, the Tazacorte beach the projection for 2050 and 2100 coastlines are show in Figure 43. The average coastline transgression for 2050 is 8.37+- 7.36 m and 14.89+-11.21 m for 2100.

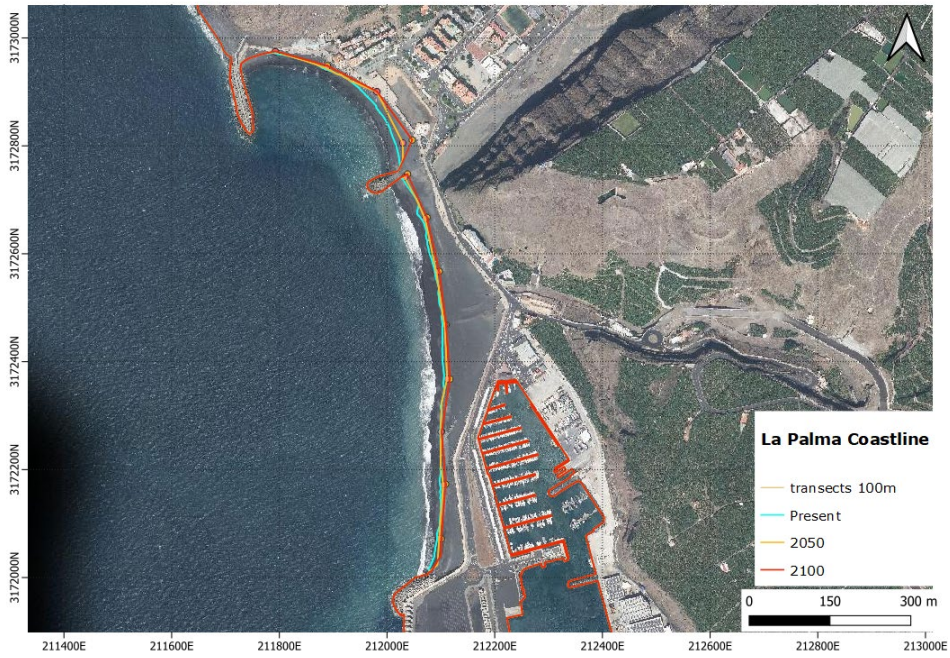


Figure 43: Coastline change for the modelled scenarios in Tazacorte beach

El Hierro north

Table 21: Average values for the climate change scenarios for El Hierro North.

Projection	Wave (SSP5-8.5)			Total water level (SSP5-8.5 and RCP 4.5)	Wind speed / direction (SSP5-8.5)
	Hs	Tp	θ_m		
2050 (SSP5-8.5)	3.51 m	19.70 s	NNE	0.26 m	8.67 m/s / NE
2100 (RCP 4.5)	3.51 m	19.70 s	NNE	0.56 m	8.56 m/s / NE

H_S: Significant wave height; T_P: Wave peak period; θ_m: Mean wave direction.

The sea level rise in El Hierro will have less effect on the coastline than for La Palma island, as most of the coastal area formation are cliffs; some areas present pools built/natural on the rocks, thus the coastline were traced after this wet area, hence no coastline alteration could be detected.

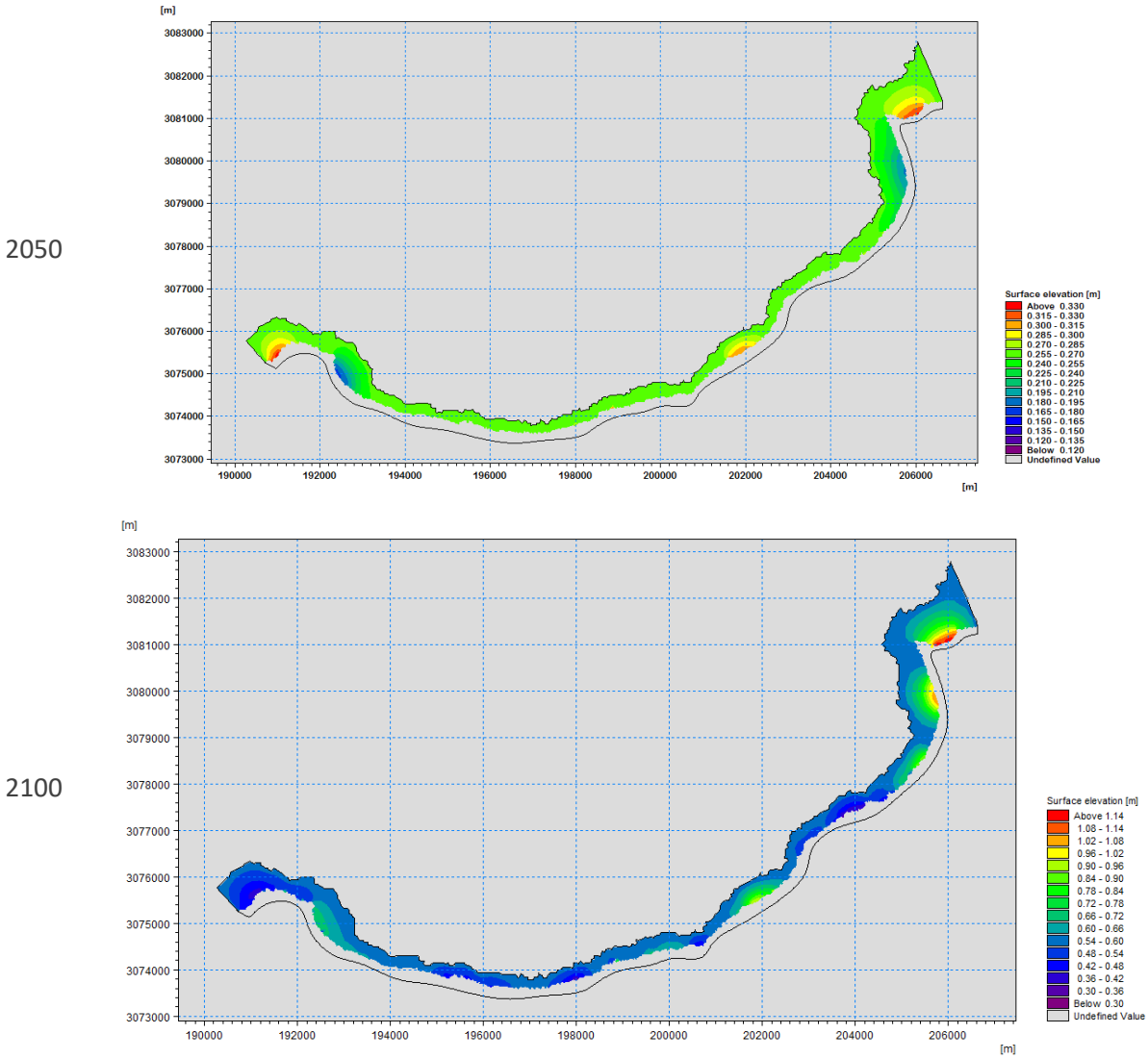


Figure 44: Water level projections in 2050 and 2100 for El Hierro north.

As an example, the Arenas Blancas beach the projection for 2050 and 2100 coastlines is show in Figure 45. The average coastline transgression for 2050 is 6.42 +/- 7.44 m and 11.59 +/- 8.25 m for 2100.

Figure 45: Coastline change for the modelled scenarios in Arenas Blancas beach.

For Maceta Natural Pool, a very popular pool in the island, the coastline evolution was not carried out as the coastline was already located at the base of the cliff and the swimming pool area before that line. The same analysis was made for Charco de los Sargos Natural Pool.

Crop Health Index

The plantain crops annual analysis (May 2021 to April 2022) in La Palma Island was carried out aiming to comprehend how the volcanic eruption of Cumbre Vieja (on September 19, 2021), which lasted for 85 days, has affected these crops, and the irrigation system of the area. Furthermore, it was assessed whether signs of aquifer water properties' change could be identified using the plantain crops as an indicator. The region of interest (ROI) was selected based on the proximity of plantain crops to the affected area. In this sense, two relevant districts were selected on the west side of the island: Tazacorte and Valle de Aridane.

To achieve our target, remote sensing satellite data were employed to monitor the affected area. Also, it was unfeasible to access the crops after the beginning of the volcanic activity; thus, satellite data can provide reliable information, such as different indexes of a crop's health state. Hence, the Copernicus Sentinel-2 Mission was selected due to the spatial and temporal resolution, which ensured enough information input for the crop health index algorithm. Furthermore, the Copernicus Sentinel-2 mission was selected due to its open-source data availability.

The following Figure 46 presents the flowchart of the steps taken so far and the phase we are in regarding the development of the Crop Health Index. The final product will be achieved by combining the vegetation indexes, NDVI (Normalized Difference NIR/Red Normalized Difference Vegetation Index, Calibrated NDVI – CDVI) and NDRE (Normalized Difference NIR/Red-Edge Normalized Difference Red-Edge).

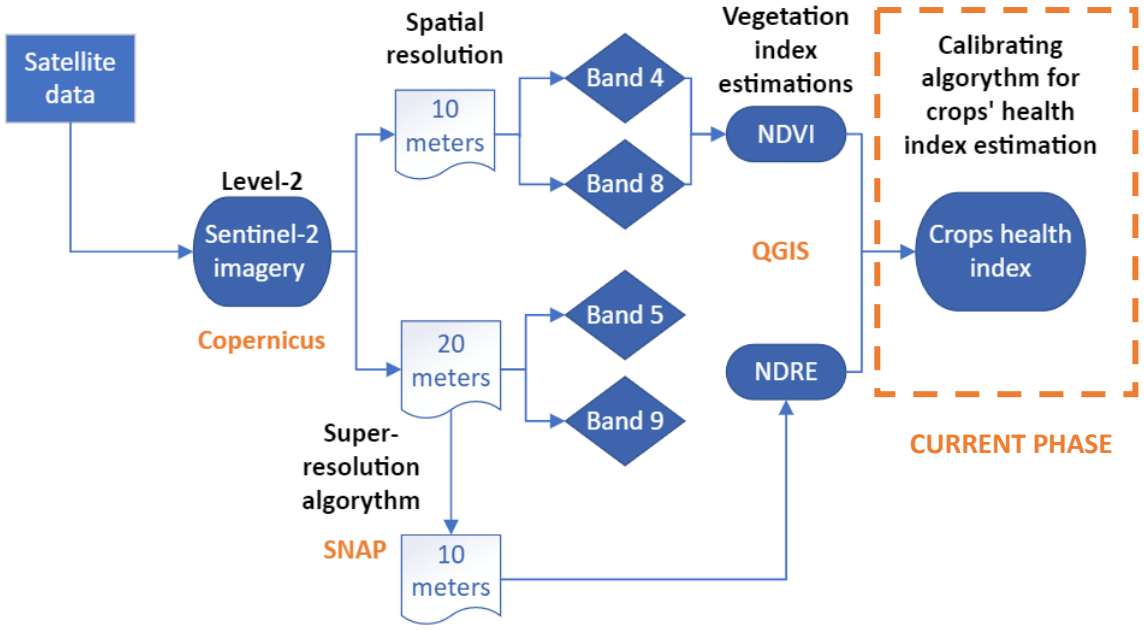


Figure 46: Methodology for Crop Health Index development.

As the sensor deployed in the Sentinel-2 satellites, the Multispectral Imager (MSI) operates with 10-, 20-, or 60-meter spatial resolution. the spatial resolution varies depending on the light spectrum employed (Figure 47); the bands 5 and 9 (for the NDRE) needed to be adjusted to present the same resolution as the bands 4 and 8 (for the NDVI). This processing was carried out on SNAP[2] using the *plugin sen2res*. Finally, the imagery dataset with the same spatial resolution were obtained and the respective indexes were calculated according to the Index DataBase (IDB[3]) for Sentinel-2.

We are working on the calibration of the Crop Health Index for La Palma to then be able to implement it for the study area in El Hierro (Valle del Golfo).

[2] SNAP - https://step.esa.int/main/download/snap-download/

[3] IDB - https://www.indexdatabase.de/db/is.php?sensor_id=96

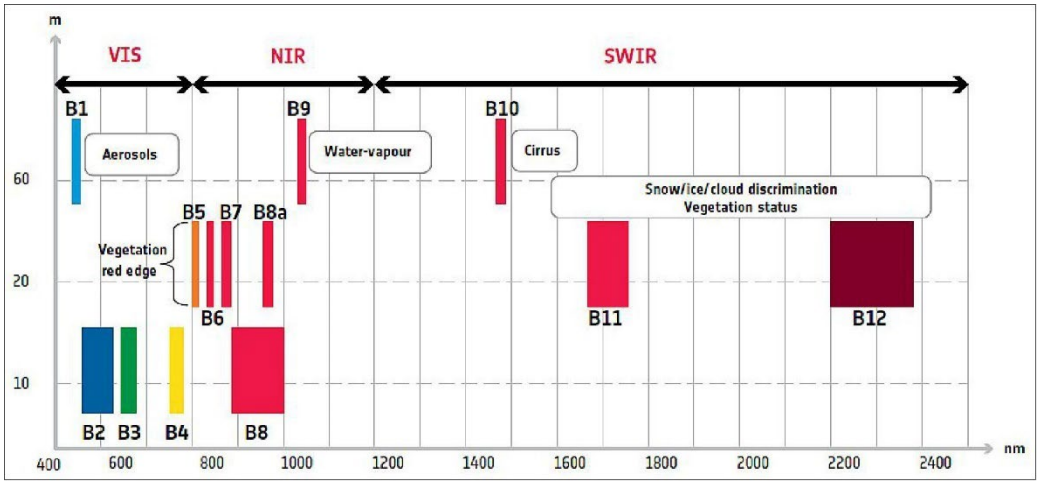


Figure 47: Spatial resolution accordingly to the light spectrum in MSI Sentinel-2 satellites. Source: eoPortal Copernicus: Sentinel-2 https://www.eoportal.org/satellite-missions/copernicus-sentinel-2#mission-status

We are working on the calibration of the Crop Health Index for La Palma to then be able to implement it for the study area in El Hierro (Valle del Golfo). Some of the preliminary results in La Palma are shown in .

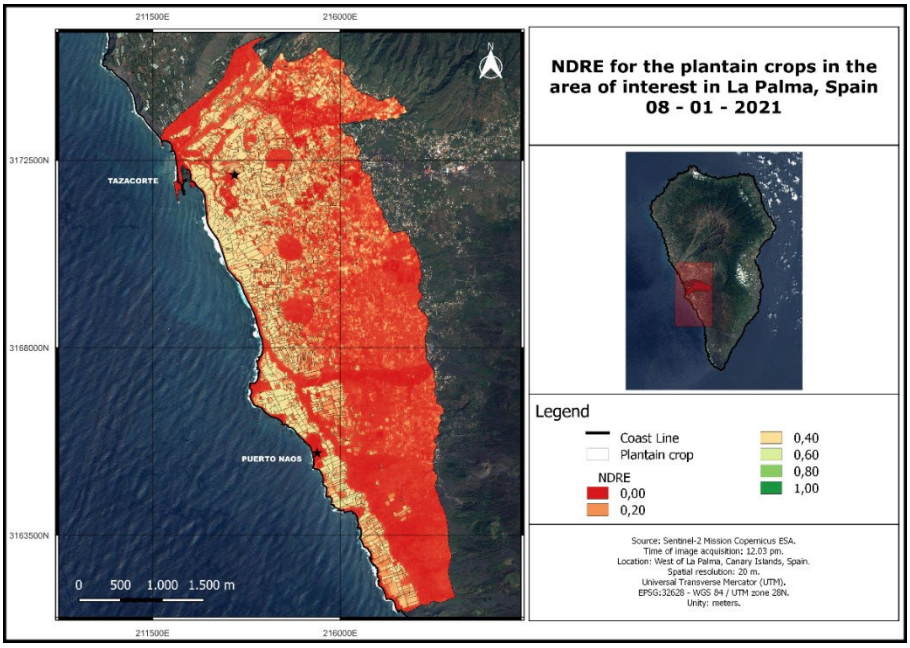


Figure 48: Normalized Difference NIR/Red-Edge Normalized Difference Red-Edge for La Palma (left) and health index for plantain crops (right).

Data collection

Table 22: Input parameters used for hydrogeological and sea level rise modelling in CS5.

Model input parameter(s)	Source	Resolution
Hydrogeological maps	IGME-CSIC	1:50000
Water spots (wells, boreholes and galleries)	IGME-CSIC	1:50000
Installed sensors (conductivity, temperature, salinity and total dissolved solids)	Seametrics CT2X	0.1˚C; 0.0034% full scale (typical); (32 bits internal) 0.1 µS/cm, 0.001 mS/cm, 0.1 mg/L (TDS), 0.001 PSU
Historical data	Island Water Board	-
Sea state (H_{S12}, θ_m and T_P); sea surface elevation ($SL_{99.5}$) and wind conditions (W_S and W_D)	ERA5	0.5° x 0.5°
MDT + Bathymetry	GEBCO	2 m – 400 m
Coastline	CNIG	1:50000 – 1:20000
Electronic nautical charts (ENC)	Hydrographic Institute of the Navy of Spain (IHM)	1:50000 – 1:20000

Case Study 6

The following Table shows the partners involved in activities related to WP3/modelling and their role.

Table 23: List of CS6 partners involved in activities related to WP3/modelling and their role.

Partner	Abbreviation	Role
Aristotle University of Thessaloniki	AUTh	Aliakmon River Modelling
Cleantech Bulgaria	CTBG	Ropotamo River fieldwork/in-depth analysis
Middle East Technical University	METU	Marine sampling, analysing, and contributing to the model.
National Institute of Research and Development for Biological Sciences	INCDSB	Danube Delta, research on salted soils and biofiltration

Ropotamo River (Bulgaria)

A total of 5 field missions were completed from 2022 to 2024, as follows:

1) August 2022
2) June 2023
3) July 2023
4) November 2023
5) February 2024

The Bulgarian team undertook comprehensive surveys with an unmanned aerial vehicle (UAV) of the Ropotamo Reserve from August 2022 to February 2024. These surveys aimed to provide detailed

geospatial data for in-depth analysis of the reserve's ecosystems, focusing on climate, vegetation, and hydrological changes. Below is a summary of the key activities and results from the fieldwork performed during this period:

- August 2022 (prior reporting period, see also D6.2)

  The initial UAV survey was conducted during the driest period of the year to capture baseline data on the reserve's terrain and vegetation. The UAV equipped with a photogrammetric camera, multispectral sensors, and a thermal imaging system gathered high-resolution images. The collected data was processed using Pix4D mapper software, which enabled the generation of Digital Terrain Models (DTMs), multispectral maps, and thermal orthophotos. This survey established the initial data set for comparing seasonal and climate variations over time

- June 2023

  A follow-up survey was conducted during the first maximum precipitation period, providing critical data on the region's response to increased rainfall. The UAV mission covered 4.85 square kilometres, capturing over 25,000 images across RGB, multispectral, and thermal sensors. The survey highlighted significant differences in vegetation health and surface temperature compared to the 2022 survey, with the Normalized Difference Vegetation Index (NDVI) reflecting more vibrant vegetation due to weather conditions

  The survey was originally planned for the period April-May, but due to highly unfavourable weather conditions for flight operations, the actual survey was carried out in June. This is acceptable given that the weather conditions in early June are identical to those of the second half of May.

- July 2023

  Another UAV survey occurred in the low rainfall period of July 2023. The comparison of data from June to July revealed stark contrasts in surface temperatures and vegetation health. Open areas without vegetation reached temperatures exceeding 30°C, while vegetated areas showed cooler temperatures, confirming the seasonal variation in climate conditions and its impact on the landscape

- November 2023

  A UAV survey conducted in November 2023 captured the reserve during the maximum rainfall period. This survey demonstrated the impact of high rainfall on vegetation, showing a higher vegetation cover index than in the previous months. The data collected during this period provided insights into how seasonal rainfall influenced the hydrological and ecological balance of the reserve.

- February 2024

  The final survey, conducted in February 2024, focused on capturing data during the river's maximum flow period. UAVs equipped with photogrammetric, multispectral, and thermal sensors collected extensive data on the hydrological dynamics of the Ropotamo River and surrounding wetlands. Early analysis indicated substantial variations in surface temperatures and vegetation health compared to previous surveys. This dataset will be used to further analyse the seasonal and annual changes within the reserve

The field surveys conducted from 2022 to 2024 have provided comprehensive geospatial data on the Ropotamo Reserve. These data sets can play a crucial role in the ongoing monitoring and analysis of the

reserve's ecosystems, enabling better understanding and management of climate impacts on the region's biodiversity and hydrology.

Danube Delta (Romania)

INCDSB continued the actions started in the previous period.

On the biofiltration topic, the major work was done on isolation of individual bacteria species from water and roots of aquatic plants. A total of 95 microbial strains were isolated from different sampling points on St. George branch of the Danube River, in Danube Delta region. The work was further conducted to extract and sequencing the DNA for identifying the species.

Viewing, editing and analysis of 16S gene Sanger sequencing data for bacterial species determination was performed. For viewing and editing, the BioEdit program was used, and for the analysis, the NCBI platform was accessed. The alignment of nucleic acid sequences was performed with the help of the BLAST program. To build the phylogenetic tree, the Mega program was used, and its rendering was made in Tree Newick format using the maximum likelihood algorithm. The results of the analysis of the DNA sequences from the 95 isolated strains show that they belong to 31 different species of bacteria.

The results were presented in the ARSINOE Seminar Exploring the Effects of Climate Change on Biodiversity (29th February 2024). Also, a scientific paper was realized and submitted in July 2024 to Scientific Reports (ISSN: 2045-2322): The influence of sediment-bound organochlorine compounds on the structure of microbial communities from Danube Delta (Romania).

On the salted soil, the ongoing research are focused on identify adaptive metabolic pathways and impact assessment on soil biodiversity for alternative agriculture after tree cycle of halophyte plants development (2022, 2023, 2024).

Southwestern Black Sea (Turkey)

ARSINOE Black Sea case study's Turkish component focuses on the Southwestern Black Sea and includes the dynamic connection between the Black Sea and the Sea of Marmara through the Bosporus Strait in the city of Istanbul as the final "cross-section" of the designed virtual watershed. METU, with its oceanographic research vessel Bilim-2 (meaning 'science' in Turkish), conducts regular sea expeditions to study this crucial oceanographic connection 'in situ', with state of art ocean sensors and samplings performed in connection to the major oceanographic features of the sub-case study. ARSINOE partly supported these expeditions in 2022 and 2023 and thereby enabled the surveying of a higher number of stations in the case study area.

The expeditions started from the Marmara end of the Bosporus and included observation stations throughout the strait all the way into the Black Sea end. A dense grid of stations in the southwestern Black Sea then enabled the tracking of the Bosporus water input to the case study area. Seawater quality parameters such as temperature, pH, turbidity, nutrient concentrations and dissolved oxygen levels were measured either in situ or after laboratory analyses of samples. This approach will altogether show the fate of the waters flowing from the Marmara Sea into the Black Sea and its control on the water quality of the case study.

The field results, once the analyses are completed, will feed into the biogeochemical models that are under development by METU IMS also in the frame of ARSINOE. The combined fieldwork and model results will help the METU team assess the state of the system and forecast the ecosystem resilience in connection to the broader climate change patterns in the region.

Aliakmon River (Greece)

AUTH has developed a sensor system to measure the water surface level at critical cross-sections to improve the hydrological model set for the study area. The data from the water levels at various locations are collected on a central server and can be used to verify the results of the HEC-HMS hydrological model and, by extension, the digital twin developed for this sub-case. In addition to verifying the results, part of this data will update the incoming DSS-file of the HEC-HMS hydrological model. This process will enable regular updates to the model's hydraulic parameter optimisation. Beyond verification and parameter optimisation updates, we also plan, as an experiment, use the level sensors to measure water flow using the Muskingum method. This procedure can be applied to channels with a known cross-section and slope, and the idea is based on applying the Muskingum method between two positions with a sufficient distance between them.

Developed Sensor System

We developed an innovative DIY water level measurement system based on the use of an Arduino microcontroller and the JSN-SR04T ultrasonic sensor. This system aims to provide accurate and reliable monitoring of water levels (recording a measurement every 10 minutes) in critical infrastructures, such as reservoirs or canals, and can be operated autonomously in remote environments. For this project, the Arduino Uno REV2 WiFi controller was selected, as it provides the necessary connectivity for remote communication. The Arduino platform was connected to a GSM phone, equipped with a SIM card, to enable data transmission via SMS messages. As a measurement platform, a JSN-SR04T ultrasonic sensor was used. The JSN-SR04T ultrasonic sensor we used has an operating range of 10 centimeters to 4.5 meters, making it ideal for accurately monitoring water levels in reservoirs and hydraulic structures.

The system sends 3 messages daily to a predefined phone number. These messages contain the water level measurements recorded. These data are transmitted from the receiving mobile phone to the server through a dedicated Android application that will be developed for this purpose. This mechanism allows for continuous updates on the status of the reservoir or canal, providing timely information on any changes in water level. This application will allow real-time communication and data transfer to the central monitoring model, where the data will be processed and analysed for further use by the management system.

To ensure that our system is fully sustainable and operational in remote areas, we designed a special power circuit. This circuit includes a rechargeable battery, which is connected to the controller and a solar panel. This allows the system to remain active even in areas without a stable power source. The battery is fully charged within two days, ensuring three days of autonomy without additional charging. This approach maximises system reliability while reducing the need for maintenance and external interventions. Additionally, the circuit is configured to send alerts if the battery's depletion level reaches a critical point, particularly during prolonged cloudy periods when the solar panel cannot effectively charge the battery.

The sensor is scheduled to be installed at the A0 canal outlet at the "Rapsomaniki" location, where it will take daily measurements of the canal’s water level. The accuracy of the sensor allows for the detection of even small changes in water level, which is essential for water resource prediction and management.

Following are photos of the developed sensor, as well as the raw data sent by the system during the testing period (Figure 49).

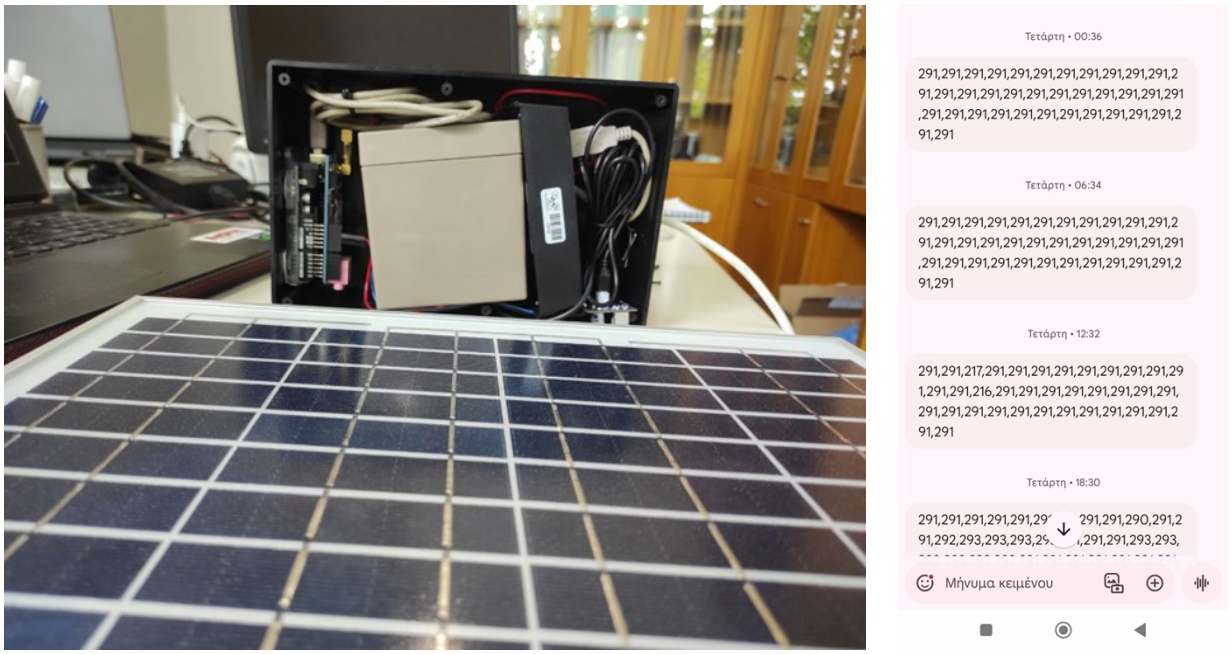


Figure 49: DIY ultrasonic water level sensor and solar panel used in CS6 (left) and impression of the raw data sent by this device (right).

Case Study 7

The following Table shows the partners involved in activities related to WP3/modelling and their role.

Table 24: List of CS7 partners involved in activities related to WP3/modelling and their role.

Partner	Abbreviation	Role
Technical University of Denmark	DTU	Climate indicators, extreme sea level model, SCALGO Live flood modelling, (OS2) Damage Cost Model "SkadesØkonomi" (co-developer, simulations), cost-benefit analyses, data provider, WP3 lead, CS7 co-lead
Esbjerg Municipality	EM	Co-development of local models, data provider, acceptance and quality assurance, CS7 co-lead
LNH Water	LNH	(OS2) Damage Cost Model "SkadesØkonomi" (co-developer, simulations), ANUGA Hydro simulations
Danish Coastal Authority	DCA	Data provider, (optional) SFINCS model, DCA vulnerability model
Ludwig-Maximilians-Universität München	LMU	Modelling support, WP3 co-lead

Modelling activities

The following modelling activities were continued, completed, initiated or have been planned in M19-M36:

(i) Relevant CS7 model descriptions were provided for WP3 Deliverable D3.7.

(ii) The OS2 Damage Cost Model "SkadesØkonomi", which was originally developed by DTU, was further refined and optimised. A fully operational version of the model that is "co-owned" by Danish municipalities has been made freely and openly available to all users through the "OS2 Public Sector Digitalization Community" in Denmark. Significant improvements were made to the user interface and usability of the tool, including the provision of an embedded set of nation-wide flood maps produced using e.g. the SCALGO Live flood model. A new set of assessments for Esbjerg, including novel evaluation of the flood impacts on human wellbeing is in preparation.

A more generic research version of the model applicable beyond the Danish context is being developed in a synergetic Horizon Europe project called DIRECTED, which started in 2022. It will be tested in the upcoming ARSINOE reporting period.

Several new features were co-identified with stakeholders in the first reporting period (M1-M18) and considered for implementation in the current or last reporting period:

- Additional functionality to underpin the implementation of different urban development scenarios (and more generally land use change scenarios). A prototype was developed within the project in the later part of 2022 and is in line for further refinement. This is likely to go beyond the lifetime of ARSINOE.
- Additional functionality for estimating the varying benefits to local property owners of installing new coastal protection; this is tightly linked to the issue of economic burden sharing, which is a central principle under Danish legislation. Explorative work has been carried out in this reporting period and is likely to be taken up in the last ARSINOE reporting period.
- Methodological support for the sensitivity analyses to be carried out in relation to various CS7 analyses as well as task 3.6 (uncertainty analysis) has been developed. A scientific paper is currently in preparation for submission in the last quarter of 2024 (Halsnæs et al., in prep.). The findings will be used as input to, e.g., the implementation of the resilience assessment.
- New industrial damage cost curves that estimate the losses to productivity as a consequence of flooding. Due to insufficient data availability and quality, this activity was not completed. Ongoing dialogues were initiated with the Danish Industry association and the CIP Foundation in terms of carrying out a nation-wide survey.
- New agricultural damage curves estimating the losses to agricultural yields as a consequence of fields being flooded were completed and integrates into the OS2 Damage Cost Model.

Finally, responsibilities for carrying out simulations and model development with the OS2 Damage Cost Model changed from the partners LNH Water to DTU in the current reporting report, i.e. as a result of the main model developer changing affiliation from LNH Water to DTU. Accordingly, LNH Water was allocated new tasks in the case study.

(iii) New regional sea level rise projections for Esbjerg and the Wadden Sea were made available, e.g. by the IPCC AR6 and the Danish Meteorological Institute, which allows for a more comprehensive estimate of the sea level rise uncertainty (e.g., task 3.6). As a result, implementation of a statistically based methodology was discontinued. The data acquired are embedded into a novel empirical-statistical model for extreme sea levels being developed for Esbjerg (together with WP3)

(iv) In the latter part of the reporting period, work on a new and explorative empirical-statistical model for estimating extreme sea levels using machine learning and artificial intelligence techniques. Observations and model data for training the model stemming from a 60-year ocean hindcast provided by the Danish Meteorological Institute has been acquired, and several different machine learning techniques are currently being piloted. Results will be available within the final ARSINOE reporting period.

(v) Scoping and implementation of a "cascading risks" model for Esbjerg and port has been initiated. The Danish model is co-developed by University of Exeter, DTU and Esbjerg municipality, covers critical urban infrastructure, and will be adapted from the analogous model that was recently completed for Torbay. A pair of scoping workshops were organized at DTU (April 2024) and in Esbjerg (May 2024) for experts and stakeholders, respectively. In addition, dedicated project work and data collection by three early-career researchers from DTU were carried out from February to June 2024. A model prototype is expected to be completed by early 2025 to be tested by local practitioners within the scope of ARSINOE. Considerations concerning a revised and fully operational model version to be completed beyond the lifetime of ARSINOE are ongoing.

(vi) Supplementary flood model calculations provided by LNH Water (ANUGA Hydro) and the Danish Coastal Authority (SFINCS) is under consideration. The Danish Coastal Authority recently completed a suite of simulations using SFINCS as means of appointing risk areas under the EU Floods Directive.

Data collection

Table 25: Model input used for CS7 modelling activities (updated).

Model input parameter(s)	Source	Resolution
Task ii), iii) and iv) Sea level rise (projections)	Danish Meteorological Institute, IPCC AR6	Station, regional
Task ii) and vi) Socio-economic indicators and data for Esbjerg	Esbjerg municipality, Statistics Denmark	Gridded, ca. 100 x 100 m
Task ii) and vi) High-resolution digital elevation model (DEM)	Klimadatastyrelsen	Horizontal resolution = 0,4 m
Task ii), v) and vi) Building layers/land cover for Esbjerg	Klimadatastyrelsen	Varies
Task ii), iv), v) and vi) Climate data (temperature, precipitation, wind, ocean)	CORDEX, CLIMEX, Danish Meteorological Institute	Ca. 11 x 11 km
Task ii), iv) and vi) Extreme sea level statistics for Esbjerg (based on observations)	Danish Coastal Authority	Station
Task ii), v) and vi) Existing inundation maps for Esbjerg for different return periods	Esbjerg municipality	Varies
Task ii) Historical data on losses in the agricultural sector due to flood events	SEGES Innovation	NA

In addition to the above, several different trial data sets were collected as part of the scoping process of a “cascading risks” model for Esbjerg and port [task v)].

Case Study 8

The partners involved in the Case Study and their specific role and contribution in it are listed in Table 26.

Table 26: List of CS8 partners involved in activities related to WP3/modelling and their role.

Partner	Abbreviation	Role
Exeter University	UNEXE	Modelling (D3.1), Development of real-time simulation engine for cascading failure, Resilience assessment wheel (D3.5) for integrating other tasks in WP3 and WP4, Data collection
KWR	KWR	Modelling assistance (D3.1), lead authoring 1, 2.1,2.2, 3.1 and provided input to other sections of D3.1, co-authored MS8, data collection, input for resilience assessment wheel (D3.5)
Torbay Council	TC	Partner; Stakeholder, emergency responder (D3.1), Provided info for the Milestone, reviewed the Milestone, Provided info for the two models.
Westcountry Rivers Trust LBG	WRT	Partner, provided input information for the models and the Milestone
Environment Agency	EA	Stakeholder, emergency responder (D3.1), participation with info
South West Water	SWW	Stakeholder, CI and emergency responder (D3.1), participation with info
Torbay & South Devon NHS Foundation Trust	NHS	Stakeholder, CI (D3.1), participation with info
Western Power Distribution	WPD	Stakeholder, CI and emergency responder (D3.1), participation with info
SWISCo	SWISCo	Stakeholder, emergency responder (D3.1), participation with info
Torbay Community Development Trust	TCDT	Innovator
HYDS	HYDS	Innovator

The work in Case Study 8 focused on the development of the DMRM&AF (resilience wheel) as described in section 4.3 and its application on CS8. Furthermore, the general resilience assessment framework was completed and reported in D3.1. A short summary is provided below.

Cascading failure engine

The real-time cascading failure engine has been updated several times to better capture critical services from CS8 Torbay.

The first round of improvements refined all the critical services related to water. Water pumps nodes were replaced by different sets of nodes related to potable water and sewerage, following the Torbay council's advice and feedback from South-West-Water. Regarding potable water, Torbay critical services now have a set of critical supply pump nodes (that bring water to the reservoirs connected to them in the northern area), a set of reservoir nodes that serve specific areas of the water distribution network (DMAs), and a set of booster pump nodes that help with the distribution of potable water in the neighbourhoods by increasing water pressure. Regarding sewerage, there is now a set of local sewerage pumps (transporting wastewater out of a neighbourhood to the main sewerage pipes), a set of critical sewerage pumps (helping to deliver wastewater to the wastewater treatment plant), and one wastewater treatment plant node.

The second round of improvements refined how the integrity of emergency services was calculated (following feedback by fire rescue operators) by taking into account the influence of the availability of mobile communication services, road traffic in the areas where police, ambulances and fire rescue cover, as well as the availability of water (for fire hydrants).

The third round of improvements added supermarkets and petrol stations as critical nodes based on experts feedback from the resilience community forums, as well as perfecting the integration of the state of road traffic in each output area to get the added consequences blocked roads can have on different services (e.g. a train station with blocked access for passengers due to flooded roads will not deliver a full service).

Finally, additional improvement beyond what was planned for the deliverable was made on performance and flexibility as the cascading failure engine has also just been adapted to CS5 Tenerife case study. The simulation engine is now sufficiently flexible to capture the whole of Tenerife (a much bigger area with 6 times more critical nodes) while displaying results nearly as fast as for Torbay.

Data collection

Table 27: Model input used for Cascading failure engine.

Model input parameter(s)	Source	Resolution
List of critical infrastructure service nodes, with service dependencies, location, and area serviced.	Multiple sources such as openstreetmap , local council GIS data, and water operator private data.	As precise and as detailed as possible (meter resolution).
List of areas with corresponding demographic, statistical and employment data	Main public statistical source (Ordnance survey, UK Office for National Statistics)	Output Areas (OAs) are the lowest level of geographical area for census statistics in the UK.
List of nodes directly damaged by hazard (with integrity percentage for each node)	flood footprint from CAFlood with resulting traffic integrity from SUMO	As detailed as possible. Present resolution for flood depth is 2m x 2m squares.

Case Study 9

The following Table shows the partners involved in activities related to WP3/modelling and their role.

Table 28: List of CS9 partners involved in activities related to WP3/modelling and their role.

Partner	Abbreviation	Role
University of Cagliari	UNICA	UNICA and CRS4 collaborated for the calibration of an AQUACROP-OS model (combination of FAO AQUACROP and Python or Matlab) to simulate the annual durum wheat productivity in Sardinia
Center for Advanced Studies, Research and Development in Sardinia	CRS4	UNICA and CRS4 collaborated for the calibration of an AQUACROP-OS model (combination of FAO AQUACROP and Python or Matlab) to simulate the annual durum wheat productivity in Sardinia
Regional Agricultural Agency of Sardinia	AGRIS	AGRIS carried out field experiments and collected field data on yield and phenology to be used for CERES-Wheat model calibration. AGRIS and CRS4 collaborated in collecting and analyzing meteo-climate data to be used for the model calibration

AQUACROP and CERES

AquaCrop is a crop growth model developed by FAO's (Food and Agricultural Organization of United Nation) Land and Water Division to address food security and assess the effect of the environment and management on crop production (https://www.fao.org/aquacrop). AquaCrop simulates the yield response of herbaceous crops to water and is particularly well suited to conditions in which water is a key limiting factor in crop production. AquaCrop has been widely used in the literature to simulate durum wheat yield production, especially in arid and semi-arid countries (Benabdelouahab et al., 2016, Bouazzama et al., 2017, Kourat et al., 2022) but needs to be calibrated for the local conditions in the Case Study area.

The CERES-Wheat model (Ritchie et al., 1984) will be applied in CS9 to simulate durum wheat growth and productivity in Sardinia under present and projected climate conditions. The available calibrations of CERES-Wheat model for Sardinia (Dettori et al., 2011; Mereu et al., 2019), a Crop Simulation Model (CSM) will be updated including new durum wheat cultivars and experimental data in irrigated conditions that is collected in ARSINOE. CSMs simulate growth, development and yield as a function of the soil-plant-atmosphere dynamics. CSMs require daily weather data, soil surface and profile information, and detailed crop management and crop genetic information as input.

Status

Modelling activities using AquaCrop and CERES-Wheat are currently underway, but no results have been published yet due to the short dataset currently available. A review study about influencing factors and climate change effects on durum wheat productivity today and tomorrow as been published by partner UNICA with the following doi: https://doi.org/10.1016/j.resenv.2024.100170.

The team is waiting to extend the analysis conducted on the data from the first year of the experiment to encompass all three years planned in the project. This comprehensive analysis aims to provide a more robust understanding of the irrigation strategies and their impact on crop yield over time.

By including data from all three years, the team expects to identify trends and variations that may not be evident from a single year data alone. This will allow a more accurate calibration of the AquaCrop and CERES-Wheat models and enhance its predictive capabilities. Additionally, incorporating multiple years of data will enable a thorough evaluation of the interannual effects of the different irrigation practices adopted, providing valuable insights for stakeholders.

The extended analysis will also facilitate the assessment of seasonal variations and climate influences on crop performance and phenology, contributing to more informed decision-making regarding agronomic management with a special focus on irrigation. Once the complete dataset is analysed, the results will be disseminated in a detailed report/paper, offering practical recommendations for improving irrigation efficiency and sustainability in agriculture, providing a reliable tool to stabilise grain yields in Mediterranean regions under climate change conditions.

Data collection

Table 29: Model input used for (type modelling activity here).

Model input parameter(s)	Source	Resolution
Daily maximum and minimum temperature, precipitation, potential evapotranspiration	https://open-meteo.com/en/docs/climate-api	From 20 to 30 km

4.3 Progress towards resilience assessment - the resilience wheel

The Modelling Work Package (WP 3) of ARSINOE aims to further cross-disciplinary research in hybrid simulation and hybrid modelling by developing the Dynamic Multi-Sectoral Resilience Modelling and Assessment Framework (DMRM&AF). The framework supports the modelling of both human and nature-based elements and the interaction between these systems. Towards this, the objective of the ARSINOE DMRM&AF is to conceptualize the application of computational models for resilience modelling of key infrastructures.

The ARSINOE DMRM&AF has four concentric circles, as such, it is also referred to as the *wheel.* At the very centre, we have the climate projection models. These models are generally 3-D grid-based models of Earth's surface. The second circle in the wheel models the effect of climate change on Earth's physical geography. For example, the climate projection models may output the expected variance in temperature over time, and which could be used as in input to flood modelling. Like the climate projection model, the flood model will also have a time element. However, the granularity of time advance may be different. The third concentric circle represents a more detailed level modelling approach. Four examples that have been included in here are, Data Science/Machine Learning models, Discrete-event simulation model, Geo-spatial model and Agent-based models. The blue nuclear symbol represents hybrid modelling approaches, wherein multiple modelling methods are applied for the realisation of the objectives of a single simulation study (Brailsford et al., 2019).

The area of Operations Research and Management Science (OR/MS) is arguably one of the key subject disciplines that are often seen as the custodians of such detailed modelling approaches, especially if they include an element of decision support at an operational level. The fourth and final concentric circle represents modelling methods that are generally used for strategic decision making.

The final element of the ARSINOE DMRM&AF is the four pillars on which the four concentric circles (the wheel) rests. As these four elements of the wheel represent different resolutions of modelling, and within each resolution, there are one or more disciplinary modelling methods, it follows that most of the modelling methods are in-turn dependent on the four pillars of the framework. The pillars are:

- Stakeholder engagement
- Data and logic requirements for modelling
- Risk assessment
- Stakeholder decision making

The resilience wheel concept is described in more detail in D3.1.

The four concentric circles of the framework represent the conceptualisation of the modelling methods. As mentioned in D3.1, the framework is extensible, and the methods are based on the requirements of specific case studies. Similarly, the methods specific to the four pillars are also extensible, and not all case studies will use all the methods. The framework could thus be used to represent the different elements that are operationalised in a particular case study.

In ARSINOE CS8 and CS1 act as frontrunners in the implementation of the resilience wheel as a resilience assessment tool. Progress of the CS in implementing the resilience wheel is reported below.

4.3.1 CS8 – resilience wheel progress

The case study has identified specific approaches related to SIA methods, data capture and logic development, resilience assessment, and decision making (the four AW pillars) that were used in the implementation of their models. Examples of integration of these four pillars in the modelling work include (see also Figure 50):

- The Cascading Failure Model (CF) used approaches from all the four pillars;
    - For SIA methods, discussion with experts familiar with historical events in the region that have caused disruption were implemented.
    - As for the data and logic pillar, secondary data from council and ordnance survey data containing GIS positions of critical services nodes; ordnance survey data showing statistics on residents (i.e. commuting distance, industry of employment) were needed.
    - As for the resilience assessment pillar, scenarios, risk assessment, evaluation, adaptation/risk control were utilised.
    - As for the decision-making pillar, visualisation and dashboard are applied to facilitate decision-making under deep uncertainty.
- While the CAFlood Hazard analysis model (cellular autonoma) uses approaches from four tiers;
    - Using stakeholder engagement to gather historic flood information (SIA)
    - Using secondary data from the Environment Agency, Council and Met Office to provide inputs for the model.
    - Modelling varying scenarios of differing interventions to understand impacts and future scenarios.
    - Discussing these outcomes and solutions with stakeholders helps in decision making.

At this stage CS8 is looking at strategic-level decision making, as the next model scheduled to be developed is the system dynamics (SD) strategic response model (SR).

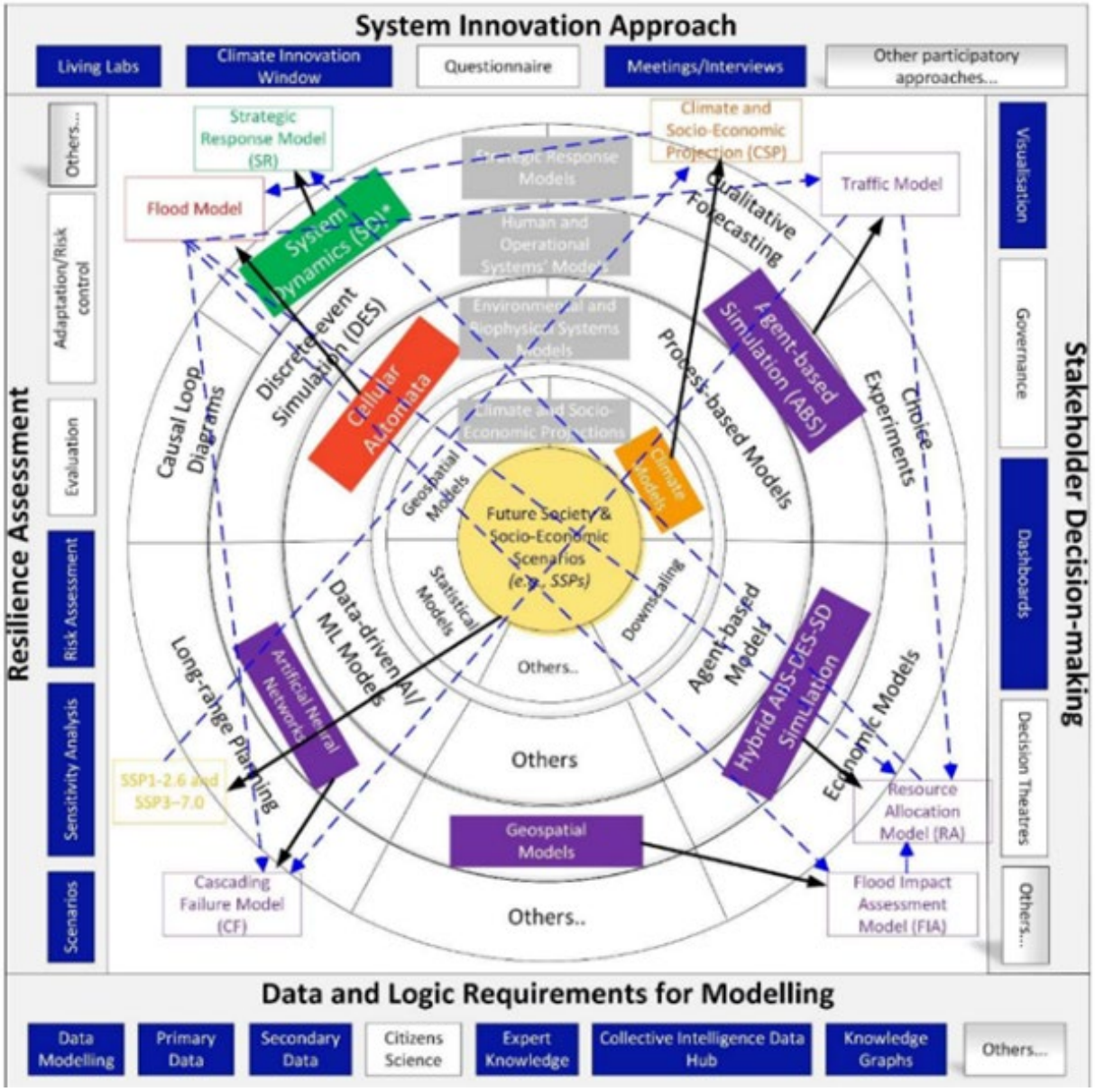


Figure 50: The ARSINOE Dynamic Multi-Sectoral Resilience Modelling and Assessment Framework (DMRM&AF) applied to the Torbay case study. Some components of the ARSINOE wheel and the four pillars are highlighted; this shows the elements that are used in the Torbay case study.

4.3.2 CS1 – resilience wheel progress

The progress of CS1 in regards to implementing its resilience wheel concerns the following activities:

System Innovation Approach pillar:

Living Lab workshops 2 and 3 were conducted. The two workshops have provided feedback for the simulation process regarding validation and evaluation of the models, finalisation of the recommended

co-created solutions that are also simulated, user requirements for the tools to be developed. Outcomes regarding specific interventions were linked to the Climate Innovation Window (CIW). The CIW was explored for solutions.

Resilience Assessment pillar

- Scenarios for vulnerabilities and scenarios for interventions were identified and modelled.
- Sensitivity Analysis was conducted for three critical hypotheses that were identified to be source for unaccepted uncertainty.
- Risk Assessment was conducted in two time horizons: short-term risks and long-term risks.
- Different equations were set for the two horizons depending on the compound hazards and vulnerabilities that are relevant for each of the two horizons.
- Evaluation is an ongoing procedure. Iterations for the evaluation of the outcomes will follow.

Stakeholder Decision-making pillar:

- Visualisation options have been implemented for the different objectives, i.e. long-term urban planning tool, short-term ABM tool, the citizen science app, and the virtual reality for the choice experiments and trainings.
- Governance is facilitated in the interface of the dashboard and the ABM tool.
- Dashboard is developed for CS1. Iterations between the developers and the end users (municipality of Athens) are planned.
- Decision theatres are mobilised specifically for the schools' environmental training

Data and Logic Requirements for Modelling

- All relevant data activities are either implemented or ongoing, including Citizen Science and the Knowledge Graph.

4.3.3 Resilience wheel application in other CS

Case Study 4

The resilience assessment using the resilience wheel methodology has been completed. The performance of the integrated water management model (IWAMM) that has been deployed in CS4, has been described in the report D3.8 (The ARSINOE Multi – System Dynamic Modelling Framework, March 2024), using the following taxonomy:

Tier 1: Future Society and Socio-Economic Scenarios:

- SSP1-2.6 and SSP5–8.5: These scenarios provide insights into future societal and socio-economic conditions, influencing subsequent models to understand the potential impacts on water and energy security.

Tier 2: Climate and Socio-Economic Projections:

- Climate indicators: Based on downscaling approach, the regional climate indicators are produced. These projections offer critical information on the future climate, including extreme events, guiding subsequent models in assessing the vulnerability of water and energy systems.

- Economic indicators: Based on downscaling approach, the regional economic indicators are produced.

Tier 3: Environmental and Biophysical Systems Models:

- Integrated Water Management Model (IWAMM): This model incorporates hydro-climate, socio-economic, and water consumption modelling of sectors based on Water-Energy-Food (WEF) nexus principles. It provides a comprehensive understanding of the complex interactions between water availability, climate, and socio-economic factors. The model utilises hybrid modelling approach.

Tier 4: Human and Operational Systems Models:

- Watershed Hydrological Model (WH Model): The model projects water consumption by economy, energy, and social sectors under selected SSP scenarios. The identification of trans-sectoral and transboundary trade-offs is based on users' prioritisation, recognizing the interdependence of water use across various sectors.

- Energy Generation Model (EG Model): The model plays a critical role in enhancing the understanding and resilience of water management practices by assessing energy requirements, simulating multi-sector interactions, optimising adaptation strategies, integrating renewable energy solutions, and informing policy decisions. It applies analytical modelling approach.

Tier 5: Strategic Response Models:

- Water Allocation Model (WA Model): [CO1] [K2] The model simulates the effects of considered adaptivity (response) measures and their influence on freshwater consumption. It aids in understanding the potential effectiveness of different adaptation strategies to optimise the allocation of water per user, based on WEF nexus principles, considering the interconnectedness of water, energy, and food systems. The model also considers the cross-sectoral integration of water management, emphasising the interdependencies between different sectors and their collective impact on water resources. It is based on long-range planning approach.

As reported in D3.8, the following input-output interrelations between individual models have been identified:

- SSP1-2.6 and SSP5–8.5: Input to the climate indicators and economic indicators in Tier2;
- Climate indicators: They serve as inputs for the downstream Integrated Water Management Model (IWAMM), as well as to energy generation model;
- Economic indicators: Input to water allocation model in Tier5;
- Integrated Water Management Model (IWAMM): Input to water allocation model in Tier5;
- Watershed Hydrological Model (WH Model): It serves as inputs for the Integrated Water Management Model (IWAMM), as well as to energy generation model.

Quoting the findings of the Report D3.8 related to CS4, it can be noted that, by interlinking the existing models listed above, through DMRM&AF, the resilience assessment gains a holistic perspective. This approach enables a dynamic understanding of the interactions between climate, water availability, and the social, economic, and energy sectors, fostering the development of targeted strategies to enhance resilience in the face of drought-induced water scarcity.

5.0 Actions related to WP4 (task 6.3) and data management

In the ARSINOE project modelling tools are developed based on two overarching research paradigms, namely, deductive research and inductive research. WP3 applies theory-driven approaches to develop deductive models (T3.1-T3.4) whereas WP4 has modelling tasks that are devoted to data-driven inductive models (e.g., T.4.1.2, T4.3.1 and T4.3.2). To facilitate data driven models, the ARSINOE Intelligent Data Hub (T4.2) is created as the central data store. All datasets produced, collected, and used in the context of the Case Studies will be stored in the ARSINOE's Data Hub and will be made available using the data catalogue available at: https://catalogue.arsinoe-project.eu. The catalogue for each Case Study will contain both newly produced / collected local datasets and references to existing open datasets (e.g., datasets downloaded from Copernicus).

The available datasets together with their metadata can be extracted through a rest Web Service to enable the machine-to-machine interaction between the Hub and the Sustain Graph, thus ensuring a continuous data flow and update of the available information between the various services that support the models and the sustainability framework.

In addition, external stakeholders could take advantage of the collected public datasets and get access to the set of information used in the Case Study.

This chapter describes progress on the specific actions in the CS related to implementation of the WP4 tasks.

5.1 ARSINOE Knowledge Graph

Part of the data collected within the case studies are used for the population of the ARSINOE Knowledge Graph (SustainGraph). This work is part of Task 4.3. The first implementation of the knowledge graph was performed for CS1 and CS8, which acts as frontrunners.

In the frame of WP4, the SustainGraph has been developed, as a Knowledge Graph that is developed to track information related to the progress towards the achievement of targets defined in the United Nations Sustainable Development Goals (SDGs) at national and regional levels. The SustainGraph has been designed in such a way to include data coming from open data repositories and data coming from the ARSINOE case studies. In the last period, focus is given on the development of mechanisms to support data quality assessment, aiming at the population of the SustainGraph with qualitative time series data. Furthermore, mechanisms to support integration of data in different spatial resolutions are developed and applied in CS1. In this case, data for the region of Attica is introduced, by considering different spatial resolutions from NUTS3 to zip code level. Currently, the SustainGraph hosts 4 billion nodes and 9 billion relationships. A set of analysis scripts are made available to support climate change vulnerability assessment in CS1. Data integration of data coming from CS4 and CS6 is in progress with the objective of interlinking them with the existing knowledge and supporting analysis related to the developed socio-environmental models.

Additionally, within WP4, an open-source Python software library has been developed that provides the mapping between text and the SDGs, taking advantage of novel machine learning techniques, called SDGDetector[4]. The outcomes from the usage of the software library are fed for data population of the

[4] https://gitlab.com/netmode/sdg-detector

SustainGraph. Currently, this feature has been used to map policy documents related with CS1 to specific SDGs within the SustainGraph.

Finally, the ARSINOE visualization kit has been developed to support interactive visualisations for all the ARSINOE CSs, by taking advantage of the structured data made available in the SustainGraph. The data included from all the CS are visualized through interactive maps, bar plots, timelines and Sankey diagrams. The visualisations are not static but constantly updated thanks to the frequent data population mechanisms that introduce fresh data in the SustainGraph. The visualisations include the results of the climate change vulnerability assessment processes, applicable to all EU countries. An indicative screenshot of a visualization for the vulnerability assessment based on the data hosted in the SustainGraph is provided in Figure 51.

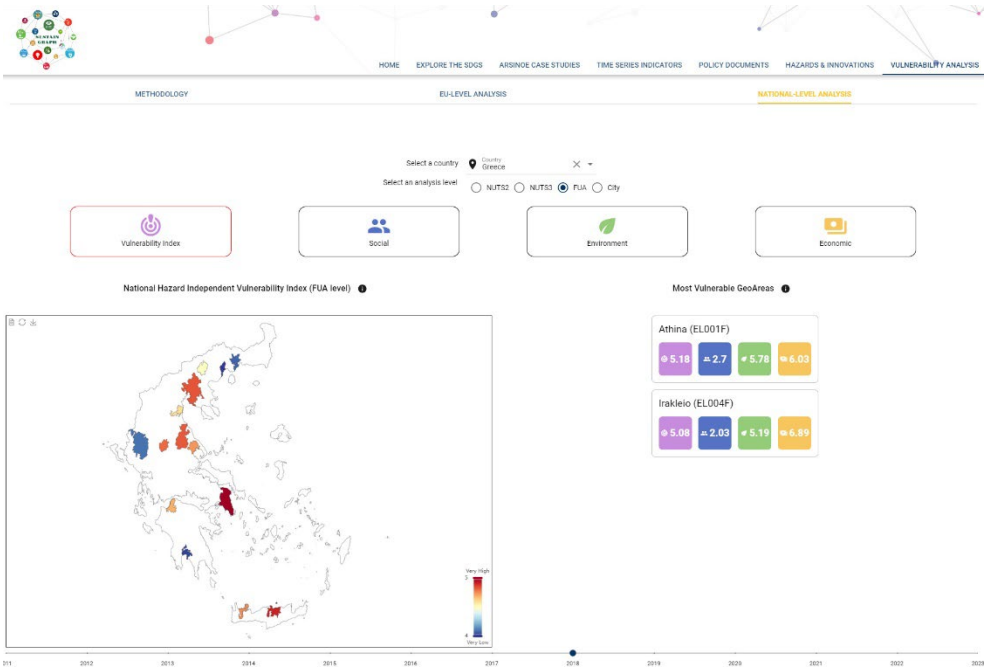


Figure 51: Indicative screenshot with visualization for vulnerability assessment in the Functional Urban Areas (FUAs) in Greece in 2018.

5.2 Dashboard

UNEXE has continued to work with Torbay Council for CS8 to develop the dashboard functionality that has been presented in D4.1. Specifically, this includes processing CA Flood-based scenario flood data into visualisable formats (PNG) and epoch-based data for cascading failure and road risk analysis, visualising the results of scenario-based cascading failure on critical infrastructure and road risk assessment, Figure 52.. In addition, CS8 has collected and harmonised sensor data from the Environment Agency, WeatherAPI and Torbay Council's own sensor network. Currently, this data is accessible through a ngsi-ld/v1 context broker and is visualised as part of the Torbay dashboard. In all visualisation cases (cascading failure and sensor visualisation), sensitive data is restricted through appropriate authorisation and accessibility controls.

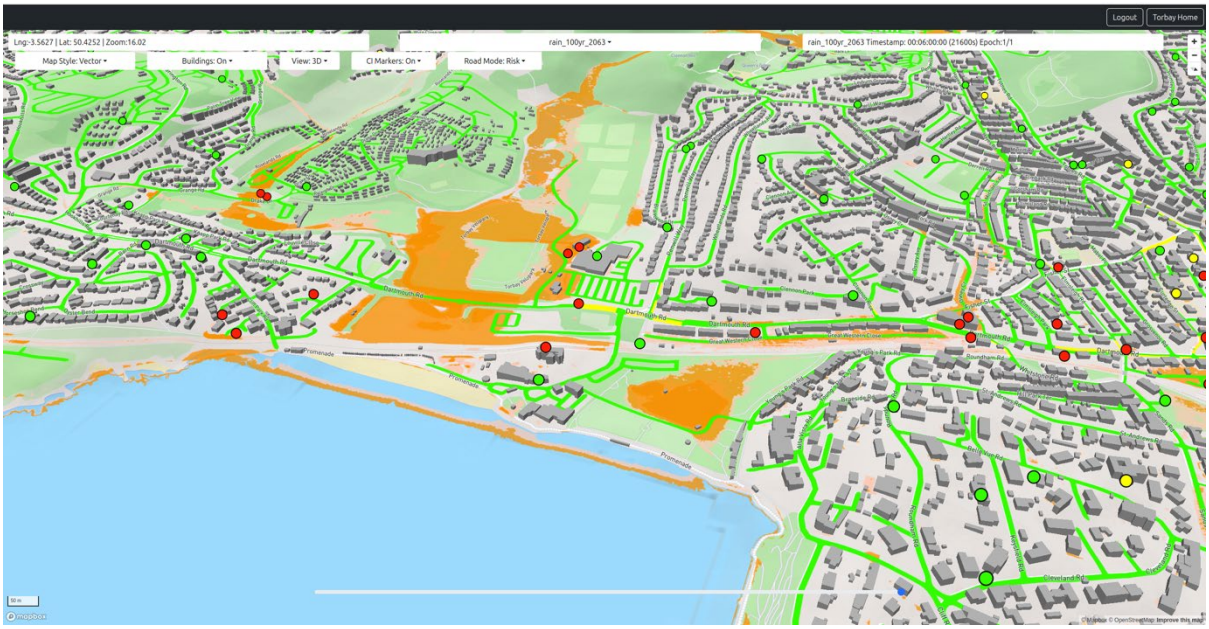


Figure 52: Torbay Case Study Flood map screen, from D4.1.

UNEXE has worked with CS1 / Athens to create nature-based solution evaluator dashboard components, which is also available as part of D4.1. The dashboard visualises Athens-based risks and enables users to visually evaluate NBS (cool roofs and cool streets, green roofs and urban greening and green roofs and urban trees) using Mapbox's swipe functionality to A|B test options, Figure 53.

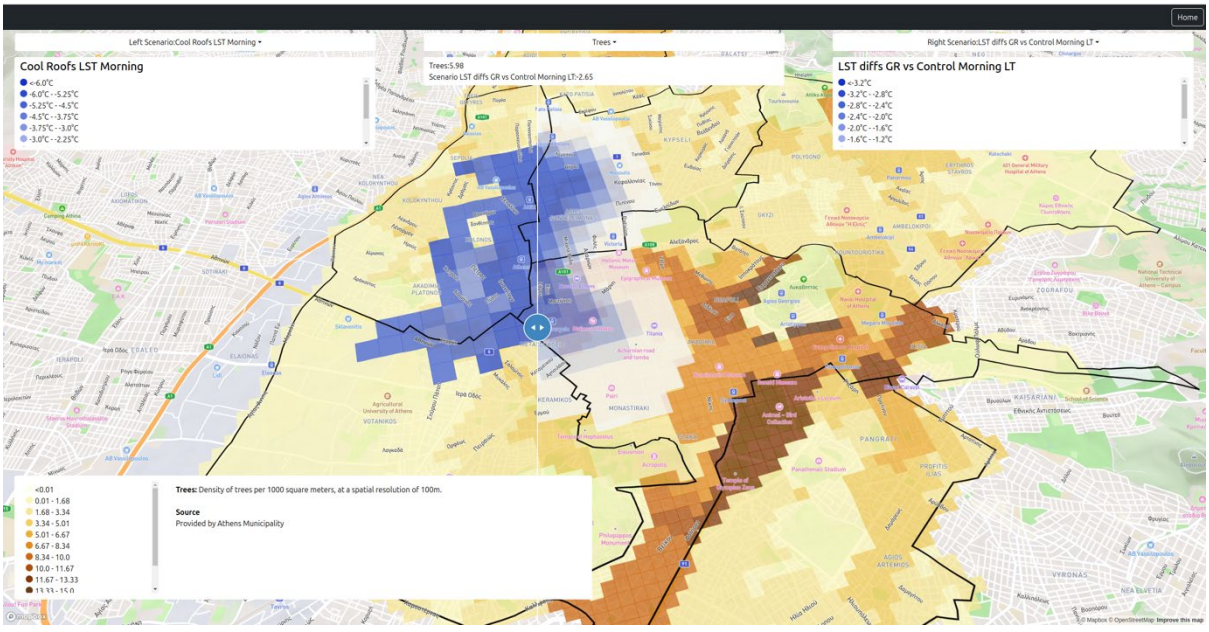


Figure 53: Athens Case Study Dashboard, from D4.1.

5.3 Activities in other Case Studies related to WP4

Case Study 5

Hydrogeological data

3D geological models stand out as highly effective graphical communication tools, offering crucial insights into the geometric characteristics of geological formations. These models provide essential geoscientific data for identifying, safeguarding, and sustainably managing groundwater resources. They play a pivotal role in the creation of numerical groundwater flow models.

In this part of the project we have set up the 3D geological model of the El Hierro Island (Canary Islands, Spain), which has been recently published (García-Gil et al., 2023). This model will serve as the foundational framework for developing the 3D hydrogeological model of the island. By doing so, it aims to advance our understanding of the island's aquifer, exploring its vulnerability and formulating adaptive strategies to address the impacts of climate change.

Initial data:

The 3D geological model of El Hierro was crafted using the GeoModeller software, employing geological observations and cartographic data. This process involves the application of a geostatistical interpolation algorithm, specifically cokriging, as outlined by Calcagno et al. (2008) and Lajaunie et al. (1997). Geographic information management, including geological mapping and the positioning of waterworks and boreholes, was implemented using ArcGIS.

Multiple information sources were consulted for model development, depicted in Figure 54:

- A Digital Terrain Model (DTM) was obtained from the Spain National Geographic Institute (IGN), featuring a raster dataset with a horizontal cell resolution of 25 m. It accurately represented the land surface without interference from vegetation or structures.
- Five geological maps were considered, comprising four sets of paper maps at a 1:25,000 scale from the Spanish Geological Survey (IGME, 1997a-d) and one from Troll and Carracedo (2016). Associated documentation included seven and five cross-sections, respectively, contributing to the construction of the 3D model.
- Lithological profile descriptions from 37 waterworks and boreholes, with a total length of 15,773 m, were utilized as input for the 3D model. These descriptions, accessible through the Canary Islands Water Points Database of the Spanish Geological Survey, encompassed two high-diameter (>5 m) Canary wells (213 m total perforation), 14 boreholes (2,047 m), 10 galleries (8,139 m), and 11 well-galleries (5,374 m). Notably, high-diameter wells in the Canary Islands commonly transition from vertical to horizontal or low-angle drilling after reaching the groundwater level. The 3D geological model incorporated detailed information on direction changes and inclinations of galleries and well-galleries.

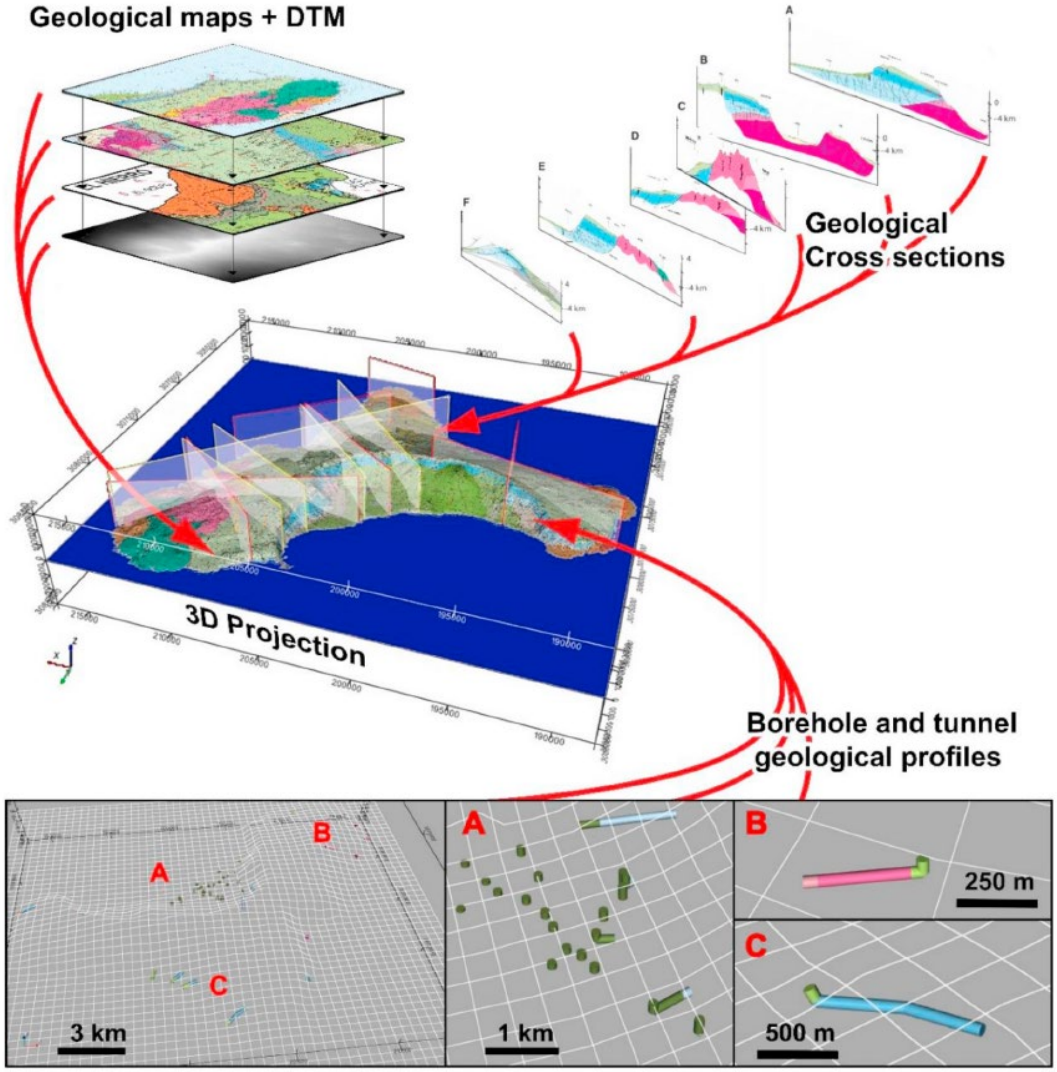


Figure 54: Definition of the four primary sources used for building the 3D geological model of El Hierro volcanic island: Digital Terrain Model (DTM), surface geological maps, vertical geological cross-sectional diagrams, and borehole and gallery input data (Source: Garcia et al., 2023).

Uncertainties and limitations

Hydrogeological modelling of the island of El Hierro has not been analysed in depth until now. The most exhaustive studies of this type carried out in the Canary Islands correspond to the islands of Gran Canaria and Tenerife, with less information available about the aquifer in the non-capital islands. Moreover, the most detailed hydrogeological studies did not begin to be published until 1975, as a result of the Scientific Study of Water Resources in the Canary Islands Project SPA/69/515 (SPA-15, 1975).

Therefore, the datasets on geological information of El Hierro Island are mainly available as 2D maps and associated vertical geological cross-sectional diagrams, and waterworks and boreholes logs. Most of this dataset proceeds from petrological, geochronological and palaeomagnetic data. The data was obtained from geological sections showing the collapse scars and deep gullies and the wells, boreholes and water-mining tunnel geological profiles.

In other words, all the information available for the construction of the 3D model was dispersed in different maps or databases, encoded in different formats and transcribed in different classification schemes of geological formations. This aspect is important because the calculation by cokriging of the equipotential surfaces that generate the 3D model requires the coherent definition of the stratigraphic units involved in it, as well as a hierarchy between them. Therefore, if there is no coherence and relationship in the input data of the programme, the equipotential surfaces model cannot be calculated correctly.

Procedure to reduce uncertainty

The first step to reduce uncertainty and achieve a coherent 3D modelling was to define the geological pile of the model, through an exhaustive consultation and literature review of the available background information. Considering that the objective of the 3D geological model is to address groundwater management, this project targeted the mapping of different hydrostratigraphic units of the island to discretize rock porosity and permeability distributions.

This geological pile is composed of a sequence of 11 formations, covering the whole island and allowing the inclusion of mapping units and relevant known structures in a generalized geological model.

Once the geological formations were reclassified, 3 main workflows were carried out to review, integrate and process the georeferenced surface geological (A), vertical cross-sections (B) and borehole and gallery input data (C) (Figure 55).

The final task consisted of checking, through exhaustive 3D visualization, the consistency between all surface and subsurface interfaces to be interpolated in 3D. This calculation process involves the review of all data that individually appear to be correct but may not be consistent as a whole, thus not allowing the calculation of the final model.

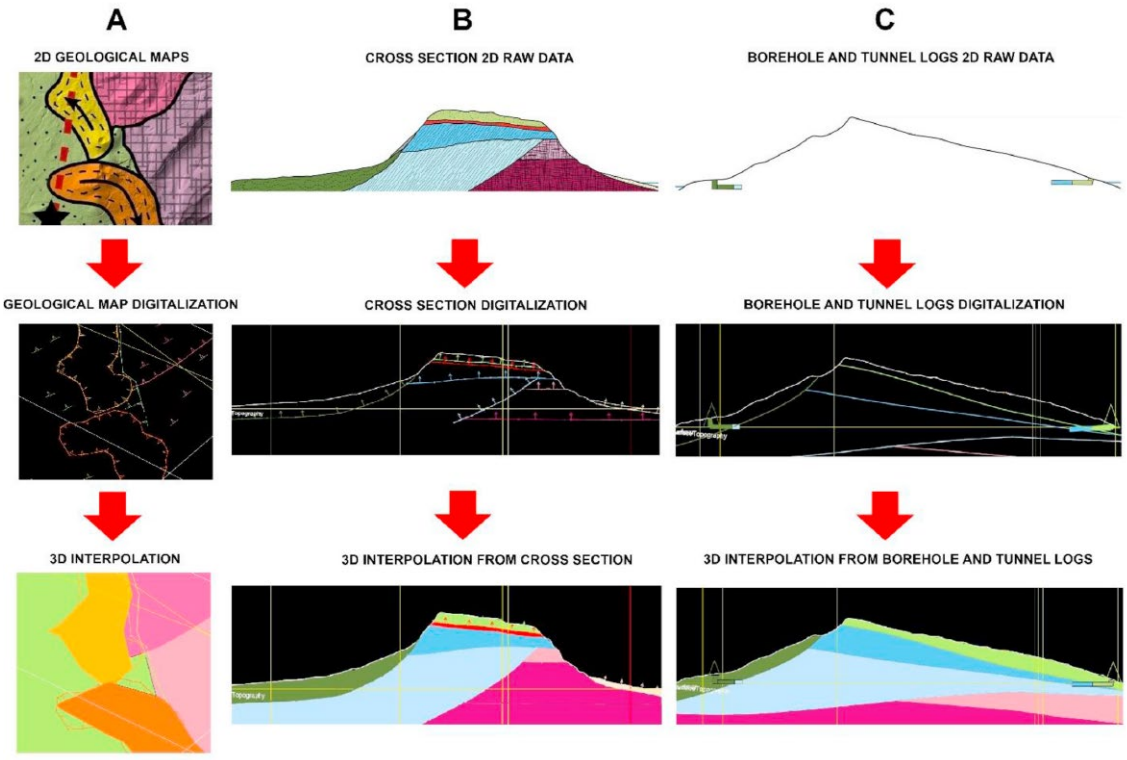


Figure 55: Three main workflows processing surface geological (A) vertical cross-sections (B) borehole and gallery input data into fully 3D geological model. Georeferenced input features (top) extracted from the surface maps, vertical cross-sections and borehole and gallery data

imported into the GeoModeller interface (middle) and results obtained from the 3D interpolation (Source: Garcia et al., 2023).

Final result and quantification

This is the first time that we have come so far in terms of the hydrogeology of the island of El Hierro, having been able to review and unify all the existing geological information and integrate it into a 3D geological model using GeoModeller software (Figure 56).

This is a methodology that can be exported to the rest of the Canary Islands, being this key to have a better knowledge of the behaviour of the island aquifers, being able to implement all this new information in future Hydrological Plans, and acting as a fundamental tool to establish management measures that take into account future scenarios derived from climate change.

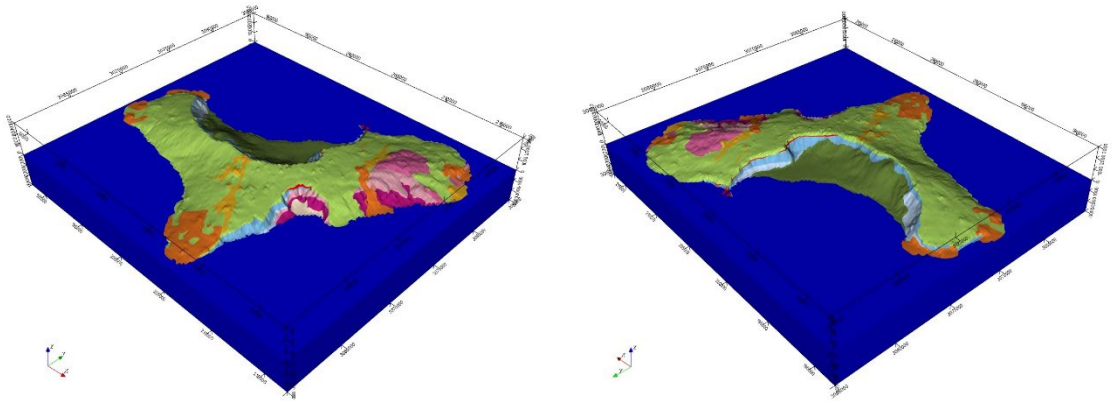


Figure 56: Obtained fully 3D geological model of El Hierro Island observed from the southeast (left) and northwest (right).

5- Potential improvements

On a regional scale, the 3D geological model of the island of El Hierro is quite satisfactory. However, there are about twenty hydraulic works scattered around the island that do not have a lithological profile description. Obtaining these records, together with future complementary geophysical studies in certain areas, could help to refine the model in specific places.

Sea level rise:

In relation to the sea level rise modelling the following data treatment and management issues were elaborated.

Lack of deep-to-shallow water continuous bathymetry data

As the input data for the sea level rise modelling and flooding study, continuous bathymetry, meaning deep to shallow water continuous data, is essential for the wave RUN-UP propagation. In other words, the wave propagation would have inherent uncertainty if bathymetry data are not a series of continuous datasets. This uncertainty can thus affect integrally the flooding study result. Therefore,

The global openly available bathymetry dataset from GEBCO was the first resource used for the implementation of the sea level rise modelling. This dataset presents a spatial resolution of 450 m between isobatics and is more suitable for studies developed on deep waters.

As others volcanic islands, the bathymetry nearshore changes dramatically within hundreds of meters from the coast, thus, the isobatics are stacked up onto each other, which means the spatial resolution between lines in a dataset should be high enough to detect those changes. However, the GEBCO data spatial resolution was not capable of detecting these subtle changes in the nearshore bathymetry in Las Palmas and El Hierro Islands.

The accuracy of topographic data, including elevation and bathymetry, can significantly impact the reliability of the model. Incomplete or inaccurate data may lead to errors in predicting coastal flooding. Hence, aiming on tackling the uncertainty, GRAFCAN Canarian bathymetry dataset was integrated with the GEBCO set to obtain an improved dataset.

The sea level rise model did not offer enough spatial resolution to study coastal flooding at a local scale

Numerical modelling of natural events is a fundamental tool to study the progression of those phenomena over the years, especially those related to climate change. To simulate the sea level rise in the Canary Islands, numerical modelling was employed for the coastal flooding study.

There is an inherent uncertainty associated to this tool as what it does is use a mathematical equation to simulate and describe a natural event. Apart from that, there are other uncertainties. One of them regards the numerical model's spatial resolution.

The spatial resolution plays a critical role in capturing fine-scale details and variations in the landscape. Regarding the spatial resolution and cell size of the model, it refers to the size of the grid cells used to represent the study area.

A smaller cell size provides higher spatial resolution, allowing for a more detailed representation of the terrain. However, using smaller cells increases computational demands, running time, and memory. The choice of cell size is often a trade-off between computational efficiency and model accuracy. Larger cell sizes are computationally more efficient but may sacrifice accuracy in representing intricate coastal dynamics.

It's essential to validate the model at different spatial resolutions to ensure that the chosen cell size provides reliable results. Validation involves comparing model outputs with observed data to assess accuracy and reliability. In summary, the spatial resolution of the model is a crucial factor in addressing uncertainties related to the representation of coastal features and the accuracy of predictions. Balancing computational efficiency with the need for detailed simulations is essential for effective coastal flood modelling in volcanic islands.

The first model used did not present enough resolution for such a local scale process, such as the flooding in La Frontera bay (El Hierro) and Santa Cruz port area (La Palma). Therefore, it was chosen to change to MIKE 21 HD. The built grid cells have the shape of a triangle (see Figure 57 for an example), and finer resolution near the coast (in the flood zone up to about ~40 m).

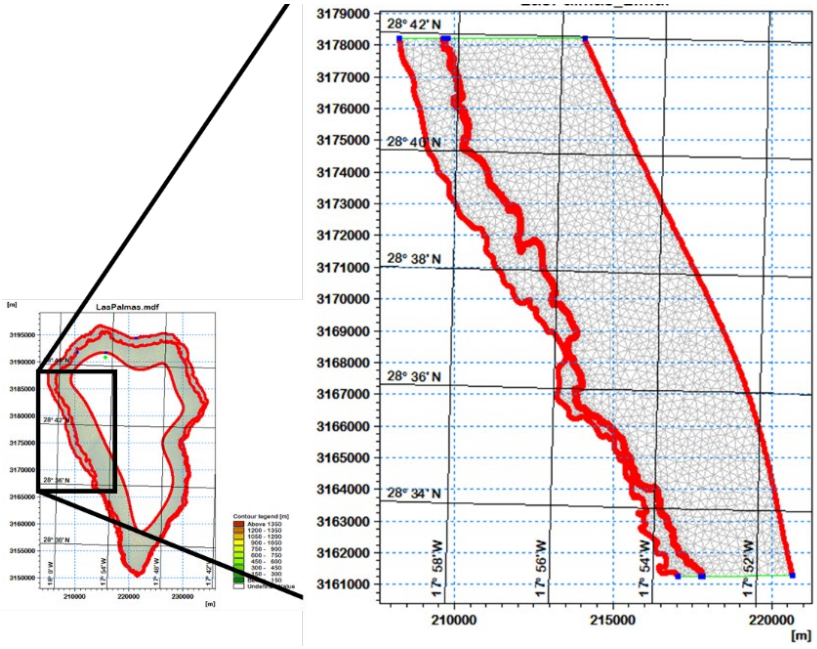


Figure 57: Example of MIKE21HD grid cell model for La Palma.

The available official coastline lacks precision compared to recent territorial orthoimages

Another very important input data for the coastal flooding model is the coastline shape. The more precise it is, the better the sea level rise model will be able to simulate the most vulnerable regions to be flooded. The official coastline available on the Canarian Government website presented high inaccuracy compared to recent orthoimages, thus a flooding model result based on that coastline will present inherent inaccuracy.

It is known that coastal features are dynamic, with changes occurring due to erosion, sedimentation, and human activities. Incomplete or Outdated Data Coastline shapefiles may be based on outdated or incomplete data, especially in regions with rapid coastal development. This can result in a misrepresentation of the current coastline and may lead to inaccurate flood predictions.

For our Case Study, we believed the CNIG coastline is not appropriate for the flooding study, although says on the website that it is up to date. Therefore, some investigation was carried on to understand the lack of precision sources. It was found that the coastline acquired from CNIG is extracted from the electronic nautical charts (ENC) of purposes 4 and 5 of navigation published by the Hydrographic Institute of the Navy (IHM) of Spain.

For this work, to reduce the uncertainty associated with this input data has chosen to manually digitalize the coastline through orthorectified images from 2023 available in the Canarian Government database (Ortofoto Territorial, IDE Canarias). This method was chosen due to the lack of accuracy and the outdate official coastline available. Examples of comparison between both coastlines is shown in Figure 39. However, the digitalization of the coastline through orthoimages may not always capture the coastline changes accurately, leading to discrepancies between the modelled coastline and the actual shoreline, presenting inherent inaccuracy as well.

Case Study 9

Field data concerning crop management and crop performances in terms of yields, phenology, grain quality and technological quality have been collected and analysed from durum wheat yield trails in “S.Michele” AGRIS experimental farm.

A 20-year long term agronomic dataset was imported from Excel to PHYTON environment to be used for the model analysis and comparison.

No specific data management actions have been undertaken for climate scenarios.

6.0 Actions related to WP5 and open tenders (task 6.4)

A number of Open Tenders for Innovations have been organised in WP5. The open tenders are used as a means to identify promising or mature innovations to be included in ARSINOE's Portfolio of Innovations. The aim is to identify promising or mature innovations that can help our case study regions become more climate resilient. Applications will be evaluated and the selected ones can receive up to EUR 25.000 or EUR 50.000 (depending on the case study region they are associated with) for demonstration activities. Innovations are selected by an Evaluation Committee formed with members of ARSINOE consortium (with the leaders and co-leaders of each regional case study to representing the interests of their stakeholders and independent partners to ensure the transparency and neutrality of the process). The Committee evaluates the applications according to seven pre-defined criteria which include: three types of readiness (Technical, Social, Market) and four qualitative criteria (Testing Feasibility, Innovator Vision, Promising Innovation, and Contribution to Social and Governance Transformation).

The open tenders were prepared in conjunction with the stakeholder processes running in WP2 and WP6, in particular the living labs. Through the tenders relevant actions for final co-development and integration of these solutions in the regional Innovation Packages are then funded. The first round of the open tenders was prepared in the previous reporting period (see D6.2), in which CS3, CS4 (Albanian part) and CS5 participated. In this chapter, the outcomes of the selection process of the first round (which was launched in May 2023) and progress with implementation are reported, as well as the identification of relevant solutions for the other case studies, the preparation for the second round of the Open Tenders (launched in November 2023), and the evaluation and selection of the solutions to be financially supported for their inclusion in the Innovation Packages and the roadmap for implementation. A report on the preparations for the open tenders was provided in Deliverable 5.1: 'Synthesis report on the results of the open calls for innovations' and a full report of the outcomes of the open tenders and the innovations implemented will provided in D6.4 and D6.8 at the end of reporting period 3.

Specific information on the open tender process concerning the participating case studies is detailed below.

Case Study 1

Open Call background and topics

The key challenge for the tender for innovations is to enhance the Athens' capacity to deal with extreme heat, both in terms of preparedness and planning as well as responsiveness during the events. Different climate adaptation measures, such as nature-based solutions, modelling and monitoring tools could contribute to addressing this challenge, embedded in the City's plan for adaptation to climate change. Athens sought social, technical and governance innovations as well as concepts for light structural and nature-based solutions in an extreme heat management context.

During the collaborative sessions with stakeholders, the following potential solution categories emerged.

Nature-Based Solutions:

- Emphasis on leveraging the natural environment to mitigate the effects of extreme heat.
- Integration of green architecture to promote cooling and sustainability.

Water Management and Blue Infrastructure:

- Measures that provide a direct cooling effect for the city.

- Solutions necessary for maintaining and supporting green spaces, such as irrigation and water retention systems.

Digital Tools and Models:

- Technologies that enhance the decision-making capacity of policymakers and stakeholders.
- Tools that facilitate planning and/or responsiveness to extreme heat challenges.

Technical/Engineering Solutions:

- Engineering measures that can directly mitigate the effects of extreme heat or support other solutions.

Governance and Communication:

- Strategies and platforms that foster cooperation among different actors.
- Initiatives that promote knowledge sharing across sectors and create a conducive framework for action.

Social Innovations:

- Initiatives that support social and behavioural changes in response to extreme heat.
- Education and capacity-building programs to raise awareness and preparedness.

Energy/Mobility:

- Solutions that address the energy consumption patterns during extreme heat events.
- Mobility solutions that can mitigate the effects of heat or provide relief to the population.

The selection process

CS1 participated in the 2nd round of the open tender, with the call launched in December 2023. Twenty-one innovations were received for the CS1. They were evaluated with a set of predefined criteria and weighting factors, relevant to the innovation value and vision, the technical, social and market readiness, the technical feasibility and impact on social transformation and governance. The first evaluation circle resulted in the top 10 innovators which were invited to submit a full proposal, following a given template.

Following coherent evaluation of the submitted proposals, and consultation of ADDMA with the City of Athens, as key stakeholders, decision makers and future implementers, three innovators were invited for the negotiations stage.

Selected innovators

KAUSAL Platform (Kausal)

The Kausal Platform is an open-source, SaaS Platform with two modules: Kausal Watch and Kausal Paths These modules are integrated to provide best possible support to cities. Kausal Watch facilitates the management, planning, monitoring, measuring and communicating of local climate actions. It helps to improve the internal cooperation of a city administration by allowing everyone responsible to work on the same Platform, insert data and update information (different rights depending on the roles). Kausal Paths is a scenario tool to identify relevant goals for climate actions. It collects all climate data in one place and estimates the impact of the City's climate actions by building interactive visual scenarios. The Platform functions as a web based Software-as -a-Service solution, cities have their own admin interface

where they can insert data themselves. The Platform will be set up according to the city´s design guidelines and will thus look like part of their own internet presence.

- Benefits: The KAUSAL solution is designed based on challenges that most of the local administrations face:
    - ambitious climate and other sustainability plans, but no clear management process
    - unclear responsibilities within the administration
    - actions in the plans are lacking targets
    - data collection is laborious and periodical
    - low visibility to internal and external stakeholders
    - evaluation and updates rely on static black-box impact assessment
    - difficulties in decision-making when it's not clear how the actions impact on the overall goal.

The establishment of the platform will enable the City to Athens to enhance its Resilience through improved Governance, being one of the Open Call areas targeted.

Singular Ribbon (Singulargreen)

The SingularRibbon is a lightweight linear structure that can be implemented in public spaces to bring nature to those places where it wouldn´t be possible or easy in other ways. The SingularRibbon is a new way to bring nature to those areas of the city where it cannot be placed in an ordinary form. It consists of a lightweight linear structure containing the necessary channels to maintain a continuous strip of vegetation through hydroponics, allowing the recirculation of excess irrigation water and the integration of other urban services such as lighting or telecommunications. The system has flexibility in its applications, as it can be installed either anchored to existing facades using tensioning cables or attached to small embedded pillars in the ground. The work required to implement this innovation is simple and does not involve trenching or pavement relocation. Being a hydroponic system, vegetation can thrive in a very small space, and the parameters of its growth can be easily controlled remotely using telecontrol technology. The temperatures in the implementation area will decrease not only due to the shade generated by the plants but also because of their evapotranspiration effect. SingularGreen, will provide the necessary expertise to select species that best adapt to the climate in which the innovation will be installed, optimising water usage and minimizing the need for maintenance.

Tiny Forest (Earthwatch)

The innovation is about establishing a Tiny Forest in Athens, creating a new quality green space in the city and engaging the local community in planting and citizen science activities. Tiny Forest brings the benefits of woodland right into the heart of the cities and urban spaces: connecting people with nature, helping to mitigate the impacts of climate change such as heat stress, as well as providing nature-rich habitat to support urban wildlife. A Tiny Forest is a dense fast-growing native woodland, typically made up of 600 trees planted in a tennis-court sized plot of 200m^2. Earthwatch has adapted a robust method of tree planting developed in the 1970s by Dr Akira Miyawaki to encourage accelerated forest development. Through Tiny Forests, communities are engaged to plant, maintain and monitor the forests through activities that support community ownership and provide social benefits in urban environments. Using citizen science, Tiny Forests are monitored as Living Labs to understand the environmental benefits they provide, including thermal comfort (cooling effect of the trees), biodiversity, carbon storage and flood management benefits. The project will be led by Earthwatch Europe who has successfully planted

over 200 Tiny Forests in the UK and Europe. Earthwatch will work in collaboration with UrbanDig, a local organisation with expertise in community engagement.

Planning and Progress to date

Kausal Platform:

Contract Signed: 19/06/2024

Kick off meeting held in July 2024.

The Kausal Platform will be launched on M6, i.e. 12/2024.

Support period of another 6 months is foreseen, i.e. 06/2025.

Regular meetings held with the innovator, once every month. Progress updates are provided.

Progress to date: data provided by the City of Athens; the development of the platform in good progress. Draft version provided.

Singular Ribbon:

Contract signed 01/07/2024.

Implementation period to be completed in 6 months, i.e. by January 2025. Another 6 months foreseen for monitoring of the project performance and impact.

Regular updates will be provided every month.

Two trips are planned by technicians: the first to check the proposed, installation site and the 2nd to proceed with the implementation. These are planned to take place between September and November 2024.

The ADDMA has identified the location for the Singular Ribbon installation, and relevant material (drawings and photographs) have been shared with the innovator. The location is within the Serafeio area, where ADDMA premises are located. The area fulfils the ARSINOE requirements, being amongst the identified vulnerable areas, and also exhibits a number of advantages relevant to the technical implementation of the innovation per se (accelerate process, vandalism protection), but also with the monitoring and demonstration value it can provide (Cooling Innovations Hub).

Serafeio is also an Athletic Complex of Athens, and a plot close to several cultural benchmarks of the city, such as the Mpenaki Museum, The Technopolis of the City of Athens (Cultural Complex), the Industrial Gas Museum). Thus, the development of the innovations at Serafeio Athletic and Community Complex, apart from benefiting from the ADDMAs full support, can also produce a high visibility outcome of ARSINOE.

Tiny Forest: Contract signature pending, for administrative reasons (latest update, 09/09/2024); expected to be concluded soon.

However, several meetings have been held, to discuss also on technical, implementation aspects of the project. Thus, preparatory work has started.

The Tiny Forest location has been identified, within the Serafeio Complex, qualifying as a very good location for the reasons discussed above, under the Singular Ribbon.

Case Study 2

Port of Valencia

Open Call background and topics

In November 2023, the Second ARSINOE Open Tender for Climate Adaptation Innovations began, in which the Valenciaport Foundation presented the challenge of the Port Authority of Valencia related to the design of a tool linked to the Climate Change Observatory.

Traditionally, port infrastructures have been designed considering past climate events. However, since the climate is changing, these infrastructures must be sized taking into account future climate conditions. Moreover, it is important for port managers to know when they will need to implement adaptation measures for their facilities and operations to address the effects of climate change.

Finding a solution capable of determining which of the climate scenarios or as originally called Representative Concentration Pathways of IPCC (RCP4.5 and RCP8.5, more recently they are called Shared Socioeconomic Pathways, SSP2-4.5 and SSP5-8.5) aligns better with the reality of the port is crucial. This will provide a decision-making tool to establish future climate variables and, in a way, predict which climatic issues will impact port operations. Additionally, the tool should allow correlating oceanoclimatic events with their effects on infrastructures and port operations to assess real impacts. This serves as a foundation for designing adaptation measures.

For this challenge, the goal is to establish a climate change impact monitoring system that integrates with the data from the SAMOA system (Puertos del Estado, https://www.puertos.es/es-es/proyectos/Paginas/SAMOA.aspx). SAMOA provides oceanic variable predictions for the Port of Valencia, and the system should also collect other meteorological variables from both the port's own stations and AEMET (Spanish Weather Agency, https://www.aemet.es/en/portada). Additionally, terminals operating in the port should be equipped with a user-friendly tool, like a mobile app, allowing them to quickly and clearly report any events (shutdowns, damages, delays, etc.) caused by climatic conditions. This way, real-time data on the evolution of variables and their impacts on port infrastructures and operations will be available.

The extended observation of both variables and events should enable predictions based on variable forecasts. It will also allow verifying whether the variable forecasts obtained during the modelling phase align with the actual climate evolution. This verification will help assess whether the real evolution conforms to the likely or unfavourable climate scenario (SSP2-4.5 and SSP5-8.5). This, in turn, will assist port authorities in obtaining the most accurate future climate predictions, facilitating proper sizing of new infrastructures and determining when adjustments to current facilities are necessary.

The selection process

The application period was from November 22, 2023 to January 8, 2024. Seven proposals were received (Table 30)

Table 30: Overview of proposals received in the 2nd open call for the Port of Valencia.

Number of application for Second OTI	Name of the Innovation	Company
#7	SACIP (Sistema de Alerta e información Climática para Infraestruturas Portuarias - Climate Alert and Information System for Port Infrastructures)	METEOGRID
#10	LABs (Little Alert Box System)	Global Smart Rescue
#14	Saferplaces	SaferX srl
#38	CliWeCaFor (Climate, Weather, Calendar, Forecaster)	HEI- HydroEnergoInzenering
#57	CLEVER TOOL (Climatic Environmental Vulnerability Event Recorder TOOL)	Nologin Oceanic Weather Systems S.L.U.
#58	CoastAI Insight	HARTIS Integrated Nautical Services Ltd
#80	AirNode and Libelium	AirNode and Libelium Consortium

In accordance with the evaluation process outlined by the ARSINOE with BRIGAID projects, the proposals were reviewed and evaluated by a committee composed of people from Fundación Valenciaport, Port Authority of Valencia, Opentop and BRIGAID.

Finally, two proposals, SACIP and CLEVER TOOL, were shortlisted. While additional proposals were considered, they did not sufficiently align with the objectives of the tender and therefore were not included. The shortlisted proposals prepared an innovation presentation document and have been invited to participate in a presentation session.

Selected innovators

CLEVER TOOL (NOW Systems)
After the entire selection process, the decision to award NOW Systems and its innovation CLEVER TOOL the contract was based on the following reasons:

- They have fully understood the challenge and the needs of the pilot.
- They have demonstrated comprehensive knowledge of the information systems of Puertos del Estado, which are suppliers of both data and user verification systems necessary for the successful development of the application.
- They possess in-depth expertise in the methodology of projecting climate variables and extreme events, as well as a thorough understanding of the port environment, including infrastructures, operations, and port governance.
- Finally, the proposal is innovative. NOW Systems' approach leverages cutting-edge technology and unique methodologies that not only address the current needs of the Valencia challenge project but also anticipate future threats and opportunities.

This innovation aligns perfectly with the use case proposed by Valencia Port and holds potential interest for other Port Authorities as well.

The innovation, CLEVER TOOL, aims to improve the knowledge on how the environmental drivers may impact in the port and its operations, by identifying (i) the main features of these drivers and (ii) also the site & activity-specific threshold values that lead to disruptions.

In the demonstrator site of Valencia Port the objectives are:

(i) develop and integrate CLEVER TOOL in ValenciaPort, allowing the port community to log hazardous events at the Port

(ii) connect this info with Near-Real-Time observations and model products

(iii) test CLEVER in a real environment, validating the easiness and clarity of the web app

(iv) reach TRL 7 for the innovation.

Despite there are metocean services that provide Near-Real-Time observations and short-term forecasts, no tool can record the weather impact on port operations and infrastructures. Some stakeholders keep a historical track of downtimes due to bad weather, but this data is not included at the former services. CLEVER will aggregate these two data sources, providing a climatic event registry logger that would allow technicians to identify those drivers and threshold values that may cause operational stops or infrastructural failures.

The contract between the Fundacion Valenciaport and NOW was drafted, negotiated and signed in March and the activities related to the contract started on April 1.

Planning of the implementation of the innovation

The demonstrator is split into four main stages, that include the development, testing and validation of the innovation in the context of the study case (Valencia Port). The planning is also represented in Figure 58:

1. Co-design stage of the user interface between NOW Systems and Valencia Port, to integrate previous experience and expert criteria in the Tool. This stage will also define the technical requirements, e.g. where CLEVER will be implemented and which sources of information will be included.

2. CLEVER Development, split into front-end, back-end and auxiliary services. This stage will be the most demanding in terms of human resources, as is the core of the innovation. It will be released in 2 loops, with a first functional version that will be tested by selected users and a second version that will integrate improvements and corrections.

3. CLEVER Tool validation and improvement assessment. After the development of the first version of CLEVER, selected end-users will be allowed to add climatic events to the database. User feedback addressing usability and easiness of the web-app will be considered during the second development loop. Technical assessment of climatic events (e.g. quality of the provided info on the drivers' features and their associated impacts), done by NOW Systems with the collaboration of ValenciaPort will allow to understand whether CLEVER provide enough feedback, or if it needs some fine-tuning of event registry section.

4. After the co-design stage, and during the duration of the demonstrator, interaction with stakeholders and port community is needed to accomplish stage 3. With the help of ValenciaPort multiple dissemination actions, including among others a formal launch of the demonstrator and training sessions for stakeholders, will be carried out.

As a transversal stage, dissemination of the CLEVER TOOL and results from the demonstrator in ValenciaPort will be done, covering from general purpose to technical and scientific forums.

	M 1	M 2	M 3	M 4	M 5	M 6	M 7	M 8	M 9	M 10	M 11	M 12
WP 1: Conceptualization & Co-design												
Definition of General Requirements												
Mockup Design		MS 1										
Design Loops												
WP 2: Service Development												
Front-end (web app)									MS 2			
Back-end (server)												
Database Design												
Integration with 3rd-party Tools												
Auxiliary Service Developments												
WP 3: Service Demonstrator												
PreOperational Deployment: Testing and monitoring..												
Service Qualification: Technical assessment of stored events (drivers and impacts).												MS 3
WP 4: End-Users engagement												
Stakeholders Meeting												
CLEVER Service User Training.												
Service Desk Capability: Customized Support to end-user climate event logs												
WP 5: Dissemination Activity												
General Purpose												
Technical Dissemination												

Figure 58: Gantt chart for implementation of the innovation CLEVER TOOL in CS2.

Monitoring plan of implementation

To ensure the successful implementation of the project, a monitoring plan has been established. This plan is designed to track progress, address challenges, and make necessary adjustments throughout the project's lifecycle.

- Monthly Meetings: Regular monthly meetings have been scheduled to systematically monitor the project's progress. These meetings will involve key stakeholders and project team members to review milestones, discuss challenges, and ensure alignment with the project's objectives.

- Technical Meetings: In addition to the general monitoring meetings, specialized technical meetings will be organized as needed. These will focus on identifying the necessary data and data sources, understanding user requirements, and addressing any technical issues that may arise.

While monthly meetings provide a consistent check-in point, the frequency of these sessions should be carefully considered to ensure they are both reasonable and effective. Depending on the phase of the project, more frequent (e.g., bi-weekly) or less frequent check-ins might be necessary. This flexibility ensures that the monitoring process is responsive to the project's dynamic needs.

Therefore, the monitoring plan will adapt to the project's timeline, marking key dates or ranges where adjustments in meeting frequency will be made.

Implementation results (if already available)
According to schedule, the first version of the tool will be available in October.

Port of Piraeus

Open Call background and topics
The identified problem statement is the following: "Climate Change (Heatwaves, Wind/Waves, Extreme Events) Negative Impacts to the Port Operations, Port Infrastructure and nearby community (Stop operations, increase of accidents, damage in goods, passenger's health, client complaints, Energy Efficiency issues, Air/Water Pollution)." The need to address these issues is crucial for the port's resilience and effective adaptation to the changing climate conditions.

The topic of the open tender launched on **11/12/2023** was the implementation of an innovative solution that will contribute to Climate Change Resilience/adaptation of the Med Ports.

The solution requested by PPA SA was the development of a system (a software-application that could also use sensors or other equipment) aiming to **a)** monitor the air quality at the premises of the PPA, **b)** predict and alert extreme air polluted events that could be harmful to personnel, visitors and citizens and **c)** will propose protection measures. The system shall assess data as an input such as number of vehicles, ships, cruise ships, climatic characteristics, etc.

The selection process
The Tender remained open (at PPA SA & ARSINOE websites) until **Monday 15/1/2024 at 23:59 CET** (initial date was **Tuesday 9th of January 2024, 00:59 am**) and **the budget is €50,000 + VAT.** The NET amount is funded by the program.

During Phase A, **8 applicants** submitted their offers, and **3 applicants** qualified in **Phase B**.

Table 31: Overview of proposals received in the 2nd open call for the Port of Piraeus.

No	Applicant	Solution
1	AirNode and Libelium Consortium	AirNode and Libelium
2	WaltR	DIORAMA LET-Ports (Local Emission Tracking - Ports)
3	Combat Climate Change ApS	ConBubble - Making recycled shipping containers injected with microbubbles
4	University of Padova	GHG-Sound: air quality monitoring through virtual sensing
5	MIA Teknoloji	CarboWare: GHG Monitoring with Blockchain-Based IoT Sensors
6	Solumar	Solumar
7	Global Smart Rescue	LABs (Little Alert Box System)
8	Everimpact	IoT CO2 cities Monitoring

The evaluation of the 8 applicants was undertaken by 4 members of the evaluation committee (3 members from PPA and 1 from BRIGAID Connect Team), based on a template that was provided by the BRIGAID Connect Team.

On the 4th of March 3 candidates were informed by the BRIGAID Connect Team that had been shortlisted for Phase B of the ARSINOE 2nd Open Tender for Innovations. The deadline for the submission of the Demonstration proposal was **12/3/2024**. The shortlisted innovators were: WaltR, Everimpact and Airnode and Libelium Consortium.

Selected innovators

PPA selected **DIORAMA (WaltR)**

The DIORAMA solution aims to accurately monitor pollution, polluting activities, and climate conditions locally *and with respect to the wider surrounding area and activities*. These data are transformed to final information on real-time conditions (air pollution), predictions on future events, and projections on affected communities and actors (dispersion). The objective is to design and be able to apply informed solutions, tailored to the local, and case by case attributes through this data driven information.

Moreover, as ports usually (and in the case of Piraeus Port) are within and/or in close proximity with cities, it is noted that there is a high need to estimate the impact of the port's activities to the surrounding, as well as other potential sources and their contribution. For this DIORAMA will use near real time and historical satellite data to model and/or measure the impact of activities at a wider scale.

Computer Vision and ML provide the ability to automate the collection of data from crucial activities (e.g. statistics about cars activities in terminals) and combine them with accurate local pollution data by SotA equipment and algorithms. Algorithms trained by these data can predict events and project impact, the key information needed to design local, tailor-made solutions. Satellite data is and will further be (future missions) a significant source of data and information on air pollution, GHGs, emissions and their sources. Measurements and dispersion models based on these data provide information on wider scale and activities of an area, near real time and historically (no missed events / gaps).

Given the CS2 (Piraeus Port) needs and infrastructure equipment is not necessary to be installed for the whole duration and infrastructure(s) of the port can/will be used. Additionally, for local monitoring of air

pollution, missions/campaigns will be co-designed at the first months of the project taking into account existing infrastructure and data (**Phase 1** "Local attributes & Mission Planning"). In **Phase 2** since no new implantation of equipment is needed; "Test mission(s) and early analytics" will take place with the given objectives. **Phase 3** remain unchanged with increased weight on the analytics from satellite data at greater scale to understand and model the impact.

Specific deadlines, tasks and deliverables are foreseen in the timeplan (Table 32) of the contract.

Table 32: Planning for the implementation of DIORAMA in CS2.

Phases / Activities / Deliverables	Submission deadline
Phase 0: Stakeholders engagement & Results dissemination (2 events) • **Act.0.1 – Stakeholders Involvement (kick-off event)** • **Act.0.2 – Dissemination & Exploitation (final event)** • **D0.1 – Event Report (kick-off event)** • **D0.2 – Event Report (final event)** • **D0.3 - Digital media e-leaflet for results dissemination (incl. Infographics)**	30/9/2024 (kick-off)
Phase 1: Local attributes & Mission Planning • **Act.1.1 – Needs & Requirements** • **D1.1 - Report on local attributes, data inputs, and mission(s) planning (Implantation study)**	30/3/2025 (final)
Phase 2: Test missions & early analytics • **Act.2.1- Installation of equipment** • **Act.2.2 – Tests** • **D2.1 - Activity report**	30/01/2025
Phase 3: Execution / from data to information • **Act.3.1 – Data collection** • **Act.3.2 – Data Analytics** • **D3.1 - Data / report(s) on results:** a) Report & Maps of ground concentration levels of NOx and PM over the 115 x 155 km area (1km pixel) for 1 year, b) b) Report & Maps and time series of NOx emission index over 5 years, 2 – sniffer campaign(s) measurements data.	30/2/2025

There will be internal, regular bi-weekly communication with the contractor for the monitoring of the progress of the foreseen activities.

The contract is expected to be signed in the first week of September 2024.

Port of Limassol

Open Call background and topics

In response to the significant threats posed by climate change to port activities, infrastructure, and the safety of surrounding communities — such as disruptions in port operations, increased accidents, damage to goods, compromised health, client complaints, energy inefficiencies, and air/water pollution — we are inviting innovative proposals for an Early Warning System. It should involve the implementation of advanced sensors capable of real-time data collection for climate-related parameters, including temperature, humidity, wind intensity, fog and air quality and effectively monitor and analyse climate-related events. The innovation must not only meet the current specified parameters but also demonstrate adaptability for unforeseen requirements in the future. The innovation must utilize advanced analytics and machine learning to process collected data and predict climate-related events, providing timely alerts tailored to the severity of the situation, seamlessly integrate with existing port management systems, ensuring coordinated responses during extreme weather events. To mitigate negative impacts, the proposed innovation needs to develop protocols for port operations, regular maintenance of sensors and early warning systems, enhanced preparedness measures, and compliance with ISO standards for reporting and monitoring. Additionally, it must incorporate AI-assisted prediction, with sensors strategically placed in at least 10 locations and have a mobile interface operational in both Android and Ios. Ensuring compliance with CE marking and establishing adjustable acceptable limits for warnings are essential. Additionally, to enable seamless integration of new sensors. We value collaborative partnerships and encourage proposals demonstrating a proactive approach to addressing future challenges, ensuring the long-term resilience of our ports and the well-being of all stakeholders involved.

Case Study-specific requirements to comply with procurement and contracting procedures

In order to ensure a stringent selection process, we have established specific financial and maturity cut-off criteria for organizations applying to this tender. Prospective applicants must meet the following requirements to be considered eligible:

• Applicants are required to demonstrate a robust financial standing. They should provide proof of an annual turnover of at least 100,000 EUR for the last year, showcasing their financial continuity and capacity to handle substantial projects.

• Applicant organizations must be established legal entities with a proven track record. The date of registration should be at least three years before the launch date of this open tender, highlighting their experience and commitment to their services.

• Applicants must be awarded an ISO certification(9001), indicating compliance with the European Union's quality and safety standards. This certification underscores the organization's commitment to delivering products and services of the highest quality.

• Applicants are required to have an existing service and maintenance facility operating within the European Union. This presence ensures that they are well equipped to handle the installation, operation, and maintenance aspects of the Early Warning System effectively.

• Successful applicants must be willing to commit to handling the installation and maintenance of the Early Warning System for a minimum period of two years. This commitment is essential to ensuring the continued functionality and reliability of the system.

• Eligible organizations, if selected, are required to register through e-procurement platforms. Additionally, applicants must complete the registration process on the official Cyprus government e-procurement portal: https://www.eprocurement.gov.cy/epps/home.do. Proper registration is mandatory for participation in this tender and the procedure is under the Coordination of Procedures on

the Public Procurement and on Related Matters Law of 2016 (Law 73(I)/2016), as amended in each case, and the General Regulations of 2007 (KDP 242/2012) on the Coordination of procedures for the Award of Public Works Contracts, Public Supply Contracts and Public Service Contracts including any amendments thereto.

The selection process

A total of 7 applications were collected from the open call for expressions of interest. From these, the committee approved that 4 is adequate to proceed with a detailed proposal. The finalist candidate companies are: Marina-Breath™, Solumar, AirNode, Libelium, and IoT CO2 Cities Monitoring. The rest of the three applicants had a very low TRL and were not in alignment with the requirements of the call. Most of them were at the idea stage or they needed to apply their innovation in order to validate it max TRL 4. In addition they were meant for mitigation.

Additionally, at a later stage, the selected companies that submitted an application were asked to provide additional documented data for their offer. They were required to register through e-procurement platforms. Additionally, applicants must complete the registration process on the official Cyprus government e-procurement portal: https://www.eprocurement.gov.cy/epps/home.do. Proper registration is mandatory for participation in this tender and the procedure is under the Coordination of Procedures on the Public Procurement and on Related Matters Law of 2016 (Law 73(I)/2016), as amended in each case, and the General Regulations of 2007 (KDP 242/2012) on the Coordination of procedures for the Award of Public Works Contracts, Public Supply Contracts and Public Service Contracts including any amendments thereto.

The tender was published through a Simplified Procedure from the following economic operators, who have been confirmed to be registered in the Public Procurement Electronic System (e-procurement):

1. Solumar Ltd
2. AirNode Ltd
3. Embio Diagnostics

The tender concerns the purchase of Early Warning Services with advanced sensors for the collection of real-time climate data for port management and their adaptation to future climate requirements, with an estimated value and the technical specifications are listed.

The fourth company, Everimpact,/ IoT CO2 Cities Monitoring, did not respond and has not been registered in the e-procurement system.

According to the open tender Embio Diagnostics gave the lowest offer and was in alignment with all the requirements and was the open calls winner for CS2 Limassol Port, Cyprus

Selected innovator, planning of the implementation of the innovation

The selected innovator, Embio Diagnostics, was selected to provide the innovation for Limassol Port. The Gantt Chart Figure 59 in represents main phases of the innovation deployment: Hardware Development, Software Integration, and Final Tuning. Prior the project starts the kick off meeting will be held with the partner in order to confirm requested specifications, timeline and milestones.

Project Activity	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Kick of meeting with partner												
Phase 1. Hardware Development												
Sensors HW assembly and testing												
Sensors Installation in 10 spots in the port												
Phase 2. Software Integration												
Requirements review, requirements analysis												
Systems Integration and Development												
Marine-Breath app development, dashboard, push out notification, reporting features.												
Pilot Testing (for all 10 locations)												
Final Software Deployment and integration in the port system												
End-user technical support, trainings												
Milestone 1. Marine-Breath prototype									M 01			
Phase 3. Fintal Tuning												
End-User Feedback												
Final Marine-Breath Validation												
Monthly maintenance and												
Milestone 2. Final prototype												M 02
Monthly reporting and maintenance checks (4/year)												

Figure 59: Gantt chart for implementation of the innovation Embio Diagnostics in CS2.

Case Study 3

Case study three took part in the first open tender for innovation. Since the preparation for the first open tender took place in late 2021 and 2022 information about the preparation and topics of the call can be found in D6.2.

A dissemination strategy was developed to publicize the call. Potential applicants and organisations and means through which information about the open tender could be spread were identified. A German leaflet was created (Figure 60) and distributed at conferences, in conversations and online. Articles on websites and in the regional press were written to attract applicants. VKU newsletters picked up the topic and articles were placed in the newsletters of stakeholders. Additionally, the open tender was promoted through social media and through word of mouth.

Figure 60: Open tender leaflet from CS3.

Selection process: The selection process was prepared jointly with the task leaders. This included the definition and weighting of selection criteria. Seven selection criteria were chosen: technical readiness, social readiness, market readiness, testing feasibility, innovator vision, promising innovation, contribution to social and governance transformation. They were assigned different weights. Scores could be calculated by the selection committee using the application forms and a predetermined procedure. The highest scoring applications were shortlisted and asked to provide a more detailed proposal. CS3 received twelve applications. Four applications were shortlisted and submitted demonstrator proposals. Finally, two applications were chosen as they addressed the challenge and fit the selection criteria best.

- **Tap-water-friendly cycling route (innovator: a tip:tap):** The innovator aims to create more places along the Main Cycle Path where water bottles can be refilled with free, fresh tap water. Existing drinking fountains and refill stations will be made more visible and new ones created. The aim is to respond to the increasing number of hot days, create appreciation for the precious resource of drinking water and contribute to sustainable tourism. The vision is to offer cyclists the opportunity to refresh themselves with tap water at intervals of no more than 10 kilometres in the future, while also promoting the value of water and its protection along the cycle path. Organisations and people from the region can support the project e.g. by creating new Refill-Stations or by supporting the communication about the protection and use of tap water. The innovation also revolves around education and capacity building: citizens of all age groups will be educated on the ecological benefits of tap water, its production and on how to save water and protect its quality. Stakeholders will learn how to implement access to drinking water in public and new ways to communicate about drinking water and sustainability positively. Social or behavioural change and governance structures' evolution will be addressed, too; people as well as organisations will be encouraged to re-think their habits of using bottled water. Drinking tap water will be normalised and facilitated. The following Gantt-Chart (Figure 61) was submitted with the demonstrator proposal. The project start was delayed. The first month of the project was in early 2024. Deadlines were adjusted accordingly.

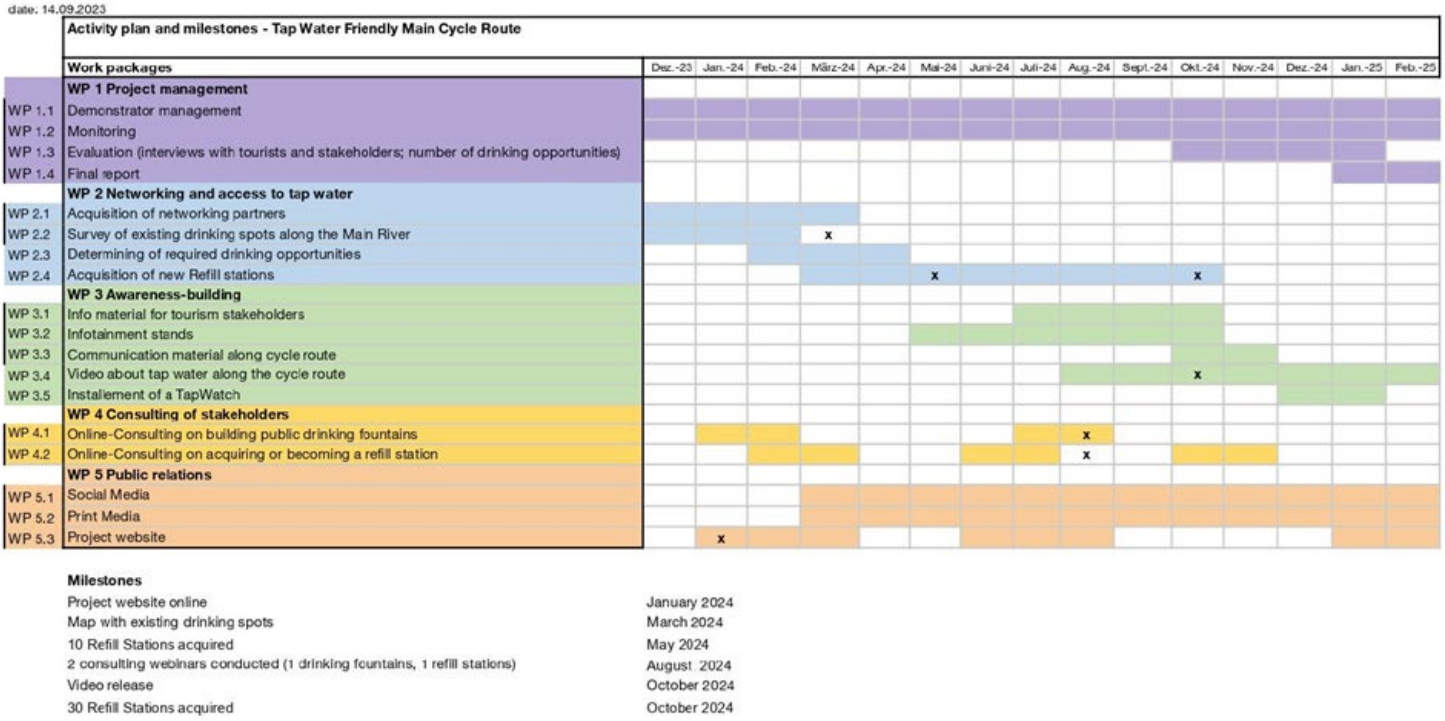


Figure 61: Gantt chart for implementation of the innovation 'Tap-water-friendly cycling route' in CS3.

- **IRRIBIGDATA (innovator: ANBI ER):** IRRIBIGDATA has been developed in the Po River Basin, which is experiencing similar climate trends and faces comparable climate change related challenges as the Main River Basin. IRRIBIGDATA aims, through systematic data collection, to concretely extend knowledge to improve irrigation planning, and aid the revision of current resource management and to address challenges for sustainable water use in holistic data-driven approach. Methods and tools developed in IRRIBIGDATA are transferred to the Main River Basin. Given the different monitoring situation and data availability in the Main River Basin compared to the Po River Basin, the innovators

will start with a site comparison/review and an estimate of water needs in the case study region. Since the project onset was delayed, the first month (M0 in Figure 62) is set to June 2024.

Monitoring plan: The implementation of the chosen innovations is supervised carefully through meetings. With "a tip:tap" meetings are scheduled every four to eight weeks to discuss the state of different tasks and their implementation. When necessary additional calls are scheduled. With ANBI ER regular meetings will be organised to discuss progress.

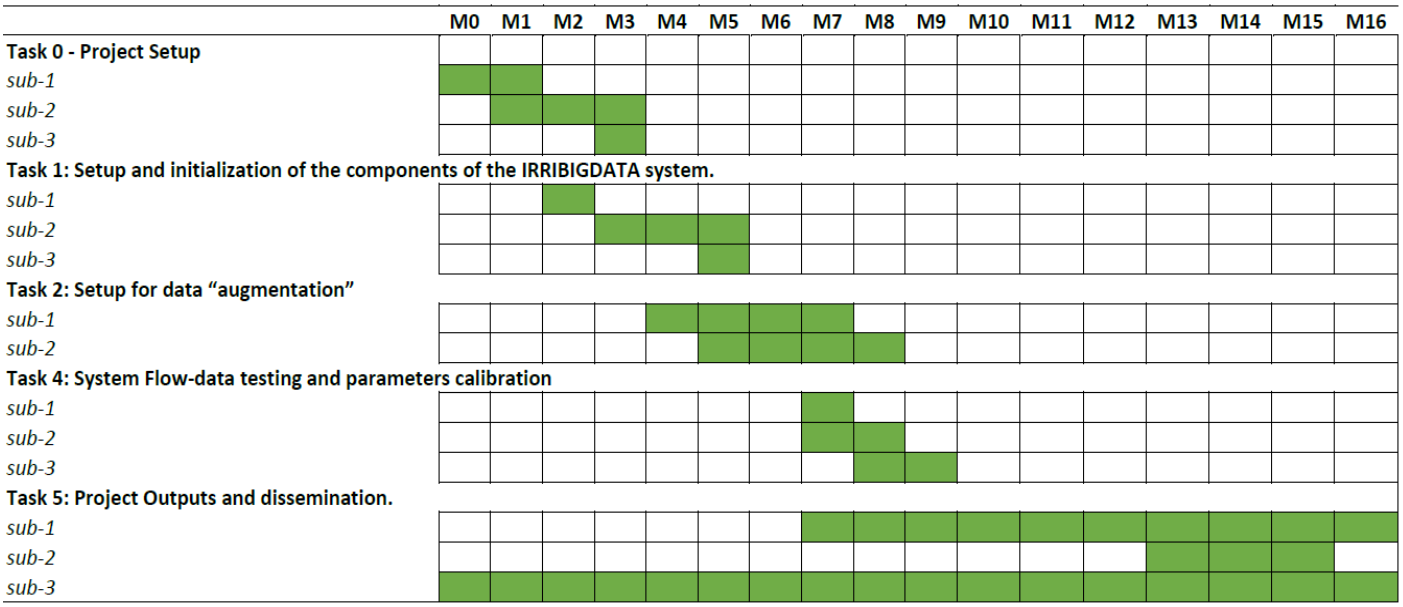


Figure 62: Gantt chart for implementation of the innovation 'IRRIBIGDATA' in CS3.

Implementation results:

- **Tap-water-friendly cycle route:** A website has been created. On 27/02/2024 a public project kick-off for stakeholders and interested partners was organised. Two webinars were held – one about refill stations and one about creating public drinking fountains. Potential refill-stations are being contacted and drinking spots are being mapped continuously. A video about the innovation was produced in August/September 2024.
- **IRRIBIGDATA:** Data availability and local conditions were debated with the innovator in June 2024. Data exchange is planned for September 2024. There are no implementation results yet.

Because of the success of the first call, it was decided that case study three would not take part in the second call of the open tender for innovations.

Case Study 4

North Macedonian demarcation

Selected innovator

For the CS4, North Macedonian part, tenders from 18 innovators were received. After evaluation, in accordance with the methodology and under permanent guidance and observation provided by the WP5 Lead, five tenders were shortlisted. In the second phase of evaluation procedure, additional questions were sent to the shortlisted innovators, including details on the quality of equipment, type and span of measured parameters, maintenance and operation costs, transboundary relevance of the innovation, and quality warranty period.

The final selection was made of one innovator from the short list, based on its highest score achieved in both phases of evaluation. The selected innovation title is Watre4All, from the Innovator GHI North Macedonia. The main idea of Water4All is that it combines technological and social aspects, by enabling accurate measurement of groundwater level, providing data to estimate the related reservoir (lake) water level, along with alerts of very low levels. The measured values are available to a wide range of stakeholders and target groups, to initiate or support their actions towards climate resilient use of water resources. It can be used to make comparisons with the forecasted levels typical for the season and make adjustments and forecasts for the next short term period. It enables visualisation, in the form of longitudinal profiles and diagrams of measured levels. Measured values will be available (accessible) on a web site and a mobile application. The system comprises measuring devices that indicate the groundwater level, along with a transmitter. Data, without processing, are uploaded via the sensor's transmitter device to the cloud where the processing of the data takes place using an algorithm of correlation of groundwater and lake water level. The results are presented on mobile devices where the user is informed about the status of the measure levels. A user interface, implemented in the mobile device, facilitates user interaction. The system is user friendly and requires simple training to use and operate it.

Planning of the implementation of the innovation

The timeline for implementation was proposed in the innovator's bid and accepted by the evaluation team (Figure 63). The contract was signed on 25th April 2024, and thereafter the works commenced. The contact shall be completed by 30th April 2025.

Work package	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
WP1 : Equipment and field works												
1.1 Purchase of equipment												
1.2.Installation of sensors												
1.3.Algoritm for the lake level and underground waters												
WP2: Creation of the Platform												
2.1.Web based application for visualisation												
WP3: Social reserach and events												
3.1.Social economic reserach on status quo												
3.2. Social economic projections												
3.3.Their relationship with climate changes												
3.4. Events and stakeholders communication												
WP4: Piloting and testing												
4.1.Testing												
4.2.Presentaion and handling training												

Figure 63: Gantt chart for implementation of the innovation 'Water4All' in CS4.

Monitoring plan of implementation

The plan for monitoring of innovation for CS4 (MK demarcation) includes: regular monthly meetings with the selected innovator team (in necessary, this will be moderated on a two- weeks basis), review of reports on progress, common site visits of CS4 and Innovator's teams, approval of the concept and quality of works, as well as of services and equipment supplied by the innovator.

Implementation results

The groundwater meters have been purchased and their Installation will be completed by the end of September. The platform development will start immediately thereafter. Confirmation of compliance of digital remote meters and the data cloud (platform) to be created by the innovator, is currently ongoing, at the time of this report preparation and it\s expected to be finalized by the mid October. So far, progress of innovator's works is in accordance with the approved time schedule and no risks have been identified.

Albanian demarcation

Through its participation in the first open tender (which did not results in selection of any innovators), the Albanian demarcation of this transboundary case on the second open tender procedure was seeking innovations that can help to improve the climate resilience of environmental, economic and social systems in the region from a water use perspective. Therewith, local innovators were invited to submit applications for innovations dealing with water scarcity and social innovative solutions for the effect of climate change in the Ohrid and Prespa lakes.

Key challenges

The key challenge for the Albanian case study is to improve climate adaptiveness of multiple social and economic sectors, related to water scarcity and water quality, in a transboundary concept. The Albanian CS4 team therefore is searching for innovations that will integrate both technological and social aspects in terms of climate resilience in different sectors relevant for water scarcity and quality (environmental, social-economic, health and education). The innovations we are looking for should be a good methodology and integrated technology for measuring water quality and quantity of both Ohrid and Prespa lakes, and ensure open data source accessibility for an operative unit on site. Moreover, the physical multifunctional/multidimensional hub has to contribute to the innovative arrangements of the stakeholders and local practice community. During our national and international meetings, the following potential solution categories emerged for a physical multidimensional incubator for the region covering technical and social environmental aspect:

- Monitoring water system for a long timeline, as a pre-condition for an effective management in transboundary level, planning and climate change adaptivity);
- Education and public awareness (entities, public and private engagements);
- Agriculture and tourism aspects of the region, innovative solutions to be provided;
- The innovative vision will help the transboundary cooperation of the Case study Ohrid and Prespa lakes.

Selected innovator

For the CS4, Albanian demarcation, the project has received 9 innovative solutions. After evaluation, in accordance with the methodology and under permanent guidance and observation provided by the WP5 Lead, seven proposed tenders were shortlisted. In the second phase of the evaluation procedure, and in accordance with the national and international laws, additional information to be provided was sent to the shortlisted innovators, including details on the administrative documents, technical and secure details to be provided by the innovator.

All the Albanian innovators were also listed in the North Macedonia demarcation, as the CS4 were a transboundary case to be considered.

The selected innovation title is “Integrated Water Resilience System” (IWRS), from Build Green Group Organization. The "Integrated Water Resilience System" (IWRS) represents a technological innovation devised to confront the intricate challenges posed by water scarcity, quality degradation, and climate variability within the Ohrid and Prespa Lakes region. IWRS is an intricately engineered amalgamation of cutting-edge sensors, drone technology, and a robust data management system, aimed at delivering precise, real-time monitoring, data analysis, and decision support mechanisms for complex water-related issues.

Relevance, Impact & Involvement

Municipality

Relevance: The municipality is responsible for local governance and infrastructure development. They may own or manage water facilities and have regulatory authority over environmental projects.

Impact: Their support is essential for obtaining permits, allocating resources, and ensuring local compliance with environmental standards. They can also facilitate community engagement and stakeholder coordination.

Current Involvement: They may oversee local water utilities, waste management, and zoning regulations affecting water resources. In the context of this project, they would be pivotal in permitting and coordinating local efforts.

Agency of Environment/ Protected Areas

Relevance: This agency oversees environmental protection and management within the Ohrid-Prespa region. They enforce regulations related to water quality and conservation.

Impact: Their approval and expertise are critical for ensuring the project complies with environmental laws. They also contribute scientific data and conservation strategies to preserve the lake's ecosystem.

Current Involvement: They conduct environmental assessments, (enforce regulations on water quality, and manage conservation projects. They provide scientific data and guidelines for sustainable water use.)

Tourism operators

Relevance: Tourism is a significant economic driver in the region, often dependent on the pristine condition of natural attractions like the Ohrid-Prespa Lake.

Impact: Automation of water measurement points can help maintain water quality, which is crucial for attracting tourists. Their input ensures the project considers tourism interests and minimizes disruptions to visitor experiences.

Current Involvement: They monitor visitor impacts on the lake, promote eco-friendly practices, and advocate for policies that protect the lake's natural beauty and biodiversity. They have a vested interest in maintaining high water quality to attract tourists.

Fishing/ Agriculture representatives

Relevance: Fishing and agriculture depend on sustainable water management practices. They rely on adequate water supply and quality for their livelihoods.

Impact: Proper water measurement and management can ensure sustainable resource use, prevent overexploitation, and maintain the ecosystem.

Current Involvement: They monitor water quality and quantity for their activities, (advocate for sustainable resource management), and participate in water conservation initiatives. Their involvement ensures water management practices support their livelihoods without compromising environmental health.

Non-Governmental Organizations

Relevance: Non-governmental organizations (NGOs) and other civil society groups often advocate for environmental protection and sustainable development.

Impact: They bring expertise, advocacy, and community support to the project. NGOs can help mobilize resources, raise awareness, and ensure accountability in project implementation.

Current Involvement: They conduct research, raise awareness about water issues, collaborate with stakeholders, and advocate for policies that promote environmental conservation. They provide technical expertise and grassroots support for water management projects.

Water Management experts

Relevance: Experts in water management provide technical knowledge and best practices for efficient water use and conservation.

Impact: Their expertise ensures the project's technical feasibility, accuracy of measurements, and effectiveness in managing water resources sustainably.

Current Involvement: They conduct water quality assessments, design monitoring programs, advise on infrastructure projects and provide technical support for improving water management practices. Their expertise ensures the project's technical feasibility and effectiveness.

Universities

Relevance: Universities contribute academic research, technological innovation, and educational opportunities related to environmental science and engineering.

Impact: They can collaborate on research, provide student involvement, and offer testing grounds for new technologies. Universities enhance project credibility and long-term sustainability through knowledge exchange.

Current Involvement: They research lake ecology, water quality, and conservation strategies. They collaborate with stakeholders on research projects, provide training for future professionals, and develop innovative water monitoring and management technologies.

Residents

Relevance: Residents depend on the Ohrid-Prespa Lake ecosystem for their daily lives and cultural heritage.

Impact: Their support is crucial for project acceptance and sustainability. Involving residents ensures community needs and concerns are addressed, fostering stewardship of natural resources.

Current Involvement: They participate in community-based monitoring, report environmental concerns, and engage in local decision-making processes. Their involvement ensures that the project considers community needs and fosters stewardship of natural resources.

Planning of the implementation of the innovation

The timeline for implementation was proposed in the innovator's bid and accepted by the evaluation team (the table below). The contract was signed on 10 June 2024, and thereafter the works commenced. The contact shall be completed by March 2025

Integrated Water Resilience System (IWRS)

Project timeline

Tasks	Jun 2024	Jul 2024	Aug 2024	Sep 2024	Oct 2024	Nov 2024	Dec 2024	Jan 2025	Feb 2025	Mar 2025	Payments
A. Preparatory work											**A 0.2 %**
A.1.1. Finalize agreements and local and national stakeholders' engagements											
A.1.2. Site analysis (reports screening) and preparing plan of implementation											
A.1.3. First meeting in area of interest with the stakeholders, presenting the project and the implementation											
B. Implementations work											**(B+D) 0.65 %**
B.1. Installations of the sensors											
B.2. Integrate infrastructure for indicator monitoring											
B.3. Drone scanning technology 3D model of the lake											
B.4. Establish operational database through web application											
C. Capacity building and awareness											**C 0.15 %**
C.1. Develop a capacity building program in the local community											
C.2 Launch community awareness programs											
C.3. Stakeholder workshops on technology utilization											
C.4. Demonstrator Run and Monitoring											
D. Monitoring and Reporting											
D.1. Activate demonstrator, data collection											
D.2. Monitor and test system performance until optimal run											
D.3. Collect feedback from users											
D.4. Compile and analyze data and develop the first report based on the data analysis											
D.5. Financial and narrative report of the project											
D.6. Report submission, comment and suggestions to be reflected											

Figure 64: Gantt chart for implementation of the innovation 'IWRS' in CS4.

Monitoring plan of implementation

The plan for monitoring of innovation for CS4 (AL demarcation) includes: regular monthly meetings with the selected innovator team (in necessary, this will be moderated on a weekly basic) review of reports on progress, common site visits of CS4 and Innovator's teams, approval of the concept and quality of works, as well as of services and equipment supplied by the innovator.

Implementation results

The sensors have been purchased by the innovator and have been identified as the locations for their installation, a dashboard in the national system will be developed and all the actors of the project (transboundary partners, lead partner, national actors) will have access to it.

Case Study 5

CS5 in the Canary Islands is concerned with the ecological transition and vulnerability of aquifers on volcanic islands, with a particular emphasis on the interdependence between water and agriculture. Given that agriculture is the primary consumer of water on the islands, the objective is to enhance water sustainability, which would have a beneficial impact on this sector and on energy consumption in the archipelago. The recent volcanic eruption on La Palma has introduced new challenges for the management of water and agricultural resources.

The project identifies several key issues, including temperature increase, water availability and the difficulties associated with monoculture, digitalisation and irrigation management. It emphasises the significance of generating scientific and traditional information for the purpose of facilitating participatory decision-making, with a view to promoting agricultural adaptation to climate change in a manner that takes into account social and gender considerations.

The project's objectives include the utilisation of technologies and virtual networks to enhance agricultural management and facilitate the effective communication of scientific knowledge to society. This will be achieved by engaging farmers as 'scientists of the territory' in the scientific process. Furthermore, through the open tenders ARSINOE aims to identify innovative solutions that are tailored to the specific context of the Canary Islands, with a view to promoting sustainability and food sovereignty.

Below the participation of CS5 in the open call for tenders is summarised.

- CS5 participated in the first round of the open tenders. A total of 10 applications were received in response to the call. Five innovators were invited to provide further detailed information regarding the proposed activities, as well as the budget and timeline. On 3 October 2023, the innovator selected for implementation was announced.

Selected innovator

The tender was awarded to the Foundation for Climate Research (FIClima), which is responsible for developing the SICMA Canarias tool. This innovation addresses the challenges related to the collection and exchange of environmental, agronomic, economic and social data in the Canary Islands, with a particular focus on climate change adaptation within the agricultural sector.

The SICMA Canarias tool provides a user-friendly and accessible platform that integrates a comprehensive range of climate data layers, along with derived indicators and variables. This platform, designed in collaboration with local stakeholders, provides detailed climate information, including future projections of temperature and precipitation at a local resolution of 100x100 metres. This is based on the analysis of 10 CMIP6 climate models. Furthermore, it calculates derived variables, such as evapotranspiration, in order to enhance the available information and adapt it to the specific requirements of the case study. Furthermore, SICMA Canarias permits the incorporation of additional data layers and the expansion of its functionalities in the future.

The digital solution proposed by FIClima is perfectly suited to the requirements of the case study, addressing the primary climate challenges in the Canary Islands, including intense rainfall, droughts and heat waves. It thus facilitates informed decision-making for climate change adaptation in the agricultural sector.

SICMA Canarias will provide environmental, social and economic benefits helping stakeholders and the whole society better understand the current and future climate of the archipelago, and the expected impacts of climate change. Consequently, the project will contribute to a reduction in economic losses, and the generation of green works preventing further degradation of the ecosystem. Additionally, actions enabled by the use of the tool, like the design of adaptation measures, will support the present management of already registered climate impacts and the future ones. For example, a long-term adaptation based on state-of-the-art climate projections, which allows better decision-making on infrastructures (improved territorial planning), or agriculture, like changes in some livelihoods: both adapting the species and diversifying the crops, or relocating cultivation areas to other parts of the islands, taking advantage of the great diversity of climates and orography.

Monitoring plan and implementation

The project will be carried out by innovating in a participatory manner with ARSINOE partner (ULL) and linked stakeholders based on previously tested methodologies, platforms and information. These elements will be analysed and improved to correct past and future projections taking into account the characteristic local microclimates. Accessing long data series to obtain very detailed observed data for improving the Canary microclimate scenarios modelling is one of the typical potential difficulties in places with such a variety of microclimates.

Furthermore, local workshops will be conducted with the objective of defining variables of interest, designing adaptation measures and validating their economic and social impact.

To generate and disseminate the results of SICMA Canarias, good communication and engagement of local authorities and stakeholders is required. Consequently, poor engagement (limited communication) would hamper the design of the tool contents. The workshops with the local authorities and stakeholders will also facilitate the dissemination of the results and the training of stakeholders in the appropriate utilisation of the tool.

The project will be implemented through 4 work packages (WP), namely: (1) Weather observations gathering and climate analysis; (2) Climate information generation; (3) Collaboration and dissemination; and (4) Platform adaptation. All WP depend on each other on a cascade scheme. Around these main areas of work, all activities necessary to achieve the main objectives will be developed:

Specific methodologies that are expected to apply: The temperature and precipitation variables and their direct derivative indices will be developed following FICLIMA's methodology.

The timeline proposed for the implementation is provided in Figure 65.

WP	TASKS	Schedule											
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M 10	M 11	M 12
1. Weather observations gathering and climate analysis	*1.1 Observed climate data gathering* ***(O1)***												
	1.2 Analysis and testing of climate data ***(O1)***												
	1.3 Assessment of Canarian climate peculiarities ***(O1)***												
2. Climate information generation	*2.1 Preparation of climate downscaling with Canarian peculiarities* ***(O1)***												
	2.2 Local temperature future scenarios ***(O1)***							D1					
	2.3 Local precipitation future scenarios ***(O1)***							D1					
	2.4 Specific ARSINOE variables generation ***(O1)***												
3. Collaboration and dissemination	*3.1 Feedback and collaboration with ULL.* ***(O1 and O2)***												
	3.2 Dissemination of results ***(O1 and O2)***												WS
4. Platform adaptation	*4.1 Platform adaptation development* ***(O1 and O2)***												
	4.2 Implementation of climatic and derived variables ***(O1 and O2)***												
	4.3 Testing platform and capacity building ***(O1 and O2)***												D2

D1. Deliverable with platform achitecture and main climate variable results

D2. Final deliverable with complete platform (user guidelines) and all climate variables developed

WS: Dissemination event of SICMA-Canarias outcomes in Tenerife and Gran Canaria

Figure 65: Gantt chart for implementation of the innovation SICMA Canarias in CS5.

Case Study 6

Ropotamo River (Bulgaria)

Call Topics and Selection Rationale

The Ropotamo River sub-case participated in the second round of the open tender. For this sub-case study, these challenges to be addressed, identified through stakeholder consultations and case studies, include water quality monitoring, flood risk forecasting, vegetation resilience, and ecosystem management. The selected call topics were chosen based on their potential to address the region's vulnerability to climate change impacts, particularly on water ecosystems and biodiversity. The Ropotamo area, a diverse wetland complex, faces severe threats from climate change, such as increased flooding, droughts, and water pollution. The tender sought solutions that could provide real-time data for water quality and flood risks, supporting more effective decision-making.

Selection Process

The call for tenders received 12 applications covering a range of innovative approaches, including IoT-based solutions, bio-sensor systems, and smart monitoring tools. After an initial evaluation, two applications were shortlisted: LABs (Little Alert Box System) and ENOVA BioSense. These two projects stood out for their technological readiness and relevance to the Ropotamo area. The final selection of ENOVA BioSense was based on its novel approach to real-time water quality assessment using new-generation biosensors, which aligns with the reserve's need for accurate and immediate data on water pollutants. The selection process involved several rounds of evaluations and discussions with the applicants.

Selected Innovator: ENOVA BioSense

ENOVA BioSense's proposal centres around a water quality monitoring system that uses innovative biosensors for real-time data collection. This system allows for continuous monitoring of key water quality parameters such as chemical oxygen demand (COD), total organic carbon (TOC), and dissolved oxygen. The project's strength lies in its ability to provide high-resolution, actionable data, enabling the rapid identification of pollution sources and supporting long-term ecosystem resilience in the Ropotamo area. ENOVA BioSense was chosen due to its ability to provide both technological innovation and environmental impact, aligned with the project's goals

Implementation Plan

The implementation of ENOVA BioSense's innovation will follow a phased approach. The first phase, started in June 2024 and includes site assessment and the development of custom monitoring hardware and software. Deployment of the system began in August 2024, with continuous monitoring expected from August 2024 to March 2025. The system will gather monthly samples from three key points in the Ropotamo River, focusing on areas with varying levels of anthropogenic influence. The project will conclude in March 2025 with the submission of a final report detailing water quality trends, system performance, and recommendations for future monitoring.

Timeline

- River basin assessment and selection of monitoring sites – June 2024
- Development of custom hardware and software for monitoring system – June - Aug 2024
- System deployment – Aug 2024
- Interim report – Nov 2024
- Monitoring and data collection – Aug 2024 – March 2025

- Final Report March 2025

Monitoring and Check-ins

The monitoring plan involves real-time data collection from three observation points in the Ropotamo River. The system will provide daily data for core parameters like COD, pH, and temperature, with monthly manual sampling for additional parameters. Check-ins with the project team will occur bi-monthly during the deployment and initial monitoring stages, shifting to monthly during the full-scale monitoring phase. Adjustments will be made if any unexpected fluctuations in water quality are detected, with additional samples collected as needed.

Danube Delta (Romania)

Call Topics and Selection Rationale

The key challenge for innovations dedicated to the Danube Delta case study is to provide local communities, local authorities and other stakeholders in the region with access to scientific evidence on the impacts of climate change on water quality and ecosystem health and functioning. This evidence can come in the form of measured data, explanatory models and simulations, and should allow scenario building and forecasting of the consequences of climate change on the adaptation of the biofiltration capacity of specific microbiota.

Selection Process

The call for tenders received 5 applications dedicated to the following sector: Digitalization of farming and agriculture; Environmental monitoring and IoT satellite to identify potential hazards to human health and the environment; Satellite-based monitoring systems of Rhodophyts/Phaeophyts beds in the Black Sea; Advanced Data Integration and Visualization for Predictive Analytics and Environmental Modelling and Community-Centric Platforms for Knowledge Sharing; and Climate Resilience Platform to address climate challenges. After the evaluation, one application was selected. The selection of the ProVerse application was based on its integrative approach that combines technological innovation with community involvement, ensuring a holistic approach to environmental monitoring and management in the Danube Delta region.

Selected Innovator: ProVerse (Finland)

The agreement between INCDSB and ProVerse was signed on April 24th 2024 and the implementation phase started on April 30th. The demonstrator contains four separate systems built on the ProVerse platform: i) data pipeline for accepting and processing timeseries data, ii) databases for long storage of the raw and processed data, iii) world state service, that also allows state changes in timelapse or simulation modes, and iv) metaverse visualisation.

Implementation plan and timelines

	2024								2025						Budget
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	euros
Data pipeline for accepting and processing timeseries data															
APIs for data sources (public databases)															1000,00
APIs for satelite data															1000,00
APIs for sensor data															1000,00
Databases for long storage of the raw and processed data															
Selection of databases															4500,00
Collection of data from different pipelines															1200,00
Testing and validating data															800,00
Creating data and prediction models for forecasts															1400,00
Sensors															
Selection of sensors															9900,00
Testing of sensor data															1200,00
Installation of sensors final locations															2400,00
World state service, that also allows state changes in timelapse or simulation modes															
Creation of world state service															9200,00
Testing world state creation															1300,00
Validating prediction models and forecasts															900,00
Metaverse visualisation															
Creating visual environments for world state data															6500,00
Ensuring usability and user frienliness of user interfaces															2100,00
Testing and gathering feedback from visaulisations															1800,00
Integrating a selection of core visualisations to more simple user interfaces such as mobile apps															800,00
Iterating visualisations based on feedback															1800,00
Evaluating of the project															
Analysing feedback															800,00
Co-operation with communities, such as scientists and large audiences															400,00
															50000,00

Figure 66: Gantt chart for implementation of the innovation the ProVerse platform in CS6 – subcase Romania.

Southwesten Black Sea (Turkey)

Call Topics and Selection Rationale and selection process

In the second open tender the call for the Southwestern Black Sea case study in Turkey focused on innovations that address the region's critical anthropogenic and climate-related stressors. Key challenges, identified through stakeholder consultations and case studies include urban development, tourism, agriculture, fishing, energy generation, and wastewater discharge, all of which significantly impact marine water quality and coastal ecosystems. The lack of conservation areas, governance gaps, and the absence of sectoral plans further exacerbate these issues. Additionally, rising temperatures and extreme weather events linked to climate change intensify the existing environmental pressures. The selected call topics were chosen based on their potential to mitigate these vulnerabilities, particularly in sustaining water quality and enhancing ecosystem resilience. Out of 9 eligible applications, 2 were invited to the second stage, and the Smart Monitoring Sensors (SMS) Project was ultimately selected for funding. This project aims to provide innovative solutions for real-time water quality monitoring and pollution prevention, contributing to better decision-making and climate adaptation in the Southwestern Black Sea.

Selected Innovator: SMS Project

The SMS platform provides data used to calculate the interaction between the atmosphere and the sea. Thanks to the SMS project, it is possible to provide early warning of the impact of disasters before they occur. Using such forewarning, the impact of the events can be reduced or completely prevented. The SMS platform provides advanced smart tools, technologies and digital innovations, including social innovation, that support the transition to a sustainable blue economy in the Black Sea. SMS aims to enhance the understanding of marine and air ecosystems by concurrently assessing multiple parameters such as temperature, pressure, salinity, pH, oxidation-reduction potential (ORP), dissolved oxygen (DO), humidity, sea level, and carbon dioxide which is a key parameter for global warming. By employing

sophisticated data analysis algorithms, the system strives to provide real-time insights into environmental dynamics.

The SMS project focuses on the development of multi-parameter analysis in both sea and air environments, and in the case of the Black Sea, it is aimed to interpret the air-sea interaction over potentially wide parameters such as wind speed/direction, air/water quality. A platform will be established for the first time in the Black Sea on air/sea interaction by monitoring air quality along with remote pollution monitoring with these smart sensors. In addition, an infrastructure will be provided with an AI-supported data processing system and information will be obtained about the pollution parameters in the Black Sea.

Implementation Plan and Timeline

The implementation of the Smart Monitoring Sensors (SMS) Project will follow a phased approach. The first phase will start in October 2024 and will include the design and supply of the sensor platform equipment. Between November 2024 and January 2025, the SMS platform will be developed. The corrosion test will begin in December 2024 and will conclude in March 2025. The development of software for remote data collection and transmission of marine and atmospheric data will start in December 2024 and continue until September 2025. The integration of the platform with the buoy and the installation of the station in the Black Sea will take place from May 2025 to August 2025. The system will collect marine and atmospheric data, and pollution parameters will be monitored between July 2025 and October 2025.

- Design and supply of the sensor platform equipment – -July – September 2024
- Preparation of the SMS platform – September - November 2024
- Corrosion tests – December 2024- January 2025
- Development of software/remote data sending tool to process marine and atmospheric data – December 2024-September 2025
- Integrating the platform to the buoy and placing the station in Black Sea – February 2025
- Processing of marine/atmospheric data and monitoring of the pollution parameters- February – May/June 2025

Monitoring-Check-ins

The monitoring plan for the SMS Project in the Southwestern Black Sea will involve real-time data collection from multiple observation points along the coastline. The system will provide continuous, data for key Marine (temperature, Conductivity, pH, ORP, Dissolved Oxygen, Dissolved CO2, Sea level and air (Temperature, Humidity (RH), CO2, Barometric Pressure) parameters conducted monthly to monitor During the initial deployment and testing phases, the project team will hold bi-monthly check-ins to assess system performance and data accuracy. As the project moves into full-scale monitoring, these check-ins will transition to a monthly schedule.

Case Study 7

Call Topics and Selection Rationale

Climate change poses several major challenges to Esbjerg, especially in terms of increased flood risk from both single and compound sources. A main challenge, identified by stakeholders, is the critical need for efficient and sustainable flood risk management ensuring citizens' safety as well as investment safety for both existing as well as future investments in city, enterprises, and other values. The city and port of Esbjerg are facing increased water challenges from "all sides". At present, there is no single actor that will address these challenges in holistic ways and this is not likely to change in the future unless legislation is changed at the national level. As a result, climate change adaptation requires deep involvement and collaboration between citizens and actors from both the public and private sectors, including the local government, investors, etc.

On the basis of this background, the key challenge for the tender for innovations is to motivate and inform relevant stakeholders and practitioners and to promote a deep engagement from commercial actors, citizens and the civil society in climate change risk management and adaptation, including investments. Without such a holistic and transformative approach, both climate change adaptation and disaster risk management are likely to be suboptimal. Many different actions and activities could contribute to solving this challenge, including social, technical, economical, and governance innovations. Education and increased risk awareness is likely to play a significant role as is the use of digital platforms and techniques such as mobile applications/apps, the use of existing and upcoming open data, and AI. Specific areas of action may include, but are not limited to: (i) innovations and actions to inform and engage civil society in climate change adaptation beyond the "usual suspects"; (ii) Improved communication pathways from the authorities to and with citizens during an extreme flood event, for example in terms of education, early warnings, real-time flood forecasts, recommendations and information sharing, data collection and citizen science.

The involvement of the private sector is also crucial, as ambitious climate change adaptation hinges on co-development and co-financing with the private sector. There currently is, however, little information on incentives for the private sector to engage in climate change adaptation with a broader scope (city and society) than just the protection of own assets. There is also an urgent need for improved knowledge of the economic costs of flood events to their business activities. The latter was recently emphasized in the aftermath of the October 2023 floods in the east of Denmark, when countless small companies reported massive, uninsured damages. In this context, specific areas of action may include but are not limited to: (iii) Innovations that can help motivate businesses and investors to adopt more community-oriented perspectives with a high valuation of co-benefits and social responsibility. Investigation and/or monitoring of incentives for investors from the private sector to engage and invest in urban development and climate change adaptation – with a focus on Esbjerg and the landmark Green Flood Barrier; (iv) Assessment and collection of data on the estimated and/or realized costs of flooding by industry, small and large businesses, shops, etc.

Based on the challenges identified above, it was decided to weigh incoming innovations against the following 7 priorities:

1. Technical Readiness: 17%. Rationale: Especially expected digital innovations should be at an advanced level to be tested during the project.

2. Social Readiness: 18%. Rationale: To be relevant, proposed innovation need to consider the uptake by and interactions with end users (municipality/authorities and civil society in interaction)

3. Market Readiness: 7%. Rationale: A high level of market readiness is beneficial, however, due to the local context it will be tested in, it is less important at this state of play.

4. Testing Feasibility: 15%. Rationale: Due to the short duration of the projects, the proposed solutions need to be ready for testing, so this is prioritized.

5. Vision: 8%. Rationale: As with market readiness, a high level of vision is beneficial, however, due to the local context it will be tested in, it is less important at this state of play.

6. Promising innovation: 15%. Rationale: This is considered important due to the urgent need for engaging stakeholders beyond the usual suspects, the need for insights into how to motivate investors and enterprises to invest in societal solutions, and for out-the-box thinking.

7.Social and governance transformation: 20%. Rationale: An overarching theme is the need for innovations with potential to lead to transformation on societal level (ARSINOE might be a stepping stone towards this end).

Selection Process

CS7 received 14 applications from the 2nd ARSINOE call for innovations, addressing most of the challenges listed above. All fourteen innovations were subsequently evaluated against the relevant challenges indicated by the innovators (which were weighted equally) applying the pre-determined weights listed in the previous section. The evaluation was carried out by a team of four members of the ARSINOE consortium with two evaluators representing the CS7 team from DTU and Esbjerg municipality (and thus the local context) and two evaluators representing WP5. Based on the first evaluation, five innovations were shortlisted and asked to prepare a full proposal:

- "Broad stakeholder engagement through interactive flood modelling with the 3Di LiveSite" - Nelen & Schuurmans Consultancy
- "PRAM" - PRAM Ltd
- "Saferplaces" – GecoSistema
- "Flood-MapEx" - University College Copenhagen (UCC)
- "Citizenlab" (now: GoVocal), CitizenLab Denmark

In addition to the original evaluators from DTU and Esbjerg municipality representing CS7, the full proposals submitted in the second phase were also evaluated by relevant stakeholders from Esbjerg municipality, the local emergency management services from the Wadden Sea area, and other selected stakeholders, including the local utility company. Based on this second round of evaluations, three projects were shortlisted for funding.

Selected Innovators

Saferplaces (GeoSistema)

SaferPlaces is a cloud-web Digital Twin Solution for flood risk intelligence in urban areas, the platform is technologically ready to address flood risks in areas prone to sea-level rise, storms, and runoff events like Southern Denmark, delivering precise flood risk hazard assessments and damage predictions, vital for informed decision-making. The objective is to empower stakeholders with accurate, real-time flood forecasts and actionable mitigation strategies, including flood wall and green flood wall barriers, thereby enhancing community engagement and resilience against climate-induced flooding.

By simulating various flood scenarios, including extreme events, SaferPlaces provides an interactive platform for: 1) Facilitating comprehensive learning experiences for municipalities and stakeholders, to understand flood risks; 2) Offering insights into flood impact on assets, encouraging businesses and investors to prioritise flood resilience in their strategic planning and investments, especially in key

projects like the projected Green Flood Barrier ("Havnestrøget"); 3) Collecting and analysing flood damage data to support cost-effective, nature-based solutions and innovative urban planning, aligning with ARSINOE's systemic solutions model.

Flood-MapEx (University College Copenhagen)
A central challenge within flood protection projects is the limited risk awareness among citizens, organisations, and companies located in the risk area. Low awareness may influence motivation to participate in both collective and individual actions to respond to the risk. Furthermore, it may manifest in a lack of understanding of, or support for, governmental-driven flood risk reduction initiatives. There is a need to develop methods to raise awareness, motivate actions, and secure an understanding of flood risk and flood protection needs, among all types of local stakeholders, including citizens, investors, and local businesses. Most flood protection projects must be inclusive and collaborative, especially in urban settings, as they will physically reach across areas owned by more than one property owner. It is essential to come to a shared risk awareness for the flood protection projects to be successful. For this aim, Flood-MapEx proposes a novel multi-stakeholder workshop concept where vulnerability and capacity assessments are combined with crisis management exercises to achieve this.

CitizenLab (since renamed to GoVocal)
The innovators will deliver a digital platform, implemented in Esbjerg Kommune, which makes it possible to ensure representativeness and supports both digital and physical citizen engagement, so that citizens who are digitally weak can be included and their contributions shared with other project participants. The platform will include a mapping function to make engagement visual and precise, and AI functions that summarizes all input in the projects and ensures feedback to all stakeholders [the name of the innovator officially changed its name from CitizenLab to GoVocal shortly after the contracting process and will be used in the following].

All three innovations feature a deep involvement of stakeholders and practitioners as a direct response to the indicated key challenges and the results of the Systems Innovation process in CS7. While Saferplaces mainly represents a technical innovation, GoVocal is a hybrid technical and social innovation, whereas Flood-MapEx is a social innovation. Conversely, the two promising innovations that were not shortlisted both represented technical innovations and only marginally involved stakeholders or practitioners. Whereas one of these innovations to some degree overlapped Saferplaces, the other innovator (PRAM) not selected was highly original. Due to the low probability of an extreme weather event happening within the implementation period, and thereby the possibility of doing actual field testing, it was however found to be difficult to test and validate the innovation within the implementation period, which was found to be a shortcoming.

Contracts between CS7 (represented by DTU) and the shortlisted innovators were signed in April and May 2024.

Timelines

An outline for the implementation of each of the three innovations in CS7 can be found below.

Saferplaces

#	Date	Description	Phase	Performed by
1	1/6 2024	Project kick-off (Phase 1 and 2 starts).	1+2	SaferPlaces
2	31/8 2024	Project charter, stakeholder agreement, requirements document are complemented.	1	SaferPlaces
3	31/1 2025	Alpha version release.	2+3	SaferPlaces
4	31/3 2025	Beta version release.	4	SaferPlaces
5	30/5 2025	Final reporting and end of project (Phase 5 and Phase 6).	5+6	SaferPlaces

Flood-MapEx

#	Date	Description		Performed by
1	June – Aug 2024	Defining cases for the 2 groups (Group A+B) of stakeholders – settings, target groups, geography, scenarios to be defined by Esbjerg municipality (EM) and DTU, in cooperation with University College Copenhagen (UCC)		UCC with EM + DTU
2	Aug – Oct 2024	Preparing the climate innovation (e.g. workshop concept, research method) for ARSINOE purposes		UCC
3	Sep – Nov 2024	Recruitment of participants for 2 groups (Group A+B), by Esbjerg municipality, with support from UCC		EM (supported by UCC)
4	Oct 2024 – Jan 2025	Vulnerability and capacity assessment mapping workshop – 2 groups		UCC
5	Oct 2024 – Jan 2025	Crisis management exercises – 2 groups		UCC
6	Oct 2024 – Jan 2025	Evaluation		UCC
7	Feb – Mar 2025	Analysis of results and reporting		UCC

GoVocal

#	Date	Description	NA	Performed by
1	1/5 2024	Kick-off. Platform license for the GoVocal platform is activated.		GoVocal
2	1/7 2024	Implementation, setup and pre-launch of the GoVocal platform. Training of the core team. Monitoring starts.		GoVocal

3	30/4 2025	Final reporting is delivered.		GoVocal

Monitoring-Check-ins
Monitoring of the progress of the innovators is ongoing and comprises regular online meetings aligned with the workplan and the need for interactions through the different stages of the project implementation.

So far, the level of activity with respect to **GoVocal** has been very high with many bilateral meetings taking place between staff from Esbjerg municipality and the innovators concerning the implementation and operation of the digital platform for citizen involvement. In addition, a strategy meeting regarding content and outreach was held on 26/8 2024 including a wider range of CS7 participants. Likewise, several meetings have taken place with the **Flood-MapEx** innovators in relation to the first task of the agreed workplan (see above) and the planning of ensuing activities. With respect to the **Saferplaces** innovation, the completion of phase 1 (see above) will be postponed for about one month due to conflicting holidays, but otherwise the initial phases of the project are proceeding as planned.

Case Study 8

Call Topics and Selection Rationale
Facing significant issues from flooding, including surface water, highways, sewers and coastal elements, Torbay's open tender sought solutions to enhance resilience against extreme weather events such as flooding, drought and water pollution issues. The Innovation should help the case study to address these local challenges, with the aim of creating a climate resilient future, which sees rewilding, greening and water sensitive urban planning at its heart.

Priorities to be addressed in the open tender:

1. The use of existing data and machine learning for flood and asset warnings, along with resource allocation during floods
2. Developing flood barriers for harbours and high-risk roads and enhancing communication for coordinated responses.
3. Empowering communities through initiatives addressing the climate crisis, co-designing of projects and creating micro funding opportunities.
4. Creating curriculum packages for climate change education in schools and promoting local environmental awareness.
5. Community rainwater sharing, sustainable water use, and blue/green space strategies.
6. The development of sustainable finance models e.g. roof taxes and community insurance.
7. Creation and implementation of accessible health programs addressing climate impacts and mapping health inequalities.

Number of applications received: **15** applications for the OTI for CS8

Shortlisted applications: **6** shortlisted applicants

Selected Innovators

Ripple Effects (Torbay Community Development Trust)

This is a social and governance-based innovation based around a conceptual framework focusing on empowering and educating the Torbay community on flooding and water resource related topics. The idea is to develop a grassroots social ecosystem focused on the reduction of the local impacts of climate change. By harnessing existing networks and knowledge, working with the community to codesign natural solutions, and by translating and sharing learning of existing technological innovations and strategies, small scale, local, low-cost initiatives can drive Torbay's residents to collectively tackle climate change, flooding and coastal erosion, where people can take ownership of solutions. This innovation aims to address four priority areas (3,4,5,7).

Argument for implementation

During the selection process this innovation scored the highest across vision, technical, social and market readiness and feasibility. The questions asked during the shortlisting period were answered honestly and there was a clear understanding of the general and local barriers and limitations of the innovation as well as the advantages. The innovation showed a good level of team experience and understanding of the requirements of CS8. The Innovator had a clear vision, with a pathway to turn the innovation into a market ready product, including future visioning beyond the project scope, with a budget and timeline clearly laid out. Although improvements could have been made in some areas such as the social readiness, it is in the nature of this innovation that some of these criteria will be challenging to test and the innovation still scored highly against the other shortlisted innovators.

Timelines

The implementation of the innovation has been clearly mapped, with much of the work being carried out between July 2024 – February 2025 (Figure 67). Stakeholder engagement and resource development will continue throughout the length of the project period. Between September 2024 and April 2025, the innovation will look to build the project resilience by applying for future funding for continuation of the innovation. Milestones of the project include quarterly monitoring reports and project reviews, the demonstrator delivery phase during March 25, and the delivery of all four schemes to be completed by end Feb 25. The final report will be submitted at the end of Oct 25. *Gantt chart provided below.*

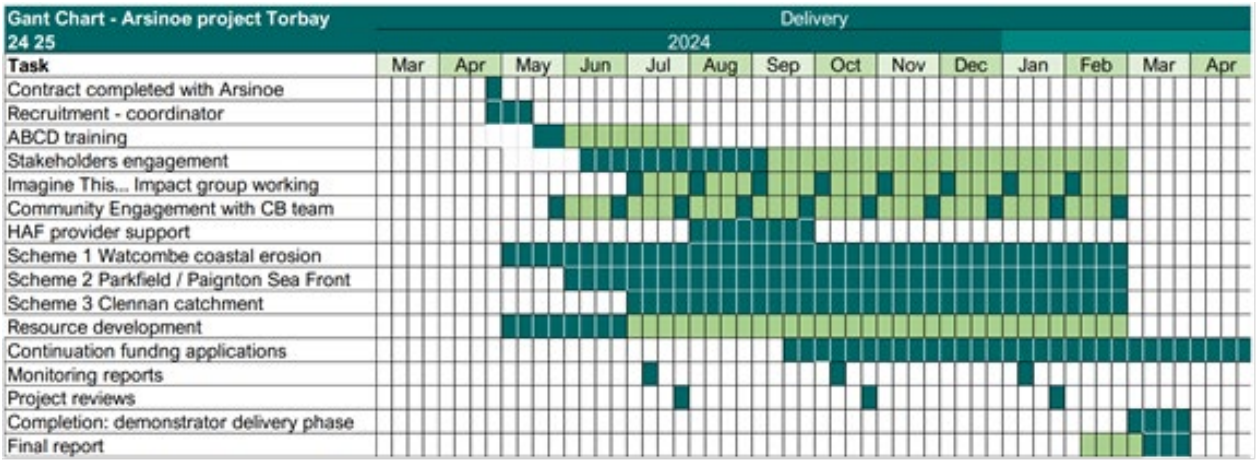


Figure 67: Gantt chart for implementation of the innovation the Ripple Effects in CS8.

Monitoring-Check-ins
Additional to the quarterly and final reporting, the innovation itself will monitor outputs and data through a CRM system. This includes information such as community feedback, engagement levels, lessons learnt, and actions delivered. Weekly CS8 meetings will allow the innovator to feedback and update on progress to the team.

ARGOS (HYDS)
ARGOS is a digital/software-based innovation addressing case study priority (1). ARGOS is a decision-making tool for climate adaptation that can act as an early warning system at a local level. ARGOS can provide real time monitoring of weather-related events, and issue warnings where impacts are expected and guide communities and users in the management of related emergencies.

Argument for implementation
The technology involved in this innovation is tried and tested in an operational capacity and was recommended based on this. There was a good understanding of the end user and the need for testing pre-implementation, given the different conditions of South-West England to the Mediterranean (Pre-existing operational case study). Barriers to adoption had been identified and workable solutions were proposed. The innovation was considered to have some new and inspiring aspects and appears to address the case studies climate related issues with the team demonstrating a good level of experience in implementing similar innovations. It was deemed likely that the innovation would help to drive an element of transformational change, either social, political or institutional. The expected technical and social readiness of the innovation was high with the innovation expected to be accepted by end users.

Timelines
The timeline of the innovation has been split into four phases. The definition phase (April 2024 - May 2024) to plan and develop a plan for the project period. This phase was used to identify and engage relevant stakeholders. The demonstrator was defined during this phase, and this was followed up with a short report. The implementation phase then runs between June – September 2024 and will focus on getting the service to a prototype stage, ready for the demonstration milestone.

Phase three includes the demonstration period and is where iterative improvements will be made based on user feedback and includes the production of a lessons learnt report (October 2024 - March 2025). Post-demonstration phase, a period of monitoring, where users can use the system at their convenience, keeping the service running in the form it will exist in come the end of the project. Final recommendations will be gathered and reported, and continuity of the project will be explored.

Figure 68: Gantt chart for implementation of the innovation the ARGOS in CS8.

Monitoring-Check-ins

Much of the project monitoring will be based around recurring contact via email and online meetings between the innovator and the project partners. The inclusion of the end users during the demonstrator's phase will allow real time-end user feedback to monitor the suitability of the innovation.

Case Study 9

Call Topics and Selection Rationale

The key challenge for the Sardinia case study is to improve sustainable food production and resilience of agricultural systems under climate change, to guarantee food security and quality. The main goals to be achieved to accomplish this challenge are: (1) stabilising and/or increasing crop production while optimising agricultural inputs (e.g., irrigation water, fertilizers); (2) increasing local food production; (3) enhancing awareness and information of all the main actors of the food chain, including consumers; (4) achieving zero waste.

Addressing this challenge implies a multi-disciplinary approach focused on Agriculture, Technology, Circular Economy, Social innovation. While some adaptational measures are already under development and/or partially implemented, there is a need to accelerate these efforts and foster collaboration among various stakeholders in the agri-food chain.

With the constraints of limited resources and changing environmental conditions, the region seeks innovative solutions to guarantee food security and quality. During our collaborative sessions with stakeholders in the living lab, the following potential solution categories emerged:

- Digital Adaptation: The development and integration of digital technologies tailored for farmers, such as weather forecasting tools, Decision Support Systems, and blockchain applications.
- Certification Branding and Consumer Awareness: Implementation and promotion of certified products that emphasize quality, sustainability, and origin supported by platforms and/or apps designed to enhance consumer knowledge and appreciation for sustainable and local food products.
- Technological Integration: Incorporation of innovative sensors, water storage systems, and other technologies powered by sustainable energy.
- Zero Waste: Development and widespread of innovative agronomic inputs from Circular Economy to guarantee sustainable crop production (e.g. organic fertilizers, amendments, etc.).

Selection process and Selected Innovators

For this open tender, 16 applications from all over Europe were received and 7 of them have been shortlisted. Thanks to the high level and variety of the received proposal, it was possible to select 4 final innovators. The final projects to implement have been selected based on innovative ideas, feasibility and pertinence with the issues emerged during the LLs with the local stakeholders.

Table 33: Selected innovators for CS9 and description of the innovations.

Title	Innovator	Description
Innovative biostimulants for plants: Protein hydrolysates by MW	Paola Casti Concimi Biologici Srl	The company is currently focusing on developing protein hydrolysates from the application of the Fasthum process to slaughterhouse waste. These hydrolysates, resulting from thermal hydrolysis with microwaves, are hypothesised to contain molecules capable of directly affecting plants, thus qualifying as biostimulants under the new EU regulation 1009/2019 on fertilizers. The innovation primarily targets the recovery of protein hydrolysates lost through evaporation. These will be condensed and compared to hydrolysates present in animal meal. The investigation will explore the presence of peptides and amino acids that have a direct impact on plants, such as the amino acid alanine, known for regulating stomatal opening and proving particularly useful in drought conditions. Beyond direct action, biostimulants will contribute to improving soil fertility and soil microbiome due to the high content of highly bioavailable organic matter, thanks to the presence of molecules with short chains.
Protected Geographical Indication for Pane Coccoi	Maria Antonietta Dessì (Comitato promotore Pane Coccoi DOP)	The Denomination aims to protect the quality standards of agri-food products, safeguard their production methods, provide consumers with clear information on the characteristics that give added value to products. This huge information asset for the consumer is ensured by the respect of production specifications.
Lobelia.AgroClimate	Thaís Fontenelle (Lobelia Earth)	Lobelia.AgroClimate platform for Soil Moisture Monitoring and Climate Risk Assessment data is a comprehensive digital solution designed for agriculture and environmental management. It addresses the critical issue of drought by delivering timely soil moisture readings and predictive climate analytics, empowering farmers to make informed decisions and maintain crop health and productivity amidst climate change. Lobelia.AgroClimate provides systematic climate risks assessments, with the aim to evaluate how current and future climate risks can affect crop production in a specific area. The information is provided through a simple and user friendly interface and also includes, in a soil moisture module, daily high-resolution operational Soil Moisture monitoring to support decision making (irrigation, planting, etc).
Integrating Rain harvesting and solar pumping	Luca Masala (Sarda Energia)	The proposed innovation is an integrated system which combines already well known and commercialised products such as rain-water-harvesting and solar pumps. Rainwater will be collected from the roof and other and impervious surfaces and collected in available water reservoirs. With the help of solar pumps the water will be transferred to larger reservoirs and used when needed for additional irrigation.

Timelines

Innovative biostimulants for plants: Protein hydrolysates by MW (Concimi Biologici Srl)
Project activities have already started, and the current focus is on finalising the new processed byproducts as well as their optimal administration doses to be applied on the soil for the different crops. The goal is to optimize these innovative bio-fertilizers for practical application, ultimately enhancing the project's outcomes. The planning for the implementation of this innovation is provided in Figure 69.

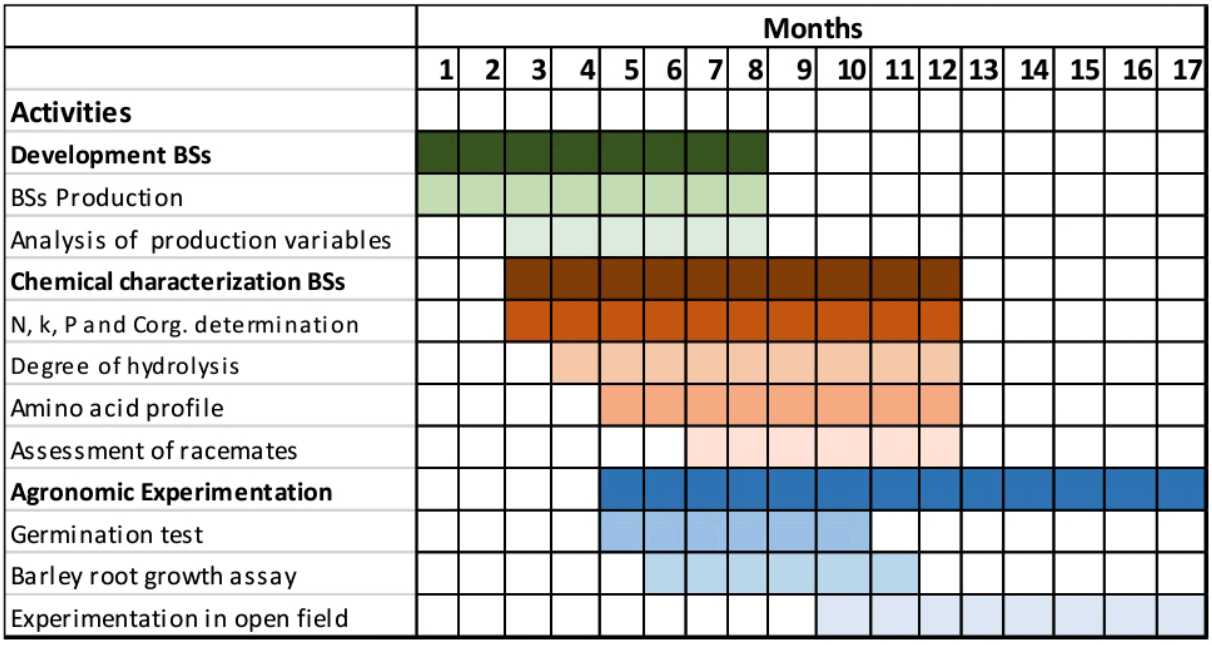


Figure 69: Gantt chart for implementation of the innovation "Innovative biostimulants for plants: Protein hydrolysates by MW " in CS9.

Protected Geographical Indication for Pane Coccoi (Comitato promotore Pane Coccoi DOP)

The planning for the implementation of this innovation is provided in Figure 70. The status is as follows: all documents for the submission of the trademark application to the Ministry of Agriculture have been formally completed and their formal submission is underway.

MONTH	I	II	III	IV	V	V	VII	VIII	IX	X	XII
DOSSIER PREPARATIONS AND ANIMATION	X	X	X								
ANALYSES			X								
REQUEST FOR INTEGRATIONS				X							
APPROVAL					X						
PUBLICATION IN ITALY GU					X						
SEND TO BRUXELLES						X					
ANALYSES REQUEST							X				
REQUEST FOR INTEGRATIONS								X			
APPROVAL AND PUBLICATION IN GUCE									X		
ANIMATION ACTIVITIES									X	X	

Figure 70: Gantt chart for implementation of the innovation "Protected Geographical Indication for Pane Coccoi" in CS9.

Lobelia.AgroClimate

The user requirements for the Agricultural Climate Risk Platform have been discussed and identified in collaboration with Agris, CRS4 and UNICA. This process included the identification of key climatological and hydrological indicators essential for the platform's functionality. Following this, Lobelia started the demonstrator setup and development phase.

The planning for the implementation of this innovation is provided in Figure 71.

Phase		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
User needs and specifications	User requirements of Agricultural Climate Risk Platform												
	Identification of climatological and hydrological indicators												
Demonstrator setting up and development	Calculation of climatological indices for the hydrological district												
	Adaptation of Back-end and Front-end Climate Risk Dashboard												
	Integration of risk indicators in the LASS platform												
	Reporting of results and creation of the dashboard manual												
	Feedback session with stakeholders												
Operations	Service operations												
	Services support and dissemination												

Figure 71: Gantt chart for implementation of the innovation "Lobelia.AgroClimate" in CS9.

Integrating Rain harvesting and solar pumping (Sarda Energia)

The planning for the implementation of this innovation is provided in Figure 72.

The photovoltaic panels required for the installation of solar pumps were brought to the AGRIS farm site in Ussana. This delivery marks the first step forward in the project, as it will allow the set-up and integration of the renewable energy solutions to proceed.

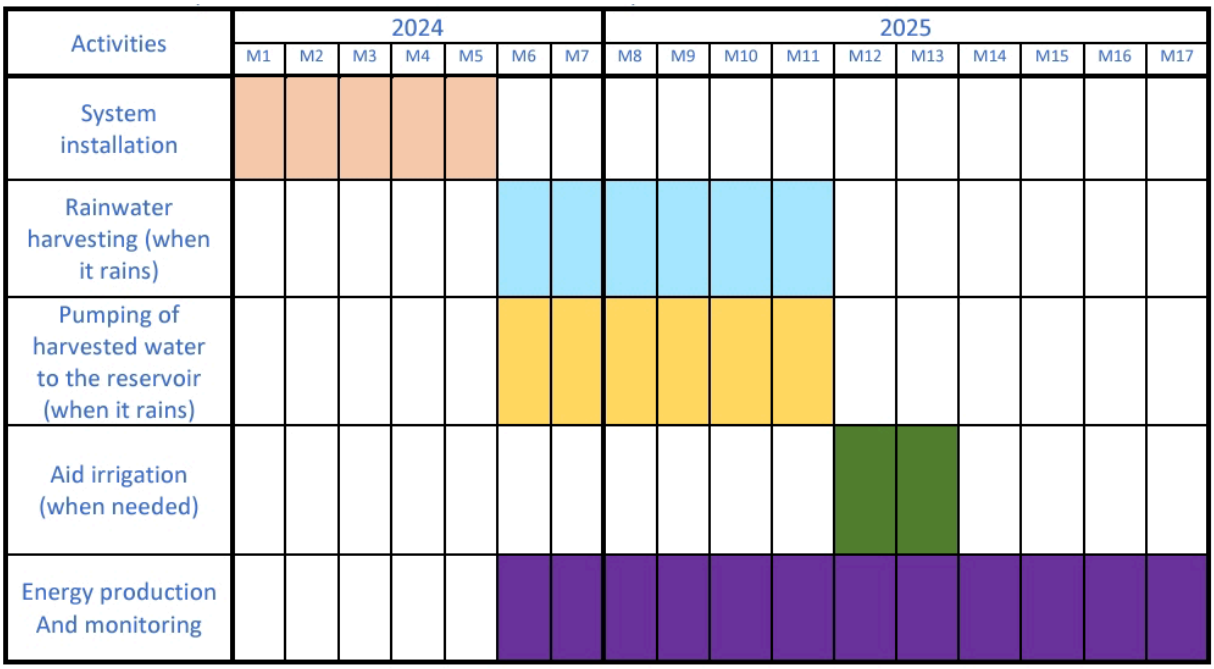


Figure 72: Gantt chart for implementation of the innovation "Lobelia.AgroClimate" in CS9.

7.0 ROADMAP FOR M37 – M48

Each case study has its own objectives, which are related to the local and regional environment. Therefore, although all CS contribute to activities in WP2 – WP5 and WP7, each CS has its own individual planning. In the reporting period all CS have, in collaboration with WP2, started up their activities concerning co-creating with stakeholders in the Living Labs, focussing on developing a common understanding, shared objectives and identifying SDGs pertaining to the challenges and which can be used as the basis for impact assessment (KPIs) as part of Task 6.2. Furthermore, all case studies have selected the models they will use in preparation for the implementation of the innovation packages. They have started data collection and most cases have performed initial modelling work (WP3 and WP4) as part of Task 6.3 and with the implementation of the innovation packages (Task 6.4). The final activity concerns the collection of Lessons Learned and Evidence based recommendations (Task 6.5) which will in M37.

The CSs are required to provide a workplan every six months (see section 7.2). Below we present the plans for the final period (M37 – M48). This period will see the finalisation of the activities already initiated in connection Tasks 6.2, 6.3 and 6.4 related to WP2, WP3, WP4, WP5 and WP7. A general overview of the activities and their planning is shown in Table 34. An overview of the action per case study for the period M37-M48 is provided below.

Table 34: Gantt chart with main actions and activities performed as part of WP7.

Roadmap for implementation of actions at the CS	M4	M8	M12	M18	M24	M30	M36	M42	M48
Task 6.1 Development and Monitoring of a roadmap of actions in all case studies									
Internal regular meetings for each CS									
Development of initial roadmap									
Updating and monitoring of the implementation roadmap									
Task 6.2 Implementation of the system innovation approach									
Long list of stakeholders									
Stakeholder engagement activities									
Visualisation requirements defined									
Implementation of virtual reality environment									
Definition of Case Study specific KPIs									
Task 6.3 Resilience Framework implementation in each Case Study									
Climate projections and scenarios decided									
Data types and needs defined									
Conceptual graph of modelling requirements									
Modelling implementations for each Case Study									
Pathways to resilience defined									
Task 6.4 Innovation packages development and validation in each case study									
Innovation packages defined and selected									
Implementation of innovation packages									
Validation of the innovation packages									
Task 6.5 Lessons Learned-Evidence based recommendations									
Synthesise experiences from T6.2, T6.3 and T6.4									

7.1 CS activity planning

Case Study 1

Activities in connection to Task 6.2 - Implementation of the System Innovation Approach

- To ensure continuous engagement of the CS1 stakeholders throughout the duration of the project and beyond, we are developing a series of newsletters, each focusing on a different key topic. The first newsletter will provide valuable insights into the educational activities being conducted within the Case Study, keeping stakeholders informed and involved in the ongoing processes.
- As part of the stakeholder engagement activities scheduled for November 22, 2024, a Focus Group will be organized with key stakeholders to present some of the results of the co-creation approach. The workshop will cover scientific results derived from the outcomes of the Living Labs, as well as governance analysis results based on interviews with stakeholders. Additionally, it will feature the innovators and innovations chosen for the Athens Case Study. This Focus Group aims to provide a comprehensive overview and facilitate in-depth discussions on these important findings.
- Investigating the potential opportunities for collaboration with Enrich Global to enhance and advance the future development and sustainability of living labs after the end of the project.

Activities in connection to Task 6.3 - resilience framework implementation

- Validation of dashboard by end-users, specifically the Municipality of Athens, and improvement
- Finalisation of the ABM tool and validation from end-users
- Final use and validation of VR tool from stakeholders for choice experiments
- Introduction to MINKA tool of environmental indicators

Activities in connection Task 6.4 - Innovation packages development

- Complete the contractual procedure
- Complete the development of the KAUSAL platform an the installation of the Singular Ribbon and the Tiny Forest
- Carry out parallel consultation and communication activities on the selected innovations

Case Study 2

Activities in connection to Task 6.2 - Implementation of the System Innovation Approach

For Task 6.2 the CS will further work on having a further interaction with the stakeholders mainly through:

- A newsletter scheduled to be sent every two or three months
- Online meeting with all the stakeholders to validate the progress of the project.

Activities in connection to Task 6.3 - resilience framework implementation

- Conclude the Modelling activities for the port of Piraeus and Limassol
- Finalize the Hybrid Financial Model for all three ports

Activities in connection Task 6.4 - Innovation packages development

- Arrange meetings with the innovators to monitor the implementation of the contracts
- Analyse the innovation pathways and combine with Policy and financial solutions to form the CS2 innovation packages.

Case Study 3

Activities in connection to Task 6.2 - Implementation of the System Innovation Approach

- Further stakeholder engagement on innovations, governance and climate services

Activities in connection to Task 6.3 - resilience framework implementation

- Co-creating and exchanging climate services with stakeholders (e.g., agreeing on platform)
- Development of frameworks for the analysis of low flow conditions (ongoing/to be completed by M44)
- Further hydrological modelling for the Main River Basin extending the climate related impacts by including multiple land use and land management scenarios under current and future climate conditions (ongoing/to be completed by M44)
- Hydrological modelling of the inflows into the Main River Basin to analyse water availability under current and future climate conditions. Water availability in the southern parts of Bavaria determine the water security of the Main River Basin (I.e., water diversion from the Danube to the Main catchment) (ongoing/to be completed by M44)
- Analysis of water availability and changes to its patterns in the Main River Catchments and adjacent catchments (ongoing/to be completed by M44)

Activities in connection Task 6.4 - Innovation packages development

- Development of financial pathways (with WP7)
- Further elaboration of innovations
- Validation with stakeholders
- Dissemination of results in the region

Case Study 4

Activities in connection to Task 6.2 - Implementation of the System Innovation Approach

- Continuous stakeholder engagement, through communication and dissemination activities (e.g. CS4 newsletter, email messages, direct contacts with some of the stakeholders, etc.)
- Workshop on final results with all stakeholders
- Implementation of the contract with the selected innovators and informing the stakeholders about the achievements and results

- Completion of adjustment and application in national contexts, of the MINKA model of socio – environmental systems engagement

Activities in connection to Task 6.3 - resilience framework implementation

- Completion of water balance of the two lakes under two climate scenarios (using the updated common climate baseline across case studies, in compliance with the report D 3.6.
- Completion of sensitivity analysis of model outputs, by varying input data in the span of +/- 15%
- Climate projections for multi-hazard and multi- sectoral risk assessment (common baseline in compliance with WP3 methodology
- Completion of application of MINKA model of social – environmental system interaction on national level in CS4 partner countries. Possible collection of biodiversity and other environmental data through citizen science (MINKA), in order to support a new water governance management framework .
- Completion of a system dynamics model (SDM) analysing the behaviour of the multi-lake system under the climatic scenarios, providing insights into potential hydrological and ecological impacts.

Activities in connection Task 6.4 - Innovation packages development

- In compliance with the methodology prescribed by the Task 6.4 lead, the CS4 team will participate in the activities of identifications of the innovation package related to this CS, as well as in the activities of development and proposing the financial instruments needed for the implementation of the selected innovations.

Case Study 5

Activities in connection to Task 6.2 - Implementation of the System Innovation Approach

- Presentation of the Governance analysis in October 2024,
- Continuing stakeholder engagement through the newsletter,

Activities in connection to Task 6.3 - resilience framework implementation

- Quality crops index literature review validation,
- Preliminary results of the cascading failure app/engine (Task 3.5),
- Continue scientific publications in order to validate all processes achieved,

Activities in connection Task 6.4 - Innovation packages development

- Continue with the implementation of the selected innovation,
- Presentation of the platform developed FICLIMA in January 2025

Case Study 6

Ropotamo River (Bulgaria)

Activities in connection to Task 6.2 - Implementation of the System Innovation Approach

- Continuing stakeholder engagement through the newsletter and direct contact, including working with the selected in WP5 innovation team

Activities in connection to Task 6.3 - resilience framework implementation

- Finalising all activities connected to data gathering and stationary sensors in the reserve

Activities in connection Task 6.4 - Innovation packages development

- Continue with the implementation of the selected innovation
- Presenting the results and its potential past March 2025

Danube Delta – Romania

Activities in connection to Task 6.2 - Implementation of the System Innovation Approach

- Continuing stakeholder engagement through the newsletter and direct contact

Activities in connection to Task 6.3 - resilience framework implementation

- Finalising all activities connected to data collection on biofiltration bacteria and biodiversity profile of salted soil under monitoring

Activities in connection Task 6.4 - Innovation packages development

- Continue with the co-development and implementation of the selected innovation
- Presenting the results and its potential past March 2025

Southwestern Black Sea (Turkey)

Activities in connection to Task 6.2 - Implementation of the System Innovation Approach

- Continuing stakeholder engagement through the newsletter and direct contact, including working with the selected in WP5 innovation team

Activities in connection to Task 6.3 - resilience framework implementation

- Finalising all activities connected to data gathering and models

Activities in connection Task 6.4 - Innovation packages development

- Continue with the implementation of the selected innovation
- Presenting the results and its potential past March 2025

Aliakmon River (Greece)

Activities in connection to Task 6.2 - Implementation of the System Innovation Approach

- Disseminate the developed vision to the stakeholders and keep them engaged for the Case Study through newsletters (international & national versions), 1-on-1 meetings and personal communication

Activities in connection to Task 6.3 - resilience framework implementation

- Connection of the hydrological model and the optimization algorithm;
- Development of the Digital Twin model.

Case Study 7

Activities in connection to Task 6.2 - Implementation of the System Innovation Approach

- Contribution to the final WP2 report on the implementation of the System Innovation Approach in all case studies (M37-M45)
- Evaluation of the System Innovation Approach with stakeholders (M44-M45 / Local conference in CS7)

Activities in connection to Task 6.3 - resilience framework implementation

- Analysis of regional sea level projections provided by IPCC AR6 and the Danish Meteorological Institute (M37-M42)
- Further development and testing of the extreme sea level model based on novel machine learning techniques (M37-M42)
- Development and testing of a cascading risks model for Esbjerg city and port based on the modelling approach piloted and developed in WP3 and CS8 (M37-M42)
- New hydrodynamic simulations for Esbjerg based on the abovementioned model innovations and the ARSINOE climate scenario baseline (M43)
- New Damage Cost simulations for Esbjerg based on the abovementioned model innovations and the ARSINOE climate scenario baseline (M43)
- Carrying out a (social) vulnerability assessment (M40-M43)
- Integration of quantitative and qualitative components of the ARSINOE resilience wheel and implementation and reporting of the resilience analysis (M42-M45)

Activities in connection Task 6.4 - Innovation packages development

- Monitoring the progress and development of innovations funded under the ARSINOE call for tenders (ongoing; until M45). Contribution to the final report(s) of WP5.
- Presentation and evaluation of project innovations with stakeholders (M44-M45 / Local conference in CS7)

Stakeholder engagement, communication and dissemination activities

- Planning, preparation and implementation of a local conference in Esbjerg for stakeholders and experts; this will take place in either May or June 2024 (M44).

Case Study 8

Activities in connection to Task 6.2 - Implementation of the System Innovation Approach

- A newsletter will be developed to ensure continued engagement with CS8 stakeholders. These will focus on key topics and individuals working on the case study. The first Newsletter will provide an overview of the ARSINOE project and the objectives and aims of the CS8 case study for Torbay. Newsletters will be produced every 6-8 weeks and will continue until the end of the project.
- Encouraged engagement of stakeholders in Citizen Science work & MINKA
- Workshops to be held through Task 6.4 which will further engage existing and new stakeholders.

Activities in connection to Task 6.3 - resilience framework implementation

- Finalising work on all data and modelling work for the Dashboard before stakeholder validation.

Activities in connection Task 6.4 - Innovation packages development

- Both Innovators will continue to develop the innovations for CS8. ARGOS will continue with the implementation phase to develop the service to create a prototype product for the demonstrator milestone. The service will then look to demonstrate and receive feedback to direct iterative improvements and guide the direction of the continuation of the innovation passed the end of the CS innovation window. Ripple effects will begin the delivery of their community engagement process, hosting community workshops and creating a narrative which will feed back into the Torbay case study dashboard. School education resources will be created. Torbay communities will address the requirement for future resilience of the innovation by applying for and securing funding for project continuation beyond the end of the CS8 innovation window in M45.

Case Study 9

Activities in connection to Task 6.2 - Implementation of the System Innovation Approach

- Enhancing ongoing durum wheat selection and Conservative Agriculture practices aiming at stabilizing crop production in climate change conditions.
- Strengthening local supply chains by fostering collaboration between:
    - Primary producers (farmers)
    - First-level processors (millers)
    - Second-level processors (bakers and pasta makers)
    - Traders and final consumers
- Crop modeling and climate scenario simulation and analysis to enhance adaptation and resilience by optimizing irrigation needs (Aquacrop) and crop management (CERES-Wheat) under changing climate conditions

Activities in connection to Task 6.3 - resilience framework implementation

- Selecting new genotypes adapted to climate change conditions
- Implementing zero seeding and minimum tillage in order preserve long-term soil fertility and stabilizing crop production
- Promoting extensive use of sustainable fertilizers from Circular Economy products
- Introducing innovative agronomic techniques (e.g., irrigating wheat to stabilize yields)
- Implementing satellite-driven techniques from precision agriculture (e.g. NDVI-index from Sentinel 2) to monitor crop growing phases

Activities in connection Task 6.4 - Innovation packages development

- Spreading commercially new durum wheat cultivars
- Spreading locally-produced, traditional products with UE Branding (e.g. Pane Coccoi Sardinian traditional Bread)
- Spreading new organic fertilizers from Circular Economy

7.2 Monitoring plan

The monitoring plan will be carried out by the WP6 leader (KWR). At the moment, the plan consists of some regular actions, but also includes some periodic actions (Table 35). It can be detailed or modified according to potential needs and/or risks that may occur for specific actions and/or Case Studies, which may need closer monitoring and attention, or even remedial actions.

Table 35: Monitoring of activities at the Case Studies.

Monitoring activity	Frequency	Action	Comments
Internal CS team meetings	Weekly	All the CS have organised their own internal meetings, hosted by the main partner for each CS. These take place regularly	Summary of these meetings is reported in the plenary weekly meeting
Plenary meeting for all the CS and representatives from all other WPs	Weekly	Regular reporting of CS activities/Guidance and coordination Monitoring of the action plan	Minutes kept online, updated all the time
Periodic longer meetings with each CS	Quarterly	WP6 leaders meet with each CS separately for longer discussions, together with the leader of Task 6.3	Specific issues to be discussed and if necessary, reported back to the STC
Risk assessment	Every 6 months	Carried out by the Risk Officer with information provided by the WP6 Leader	Reporting to the STC
KPI monitoring	Every 6 months	Carried out by each CS, with guidance from Task 6.2	Each CS reports to T6.2 and to the WP6 leader Any issues are to be discussed at the STC

8.0 DISCUSSION AND CONCLUSIONS

During the reporting period the focus has been on i) the execution of the Systems Innovation Approach (Task 6.2), ii) performing the modelling activities (Task 6.3) and iii) the preparations for and implementation of the open tender for innovations. The main achievements from the reporting period are the following:

System Innovation Approach

Central to the ARSINOE project is the implementation of the combination of a System Innovation Approach (SIA) with the Climate Innovation Window (CIW) to create an ecosystem for climate change adaptation solutions. Nine living labs (LLs) were set up, one in each case study, to implement the SIA and effectively engaging the various tiers of stakeholders. In the international case studies (CS2, CS4, CS6), additional national / regional livings labs have also been created. In these LLs, stakeholders from diverse backgrounds and disciplines are brought together to co-design a preferable vision of the future. The objective is to enable project partners from diverse disciplines to converge on a unified view, before implementing assessment frameworks and resilience modelling using multi-disciplinary modelling methods. All CSs organized their first LL workshops in the previous reporting period. These first workshop were used to define the scope and objectives of the case studies and to develop a mental map of the living lab. A conceptual model for the CS was derived from this mental map and validated by the stakeholders. During the current reporting period, all CSs organised their second and third LL workshops. The second workshop validated the mental map and found consensus on the problem statement. Furthermore, in the second workshops the stakeholders worked on defining the guiding principles for the LL, which were derived from Sustainable Development Goal (SDG) targets (described in D6.2). The Stakeholders then envisioned a common future for 2050 by developing a future vision using the identified guiding principles. These visions, although unique for the context of each CS, share the common elements in the ambitions for achieving resilience to climate change. Recurring pathways in the future narratives include use of smart technologies (sensors, data platforms, AI, UAVs, etc.) to inform stakeholders and support decision making including informing citizens, stimulate green solutions (green infrastructure, conserving and restoring biodiversity) and achieving combinations of functions (e.g. agro-ecology, tourism) and strong communities.

The third workshops subsequently focussed on elaborating innovative pathways for the implementation of the vision laid down in the future narrative from the 2nd LL. A "backcasting" methodology was used to define the steps required to achieve the vision and the milestones and key-innovations required for this realisation. This was supported by a *Political, Economic, Sociological, Technological, Legal and Environmental* (PESTLE) analysis of the innovation pathway, identifying relevant sectors and potential enablers and barriers. The innovation pathways were subsequently used as input for the call for open tenders in WP5 and Task 6.4.

Modelling and data collection

To modelling activities in the ARSINOE CS is performed in support of the implementation of the innovation pathways, co-developed with the stakeholders in the living labs. The conceptual model developed in each CS defines the context and maps out all relevant aspects of technical/modelling activities. These conceptual models form the basis for all modelling activities. During the reporting period these conceptual models were further refined, and work progressed on the execution of the modelling activities

associated. Data collection has been completed in most case studies, and models have been developed/adapted and validated for the case specific context and where necessary have been downscaled to the required granularity. First results are presented, such as results for urban heat island effect, sea level rise predictions, hydrological and geohydrological models, from which the impact of climate change on the case study level is estimated. Particular modelling results that transcend relevance of individual case studies include the MINKA citizen science application and the cascading failure engine, which after being adopted in CS1 and CS8 respectively, are being applied in further CS (CS4 & CS9 and CS5 respectively). The case studies are on track in the preparations for the implementation packages in their local conditions.

The Modelling Work Package (WP 3) of ARSINOE also aims to further cross-disciplinary research in hybrid simulation and hybrid modelling by developing the Dynamic Multi-Sectoral Resilience Modelling and Assessment Framework, which will allow for the project partners from diverse application domains to converge at a unified view of the multi-disciplinary modelling methods. The various resolutions and disciplines required for the modelling, including supporting activities to connect the modelling work to the stakeholders and their environment, are brought together in a framework referred to as the resilience wheel. The operationalisation of this framework will be performed in each case study. To gain experience, CS1 and CS8 act as frontrunners in this implementation and continued with the implementation of the resilience wheel approach.

Open Tender for Innovation

To modelling activities in the ARSINOE CS is performed in support of the implementation of the innovation pathways, co-developed with the stakeholders in the living labs. The conceptual model developed in each CS defines the context and maps out all relevant aspects of technical activities, which include modelling, VR implementation, citizen science activities (MINKA), resilience wheel and dashboard developments and application in the case studies. These conceptual models form the basis for all modelling activities. During the reporting period these conceptual models were further refined; work progressed on the execution of the associated modelling activities. Data collection has been completed in most case studies, models have been developed/adapted and validated for the case specific context and, where necessary, have been downscaled to the required granularity. First results are presented, such as results for urban heat island effect, sea level rise predictions, hydrological and geohydrological models, from which the impact of climate change on the case study level is estimated. Particular modelling results that transcend relevance of individual case studies include the MINKA citizen science application and the cascading failure engine, which are being adopted in CS1 and CS8 respectively, are being applied in further CS (CS4 & CS9 and CS5 respectively). The case studies are on track in the preparations for the implementation packages in their local conditions.

Coordination and monitoring

Weekly teleconferences for WP6, in which progress and issues from all case studies and actions related to the other work packages are discussed have been continued (see Chapter 2 and Annex 1 for details). These meetings are a constant fixture in the ARSINOE execution and allows close monitoring of progress, provides a persistent building block for the mutual exchange and helps to solve any issues that might occur. It also provides all case studies insight into the activities in their fellow case studies in ARSINOE and support the community building within the project consortium.

All the CS have continued their own internal meetings, hosted by the main partner for each CS. These take place regularly (mostly every week). Minutes and details about them are reported in plenary, during the weekly WP6 teleconferences.

The next and final reporting period will continue to execute the work described herein, in particular the implementation of the innovations selected through the open tenders, the completion of the implementation of the SIA and the resilience assessments. Furthermore, in the last months of the project the focus will shift to finalisation of the innovation packages and the collection of the lessons learned and defining evidence based recommendations, which will be validated with the end-users and stakeholders in the case studies before they will be published.

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ANNEX 1 - Minutes of the weekly meetings (M19-M36)

This is an open document noting down the main points out of the weekly meetings (Thursdays) for WP6. The meetings are organised by KWR and Task 6.1.

This file contains the minutes for M19-M36

We are recording.

- Progress for each Case Study (CS).
- Any issues.
- Any changes.

April 6, 2023

All deliverables were submitted on time on the 31st of March.

All partners notified by the commission that financial reports now need to be submitted. Please do this ASAP and do not leave it until May. Technical report to be finalized and submitted by UTH. Project officer has been notified of our intention to submit before the end of April. External review possible by end of June – any feedback will be shared.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Regular meeting held on Tuesday. Focussing on 3 main tasks: 1) citizen science – reviewing Minka application in Greek. Some issues have been observed and need to be addressed (both translation as well as coding / functionality issues). Expected to be fully functional by end of April (20th). On 21st of April -> youth assembly organized by ELYAMEP in Athens (university students) Second event on 27th of April organized for target audience students (secondary schools) . Here Minka will be launched. 2) technical concept note to be prepared describing how to communicate about the tool to stakeholders (citizens) – guidelines. 3) started work on agent based models – initiated threat to address capacity of Athens to deal with crises due to extreme heat in close collaboration with UNEXE. Objective is tool to enhance the capacity of the municipality. Tool possible to include digital twin (being investigated). In April follow up planned for all models to be used, before starting work on all modelling.
CS#2: Mediterranean ports	AUEB		Not present.
CS#3: Main River (Germany)	LMU	VKU	March 30th – met with stakeholder in Würzburg region (head of viticultural assoc. in the region). Project introduced, investigated possibility to participate in workshop (3rd LL). Meeting was in the framework of kick-off meeting of new regional project on farming strategies in Bavaria. Conclusion – many relevant projects ongoing – by focusing on specific sectors. Added value of ARSINOE is the integrated approach. Many sectors look into strategies to climate adaptation built upon using water from the Main river – under the assumption there will be enough water at all times. Meeting also discussed the urgency of climate adaptation (no general conviction).

			Also continuing to contact additional stakeholders (e.g. chamber of commerce) in preparation of the 3rd LL. Governance analysis – drafting document to understand region further.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Today regular internal meeting was held. Working on report from the transboundary LL. Data on lake outflow of lakes from Greece stakeholder received and being processed. Data from Albanian partner not yet received. Innovation call – Albanian partners is facing some complications, new meeting to align with WP5 is being planned in coming week. Meetings with stakeholders: NM – met with municipality and office of tourism, Albanian partner met with private and public universities. 3rd of April – meeting to discuss Minka (with WP3) to assess whether Minka could be used. Decision made – Minka to be used in CS4 (in all 3 of countries involved in CS4). NM and ALB most likely need translation, but English backup is available. Greek partners – dissemination with local units started. ALB partners to disseminate with universities and ministries, NM to disseminate with ministries and municipalities, local museums, biological societies, etc.
CS#5: Canary Islands	ULL		Not present due to Easter holidays.
CS#6: Black Sea	AUTH		Living lab (2nd) for black sea case study held last Friday. Positive feedback received from participants. About 12 stakeholders and ~12 people from the CS participated. Clear vision for next steps and focus obtained for the CS from the group. Which is a good success considering the complexity of the CS. Regular meeting held this week to plot the following steps. In close contact with WP2 on discussion how to move forward. Also discussed potential of use of Minka in CS6. Expect that it might be used in the CS. Meeting with Ralph and Martin on climate model to be planned after Easter(s).
CS#7: Southern Denmark	EM	TUD	Not present this week.

CS#8: Torbay and Devon County	UNEXE	TC	Meeting between TM and UNEXE on flood modelling – work on modelling (validation) progressing well. TM working on modelling predictions on flooding / flood warnings / adaptation. Weekly meeting with entire CS team: presentation by UNEXE on the dashboard. Sensor data from Env. Agency now included in dashboard (based on existing APIs). Further data streams under discussion to be included. Meeting with West Country rivers trust – to bring in information on ecosystems and ecosystem health into cascading effects modelling.
CS#9: Sardinia	AGRIS		Week focusing on interviews with Stakeholders (WP2 in Sardinia to support this). Refined mental map and common vision for LL, to be discussed with stakeholders after Easter. Studying the development of the experimental durum wheat field (concerning various irrigation strategies).
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Working on guidelines for workshop 3 – scheduled to mid-April. In time for May 3rd training session.
WP3	TUD	LMU	Progress regarding dashboard reported. Web interface that allows visualization of maps with real time data integrated in browser now prototyped. Interactive map demonstrated. Technology integration based on REACT framework being worked on by UNEXE -> to be compatible in Dashboard and also connected with serious game which will be part of the dashboard.
WP4	UNEXE	ICCS	
WP5	BRC		
WP7	AUEB		
WP8	GAC		New video shard (Ebun talking about stakeholder engagement). Isabelle & team are in Sardinia. Many highlights were shared through the socials – please interact with this. And when visiting – please also share highlights. Request to Ioannis – share participant list for upcoming event in Skiathos to prepare interviews.

13 April 2023

Skiathos papers: Alice (WP2), Gareth (UNEXE-WP4), Conrad (AUEB-WP7), Dimitris (CS#1)

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting took place, preparing for the citizen (implications through MINKA-under WP3). Meeting with Otto/Nav WP3 about the ABM model Option: The agents are the services, not the stakeholders (1st approach). Another option to have the stakeholders as agents-difference from the flooding case, because "heat" is also a trend, not a sudden event. Some thematic models hay results (e.g. land use/fragmentation of green areas in Athens)
CS#2: Mediterranean ports	AUEB		Not much news, because of Easter breaks, re-arranging meetings. Finalised the reports from the 2nd LL. Post workshop meeting on April 18 or April 24. Discussed the variables and models to be used (creating a list) to be followed with another meeting with WP3
CS#3: Main River (Germany)	LMU	VKU	Bi-weekly meeting (LMU-VKU), planning the 3rd workshop. Possible date May 12, or it may take place later. Working on the governance analysis (collaboration with WP2). Meeting with project from the CS-region developing serious games on adaptation
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	No meeting this week-Easter break. Meeting with WP. MK meetings with stakeholders. WP5 meeting last Tuesday for the open tender (AL). Finalising reports about the LLs. Received the templates for MINKA from CSIC (Sonia)
CS#5: Canary Islands	ULL		Not much to say because of Easter break. IN contact with WP5 about the open call. 2 candidates have shown interest. Waiting for instructions from WP5. Filling the document by Isabella with Carola in another meeting.
CS#6: Black Sea	AUTH		Not present, Easter break
CS#7: Southern Denmark	EM	TUD	Not much to report because of Easter break.
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday, Xin updated about the flood modelling, discussed some issues, but good progress. Torbay provided a draft presentation for comments.
CS#9: Sardinia	AGRIS		Isabelle and Claudia in Sardinia in the last 2 weeks for interviews, meeting with Dimitris and Alexandra (UTH) about the SDM, irrigation at the demo field, new soil/water balance
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		

Task 6.5	KWR		
WP2	UT	AUEB	WP2-WP5 meeting to prepare for a common workshop on May 3- general intro on April 20 to present related to the innovation open tender call before the 3rd workshop to fill in the .xls sheet on Teams that needs to be prepared 1 week before the workshops. Also checking the CIW by the CS leads. CS investigation re governance-end of October for Athens. Collaboration with WP8 about food security (documentary film being prepared).
WP3	TUD	LMU	Further discussion about ABM (explanations to Otto), Discussion about dashboard, about the progress of SDM, some delays with MINKA, because the app had a mistake. Contact with UNEXE, looks it can be resolved.
WP4	UNEXE	ICCS	Progress on the dashboard, meeting UTH and UNEXE.
WP5	BRC		See above WP2-CIW use to be explained next week
WP7	AUEB		No meeting-Easter break. Previous week meeting with WP7 participants, presenting a xls sheet to be filled. CS#1, CS#2, CS#3, CS#7 are participating regularly (having more PMs in WP7). Question: how are the other CS be informed? Suggestion to post notifications for new material at the common folder for all to see.
WP8	GAC		Working with REGILIENCE. Discussing a joint paper. Martin (DTU) volunteered. No papers for EURF. Communication about the capacity building session (next 21 April) for CS "Step-by step towards climate resilience". Video about the interview with Susanna (CS#4). WE organising an online seminar (Water & Public Health) 19 April.

20 April 2023
Project review: June 23 ARSINOE review, June 29 for the sister projects. Block the dates ! All the WP Leaders and 1 representative from each CS, but all are "encouraged" to attend (=Please attend!). The persons that led Deliverables need to be there.
We need a rehearsal (details have been discussed)
WP Leaders to be present on June 29.
Mission (europa.eu) The new platform -we need to link (CLIMATE ADAPT)
ICT4WATER- June 21 in Brussels. Chrysi to attend (+application).

Gloria to make a presentation about WP5 to all
We skipped the round of CS, but asked if anyone had an issue.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		
CS#2: Mediterranean ports	AUEB		
CS#3: Main River (Germany)	LMU	VKU	Date for the 3rd LL may be postponed from May 12, because some stakeholders are not available (this is the 1st CS with the 3rdLL) for the innovations
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	
CS#5: Canary Islands	ULL		
CS#6: Black Sea	AUTH		
CS#7: Southern Denmark	EM	TUD	
CS#8: Torbay and Devon County	UNEXE	TC	Medhi highlighted some of the works he has been undertaking on the dashboard modelling. Update on the flood modelling works provided and discussion. Otto has been looking at the modelling tool and has made contact with National Grid He is also going to make contact with South West Water to get more details . Dave spoke to Adam Luscombe yesterday regarding the traffic flow figures..
CS#9: Sardinia	AGRIS		
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	For the CS that plan the LLs before the summer- they need to provide the dates to Isabelle. Reports from the 2nd due 15 April. Some did not provide full details.
WP3	TUD	LMU	
WP4	UNEXE	ICCS	
WP5	BRC		Gloria presenting. Material (Excel) distributed by Carola to be filled by all (about the innovations)

WP7	AUEB		
WP8	GAC		

April 27, 2023
Announcements:

- Review meeting date: June 27 for ARSINOE (To be confirmed)
- Stakeholder classification has not been completed by all (Tasos started): Missing info: CS#2, for CS#6, #7 and #8 missing fields. **This is pending**
- DG meeting in Brussels: Martin, Ralf and Andrea Rubini will participate. Success stories need to be presented. Meeting next week about this organized by Giannis.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting this week took place + meeting with CSIC: the website to be used during the first months, not the app, as in the GA. Focusing on how to build the experts' community, then the schools, students and finally general audience. Dashboard: UNEXE present too, discussion with UNEXE also about the ABM (Nav+Otto). Feedback from NOA-progress to be reviewed next week (air quality and accessibility for the location of the NBS-15 min walking concept)
CS#2: Mediterranean ports	AUEB		Meeting with AUEB (EBUN and Alice), applying the comments to the reports from the LL. 3rd LL 19-20 June, 2 days with groups of stakeholders coming to Athens from Limassol and Valencia. Working about the innovations (CIW and others).
CS#3: Main River (Germany)	LMU	VKU	Jour fixe LMU-DTU dated set for the LL (May 26), working through the guidelines for the workshop. Completing the list about the innovations. Working on the governance analysis, guidelines from WP5 also being read for feedback.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Internal meeting today, finished all the reports for the WG and LL, sent to WP2. Discussion about MINKA, received material from CSIC. Discussed also the innovation call from NECCA, meeting with WP5 about the open tender, discussion about data-some missing from AL also data expected from GR. Modelling progressing-moved to Ohris from Prespa. Meeting also with stakeholder MK.
CS#5: Canary Islands	ULL		Internal meeting last week, WP3 to be attended to present the groundwater model (10 May). New innovator found (3 in total), info from WP5 received. Trip to La Palma in June to check the sensor-values not ok (perhaps because of the eruption-conductivity)
CS#6: Black Sea	AUTH		Meeting with WP3/WP4 this week on the climate scenarios and the downscaling. Reports on the LL done.
CS#7: Southern Denmark	EM	TUD	Nothing to report. They are at the EGU
CS#8: Torbay and Devon County	UNEXE	TC	Meeting took place this week-presentation by Alex about the networks (Brixham), discussion followed-could be applied also for other hazards, Mehdi working on the discussion about flood

			modelling-progress good. Some differences with the EA model-these are being investigated (UNEXE+TC). Discussion about the 4.1 dashboard with Gareth.
CS#9: Sardinia	AGRIS		Finalised the report of the 2nd LL, receiving the feedback from stakeholders about the common vision. Organising field day with stakeholders (relevant to bread). Students from LMU (6 students) for 4-5 weeks to stay in Sardinia (field work)
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Checking the reports + emails. Most of the reports are already uploaded-the rest on track. Dates of the workshops happening before the summer fixed. Working also on the training and with WP5-adjusting the content to account for the list of innovations approach. All to prepare questions, as needed for Carola.
WP3	TUD	LMU	Two meetings this week: meeting with CS#6 (reported above). Weekly meeting yesterday-discussion on the dashboard-links to the knowledge graphs (technical meeting). All to join the meetings WP3/WP4 if they can
WP4	UNEXE	ICCS	Dashboard starts with CS#8, followed by CS#1 (long term and short term with different functionalities). Mock up being prepared. Long term: strategic. Short term: response to crises. Long discussions with Gareth (UNEXE).
WP5	BRC		Guidance for applicants circulated (Gloria) to the partners involved for feedback-deadline 10 May for feedback. Questionnaire prepared for the weighting of the criteria for evaluation of the tenders. Deadline 5 May (before circulating to stakeholders). Meeting with CS#4-waiting for inputs from Nancy (open tender for AL). Joined WP8 meeting.
WP7	AUEB		Meeting with the team (AUEB) working on the choice experiments for CS#1 – initial info processed. Next step getting touch with CS#1
WP8	GAC		Meeting this morning, discussion also about the open call (+evaluation). Rehearsal meeting on WP8 to prepare for the review in June. Release video (Isabelle about SIA). ENoLL is organizing the open LL days in Barcelona (21-23 September): LL for an era of transitions. Request for papers (if the partners are interest). Lisa to send around a notification. WP2 likely to attend..

May 4, 2023

- Instructions for the Gantts (review) LVL
- Request by WP2 to share specific details about preparation for Workshop 3 (all the CS)
- Several people attended the webinar about CLIMATE-ADAPT organized by REGILIENCE on 04/05
- Discussion about CLIMATE-ADAPT
- We need to discuss about common KPIs with WP2 (TBD)

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Regular meeting took place on Tuesday 02/05, with the participation of representatives of all sub-groups of NOA. The goal was to discuss the progress till with regards to the models' development. Among the issues discussed was to confirm the "study area" and define the "hot spots" to be analysed. To this end, UTH team referred to 2 studies conducted, based on the socioeconomic data: a) vulnerability assessment and b) biodiversity analysis. It was decided that the findings of the 2 studies (i.e. maps) can definitely set the ground for the identification of the hot spots, mapping heat impacts, deaths, etc. Another topic discussed was whether our analysis will focus on heat or heat islands specifically. This will define whether our area will include the suburbs, since for the heat island analysis, we need to assess urban vs. suburban data/phenomena. We all agreed that we need to investigate at least the Athens Metropolitan Area, formulated by 7 districts.in parallel, we discussed the preparations of the citizen science exercise, and we decided to initiate the communication with the 1st target group thus, the exerts community.
CS#2: Mediterranean ports	AUEB		• Meeting of 1/5 (Holiday) was rescheduled for Tuesday 2/5. • Dates for the 3rd LL were finalized - 19/20 June. International LL hosted in Piraeus with representatives and stakeholders from all 3 ports of our CS. • Our 3rd LL will be a two day event, as it will be combined with events for our Maritime Accelerator (MENA), so that the stakeholders of the 3 ports get in touch with port related innovations included in the accelerator. • Next meeting (Monday) will be dedicated to discussions in relation to the Common Vision for the Mediterranean Ports.
CS#3: Main River (Germany)	LMU	VKU	Preparing 3rd workshop (end of May), attended the training webinar. Feedback for the tenders. The

			visit by UT will need to be adapted because of the review moving to June 27.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Meeting today-3rd workshop, possible dates for LL also discussed. Option for a physical LL also discussed. Looking for events to participate in the region (e.g. PRESPA PARK MGT committee). Meeting with UTH about the SDM. Missing data for AL need an on-spot check.
CS#5: Canary Islands	ULL		Attended Webinar (yesterday). Contacted the stakeholders about the tender for innovation (for ideas). Also had internal meeting. Meeting with WP2 about governance analysis (meetings in several islands).
CS#6: Black Sea	AUTH		We had our meeting on Tuesday and we discussed, amongst other, about the time-schedule for the third round of WGs and LL. All our members participated to the workshop organized by our colleagues from WP2.
CS#7: Southern Denmark	EM	TUD	Not present. Working on the reporting for Workshop 2
CS#8: Torbay and Devon County	UNEXE	TC	Meeting cancelled because of the CLIMATE-ADAPT. Attended the training webinar. Meeting with UNEXE about the flood modelling (details and comparison between CAFLOOD and TC model). Difference with the older models spotted. TC modelling to finish next week for the final comparison. July 10th 3rd LL.
CS#9: Sardinia	AGRIS		Internal meeting today, meeting with LMU students who are doing the measurements, attended the webinar yesterday. 12 May : field day with the stakeholders (relevant for the short supply chain)
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Training for the 3rd workshop done yesterday. All the CS were present. Focused on the steps for preparation (linking with AUEB and WP5). There is a need to organize a MOOC for the facilitators, together with the completion of a worksheet. The CS need to report back on their experiences. The worksheet needs to be ready 2 weeks before the 3rd LL. Carola working on short paper to participate in a conference at Barcelona for LLs (June 2023). Ant CS that wants to participate too, need to refer to D2.1 and D6.5 and to this abstract. Deadline today for abstracts.
WP3	TUD	LMU	Discussion about how WP3 will feed to the dashboard.

WP4	UNEXE	ICCS	Long dashboard about the dashboard. Modelling: link of the dashboard with the failure cascading engine (UNEXE). Also discussion about D4.2 and D4.3. Preparing the prototype for the dashboard to present to the review. Giota needs updates about the datasets before the review.
WP5	BRC		Poster accepted for ECCA Conference (Dublin) about the open tenders and the CIW. Finalising the instructions for applicants. Timeline updated because of the summer break.
WP7	AUEB		• There was significant progress with Tasks 7.2 & 7.3, CS1 will join the WP7 meeting on 15/5 to discuss the implementation of the Choice Experiments in Athens CS. • The Hybrid Reporting Model of Task 7.4 was finalized. Until now, the model fits the needs of Private and Public Companies, being directly suitable for a subset of ARSINOE's case studies. As it is in our intention to be applied horizontally to all case studies, a meeting first with CS1 is also scheduled for 15/5, so we discuss and fix the applicability of model to Municipalities or Regions (cases where the decision makers are broader than a Public Company). • WP7 meeting of Monday 1/5 (Holiday) was rescheduled to Monday 8/5 same slot (3:00-4:00pm EEST). • Finally, we had couple of meetings with REGILIENCE project and we initially discussed to do some common work suitable for WP7 (output fits for Tasks 7.1 and 7.5) in relation to the Private and Public Partnerships (PPPs). More details for this task will be communicated after the next meeting with REGILIENCE late May.
WP8	GAC		CLIMATE-ADAPT as an additional channel for diss/comm. Next seminar June 1st (WE). CS#9 covers as speakers. New video shared (Isabelle). Next about CS#5

11 May 2023

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Progress regarding organization of 3rd living lab, internal exercise on implementation of dashboard
CS#2: Mediterranean ports	AUEB		Agenda of 20th June Living Lab (all 3 ports, in Piraeus), 2nd living lab follow-up activities and preparation for 3rd living lab
CS#3: Main River (Germany)	LMU	VKU	Preparation actions for the 3rd LL workshop, pre-workshop meeting held with WP2; internal meeting LMU & VKU to discuss 3rd workshop and subsequent activities with stakeholders; WP5: reviewed guidelines/ preparation for the open tender; WP2: The schedule for the field trip for the governance analysis had to be adjusted to accommodate for the project review meetings
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Meeting with WP5 regarding innovation call/ preparation (Albania partner), meeting with WP3 (regarding SDM modelling methodology and Albania partner required data, which are currently missing), Gantt chart preparation, discussion regarding Minka, discussions and preparation regarding 3rd living lab.
CS#5: Canary Islands	ULL		Finished Gantt chart, started collecting and preparing data regarding 1st periodic report, progress regarding modelling to be presented in WP3/4 meeting , preparations regarding 3rd LL
CS#6: Black Sea	AUTH		
CS#7: Southern Denmark	EM	TUD	Completing 2nd LL workshop reporting, intermediate workshop to be held in June regarding implemented innovation and discussion with stakeholders, preparation regarding the periodic report.
CS#8: Torbay and Devon County	UNEXE	TC	Gantt chart prepared, UNEXE and WRT met with WP2 regarding innovation spreadsheet and 3rd LL, preparations for 3rd LL, drop-in sessions organized between stakeholders, partners and innovators, progress on modelling
CS#9: Sardinia	AGRIS		Organization of field day (together with stakeholders) to be held on 12/5/2023, Gantt chart preparation, periodic report preparation
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Preparation of 3rd LL meetings (pre-workshop meetings), draft of survey prepared and to be discussed with WP6, 26 May first 3rd LL workshop, short paper regarding ARSINOE experience on LLs prepared for Open Living-Labs conference in June,

			question regarding potential problem of LL delay of 2-3 weeks for the other WP's
WP3	TUD	LMU	
WP4	UNEXE	ICCS	
WP5	BRC		Meeting with CS4 regarding open tender, preparation regarding revision of guidelines for applicants of open tenders.
WP7	AUEB		Progress discussed on Monday meeting, meeting to be held on Monday regarding tasks 7.2,7.4
WP8	GAC		Workshop on CIW coverage, supporting the preparation of the periodic report on WP8 side

May 18, 2023

- Discussion about the date and time to have a consultation with the EAB
- Presentation by Mehdi (T3.1)

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		CS#1 joined WP7 meeting on Monday-brainstorming on the experiments (VA) ,Meeting on Tuesday- Gantt activities filled, Innovation lists preparations, working on the MINKA: contacts 1st group, dashboard/resilience assessment.
CS#2: Mediterranean ports	AUEB		Meeting on Monday-agenda for 3rd LL fixed (June19-20). June 19 Maritime accelerator-June 20 3rd LL-international, all the ports participating (in Piraeus)-hybrid event for the stakeholders to be organized. Working on a merged vision to be validated by all the stakeholders. Discussion on innovations to start.
CS#3: Main River (Germany)	LMU	VKU	Absent due to public holiday in Germany. Written report: Continued preparation of 3rd workshop in the Living Lab (26th May); Conducted a mock session of the 3rd workshop this week; Preparation of field trip for governance analysis; Preparation of survey on climate resilience (self-assessment)
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	All 3 partners Working on excel sheet with activities for WP6, N. Macedonian partner: working on the preparations for 3LL, group of engineers still working on the modelling of the data, meetings with stakeholders from the 3 municipalities Albanian partner: working on the innovation call , meetings with innovators and stakeholders that will be involve with the innovation call, still searching for hydrological data in AL Greek partner : preparation for the 3LL.
CS#5: Canary Islands	ULL		Meeting with Carola (WP2) to prepare the LL for June. Internal meeting (resilience Excel).
CS#6: Black Sea	AUTH		Meeting on Tuesday (internal)-working on the Gantt, working on stakeholder classification. UTH presented the uncertainty excel. Discussing also about the innovation bazaar. Dates for the next Workshops and LL not fixed yet.
CS#7: Southern Denmark	EM	TUD	Not present-holiday
CS#8: Torbay and Devon County	UNEXE	TC	Meeting on Wednesday, amending the Gantt (finished), stakeholder classification completed, presentation on ARSINOE, June 8 (WRT-Sarah attending) in Paignton.

CS#9: Sardinia	AGRIS		1) May 12 (Friday) important field day held in AGRIS experimental farm of Ussana with several ARSINOE stakeholder. Experimental smart irrigation fields as well as the effect of fertilizers from circular economy on durum wheat fields were shown. Social innovations implying local food production in the context of ARSINOE were discussed. 2) First data from the probes of the smart irrigation experimental fields and irrigation volumes are being analysed. 3) We are working on the Gannt chart of CS9 activities. 4) Experimental activities in the field and in collaboration with LMU students are underway.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	During the week, WP2 worked on the survey to circulate to case study leaders for feedbacks on the LL process. This will be circulated to them rapidly. We also brainstormed with WP5 on the open calls and the possible impact of delays in WS3. Then we continued to support the preparation of WS3. -we held our first WS3 preparatory meeting with CS5 on Tuesday.
WP3	TUD	LMU	Meeting WP3/WP4, clarified the deliverables and how to organize them.
WP4	UNEXE	ICCS	See above.
WP5	BRC		Next Wednesday the first tender to be published. CS#3 still misses some feedback. Next step to discuss about the 2nd open tender (before or after the summer).
WP7	AUEB		Meeting turned to weekly. Meeting with CS#1 on Monday (reported underCS#1). Next week presentation of financial reporting model (T7.4 and T7.5). Adapting the financial model for local authorities-to be applied ultimately for all the CS (started with CS#1 and CS#2)
WP8	GAC		Not present-Holiday

25 May 2023

- Gantt tables for the CS finished until tomorrow morning!
- Need to fill the Excel file with hazards for each CS. The file is under WP6.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Weekly meeting. Gantt discussed. Invitations for 3rd LL sent (June 16). Working on horizontal activities.
CS#2: Mediterranean ports	AUEB		Weekly meeting on Monday-3rd LL preparations. Presentation of the first results of the modelling (Piraeus-waves). Need to link with WP3 for data.
CS#3: Main River (Germany)	LMU	VKU	3rd LL tomorrow, good preparation, some last minute cancellations.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Today regular meeting, Gantt, innovation open tender, preparations for the 3rd LL (August-September), looking for data for the modelling.
CS#5: Canary Islands	ULL		Not present-They have another meeting
CS#6: Black Sea	AUTH		Preparation of the Gantt.
CS#7: Southern Denmark	EM	TUD	Meeting yesterday, Gantt, missing reporting, prepare the intermediate event for June 12 (to include changes in the area that affects the LL). The whole stakeholder group invited to discuss about these changes. This is a preparation for the 3rd LL. Suggestion to have the 3rd LL in October-in discussion with WP2 and WP5-to see if it is possible.
CS#8: Torbay and Devon County	UNEXE	TC	Weekly meeting-completed the hazards (excel spreadsheet), working on flood modelling (comparing CAFLOOD and INFOWORKS)-good alignment between the two (verification)
CS#9: Sardinia	AGRIS		1) Gannt chart of CS9 activities prepared and uploaded 2) Preparation, finalization, and submission of the financial report 3) Experimental field activities in collaboration with LMU students are underway.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	No issues-all arranged. Feedback form on Teams for all to download (suggestion by CS#3). Preparations for 3rd LL are finalized.
WP3	TUD	LMU	Weekly meeting- Work 3.1 to go on the dashboard.
WP4	UNEXE	ICCS	Reminder about the hazards classification.
WP5	BRC		Final drafts for 1st tender circulated. All set. Ready to launch. Plan to share tomorrow the link (to run until July 20), evaluation to follow until the end of

			September. Contracting phase in October. Implementation to start in November 2023. Next round (if there is enough interest). 3rd round towards the end of the year.
WP7	AUEB		Meeting on Monday. Hybrid reporting modelling-discussing about implementation in CS#1.
WP8	GAC		Internal meeting on CIW (10-11 May-in Rome) to see how it can be used for ARSINOE, also about the organization of the external exploitation workshop inviting regions and innovators (related to CIW). Preparing for disseminating the open tender call. Working on the interview for CS#5 (Noelia).

1st June 2023

- 19 June EAB meeting 10-11 CEST. Attendance required by WP Leaders/Co-Leaders. Representatives from the CS. We will use it also as (part of) the rehearsal. Presentation 30 min, then discussion. Template online by Giannis for the WP Leaders to fill in.
- Giannis to send material to the EAB (Technical report and Open call)
- Based on the (submitted) PR, we need to keep files updated. Giannis to create a dedicated folder for "horizontal" activities.
- Wednesday 7 June special session for ARSINOE in Skiathos (CEMEPE)
- Hazards list: We check only the Hazards that are relevant to the content of each CS (within ARSINOE)
- Finalising the stakeholder classification: CS#2, CS#7 (empty file)-To be uploaded

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting this week, finalized the innovation list (38 innovations selected from CIW and others from colleagues as a result of the challenges). List under review by the municipality. Short list to follow for the stakeholders (16 June meeting). Ask also the stakeholders about recommendations to finalise the list. ATHENA (Vivi Katifori) made a presentation about the VR-to add a short timeslot during LL#3, it will also be demonstrated and tested by stakeholders. Worked on the hazards (to be finalized), start working for the open call (with WP5-collaboration).
CS#2: Mediterranean ports	AUEB		Meeting on Monday, links with WP2, discussing about the Innovations (list), list to be finalized by next Monday, to look at the innovations before LL#3 (June 20). Hazards not filled.
CS#3: Main River (Germany)	LMU	VKU	Completed the hazards, scheduled meetings with interviews for the governance analysis. Last Friday LL#3-it went well-good discussions-benefited from the discussions with WP2 before the workshop. Preparing the report and scheduling a post event meeting. Call for innovation dissemination started (flyer in German) to the stakeholders and others that could be interested. Article being prepared in German to be published in 2 weeks in a Bavarian newspaper (circulation per issue: 10K printed; 19K online download). Survey feedbacks after the workshop, not on the same day, so no results yet. Praise for the LL for this CS by several stakeholders: "**unique forum for resilience for the region**". Asking questions about how it will continue and how the results will be communicated to the authorities.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Today weekly meeting, discussed about the hazards and the activities (both finished). Open call ongoing. Registration to the EU portal (AL partner). Discussion about the LLs-LL#3 in September (national LL AL in September, the others in July or

			September). Discussion with WP3 about having the LL in October. Modelling continues (SDM and hydro systems), finished with the energy model in NM, ongoing energy for the lakes (AL side). GR: Is it possible to have the national LL in July? After Carola gets back to be discussed (after June 21).
CS#5: Canary Islands	ULL		On May 26 2nd meeting with Carola (WP2) for the LL, filled in the hazards spreadsheet. Distribution of the open call to the stakeholders.
CS#6: Black Sea	AUTH		Meeting on Tuesday, data sources, uncertainties and hazards-info has been uploaded. Meeting also with MINKA (Sonia). WG: will take place in the last week of September.
CS#7: Southern Denmark	EM	TUD	Weekly meeting today. Preparing LL 2.a (June 12) to confirm their vision and to present the solution that EM have been working and to prepare for the open tenders. LL#3 will take place in October (approved by WP2-until mid October is ok). Contact also WP5 about this.
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday, report on the dashboard and the cascading failure model-setting up meetings with stakeholders. Next LL: Scheduled drop-in session (5) to discuss the innovations, before the LL (10 July). Continuing with the verification of flood modelling (based on previous events through the Council).
CS#9: Sardinia	AGRIS		Finalised the PR, joint activities with LMU activities-observations durum wheat fields mostly, Hazards filled and uploaded.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Not additional communication. Weekly meeting, how to exchange with Ebun for the innovation calls (applied and reported for CS#3)
WP3	TUD	LMU	Cascading modelling being updated -first results to be shared during the review meetings. Task 3.6 discussion about uncertainties for CS#1 (also about the ABM)
WP4	UNEXE	ICCS	Prototype of the dashboard working, more work for details is needed (ongoing activity), so as to include the info that is useful for the stakeholders (engaging with the stakeholders during the LLs, at least for Torbay)- Time to be allocated (30 min). Task 4.2 working on private and public datasets and related documentation for Zenodo. T4.3 (Tasos) classification of hazards ongoing
WP5	BRC		Could the CS share more info about the open tender from WP5- Maybe a short presentation (Gloria) or directly to the questions (TBD). All the CS participating in this call, need to participate to

			the info session. IA in the brochure (not RIA) to be corrected. Starting preparing the 2nd (DN#7, UK#8, BU#6, GR#1). Others, please let Gloria know. Next open tender before the summer break. Participation at the ECCA (in collaboration with REGILIENCE)
WP7	AUEB		Meeting on Monday (discussion also with CS#1) to present at the LL about the experiments. Discussion about the questionnaire (T 7.3)
WP8	GAC		Coordinated the dissemination about the open tenders, shared also a video with Gerardo, a follow-up to be organized with BGD and another event in NY (Giannis to let them know).

June 8, 2023

- General info about the upcoming project review.
- We need the numbers of the people attending the GA-Please fill in the Excel sheet.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Not present because of the CEMEPE conference and the NEXUSNET event.
CS#2: Mediterranean ports	AUEB		Meeting cancelled because of holiday. Filled the hazard mapping and preparing for the LL.
CS#3: Main River (Germany)	LMU	VKU	Not present-Holiday
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Internal meeting, discussion about the dates for the LLs, different dates, GR in July-date: 5 July, the others in September, International in October. Arranging meeting with Carola about the dates. Innovation is ongoing. New idea: International competition in the region for University Students from the three countries (e.g. summer camp). TBD further. Suggestion to contact WP8 for material.
CS#5: Canary Islands	ULL		Tuesday meeting with WP2 for arranging the meeting for governance analysis. Attended also the call organized by BRIGAID (also CS#3 was there and shared experience from LL) Disseminating the call through ULL and through the stakeholders.
CS#6: Black Sea	AUTH		WGs: September and October. Field trip to Aliakmon (data, discussion with authorities, spots for sensors for data collection-Digital Twin). In contact with Gerardo about the Open call.
CS#7: Southern Denmark	EM	TUD	Meeting yesterday preparing the meeting on Monday (intermediate LL). Preparing about the GA in October and for a side meeting with CS#8 at the GA. Only the reporting on the 2nd LL pending-all the other tasks done.
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday. Discussing the GA and the meeting with CS#7 (see above). UNEXE confirmed the procurement for the open tender call. Mehdi meets with NHS for health services to be build in the cascading models. Discussing flood outputs and traffic models (time of travel etc.- Barry and Mehdi) Flood modelling: Discrepancies discussed (rainfall simulation issues). Discussion on whether we will include the flood maps to the dashboard – could be that limited/restricted access option will be needed for the dashboard.
CS#9: Sardinia	AGRIS		Field activities: Collecting field data (smart data). LL: planning the 3rd workshop – mid September in Cagliari. Social activities: Inserting subtitles to the TV programme/video "Europe" dedicated to ARSINOE-preparing to give it to WP8. Preparing radio broadcasting for ARSINOE and INBESTSOIL (another EU project, with which we have synergies)

Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	No further updates.
WP3	TUD	LMU	Meeting yesterday, no issues. Discussing the review. Dedicated meeting for the review next Wednesday.
WP4	UNEXE	ICCS	Reminder about the hazards to the CS. Gareth and Dimitris at CEMEPE. We will have a single dashboard for all, not multiple entry points. Discussion on how to present the info.
WP5	BRC		Internal meeting on Monday on the calls for innovations. Contacting the CS for the 2nd round. The number of CS for the 2nd round need to be confirmed, also when to launch (summer or later). This depends on the CS interested. Tuesday open session for innovations (only the CS colleagues from CS#3 and CS#5). Received emails from innovators already. Next info session on July 6. Preparing the Guide for evaluators. Check list to be presented next week. Gloria at ECCA (June 19-21)
WP7	AUEB		Holiday on Monday-no meeting. The model presented at CEMEPE
WP8	GAC		At the Conference. (CEMEPE).

22nd June 2023

Run through all CS to check whether any updated have been made to the presentations based on the review rehearsal. Any changes that need to be made need to be done by tomorrow (June 23rd).

Questions received from the reviewers already yesterday. Ioannis will forward the questions to whom it concerns. (this is new – normally no questions are received in advance).

General Assembly – CS7 and CS8 planning to meet on the Monday before the GA. Albert indicates that any partner interested is welcome to join. Teresa indicates CS3 is interested in joining.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		3rd stakeholder workshop held on 16th of June. Good meeting, with adequate number (~15) of stakeholders there. Defined process was followed – first selections of innovation made. To be done – all collected information to be shared with the stakeholders. This Tuesday – regular meeting held – feedback from EAB was discussed and also discussed how feedback can be adopted in CS1. Post workshop meeting with WP2 to be organized by early July.
CS#2: Mediterranean ports	AUEB		International stakeholder workshop held last Tuesday (20th). Ioannis (reporting briefly) was there – very positive meeting. All tasks set up for the meeting were achieved.
CS#3: Main River (Germany)	LMU	VKU	Weekly meeting held on Tuesday. Mainly prepared for review meeting and visit of WP2 to CS3 next week. First open tender disseminated (e.g. in local newspaper). Working on climate risk analysis (master student involved) – thesis to be completed in 6 months.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Regular meeting this week did not take place. Meetings took place with WP7 on financial instruments and WP5 on the open call. Albanian partner preparing for 2nd round of open call. All partners working on preparations for the 3rd national workgroups. Invitations have been sent to the stakeholders.. First one is the Greek WG (5th of July). Modelling group in ICE continued work.

CS#5: Canary Islands	ULL		3rd LL held on Tuesday (20th of June). It was successful – stakeholders indicated they want to continue collaborating and extra activity was discussed (possibly in November).
CS#6: Black Sea	AUTH		Focusing on the review meeting. All partners have confirmed that they will be participating in the meeting. CS meeting rescheduled to the morning before the review.
CS#7: Southern Denmark	EM	TUD	Not present
CS#8: Torbay and Devon County	UNEXE	TC	Last week 3 LL drop-in sessions -> 10 people attended. to gather ideas for innovations for the 3rd LL meeting. Sarah presented ARSINOE to Torbay climate partnership meeting. Wednesday's weekly meeting organized. Mehdi updated on meeting with NHS, who expressed interest in the modelling done in ARSINOE and might want to use the outcomes of the models. Discussed Serious Game developments. Ideas to use the SG for educational purposes. (target audience was not defined in the DoA – this is now the first step). Flood modelling – validation of results from different models and identifying causes for discrepancies.
CS#9: Sardinia	AGRIS		June 16 – meeting with partners to discuss: CS9 contribution to review meeting. A) shared information on open tender to other partners. B) organization of the 3rd living lab – sept 25 or 28 are tentative dates for this workshop. June 19 participation to rehearsal and updating of CS9 slides. Field activities – data collection underway, wheat genotype selection and preparing for harvest (expected first week of July). Partners submitted abstract about Duram Wheat under climate conditions at the Italian hydrology days (in September).
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		

WP2	UT	AUEB	Worked on rehearsal for the review meeting. Weekly meeting cancelled this week Paper on methodology for the living labs – has been accepted for conference and for publication in journal Innovation Management. And preparation for the visit to CS3.
WP3	TUD	LMU	Not present – focus preparing for review meeting. Further work on modelling (e.g. the work with NHS).
WP4	UNEXE	ICCS	Preparing dashboard demo for review meeting. Knowledge graph and data hub to be included in the dashboard, but not yet decided how. For dashboard looking to input from stakeholders (through survey) -> to start with stakeholders from CS8, but as stakeholders from other CS might have other requirements -> dashboard to be made generic to these can be accommodated and to be expended later.
WP5	BRC		Not present
WP7	AUEB		Not present
WP8	GAC		Published interview (video) on NBS. Selection public authorities to be interviewed for Climate Innovation Window -> connection through resilient cities network.

June 29, 2023

- Milestones MS10 and MS13 ready.
- End of July and August: No Deliverables and Milestones
- Discussion about the review

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		No meeting this week (Review). Starting the educational activities. Meeting with Otto/Nav tomorrow. Next week summer school supported by ARSINOE in Athens (2 weeks-presentation of ARSINOE scheduled)
CS#2: Mediterranean ports	AUEB		Not present (In Cyprus for a conference)
CS#3: Main River (Germany)	LMU	VKU	Ongoing governance analysis with UT –Isabelle and her team(CS region: Main river basin), location of the LL. Meeting planned in Munich for tomorrow about the governance analysis. Report about the 3rd LL ongoing. Disseminating the open call. Attending also the same conference as CS#9 (Details below)
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Activities with WP2, preparing for the 3rd Workshop. Albanian CS ongoing open tender. MK completing the energy module (modelling). July: To be working on the water demand/use model. Working on scenarios complying with the RCP 2.6 and 8.5 and SSP 1 and 5 (downscaled) for the water sector (according to the GLOBAQUA approach). Results to be shared at the 3rd LL. Agriculture is included in the water demand. (water balance with monthly resolution).
CS#5: Canary Islands	ULL		Working on the report for the 3rd LL. Meeting with WP2 next week. Finishing the schedule for the interviews (governance analysis) (10 July starting for a week). 3 stakeholders participating at the open tender call.
CS#6: Black Sea	AUTH		No meeting, because of the review. Reporting next week. Disseminating ARSINOE to a new HE project EUROPELAND. Looking for potential synergies between the 2 projects (Hamburg University coordinating). Keep WP8 informed.
CS#7: Southern Denmark	EM	TUD	Not present
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday. Traffic data received (Barry) for the validation of the traffic modelling. UNEXE organising a series of meetings with CI stakeholders (over 16 different ones) for validation/data. CAFLOOD calibration continuing. Analysing a recent flooding event (May 2023) in Devon-Sidmouth. WRT synergies)invited speaker) with the UNESCO Geo-Park (Paignton). Gareth shared design considerations about the dashboard.

			(Short and long term dashboard). Working on the 3rd LL (July 8)
CS#9: Sardinia	AGRIS		Field activities ongoing for durum wheat genotype selection. Meeting with Blue-Gold for the development of a new tool for energy consumption and water irrigation losses. UNICA/CRSScore preparing contribution about crop modelling for IAAHES 2023 (International Association of Hydrological Sciences – Berlin)
Task 6.2	UT	AUEB	No other news
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	No other news
WP3	TUD	LMU	Not present
WP4	UNEXE	ICCS	Gareth made a general intro to the dashboard considerations
WP5	BRC		Reminder: Dissemination for the open tenders required. **BY ALL**. CS#8 to disseminate also with the sister projects. Support needed. AL said the timeline for applications is short. Suggestion : WE to help with their network and the marketplace
WP7	AUEB		Not present
WP8	GAC		Dissemination of the open calls (ENRICH GLOBAL) and also to contact WE.

July 6, 2023

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		1st meeting regarding 3rd workshop and next steps set, regular weekly meeting held focusing on citizen science and school involvement, accessibility models with NOAA team discussed.
CS#2: Mediterranean ports	AUEB		Regular meeting held, post-workshop meeting with WP2 held, finalizing reporting regarding 3rd LL, wave-model results concluded, next meeting to be dedicated to the discussion/ presentation of results, WP4 exercise finalized.
CS#3: Main River (Germany)	LMU	VKU	Governance analysis conducted (with WP2) , Ralf joined the sister projects' meetings on Friday, VKU-LMU regular meeting held, info session for call for tenders attended, post-workshop meeting with Carola held. Discussed follow-up activities of LL, climate and hydro services workshop with stakeholders to be held. LMU looking into variables of climate models for next climate scenarios.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Greek partners held working group in Prespes (positive- all stakeholders were present), Albanian partner ongoing innovation tender ongoing, summer school preparation, workshop to be held in mid-September, North Macedonia partner holding preparations for summer school, field trips with researchers planned, preparations for working group in September. Transnational LL being prepared. Ongoing modelling activities.
CS#5: Canary Islands	ULL		Meeting with Carola (post-workshop meeting), reporting almost finished, joined the innovation call meeting , innovation calls being prepared, finishing agenda for governance analysis.
CS#6: Black Sea	AUTH		Regular meeting held, focusing on preparation of next round of WGs and LL (last week of September), many ongoing field activities by partners (asked to sent reports of activities), Romanian partners have meetings with local authorities regarding reporting due to activities in protected areas.
CS#7: Southern Denmark	EM	TUD	N/P.
CS#8: Torbay and Devon County	UNEXE	TC	Discussions regarding 3rd LL which takes place this Monday (preparations, agenda etc.), dashboard and modelling activities to be potentially presented in LL, discussion as to how stakeholders will be engaged/ involved after the last LL. TC-UNEXE meeting regarding flood modelling (validation of model issues/ details tweaking).

CS#9: Sardinia	AGRIS		Field operations and lab analyses, crop modelling activities ongoing, Elena attending summer school regarding water-food-energy nexus approach.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Governance analysis in Main River , currently in Canary islands, post-workshop meetings held (see above), proposal for open LL days accepted (presenting SIA and LLs in conference in Barcelona)
WP3	TUD	LMU	Ongoing development of models, hybrid-model being extended
WP4	UNEXE	ICCS	
WP5	BRC		2nd info session held (positive, innovators and ARSINOE partners present), feedback and details being given, extension of deadline for submission of application for Albanian case requested (being discussed), current submission phase to be finalized in 2 weeks, draft of guidance for evaluators finalized and to be shared with some CSs.
WP7	AUEB		Worked on task 7.2 , final version of questionnaire to be ready by end of July, AUEB participated in conference (Annual *Conference* of the EAERE (European Association of Environmental and Resource Economists) IN Limassol, Cyprus) in Cyprus and presented financial reporting model.
WP8	GAC		Organizing meeting next week regarding dissemination of open calls , new videos to be shared in coming weeks, disseminated ARSINOE presentation event at UNHLPF.

July13, 2023

- Summer break: Last meeting July 27, First meeting after the break August 24
- Feedback from the Reporting is back- minor issues (mostly admin and financial). Giannis to contact each partner involved separately later today.
- No feedback about Deliverables yet. Deviations accepted.
- Uncertainties: Introduction by Dimitris (UTH)- 1st deadline for feedback **end of September**

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting on Tuesday. Working on the material from the 3rd LL, communication with the school to be involved with MINKA-progressing (13 teachers in schools-11 schools)+ educational centres for awareness to contact the schools. Working with Universities about selecting the curators for data evaluation . Developing modelling for vulnerable people (access). Investigating opportunity to work with EYDAP for sustainable solutions (in relation also with the open tender actions in the future). ABM model progressing (regular meetings with UNEXE).
CS#2: Mediterranean ports	AUEB		Regular meeting on Monday. Presentation of the first results from Piraeus (model), discussion on how it will be applied for Limassol. Discussion also on the report from the 3rd LL, to be delivered to WP2 on Monday.
CS#3: Main River (Germany)	LMU	VKU	Working on the report from 3rd LL. Disseminating the open call. Potential applicants are asking questions. LMU presenting the project at IUGG (Berlin). Working on governance analysis, preparing workshop on climate services.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Weekly meeting yesterday. Informing partners about experience from the GR national workshop. Working on the material from this. MK and AL preparing their own workshops. Preparing also for the international workshop (most probably to be held in Greece). AL waiting for applications for the open call (only for AL)-in contact with WP5.
CS#5: Canary Islands	ULL		Field work today at the islands for the governance analysis (interviews).
CS#6: Black Sea	AUTH		Field work from all the partners. AUTH collecting a report with their activities. RO meetings with stakeholders (national level). WGs in the 2nd half of September-dates to be finalized. In contact with MINKA about the parameters. Digital Twin also prepared for CS#6 with equipment from the open call (planned). Meeting with UTH planned for September: Contact between UTH and RO partners needed. Dimitris to contact him. Meeting needed between WP4 (T4.1) and RO digital twin team.
CS#7: Southern Denmark	EM	TUD	Not present.

CS#8: Torbay and Devon County	UNEXE	TC	Weekly Meeting yesterday. 3rd LL last Monday with 14 participants. All the tasks completed. The stakeholders want to continue being in contact after the 3rd LL. Working with the report. Meeting with WP2 planned for next week. Barry (UNEXE) progressing with the transport modelling. To be integrated in the modelling. Mehdi (UNEXE) in contact with stakeholders Frie Brigade, hospitals, emergency agencies , schools (to play the SG for feedback). Demonstration of the system to emergency services. Tool/model useful for preparedness for critical events (e.g. for the power utility about cuts etc.
CS#9: Sardinia	AGRIS		Field activities and lab analysis, finalizing material for crop analysis (conference next week International Association of Hydrological Sciences.)
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Governance analysis ongoing for CS#5. Working on the analysis of LLs. First session next week. Initial discussion now about the continuation oof contact with stakeholders. Analysis on a case-by-case basis.
WP3	TUD	LMU	Discussion CS#8 and CS#1 about extension of the SG for CS#1 for heatwaves.
WP4	UNEXE	ICCS	Nothing new.
WP5	BRC		Meeting yesterday for the dissemination of the open tender (social media). The CS will need to keep disseminating (CS#3 already doing it). Please send the text for dissemination to all.
WP7	AUEB		Meeting on Monday. Working with CS#2, finalizing the questionnaire for CS#1. First draft at the end of the month.
WP8	GAC		Working with BRIGAID for the dissemination of the open tenders.

July 20, 2023

- Introduction 2 new colleagues (Valencia port CS#2): Noemi Monterde, David Calduch
- Update on the feedback from RP1 by Giannis.
- Note: All the international CS #2,#4, #6: they will need to follow the same or similar approach for uncertainties. Differences are to justified and explained.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting on Tuesday, working on the report from the 3rd LL, online file in preparation for the stakeholders about the innovation pathways, working on subgroups: ABM progress, summer school (perhaps involving architects), progress in all tasks. Validation by the municipality (also their needs) needs to be taken into account: meeting with the municipality planned. Meetings with other stakeholders organized (e.g. fire brigade) and meeting with the new heat officer. Working with Data and special data with NOA. Progress in educational and training activities (work with specialists/contacts) for recognizing the species correctly (relevant for MINKA). Meeting with MINKA (CSIC) also took place for extra features to be developed. Next week meeting with ATHENA about the VR experiment. Real data are being collected during the current heatwave. Suggestion to collect also other types of data (e.g. from the media)
CS#2: Mediterranean ports	AUEB		Meeting on Monday took place (extended one). Working on the report for the 3rd workshop, interaction with WP2 about the innovation pathways (Ebun). Preparation of specific email to the stakeholders in all locations about the innovation pathways.
CS#3: Main River (Germany)	LMU	VKU	Participation at the Conference in Berlin (also Sardinia there). Open tender deadline on July 23, 7 applications in total received. Weekly meeting took place, preparation of the climate services workshop. Meeting with WP2 tomorrow (Alice). ARSINOE presented today at a network event for municipalities, districts, NGOs, water authorities etc. from the region.
CS#4: Prespa-Ohrid Lakes	IECE	NECCA, AKPT	No meeting this week (holiday), GR working on the material collected from the LL, MK/AL working on the preparation of the WGs (September). On site visit to the AL part by MK partner regarding missing data. AL working on the summer school preparation. AL postponed the participation to the open tender for the next call.
CS#5: Canary Islands	ULL		Tuesday meeting with Alice/Ebun about the innovation pathways. Meeting today with WP5, 4 applications received so far. Interviews about

			governance analysis finished last week (with WP2). Deadline 1st open call July 23.
CS#6: Black Sea	AUTH		Meeting on Tuesday: Field work by all, short report about this in preparation by AUTH for all the countries of the CS. Discussion on the uncertainties with UTH and the process to follow for the transboundary CS, also meeting next week with UTH about the SDM.
CS#7: Southern Denmark	EM	TUD	Not present
CS#8: Torbay and Devon County	UNEXE	TC	Weekly meeting, working on the cascading engine and traffic modelling, Working with WP2 about the 3rdLL report. Working on the admin side of the open call with the Uni. Discussion on the ranking/selection of the innovation
CS#9: Sardinia	AGRIS		Field work: selecting durum wheat/harvesting the smart irrigation pilots. Meeting with LMU about common activities (5 MSc theses). Further governance activities with WP2 in September.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		Discussion about the involvement of the stakeholders in the implementation of the innovations TBD next week (July 25)
Task 6.5	KWR		
WP2	UT	AUEB	Collecting data for the governance analysis from the CS.
WP3	TUD	LMU	Discussion about the approach on uncertainties with UTH (Dimitris). Progressing, but many people on holiday
WP4	UNEXE	ICCS	Not much to report, progress, progress with the SG
WP5	BRC		Meeting to discuss the evaluation. Template prepared for the evaluation of the proposals. Final applications to be sent on Monday for DE and ES.
WP7	AUEB		Meeting this Monday , financial model for CS#2 discussed. Discussion about indicators to be included in the (hybrid) financial reporting model.
WP8	GAC		Published a new video yesterday (CS#7). Next video next week for CS#6. Lisa in Madrid to discuss with BRC about CIW.

July 27, 2023

- WP6 meetings cancelled for 3 weeks (summer holiday)
- WP2 next meeting 30 August (summer holiday)
- WP2: Survey needs to be returned after the 3rd Workshop (**deadline 30 September**)
- WP5: Each CS needs to participate in an open tender call (at least) until **DECEMBER 2023. This is a hard deadline**

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting discussion about: 1) MINKA: Inventory of species offered to the users for selection - Discussion about how this will affect the replicability of MINKA 2) VR experiments: Discussion whether the location would be an actual one or an imaginary one-shortlisting suitable locations for the experiment (heat vulnerability the main criterion)- contact with the municipalities, whether the locations can be named. If not there will be an imaginary location. 3) EYDAP request: Including in the assessment how NBS affect the temperature-Poikilon Oros to be included (re-use of treated waste water from Psyttaleia). Offer of the NEXTGEN SG available if needed (Mehdi).
CS#2: Mediterranean ports	AUEB		Meeting this week cancelled (holiday)
CS#3: Main River (Germany)	LMU	VKU	Meeting with WP2 about innovation pathways, meeting with WP2 also about the governance analysis. Working on climate services workshop (stakeholders' needs). Possible connection to MINKA discussed- focus on retaining drainage water locally (e.g. help with photos by the public, also for missing blueprints when the house is empty). This is linked with payment for drainage (political), linked to water security law (rural areas mostly). During the governance analysis WP2/LMU met with 3 politicians.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Internal meeting today. Preparing the transnational LL (October). Meeting with WP2 (post WG reporting with NECCA). GR waiting for data on water consumption, MK preparing the national WG (September) and for the site visits, AL preparing for the national WG (September), the open call to reopen for AL. Al also preparing for the summer school.
CS#5: Canary Islands	ULL		Not present- on holiday
CS#6: Black Sea	AUTH		Meeting postponed. Discussing on the dates for the WGs (set for TR, discussing for BU).
CS#7: Southern Denmark	EM	TUD	Not present
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday. Working on the spreadsheet on the LL, discussion about the open tender

			evaluation etc. Agreement with SWW to use the SWW data.
CS#9: Sardinia	AGRIS		Field activities ongoing – common activities also with other partners-modelling tool AQUACROP used. Updating the web data server with satellite weather and field data. Field survey for the farm for a small reservoir powered by photovoltaic (innovation-prototype)
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Refers to 6.4 also. Still working on the outcomes from the LL. For the GA, WP2 planning a workshop about the way to work with the stakeholders (co-design guidelines) in the coming 2 years, with all the CS- Common activities and also tailor-made approaches, according to the needs of each CS.
WP3	TUD	LMU	No news-most people on holiday
WP4	UNEXE	ICCS	No news-only the SG is progressing.
WP5	BRC		Open call (1st call) ended on July 23- 19 applications in total received – Currently filtering them (evaluations in DE to end next week), to decide on the 2nd stage proposal selection and invitation. CS#5 to do this in September. Meeting with CS#2 (Valencia) about the open tender
WP7	AUEB		No meeting this week
WP8	GAC		Internal exploitation meeting with BRC, Video CS#6 released. Next week video with WP2 (Isabelle) to be released

August 24, 2023

- Meetings restarting after a 3-week summer break.
- Open position at LMU for the next 2 years. German not necessary. Urgently. (Teresa leaving).

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		3 weeks' break.
CS#2: Mediterranean ports	AUEB		3 weeks' break. Meeting on Monday about priorities
CS#3: Main River (Germany)	LMU	VKU	3 weeks' break. Started filling the template on innovation pathways and sent out invitations for the workshop in September. Decision on shortlist with 4 applications (out of 12 submitted). Contacted them. After mid-September applications.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Meetings every Thursdays continued. Preparations for the WGs. Dates for the Trans LL (in Greece, 19/10). Date for the national WG in MK (28 September). AL date missing still. Yesterday meeting with WP5-about the open tender call (5 innovations received). Selected 1 that will go for the 2nd innovation call. AL doing a summer school (21-25 Aug). MK preparing for the 3rd round WGs and on the modelling (moving to Ohris). Contacted expert on biodiversity for MINKA. GR preparations for the trans LL, also working on the reporting
CS#5: Canary Islands	ULL		Not present
CS#6: Black Sea	AUTH		Field work performed in the last 3 weeks by all. Results from BG and RO. Finalising the sates for the WGs.
CS#7: Southern Denmark	EM	TUD	Started last week after the summer break. Meetings internally and with WP2. Set the date for the 3rd WG (3 October). Meeting next week with all the municipalities. LNH water calculations on the damage costs.
CS#8: Torbay and Devon County	UNEXE	TC	Meetings continued. 3rd LL preparations, open tender preparations, clarifications sent to WP5 (Gloria), meetings with the stakeholders about the cascading effects (to be completed in October). Schools are interested and the fire service. Working also on the dashboard-co-design workshop in preparation. WRT new colleague joining the team (Emily). Progress with traffic modelling (Barry.
CS#9: Sardinia	AGRIS		Not present
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	

Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	On holiday most of the team. Preparing for the governance analysis in Athens, meeting with CS#7, preparing for the conference in Barcelona (open LL),proposal accepted, now writing a follow-up paper.
WP3	TUD	LMU	Most on holiday. Teresa met with Martin in DTU for a review of WP3 Deliverables. Follow-up soon for the M30 deliverables. Looking at the different modelling approaches at the CS-better documentation needed (WP3-M30 Deliverable). Invitation to all the modelling teams to submit papers to journals about their modelling to use as documentation.
WP4	UNEXE	ICCS	On holiday. Working on the dashboard and the SG mostly.
WP5	BRC		Not present
WP7	AUEB		3 weeks' break.
WP8	GAC		Not published new videos. Working on the videos. Videos available till November.

August 31st, 2023

General assembly – list of participants is available. List of people for site visit is also complete. WP leaders have been contacted to start working on the agenda. Expected we can discuss draft agenda next week. Focus on workshops (not on reporting progress).

Reminder the annual meeting will also be a joint meeting with IMPETUS (11th October). There will be opportunities to discuss activities that run in parallel / where we can work together. Collaboration needs to be defined in more details.

First periodic report – project officer will be back from holidays tomorrow. Updated version to be submitted soon. The second payment can be done soon afterwards (possibly one month after submission of final version of periodic report).

Once deliverables are accepted – all will become public (Q from Nikos) – Giannis – in principle yes, once they are approved those that are marked as public will be published.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Weekly meeting held. Working on reporting findings of 3rd stakeholder workshop. Bilateral meetings with selected stakeholders to discuss outcomes (insufficient time during workshop). Logistics to be prepared for these bilaterals (selecting who to involve). Also in collaboration with municipality and WP2. All groups of CS1 – accessibility issue being analysed – preliminary report expected by mid-September. NOAA is in close collaboration with European Env Agency. They prepare report on Climate Adaptation in Europe. Input to this report may be provided from CS1 partners. (good for ARSINOE visibility). Knowledge graph possibly to be described for inclusion. Discussion concerning MINKA – app ready by beginning October (Android) slightly later for iOS. App will be used – but new project initiated to collect data through website. To be discussed during GA.
CS#2: Mediterranean ports	AUEB		Weekly meeting held last Monday. Working on innovation pathways. To be shared with stakeholders as follow up to 3rd workshop.

			Input from WP4 on hazards being processed. To be finalized next week.
CS#3: Main River (Germany)	LMU	VKU	Working on post workshop report. Working on innovation pathway. Documentation for governance analysis being gathered. Climate and hydro services workshop being prepared (online = 29th of September). Invitations were sent. Next workshop on climate services will take place a few weeks later and include a broader audience. Waiting for the proposal from call for tenders (to be expected by mid-September).
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	No internal meeting this week (still holiday in Greece). Working on preparation of 3rd international LL. Communication with WP2 on LL (WP2 will partake in the transboundary LL). Albanian partner finished summer school (successful event). Preparations for 2nd innovation call ongoing (Albania and North Macedonia). North Mac. Partner preparing for 3rd national Working Group. Meetings with stakeholders that will participate in this WG. Dates for North Macedonian WG is fixed, and also for the transboundary LL. Albanian WG date expected next week. Model presentation to stakeholders in these meetings being prepared.
CS#5: Canary Islands	ULL		Not present this week.
CS#6: Black Sea	AUTH		Weekly meeting held on Tuesday; Dates for working groups established – working group in Turkey (online – September 15th). Romanian WG will also meet on that date (in person). Bulgarian WG to meet on 5th of October. International LL to be held by mid-November following these national working group meetings. The planning is OK both for WP2 and WP5. The work with WP5 is to be done by the national working groups, not dependent on the international LL.

			Preparatory meetings with partners from the national WG being scheduled by Alice. SDM – Romanian partners to have a meeting tomorrow, to be followed by meeting with all partners to decide how to follow up on SDM. Connection to Spanish CS in IMPETUS – all partners from CS6 will be in the general assembly. Presentation to IMPETUS is being prepared. Issues of interest: COP28 – in Dubai in December. Various representatives from ARSINOE will be there. A spot to present ARSINOE has been requested from the organisers. IF anyone is coming to COP28 – let Nikos know – there is an option to coordinate. Next week is the deadline to request presentations. Issue of interest – September 5th annual event is being held –(hybrid) – from LDSM Black Sea. Topic is urban sustainability. All are welcome to join. http://sdsn-blacksea.auth.gr/thessaloniki-sustainability-summit-2023/
CS#7: Southern Denmark	EM	TUD	Communication workshop with Danish partners took place last week. Comm consultant from Danish Coastal authority hosted this. Steps on common narrative for ARSINOE communication were discussed and established. Coastal Authority will present plan for comm in the next month – will result in improved communication on CS7. Agenda for CS7-CS8 meeting on October 9th needs to be confirmed. Outcomes of additional workshop (WS 2a) were discussed with WP2. 3rd workshop planning discussed with WP2 – 30th of October.
CS#8: Torbay and Devon County	UNEXE	TC	No weekly meeting this week. FCRIP knowledge exchange meeting attended (meeting other project from East Sussex en Bedfordshire counties). Information might be included in the ARSINOE project. Scripts written to link flooding data to cascading effect engine. Code can be used also in the other case studies. Serious game meetings to be hosted each month by Mehdi as part of WP8. Cascading engine to be

			used as prototype for SG development. (international consortium of SG developers).
CS#9: Sardinia	AGRIS		Still on holidays, but next meeting of the LL planned in September.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Weekly meetings started again after the summer. Contact with CS restarted – all is on track. Preparation for GA is focus for coming week.
WP3	TUD	LMU	Not represented
WP4	UNEXE	ICCS	No developments to be discussed.
WP5	BRC		
WP7	AUEB		Finalised first steps for CS1 – meeting with CS team next to proceed.
WP8	GAC		

7th September 2023

UTH – not present due to the flooding in Greece. The university building are flooded and there is no electricity. Request to all of us to share our sympathy.

Nikos adds – this situation is really extreme. First estimations indicate it might be an event with a more than 1000 year return period. Only positive – large wildfire might have been extinguished.

We have guests from the NATALIE project in the meeting – this project started 1st of September and will organize similar meetings for their CS (KWR is co-leading). Coordinators invited to see how our meetings works.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Not present due to extreme flooding in Greece – university is severely hit by the flooding.
CS#2: Mediterranean ports	AUEB		not present, written report: We worked and Corrected the Hazards file for CS2 We worked and finalised until next Monday's meeting the Innovation Pathways Excel file for WP2.
CS#3: Main River (Germany)	LMU	VKU	Finalised post workshop 3 report and innovation pathways. Preparing climate services workshop at end of September.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Internal meeting held with Greek and Albanian partners. Preparations for working groups and LLs ongoing. Technical issues for international LL in Greece being prepared. Data for Albanian national WG set (28 or 29 September) to be held in Tirana. Summer school yielded new data. Modelling ongoing, next week next project team meeting to discuss these items. Meetings with stakeholders started in Albania and North Macedonia for the national living labs in September.
CS#5: Canary Islands	ULL		Tuesday first internal meeting since holidays. Worked with Dimitris on SDM. Reviewing applications for open innovation call (reviewing with Gloria). 5 companies pre-selected – proposals of good quality – one to be selected (deadline is Monday 18th September). Aim is to start the work before the end of the year.
CS#6: Black Sea	AUTH		Preparing for first working groups on the 15th (Rom, Tur), in collaboration with WP2 to prepare the moderators of the working groups.

			Meeting schedules with Dimitris for the SDM, but postponed due to situation in Volos/Thessaly. Proposal for COP 28 (Dubai) submitted – if anyone will be present there and wants to present on their case study, please contact Nikos.
CS#7: Southern Denmark	EM	TUD	3rd living lab scheduled for 30th of October. Invitations sent. Preparation for this LL will be focus of the coming weeks. Internal meeting focused on outreach held this week. Will now receive more focus in CS7. Modelling work being started up again. Lydia – is it possible to have a meeting with CS8 next week to discuss agenda for the meeting at KWR on the 9th of October.
CS#8: Torbay and Devon County	UNEXE	TC	Weekly meeting last Wednesday. Tender process was the focus. Questionnaire for customization of 2nd round of tenders reviewed and answers drafted. Will collaborate with stakeholders to set weighting indices for the evaluation process. Doodle sent for this meeting. Mehdi – involved in stakeholder engagement to agree on impacts of flooding on critical infrastructure. Expected coming weeks. Traffic modelling – Barry demonstrated outcomes of work so far. (n.b. ambulances located in a flood risk area). CCWI conferences – 2 presentations. Alex and Lydia (on behalf of Medhi) presented.
CS#9: Sardinia	AGRIS		Chemical analysis for field trials carried out. Selection of best lines from Durum wheat well progressed. ~3 lines may be selected as new varieties. Meeting with WP2 to discuss 3rd living lab organisation. Data – between 22-28 September. Ideas for open call for tenders discussed also with WP2 (possibly social innovation, organic fertilisation, renewable energy for pumping in the field). To be further developed.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Concentration on Governance Analysis and preparing the workshops to be organized at the GA and the joint meeting with IMPETUS.

			Meeting with KWR (IMPETUS) – conclusion stakeholder engagement is very differently organized between ARSINOE and IMPETUS. Joint meeting to be structured around needs and concerns of the partners. Carola to post a message on Teams for all of us with question on our requirements/ideas on stakeholder engagement. Response required before middle of next week (message to include deadline). Meeting with CS that have not held 3rd LL yet to discuss organization and discussion with CS4 on the upcoming transboundary LL. Please send feedback forms from participants int eh LL to WP2.
WP3	TUD	LMU	Regular weekly meeting held yesterday. Main issue discussed was input for GA – following up email from Giannis. Main topics for WP3 identified – implementation of resilience framework, climate projections in the CS, use of the knowledge graph and dashboard by the CS, data collection in CS. Focusing on feedbacks actions, not on presentations. Dedicated invitations will be sent to people who should contribute to preparation for the GA .
WP4	UNEXE	ICCS	See WP3.
WP5	BRC		Completed evaluation of first open tender for CS3 and CS5. 4 resp. 5 applications shortlisted. They will be invited to send a 2 page proposal. Starting 2nd open tender (CS8 started with the process). Tender to open in autumn. All CS should participate in this tender, otherwise there is not enough time for implementation. CS participating in first call and with remaining budget can participate also in the 2nd round. N.B. – if more than one interesting proposal received in first round – more than one can be selected for funding.
WP7	AUEB		In relations to tasks 7.2, 7.3 The Choice experiment for CS1 is ready and there is a meeting tomorrow with WP2 (Vivi - Team working on the VR experiments) and CS1 to proceed.
WP8	GAC		No update

[14 September], 2023

- Common activities with IMPETUS (October 11): Number of participants needed for each activity. We'll have an EXCEL file to fill it in. One participant from each CS needed for the stakeholder engagement meeting/session.
- Resilience assessment (wheel) for each CS will be different). Prepare for the discussion. Minimum of "common" components for all the CS to be decided.
- Draft agenda for the ARSINOE (October 10) in preparation. To circulate in a few days.
- Confirmation of numbers for the meeting needed.
- Revision of the Technical report (with comments) finished. Issues with TORBAY about the financial statement. Only issues about postponing (a) D2.4 and D2.5 to be submitted by the end of November; (b) Also the plan for IPR to be added at the exploitation plan. Unpublished (temporarily) D3.1 to be kept for some time.
- End of September: D7.1- Reviewer: Martin (TUD) and D5.1- Reviewer: GAC – name to be confirmed.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting (weekly) cancelled because of another meeting this week. Proceeding with the report of 3rd LL. In contact with WP2. Material for stakeholders prepared for finalizing the work from the 3rd LL. Meetings with WP7 about the VR experiment. No progress about the dashboard requirements with the stakeholders. This needs to be done.
CS#2: Mediterranean ports	AUEB		Finalizing the report for the LL. Concluding with the innovation pathways matrix. Looking for options with the 3 ports-stakeholders to identify more innovation, which they had not identified before (important for this CS) to share the outcomes with all. Help needed from WP3 (Martin). Suggestion to attend the WP3 meeting in 2 weeks.
CS#3: Main River (Germany)	LMU	VKU	3rd workshop report submitted. Meeting LMU/VKU. Material sent to WP2. Receiving the proposals from the open tender (Sept 17 deadline). Marion participating at the MISSION seminar promoted via Teams by Giannis in August (today). Participation to the Bavarian Sustainability Conference and the UN Conference in New York next week.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	NM about 30 local fires this week! Internal meeting took place, preparing the 3rd LL (f2f in Greece). National workshops in 2 weeks (also f2f) preparing for them. Meetings with stakeholders, collecting the innovations to present to the stakeholders. Communication with Gerardo (WP5) about the CIW. Preparation for the Hydro-modelling system for the stakeholders (to be presented).
CS#5: Canary Islands	ULL		Discussion with WP2 (Carola) and also about to keep collaborating with stakeholders. Sept 26

			visiting a farm locally (stakeholder) affected by the fire in the summer. Did the EC accept the changes in the budget ? (Giannis to be contacted).
CS#6: Black Sea	AUTH		Tomorrow 2 WGs (RO and TR) will take place. WG in BU will take place later. Bulgaria had also floods in our (ARINOE) region flooded. They will have an expedition to assess the impact to the protected area. Discussion with MINKA (Sonia) to come to a CS#6 meeting. UN SDN meetings in New York next week: ARSINOE to be presented by Nikos.
CS#7: Southern Denmark	EM	TUD	Synergies with CS#8 reported below.
CS#8: Torbay and Devon County	UNEXE	TC	Update for the financial situation/documents. Hopefully it will be settled by Monday. Discussion with CS#7 to discuss the agenda for the common meeting of the 2 CS on October 9. Modelling work: Based on the severe storms that happened lately in Greece/Spain/Libya, it was decided to look also at the T=1000 storm. Updated by Mehdi, in preparation for the meeting in October (looking on what additional features to include).
CS#9: Sardinia	AGRIS		Open calls: Collected contributions and proposals from the stakeholders and uploaded them on Teams. Preparation for the LL-meeting with Carola, scheduled for Sept. 27. Organising the data to be shared with the other partners, especially LMU. University of Cagliari presented the results from AquaCrop at a National Conference.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	D2.4 and D 2.5 to be submitted at the end of November: Instead of changing the date, the EC officer suggested to submit with the progress by the end of November (as draft) and update later. Stakeholder engagement map: Feedback from 3 CS: All the activities related to the SIA are in common for all the CS. Another level of activities specific for each CS could also be supported but it requires effort (PMs) by all (additional).
WP3	TUD	LMU	We had 3 presentations CCWI 2023- To send the links to WP8.- Uncertainty issue for the GA.
WP4	UNEXE	ICCS	Dashboard discussion at the GA.
WP5	BRC		Not present
WP7	AUEB		Preparing D7.1- to circulate by Sept 20. To be sent by Set 25 for review.
WP8	GAC		Released the video by Mike Wood and a video from WP3 from Martin. Disasters (article) and videos to be done.

21 September 2023

- GA discussion:
- WP2: request on how we will engage the stakeholders (till the end of the project)- Tuesday October 10 Workshop)
- WP5: WP5 needs 1 hour on Tuesday about the open tenders and how to proceed. Check overlapping with WP2
- WP1: 1 hour (?TBC) needed for MGT
- WP8: 30 min on Tuesday
- WP7: 30-45 min for next steps (Tuesday)
- WP3/WP4: Resilience wheel workshop. 90 minutes (Tuesday)
- WP8 needs a room for interviews on Tuesday afternoon. (2-5pm)

Confirmation of numbers needed (Giannis)

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		No special issues. Contributed to the EEA report (initiated by NOA)
CS#2: Mediterranean ports	AUEB		No issues- no meeting this Monday
CS#3: Main River (Germany)	LMU	VKU	Applications received. 3 good, 1 disqualified. Question whether they can select 2 innovations already without waiting. Question to WP5. Based on previous discussion WP5 agrees. Contract template from WP5 coming.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	No issues. 2 meetings this week with WP2, internal meeting today. Preparation for the LL, Date for AL WG changed to 1st week of October.
CS#5: Canary Islands	ULL		No issues. Normal meeting. Working on the contracting phase for the open tender. Template provided by WP5.
CS#6: Black Sea	AUTH		No issues. Organising WGs and Int. LL.
CS#7: Southern Denmark	EM	TUD	No issues, just working.
CS#8: Torbay and Devon County	UNEXE	TC	Sunday significant storm event-used as info provider for this CS (for modelling etc.) and the technical aspects. TORBAY collecting the info and Devon CC for the rest. Alex working also on collection
CS#9: Sardinia	AGRIS		No issues-Working, preparing the LL (Sept 28), also with synergies with INVEST-SOIL.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Not present (other project meeting)
WP3	TUD	LMU	Merging the info about the models with the Resilience wheel, working on a survey for after the GA
WP4	UNEXE	ICCS	
WP5	BRC		

WP7	AUEB		
WP8	GAC		Not present (other meeting)

September 28, 2023

- Nav presented the preparations for the WP3/WP4 workshop during the GA (the Wheel)
- Final agenda for the common day. People to communicate with the other project, for common sessions.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		All the team at the meeting for another project
CS#2: Mediterranean ports	AUEB		Meeting on Monday, Corrections to the reports from the LLs (by Alice)-next week meeting with WP3 (Martin). Dimitris (UTH) helping with for analysis simulation.
CS#3: Main River (Germany)	LMU	VKU	Preparing the climate services workshop, also working on the innovation pathways. Teresa says Goodbye… ☹
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	National WG in MK, next week AL WG, preparing for the international LL. Presentation at the International Wetland Conference.
CS#5: Canary Islands	ULL		Working with WP2/Innovation Pathways, also on the Excel for WP2.
CS#6: Black Sea	AUTH		Two workshops last week (RO and TR). Discussion with WP2, Final Workshop next week in BU-November last LL. Presentation of the ARSINOE project at the UNSDN Conference in New York (as good practice for international cooperation). Discussing with UNSDN/Europe for potential support to Ukraine colleagues- participation of Ukrainian Universities-to support them in finding funding sources through the EU/EC. Letter to be prepared by Nikos for all.
CS#7: Southern Denmark	EM	TUD	Meetings planned for next week. LL final version uploaded. Agenda finalized for the CS7/CS8
CS#8: Torbay and Devon County	UNEXE	TC	Short meeting yesterday about the agenda, T=10000 flood investigated by Mehdi, meeting net week with the stakeholders.
CS#9: Sardinia	AGRIS		Not present, because of their LL today
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Presented SIA at the open LL day Conference (Barcelona), working on the workshops for the GA.
WP3	TUD	LMU	Preparing for the GA (a lot of work and interactions) for the WP3/WP4 workshop. Also looking at the recommendations from the EC.
WP4	UNEXE	ICCS	Working with WP3
WP5	BRC		Preparing for the GA, request for preparation for the 2nd call by BRIGAID. D5.1 submitted

WP7	AUEB		D7.1 delivered. TUD reviewing.
WP8	GAC		ARSINOE in the ICT4WATER newsletter, Alex blog published, Videos: Noelia (canary islands), Mehdi (flooding), Alex (cascading effects), Suzanna (Fires in North Macedonia)- Opinion paper by Martin.

October 5, 2023

- All ready. Link for remote participation is available. Templates for presentations ready.
- Observer from NATALIE (coordinator) coming.
- Review results received-> Very good! All Deliverables have been approved. Minor admin issues.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Regular meeting, MINKA positive reactions by teachers. MoU to be signed (Park-Antonis Tritsis Metropolitan Park)-5 centres in Attica. All subgroups are progressing. Exploitation workshop discussed (Barcelona-7-8 November). Tasos (ICCS) progressing-presenting next week. Uncertainty work progressing, but more attention is needed (discussion during WP3/WP4 meetings would be useful)
CS#2: Mediterranean ports	AUEB		Not present. Cannot connect. Will update directly.
CS#3: Main River (Germany)	LMU	VKU	Discussion with stakeholders about climate services (interests), debates to continue in November. No meeting this week. Interactions with IMPETUS prepared.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	National WG (MK) took place, successfully. The other WGs will be postponed for October (AL). Regular meeting last Monday: preparation for 18-19 Oct 3LL to take place in GR(Prespes). Linking with WP5 for the 2nd Innovation call Al and MK will be involved (working on this). Synergies with IMPETUS (Italian CS).
CS#5: Canary Islands	ULL		Discussed with IMPETUS (Spain CS), Internal meeting, meeting with WP2 about the innovation pathways. Working with WP5 with the innovators (contracts)-not easy admin part.
CS#6: Black Sea	AUTH		Not present.
CS#7: Southern Denmark	EM	TUD	Monthly meeting with the municipalities took place yesterday. Preparing for the 3rd LL (end of October). Meeting to prepare for the KWR.
CS#8: Torbay and Devon County	UNEXE	TC	Meeting preparing for the open tender and discussed the evaluation questionnaire with stakeholders- Working on the wheel for CS#8, UNEXE received the open tender document (admin). Modelling: Mehdi met with the Police (Blue Lights) for Torbay about input for preparedness.
CS#9: Sardinia	AGRIS		Not present
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		

WP2	UT	AUEB	Working on innovation pathways and on the workshops for the GA. Also on a roadmap for the interaction with stakeholders for the next years and about the synergies with IMPETUS.
WP3	TUD	LMU	Major task “The wheel” (intensive in meetings and in preparation). Preparing for the presentation. Nav preparing the wheel for the workshop (material)
WP4	UNEXE	ICCS	Working with WP3 about the wheel.
WP5	BRC		Innovators for ES and DE have been notified. Finalising contracts this month. Preparing the publication of the 2nd open call. Next steps next week.
WP7	AUEB		Not present
WP8	GAC		Exploitation workshop (Barcelona-7-8 November). Shared the interview by Noelia. Working on the video by Mehdi. Room for interviews on Tuesday afternoon. Interviews next week about the work done (5 min each) and the next steps. ARSINOE newsletter sent out. Exploitation workshop in Barcelona: all share some success stories and practices and implemented solutions.

October 19, 2023

- Amendment submitted

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		-Preparations for the open tender call -Climate projections discussed, need to readjust -Citizen science task discussed, satisfactory progress, first workshop held, second workshop online (high interest of schools to participate) -Resilience framework discussed, to start working out
CS#2: Mediterranean ports	AUEB		-Outputs of GA discussed -Preparations for Open tenders calls -Until next meeting the resilience framework inputs will be finalized -Workshop with stakeholders of all three ports to be organized (in addition to the completed 3 LLs)
CS#3: Main River (Germany)	LMU	VKU	-Invitations for climate services workshop sent out -Participation in a conference regarding sustainability with CS -Resilience wheel discussed during GA and will be further discussed in next meeting
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Not present/ in LL
CS#5: Canary Islands	ULL		-Resilience framework discussed and information sent to WP3 (awaiting input from WP3) -Draft for the contract of the innovation call received from the university, technicalities regarding this discussed (receiving funding in parts)
CS#6: Black Sea	AUTH		-Meeting dedicated to ARSINOE Resilience Framework explaining the concept of the resilience wheel. -Next Tuesday the draft resilience wheels of each of the four sub-case studies will be discussed and combined to a single one -Living Lab scheduled for 14th of November
CS#7: Southern Denmark	EM	TUD	Not present
CS#8: Torbay and Devon County	UNEXE	TC	-Resilience framework input mostly already completed -Discussions about dashboard -Gathering data from recent flood event to be fed into the dashboard -Update on modelling work regarding cascading effects engine (Synergies with CS7 discussed, as discussed at the GA) -Technicalities regarding traffic modelling discussed -"Groundworks" company contact with UNEXE, regarding open Innovation tender

CS#9: Sardinia	AGRIS		- In the framework of ARSINOE second Open Tender for Innovation, two documents (i.e. Questions for customisation and CS9 Supplementary Information) were completed and shared with WP5 members; - Concerning ARSINOE-related technical and experimental activities, both segregating and advanced genotypes from the AGRIS durum wheat genetic improvement program were evaluated and selected
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	-Working Template for roadmap for stakeholder engagement strategy (to be presented in November) -Meetings organization changed (1 meeting every 3 weeks) -Preparing drafts for deliverables 2.3,2.4 -CS1 for governance assessment visit preparation -Refer to deliverable to 2.1, 6.5 when LLs need to referenced by case studies -Survey regarding feedback of WP needs to be circulated
WP3	TUD	LMU	-Started working on deliverable regarding Resilience Framework, case studies need to send out their inputs (by 31st October) -Progressing regarding model regarding resource allocation (test demonstration by mid November expected) -Looking into how Dashboard can present necessary information
WP4	UNEXE	ICCS	-Looking into how Dashboard can present necessary information
WP5	BRC		Receiving and processing information regarding 2nd Open Tender, bilateral meetings may be held with CSs, Exploitation workshop in Barcelona in November (Interest to participate should be expressed by next week)
WP7	AUEB		
WP8	GAC		Questionnaire on IP and exploitation prepared, videos to be shared.

26 October 2023

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Not present
CS#2: Mediterranean ports	AUEB		Not present
CS#3: Main River (Germany)	LMU	VKU	-Circulating invites for climate services workshop -Discussed about stakeholder engagement -Worked on innovation pathways -Progress regarding resilience wheel -University legal department progress regarding open tenders
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	-19th of October 3rd LL held, excellent outcome -Working on post-LL reports (meeting with Carola scheduled), internal meeting regarding post-LL activities held -Finished resilience wheel inputs, to be uploaded by 27th October -Meetings with innovators held regarding innovation calls
CS#5: Canary Islands	ULL		Not present
CS#6: Black Sea	AUTH		-Discussion held, Clear ideas from all partners to participate in the innovation calls -Resilience wheel sub-parts (from different sub-cases) presented, to be merged in 1 concerning the whole case study
CS#7: Southern Denmark	EM	TUD	-Final review meeting with Carola before Monday's 3rd LL, preparations regarding LL -Resilience wheel discussed, at first it will be handled by Esbjerg municipality and then possibly workshop to be held to present this to the other municipalities as well -Discussions regarding the innovation call (amongst all municipalities) held
CS#8: Torbay and Devon County	UNEXE	TC	-Cascading module discussed and gathering of data, meetings with stakeholders held -Progress regarding the ranking of infrastructure assets based on their criticality -GIS plugin -Progress regarding traffic modelling -Data on the response to recent floodings discussed and to be gathered
CS#9: Sardinia	AGRIS		-Resilience wheel progress, to be finalized soon -Report after 3rd LL almost finalized -Preparation of materials for open tender -Activities regarding the selection of durum wheat genotype ongoing
Task 6.2	UT	AUEB	-Worked on Finalizing the email to be sent to stakeholders to validate the innovation pathways

			-Discussed about the open calls for the 3 ports – a meeting with the wp5 will be requested to provide some clarifications.
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	-Wrapping up LL workshops -Stakeholder engagement roadmap: gathering input from CSs -Preparing for governance analysis in November in Athens
WP3	TUD	LMU	-Modelling on cascading effects progressing, social vulnerability analysis to be incorporated -Resilience framework analyses progressing -Transportation modelling -Reviewing European Climate Risk Assessment Report, some things can be utilized in ARSINOE. Confirmation of climate scenarios used.
WP4	UNEXE	ICCS	-Discussion with stakeholders regarding the development of the dashboard -Looking into how different modelling components can be integrated
WP5	BRC		- To verify in grant agreement whether there is contractual obligation to arrive to innovators in all CSs or there is some leeway
WP7	AUEB		Start organizing the details for the upcoming workshop
WP8	GAC		-Dissemination regarding 2nd open tender -New video released -ARSINOE Seminar jointly organized with the sister projects within the broader theme of "Water Smart Cities" to be held on the 30th of November 11.00-12.00, looking for speakers

[November 2], 2023

- Message about potential changes in partners' financial details to be sent to Giannis for the 2nd payment.
- Large number of Deliverables for March 2024-We need to work now. Attention to the Open call, the Resilience wheel (October 21 deadline), **Uncertainties feedback from all the CS (deadline 10 November)-4 CS still missing: #2,#3,#6,#8. Workshop to be organized later (November 30)**
- 2nd open call to open Nov 15-Nov 17 and to close at the end of 2023

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Regular meeting last Tuesday, event with the Metropolitan Park (location for testing MINKA, successful event with teachers and authorities)-training session for MINKA for the schools, discussion about validation with CSIC and which species will be monitored. Submitted the draft for the open tender (Ina to work with the details-BRIGAID)-3 sub calls to open. Worked on the Res Wheel-submitted. Progress on the models. NOA preparing report about the modelling.
CS#2: Mediterranean ports	AUEB		Open calls under discussion-still issues that need to be discussed with WP5, worked on the Res Wheel-finalised (not delivered yet), to be shared next Monday.
CS#3: Main River (Germany)	LMU	VKU	Preparing for the seminar (with WE-Nov 7-regional event), another seminar planned for next month with local organisations from municipalities. Winners of the open tender are waiting to be notified by the admin team in LMU. November 24: Event in Nurenberg, organized by LMU on ARSINOE
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Working on the preparation of the LL report, working on the open tender call, next Thursday to finish, Res Wheel completed and sent, Oct 3: Internal meeting with Hydro model engineers (interest by the stakeholders + dissemination about it). Internal meeting about the SSP scenarios. Also AL working on the open tender.
CS#5: Canary Islands	ULL		Meeting this week, progress with the sea-level rise model, meeting also with the selected company from the open call-some details need still to be defined. Expected t be signed in November-next meeting Nov 14, working on the Innovation Pathways (WP2)-feedback expected in 2 weeks. To contact Martin about the climate scenarios.
CS#6: Black Sea	AUTH		Meeting last Tuesday, discussion about the Res Wheel and preparing for the LL (Nov 14),
CS#7: Southern Denmark	EM	TUD	Meetings: 3rd LL last Monday, good input for the open calls through the LL. WP5 to be contacted. Res Wheel postponed (in agreement with Nav).
CS#8: Torbay and Devon County	UNEXE	TC	Cascading model-update by Mehdi, tool for testing. Discussion also a follow up from CS#7. Discussing the concept of protecting specific nodes (two

			approaches Mehdi and Alex). Working on the traffic model (Barry). Gareth sent short video from the dashboard. CAFLOOD-work on infiltration and on data sources. Wheel finished. Local into the legal requirements for the open tender (Albert).
CS#9: Sardinia	AGRIS		Meeting with the CS partners to define shared crop modelling and to discuss the Res Wheel (submitted to Nav). Finalising the outcomes from the 3rd LL for WP2. Today meeting with UTH about the SDMs. Technical activities about durum wheat in progress.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	-UT worked on the roadmap template to be presented next week at WP6 meeting. In this purpose, would it be possible to book 10 to 15 minutes next week to dedicate to this, please? -UT continues to work on preparing the last case study visit for governance analysis -UT works on the draft of D2.3 to be submitted at the end of November -UT continues to work with CSs on post WS3 of LLs for CSs under their responsibility. -AUEB-Waiting for input from WP3/WP4 (Martin) about the stakeholder engagement.
WP3	TUD	LMU	Meeting yesterday about the 6 deliverables for March 2024. Discussing all of them (and the Milestones for WP4). It will be very tough to meet all these deadlines. Invitation to all to attend the meetings on Wednesday is they are involved in any of the deliverables.
WP4	UNEXE	ICCS	Common meeting with WP3-Same issues.
WP5	BRC		Aiming to launch in mid November the 2nd call. All the material needs to be finalized next week for the call to be launched. Monday Nov 13 LAST DEADLINE for uploading to the website.
WP7	AUEB		Discussion on the finalization of the papers for publication. Working on the implementation for CS#1 (financial model).
WP8	GAC		Campaign for the open call ready. Visuals on Teams and for the CS. Need the support by all ten CS for disseminating the event. Working on the external exploitation workshop (Nov 7-8 Barcelona). Working on the IP questions.

November 9, 2023

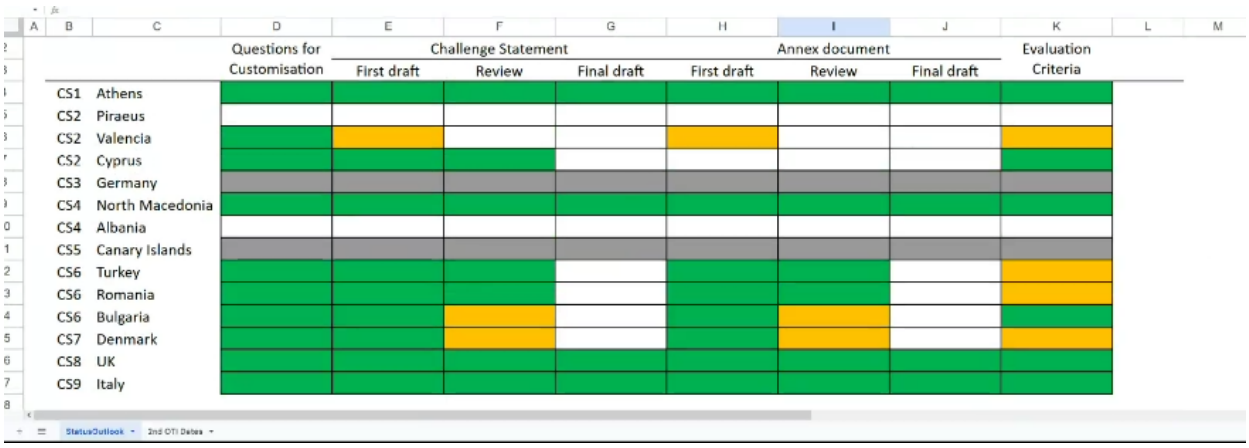
Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		-Agent based modelling discussion about application in CS1, implementation to start soon -MS11 (end of January), input required from CS1
CS#2: Mediterranean ports	AUEB		Not present
CS#3: Main River (Germany)	LMU	VKU	- ARSINOE presented at conference (poster) - Climate services workshop preparations - ARSINOE to be presented in a seminar aimed at water supply companies (German) - Resilience wheel to be finished - WP5: Innovator contract still waiting for approval from university side
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	-Preparation for report 3rd transboundary LL -Woking on the Miro board of the 3rd LL -Internal meeting 9th of November regarding innovation call -Meetings with legal department from institution regarding innovation call and contract -Text for innovation call to be finished this week -Resilience wheel finished -Modelling ongoing
CS#5: Canary Islands	ULL		-Preparing contract for innovators -Finalizing preparation for visit to farm affected by recent wildfires (with participants of LLs)
CS#6: Black Sea	AUTH		-Sent the four wheels and we are sending the overall one later today. -Uncertainty exercise to be finalized by tomorrow - Preparations for final Living Lab scheduled for next Tuesday, November 14th
CS#7: Southern Denmark	EM	TUD	-Working on open call annex, sent yesterday to WP5 -Pending work on weighting criteria for innovation call assessment
CS#8: Torbay and Devon County	UNEXE	TC	-Discussion regarding uncertainty exercise completed -Modelling work ongoing -Legal department almost finished reviewing innovation call details
CS#9: Sardinia	AGRIS		-Meeting with WP2 regarding outcomes of 3rd LL -Finalizing materials for open tender -Collecting data for SDM modelling -Meeting with stakeholders (from LLs) to discuss policies regarding sustainable food production
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		

Task 6.5	KWR		
WP2	UT	AUEB	-Preparing arrangements for interviews with CS1 (governance) -Roadmap for stakeholder engagement -Next meeting to be on the 29th of November (longer meeting) -Innovation pathways: draft deliverable being worked on -Stakeholder engagement roadmap: Case studies to report on their draft plan until Dec 20.
WP3	TUD	LMU	-Discussion regarding modelling uncertainty identification exercise -Progress regarding resilience framework
WP4	UNEXE	ICCS	Not present
WP5	BRC		-Case studies on track regarding innovation calls -CS2 (Piraeus), CS4 (Romania) need to give input -Case studies to contact contracting organizations regarding logo placement and send input
WP7	AUEB		
WP8	GAC		-External workshop in Barcelona 7th November held -WP8 to support with newsletter and visuals regarding Cs-stakeholder communication -Call to CSs to submit abstract for adaptation mission shared amongst CSs (Tasos will present Knowledge graph)

16 November 2023

- Contacted by REGILIENCE about contacts with the CS at the same geographical areas (UK, Sardinia) CS#8 and CS#9
- Uncertainty (Dimitris): There are some delays, contacted by Dimitris. Analysis about the uncertainties needed for all the CS. Need help from WP2-already contacted. Also assistance by WP3 about the climate projections. List is being formed about the feedback. The approached to be discussed-**Next week 1st presentation by Dimitris about uncertainty (30 min)**

Update of the status from the open calls (WP5)



	Questions for Customisation	Challenge Statement			Annex document			Evaluation Criteria
		First draft	Review	Final draft	First draft	Review	Final draft	
CS1 Athens								
CS2 Piraeus								
CS2 Valencia								
CS2 Cyprus								
CS3 Germany								
CS4 North Macedonia								
CS4 Albania								
CS5 Canary Islands								
CS6 Turkey								
CS6 Romania								
CS6 Bulgaria								
CS7 Denmark								
CS8 UK								
CS9 Italy								

Key dates of the ARSINOE 2nd Open Tender for Innovations

Phase I - Applications	Phase II - Evaluation and Selection	Phase III - Contracting
21 Nov - 8 Jan Info sessions: 12 Dec - 14:00 CET & 05 Jan - 14:00 CET	**9 Jan - 8 Feb** -> Evaluation of applications **9 Feb - 15 Feb** -> Demo proposals in preparation (shortlisted innovators) **16 Feb - 29 Feb** -> Review of proposals and selection of winners	**1 Mar - 31 Mar**

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting this Tuesday, ready for the open call. Invited the Mrs Variani (Chief heat officer for Athens) to make sure that the CS is aligned with the municipalities and also to make presentations and the solutions (e.g. NBS) appropriate for Athens. Everything on track. Continuing the meetings with ABM (Otto and Nav). Potentially it could be expanded to other CS.
CS#2: Mediterranean ports	AUEB		1. All ports have sent documentation to WP5 in relation to the open call. 2. We decided that an online meeting with the stakeholders of all ports will take place at 22/1/2024.

			For Valencia, they will conduct the meeting on the 16th of December and they will present the results at the meeting of 22/1, because is difficult to engage their stakeholders twice (Port has scheduled meetings with them twice a year). 3. We are planning to finalize the uncertainty exercise next Monday.
CS#3: Main River (Germany)	LMU	VKU	Wednesday meeting VKU-LMU about the workshop next week. The Bavarian Environmental Authority shared the invitation. Attended a Conference organized by the local Ministry on Agriculture. Introduced ARSINOE to water utilities (workshop). Working on the stakeholder engagement plan.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	14/11 meeting with WP2 (Carola) post LL meeting with her, discussing the report, also discussed the roadmap for stakeholder engagement. Further meeting planned on this. Reports finished, still in draft the 3rd transboundary LL, to be finished next week. Meeting with some innovators in MK, communication with WP5 about 3 innovations from CIW. Dissemination event in MK for ARSINOE happening today (16/11) with the University. AL sent the text for the open call. GR working on the draft report, meetings with stakeholders from the LL.
CS#5: Canary Islands	ULL		Working on stakeholder engagement roadmap on MIRO, meeting with Carola (WP2). Internal meeting last Tuesday. Last meeting with the selected company from the open call called FIClima. Contract to be signed this month, but to start in 2024, 1 year of implementation (results before the end of the project). They are going to provide climatological data and show the results on an open platform-this was an issue with the CS. They are also going to provide data for the climate projections until 2100, focusing on the 6 selected scenarios by WP3. Also, they are going to provide two workshops to show the results to the stakeholders.
CS#6: Black Sea	AUTH		LL last Tuesday, successful, 22 stakeholders (high number), productive discussion. Submitted the Wheel(s) for all the local CS and the combined one. GR and TU have submitted uncertainties BG working today and RO need to be reminded again to finalise it.
CS#7: Southern Denmark	EM	TUD	Not present.
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday. Mehdi working on open street map, incorporating also post codes. Working on visualization, Alex working on cascading effects and Otto on ABM and how it can be integrated.

			Jess and Sarah met to discuss WP2 stakeholder engagement activities for CS#8.
CS#9: Sardinia	AGRIS		Working on open call-all ready, some details to be refined. Collecting data for the SDM (crop, land , water demand for some crops etc.) DSSAAT model for crop simulation is being used.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	Cooperation with WP3 about the uncertainties.
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Meetings with CS#4 and CS#5, preparing the governance analysis for CS#1 (Isabelle to go to Athens next week about this).
WP3	TUD	LMU	Cascading failure: progressing WP3/WP4 (dashboard)- Mehdi made a short presentation. Update about the uncertainties at the general intro of the minutes. CS#1 contacted list of data needed for Athens and for CS#3.
WP4	UNEXE	ICCS	See above.
WP5	BRC		Launching 2nd open call on November 21, update of status on top. Concerns about Piraeus (CS#2) and Albania(CS#4). We'll launch
WP7	AUEB		1. A survey and Questionnaire is being prepared by WP6 and WP5 2. Questionnaire to be distributed at the start of December (we would need a slot in WP6 if possible first week of December to explain). Case studies will have 2 months to complete 3. A workshop will take place during the first 2 weeks of February.
WP8	GAC		Working with WP2 for the newsletter. ICCS presented at the Green Deal support office meeting yesterday (GDSO)- success stories. Next round Nov 22 , open to all. ICT4WATER for early December Mehdi, ICCS.

[23 November], 2023

- Finalising the amendment
- 2nd payment to be distributed in a few days
- Open tenders (12) are out since Nov 22
- Presentation by Dimitris about the uncertainty exercise (20min)- Canary islands (CS#5) will be the 2nd frontrunner (apart from CS#1)

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Citizen Science: planning an activity for March 22: open call for schools-collecting data through MINKA-working. Progress in modelling, analysing the hotspots. Meeting with ABM (Otto/Nav): concluded 2 scenarios, 2 time horizons-conceptual framework and then adding more. ICCS working on the Graph and the vulnerability index. Planning a meeting with the AR team (ATHENA).
CS#2: Mediterranean ports	AUEB		Meeting on Monday, completing entries for the uncertainty exercise-still some entries missing. Reminder from Otto about the Resilience Wheel-to be sent to Otto.
CS#3: Main River (Germany)	LMU	VKU	Meeting between LMU and VKU about climate services workshop (planned for tomorrow). Provided info for IPR file, articles written for the VKU newsletter. Resilience wheel and uncertainty exercise submitted.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Internal meeting today-transboundary LL report to be finished this week. Also discussion about MINKA translating in Macedonian, perhaps also to be translated in Albanian, otherwise to be used in English. MINKA for three countries at transboundary level. Today meeting with local municipality about local innovators (open call), Working on dissemination: competition call for students in 2024 for the three countries. Innovation fair to be led by AL (the others participating) to bring together all the innovators from the 3 calls. Modelling progressing.
CS#5: Canary Islands	ULL		Visit to the farm with the LL group, posted on Instagram. Participated in a Forum about sustainability. Working on sea-level rise modelling planned to have the 1st version at the end of 2023. Groundwater modelling (almost) finished.
CS#6: Black Sea	AUTH		Working together with WP2 to finalize the report of the 3rd Living Lab. All of the partners have filled the Uncertainties sheet. We asked at least one from each partner to participate to today's meeting so that they can hear the clarifications and comments from Dimitris on this exercise. Resilience wheels finished for all the 4 countries and the aggregated one.
CS#7: Southern Denmark	EM	TUD	Not present

CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday, reviewing the docs for the WP2 roadmap (deadline Dec 20). Meeting of the national Resilience Forum attended by Mehdi and presentation of his work-interest. SWW are going to send more info about CSOs in the area, already included. Otto testing about exchanging files among files, meeting arranged with IMPETUS (about flooding with N&S) and TRANFORMAR (about WRT/synergies in Devon) both in January 2024-2 meetings) to compare the CS)
CS#9: Sardinia	AGRIS		Uploaded crop data for the SDM (with UTH), meeting with the local water consortium to have access on crop and water consumption data for the SDM, proceeding with the crop modelling activities. On the ground finalising ground soil management. Arranging meeting with REGILIENCE/Transformar for 12 January 2024.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Working on the tools and strategies for stakeholder engagement, meeting also with WP3 (Wednesday) about uncertainties related to SIA. Also met with WP8. Fieldwork in Athens for governance analysis. Submitted draft D2.4.
WP3	TUD	LMU	Yesterday long uncertainty meetings (2 meetings)
WP4	UNEXE	ICCS	See above
WP5	BRC		WP5 needs all the CS to assign 2-3 people as evaluation committee and go through the evaluation guide and block the dates. General presentation of the next activities.
WP7	AUEB		Two meetings for the choice experiment)CS#1) also with WP2. Final version of the questionnaire. Choice cards are being implemented.
WP8	GAC		IP questions on Teams.

[30 November], 2023

- Submission today D2.3 and D2.4 (draft versions), also D8.7 with details about IPR (all on time)
- No Deliverables for the end of December
- WP2-Draft for the stakeholder engagement roadmap due on **December 20, 2023**
- Request from NATALIE to have a webinar/meeting (Martin/Ralk) about the climate scenarios. NATALIE following ARSINOE on the matter.
- Deadline for WP5 evaluators **Dec 7, 2023**

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Regular meeting this week, looking for SMEs for the open call. Planned bilateral meetings until Christmas with ATHENA (VR), Isabelle (WP2) and Conrad (WP7) to come to a meeting on Dec 19, tomorrow meeting for ABM (UNEXE) and NOA. Working on the Deliverables for March
CS#2: Mediterranean ports	AUEB		Meeting with Dimitris to finalize the inputs in the uncertainty exercise. CS2 to finalize based on Dimitris comments.
CS#3: Main River (Germany)	LMU	VKU	Climate services workshop last week (regional), Bavarian Environmental Agency participated also. Worked on the stakeholder engagement plan, completed IP table, Gunar spoke today at the seminar about Water Smart Cities. Completed also the resilience info and the uncertainty info. Practitioners need new climate services model (e.g. landslides), i.e. info related to practical advice.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Internal weekly meeting today, reports to be finished next week from the LL (transboundary), SDM for the lakes to finish in January (Prof. Vasileiadis-GR), also heat model and SSH model (all models for the three countries. MINKA to be translated in MK and GR (also probably in AL) to be implemented also for CS#4, with students from AL involved. Meetings with stakeholders planned for Dec 2023 about the Open calls. January 2024 competition event with students planned (at transboundary level).
CS#5: Canary Islands	ULL		Internal meeting last Tuesday, UTH (Dimitris) joined. Main assumptions: groundwater the recharge value and the coast line for sea-level rise. Innovation pathways sent to WP2-meeting planned for next week.
CS#6: Black Sea	AUTH		Report from LL prepared and sent to WP2 for comments, disseminating the open call in all the countries.
CS#7: Southern Denmark	EM	TUD	Contacted potential SMEs for the open call. IP info provided. Mehdi to send list or data needed for the simulation (WP3/WP4) of cascading failure.
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday, discussing open tender, meeting with interested stakeholder, also further

			contacts. Technical meeting on cascade modelling yesterday (CS#8 flooding)-sorted by Mehdi. SWW provided info about potable water, pumping station etc.
CS#9: Sardinia	AGRIS		Collecting data for the SDM, field: finalizing genotype selection, LL reports finished. Focusing on the stakeholder engagement plan. Discussing MINKA with the Agricultural Technical Institute in Cagliari.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Meeting yesterday WP2, also meeting with WP5 (linking about the stakeholder engagement plan), in touch with all the CS about the innovation pathways. CS#1 supported with booking interviews (visit to Athens). CS#1 and CS#2 to report about the progress (Conrad and Vivi). Governance assessment: 2nd round of visits planned to meet with stakeholders to present and discuss the results from May 2024). All the CS have delivered the report from 2nd workshop. Draft for the stakeholder engagement roadmap due on December 20. Working with WP8 for a template for the newsletter-meetings 1 to 1 available if needed. Presentation on Dec 14 during this meeting. Governance analysis prepared for 4 Case Studies (CS#1, 3, 5, 9). The selection was based on the CS leaders that accepted to do it. Giannis and Isabelle to check about potential deviation from the GA on the matter.
WP3	TUD	LMU	In touch with CS on modelling issues. Update for uncertainty: Dimitris update-no time. Draft for the uncertainties Deliverable to be sent on Sunday. All have to look at it. Meeting next week will last 1.5 h to discuss it.
WP4	UNEXE	ICCS	Discussion about the dashboard, also for CS#8-CS#1 needs to be included in the Milestone for D4.1 (M30)
WP5	BRC		CS to start working on the evaluation. Info from CS#1, 7, 9, 6 (Turkey) provided. Deadline for the rest 7 Dec 2023. Evaluations during Jan/Feb 2024. 12 Dec 14.00CET 1st session Q&A for the innovators. CS are invited too. Registration is open. 2nd session around Jan 5, 2024. Discussion WP2/WP3/WP4/WP5/WP6 about impacts from the solutions to be implemented (reasonable content for the applications). To arrange a meeting
WP7	AUEB		Working on the final version of the survey for Tasks 7.1 to 7.3.

WP8	GAC		Posted message on Teams with material for the open tender. Mehdi and Tasos about the ICT4WATER newsletter material.

[December 7], 2023

- WP5: Deadline for evaluators (open calls) **Monday 11 December** (fill online Teams)
- WP5: 1 person to join the info session for applicants on Dec 12. Let Inna know deadline also **Monday 11 December**

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Regular meeting this week, Vivi Katifori (ATHENA) discussion about VR, meeting with WP7 planned (needed). Many bilateral meetings yesterday and today UTH and with UNEXE about the ABM and the long term exercise.
CS#2: Mediterranean ports	AUEB		Many members at the COP28-Discussion about the open calls.
CS#3: Main River (Germany)	LMU	VKU	Internal meeting this week. LMU signed a contract with one of the innovators; two newsletter articles published about ARSINOE at national and regional level. Working on the stakeholder engagement plan. Discussing the innovation pathways.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Dec 6, meeting with WP2 (Alice) about the innovation pathways, explanations about the Excel file to fill. Discussion about the transboundary innovation pathway-there will be a single one for the 3 countries. Today internal meeting, discussing open calls and diss/comm. Also UTH present (Nikos) about the SDM, next meeting Jan 24. Competition planned (reported also last week)-brochures to be made about it. In contact with WP8 about this event.
CS#5: Canary Islands	ULL		Bank holiday in Spain
CS#6: Black Sea	AUTH		We have finalised our report on the Living Lab, in collaboration with our colleagues from WP2. We reminded our partners that they should provide evaluators for the assessment of proposals in collaboration with WP5. We received an expression of interest for the call from our Bulgarian partners. We also reminded them that at least one from each sub-case study should participate to today's meeting.
CS#7: Southern Denmark	EM	TUD	Monthly meeting with all Danish partners and the other 3 Wadden Sea municipalities was held on the 6th of December. Discussions on flooding modelling and the process for the Living Lab as well as the open call was discussed at the meeting.
CS#8: Torbay and Devon County	UNEXE	TC	Weekly meeting yesterday. Discussion about the dashboard-how to incorporate the Met office data, Mehdi showed the cascade model, SG developing to be sent around to Torbay, PESTLE analysis (Sarah and Jess), meeting with potential applicants

			tomorrow. Otto discussed about the distributed model and the Digital Twin.
CS#9: Sardinia	AGRIS		Planting season started-durum wheat experimental field are being planted. SDM data received about crops, to be uploaded on Teams. Meeting with WP2 yesterday-discussing the outline of a film on the durum wheat and food security for the Mediterranean. Evaluation committee members defined.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Meeting with CS#7, stakeholder engagement meetings organized, analysing the data from the field trip to Athens. Writing a paper with CS5.
WP3	TUD	LMU	Meeting yesterday-main discussion about the uncertainty deliverable (D3.10)
WP4	UNEXE	ICCS	Long discussion about the dashboard (meeting yesterday)
WP5	BRC		After the deadlines, the CS need to look at the text of the proposal, in case changes are needed. End of January 2024 it needs to be finalized. Implementation period 12 months and monitoring to take place and reported for the impact.
WP7	AUEB		Not much work because of COP28. Next week 20 minutes presentation needed at this WP6 meeting.
WP8	GAC		D8.7 submitted on time. Dissemination about the open tender call takes place.

[December 14th], 2023

- Presentation for the newsletter (WE)- Banners for all the CS are ready by WE.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		No meeting this week. Meeting with WP7 on Monday about the experiments. Final loop of the questionnaire before end of Dec. To be finalized in mid-January. Discussion about the samples (around 100 people needed). Raising awareness about the open call. At least 3 needed-optimal 5-6. Uncertainty: Socio-economic vulnerability-done-consistent results for the four most vulnerable neighbourhood , internal meeting for the other two sources of uncertainty. Three uncertainties threads to be combined (CS#1 is a frontrunner for uncertainty).
CS#2: Mediterranean ports	AUEB		Case study started working on finalizing the Hybrid financial Reporting model (WP7) for CS2. A meeting is scheduled for 18/12 with Martin (WP3) to discuss on the models and data for our case study. Missing the evaluators for the open call-WP5 to contact.
CS#3: Main River (Germany)	LMU	VKU	Meeting with WP2 (Alice) for the innovation pathways. Stakeholder engagement plan submitted. Preparation for participation in IFAT Munich (next year-May), to present the project at a trade fair.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Internal meeting today. Discussing the stakeholder engagement roadmap, to be ready next week. Working on the innovation pathways. Participating in the info session for the open call.
CS#5: Canary Islands	ULL		Internal meeting on Tuesday. Meeting with WP2 (Alice) about the Innovation pathways-these have been sent to WP2-waiting for feedback. Working on the uncertainty task.
CS#6: Black Sea	AUTH		No meeting this week. Uncertainties: working on them. Setting the evaluators for the open call. Three open calls for RO, BU, TR.
CS#7: Southern Denmark	EM	TUD	(Not present in person, i.e. due to other meetings / teaching). Meeting with Carola & WP2 regarding the 3rd Living Lab workshop on Dec 6th (last week) Preparation of the report and the stakeholder engagement plan is ongoing. Bilateral meeting with IMPETUS project partners from Tromsø regarding financing issues in CS7. A follow-up meeting is planned for January. Bodil/EM participated in the innovation call workshop on the 12th. Dialogues with several potential innovators, including one of the IMPETUS partners.
CS#8: Torbay and Devon County	UNEXE	TC	Internal meeting yesterday-working on the dashboard-feedback to Gareth (UNEXE), discussion

			about different levels of access. Cascade engine working on implementation of different infrastructures -interest from others in the UK (Resilience Forum)(Mehdi-UNEXE). Working on stakeholder engagement roadmap. Discussing also ten open call-meeting with the innovators.
CS#9: Sardinia	AGRIS		Analysing hourly meteo data for the digital twin and for developing hydrological model for the durum wheat in collaboration with LMU. Need to be in contact with WP4/Task 4.1-Gareth (UNEXE). Participated in the open tender session. Working on the script with UT (concerning their tool) food security related to durum wheat-defining who will be interviewed-establishing contacts for this. Also contacting officers in Brussels (EU) for general links to EU policies. Continuing the field work at the experimental farm.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Ongoing Innovation Pathways-Stakeholder engagement-Governance. Working also on the experiments (VR)-to be adapted beyond the Choice experiment for educational purposes.
WP3	TUD	LMU	The WP3/WP4 meeting was held yesterday / general discussions on the uncertainty task, dashboard, MINKA, etc. Next meeting will be 10th January where we will ask for the status of all tasks. WP3/Martin will meet with CS2 on December 18th; WP3/Martin and Ralf will present the climate scenarios approach to NATALIE project on December 19th.
WP4	UNEXE	ICCS	See above
WP5	BRC		Info session about the Open calls last Tuesday (around 40 participated)-good questions by the innovators-participation also of CS (CS#1, CS#4, CS#6, CS#7, CS#8, CS#9)-Missing CS#2, but discussing separately with Valencia, because they have their own accelerator. Video to be publicly available-Q&A will be anonymized in the public version. To be uploaded within this week. Next session on 5/1/24. Evaluation committees: All ok except CS#2 (Piraeus). Gerardo to contact them and copy UTH.
WP7	AUEB		This week we had a meeting with CS1 and the VR team from WP2. The implementation of the Choice Experiment in the VR environment for Athens was discussed. WP7 explained several details in relation to the

			questionnaire and the details in relation to how the attributes need to be implemented
WP8	GAC		News about ARSINOE and the COP28 (Present WE, Chrysi, Nicos, Phoebe, Conrad, Ebun). These people need to provide material to Lisa (few lines and photo needed). ARSINOE also in the PROTECT project newsletter. Joined newsletter in preparation with the sister projects (on land use and food systems)- CS#9 to send email. Network Pathways to Resilience: They have an open call. Link to the General chat.

21 December 2023

- Giannis/UTH- Proceeding with interim payments.
- WP7 (Conrad) makes a presentation to all the CS about the forthcoming workshop for WP7. Link to the questionnaire shared with all
- https://uthnoc.sharepoint.com/:x:/r/sites/ARSINOE/Shared%20Documents/General/WP%207/Workshop/WP7_Adaptation_Finance_Workshop.xlsx?d=w1994493277d542e5940681cdd873404a&csf=1&web=1&e=cQ4oUa
- Conrad will arrange to fill the table first with CS#2 and then with the others attending the meetings for each CS (their weekly meetings)

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Weekly meeting took place, WP2 participating (Isabelle) for the governance analysis-25 interviewees, probably another visit in May 2024 with a meeting with stakeholders, Conrad also attended-discussion about the VR experiment, also working on the models to transfer to Conrad (WP7). After Christmas NOA will present the hotspot analysis/9 January 2024
CS#2: Mediterranean ports	AUEB		Meeting last Monday, Alice (WP2) attended too, finalizing the roadmap for stakeholder analysis.
CS#3: Main River (Germany)	LMU	VKU	Not present
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Regular internal meeting today, discussion about innovation pathways-ongoing, also about stakeholder mapping (finished) and the open call (discussion with Inna-info session next week)
CS#5: Canary Islands	ULL		Not present
CS#6: Black Sea	AUTH		Finalised the stakeholder engagement map as a live document. To be updated every month. Decision to disseminate the outcomes of the LL to those that did not attend, discussion about the open tenders-there is some interest.
CS#7: Southern Denmark	EM	TUD	Completed the reporting for WP2, meeting with Alice (WP2) about the innovation pathways and follow-up in January about the stakeholder engagement. There is interest for the open tender-bilateral meetings with potential applicants-meeting planned with them on January 5.
CS#8: Torbay and Devon County	UNEXE	TC	No weekly meeting-Torbay meeting with Mehdi about new data for waste water treatment system by SWW, potential applicants for the open tender in contact for more information. There is interest for the open tender.
CS#9: Sardinia	AGRIS		Weekly activities: - sowing of the smart irrigation fields for Arsinoe; - meeting with CRS4 regarding the use of observed data from the weather stations located at our experimental farm for the development of the digital twin ; - supporting possible innovators to participate in open tenders.

Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Workshop reports from all the CS-finished. 1st draft for stakeholder engagement roadmap info collected from all the CS-Work on innovation pathways ongoing. Meeting with Dimitris (UTH) on how to organize the report about uncertainties related to SIA. Finalising article with CS#5.
WP3	TUD	LMU	No meeting this week. Meeting with CS#2 took place for their needs related to WP3. Draft and definition of tasks for D3.10 (Uncertainty analysis) – not yet sent to the CS- done. Presentation on Tuesday 19/12 to the NATALIE partners for the climate projections-interest for a 2nd webinar. Collaboration started. During the first meeting in January detailed review about the status of all the deliverables due for the next 2 months.
WP4	UNEXE	ICCS	Dashboard: Gareth has sent internally a link showing the first version in operation (working prototype), needs improvement on how to present info to various stakeholders.
WP5	BRC		Not present
WP7	AUEB		Finalising the hybrid model for CS#2, started the discussion with CS#1, waiting for input from CS#1, discussion about the choice experiment with CS#1.
WP8	GAC		Continuing with diss/comm. 1000 followers on LinkedIn and similar number on Twitter.

11-january 2024

General feedback from the project management:

- Congratulations to BRIGAID for the successful open call . Many reactions received. For some cases deadlines have been extended.
- Several deliverables coming up, especially for WP3. 8 deliverables due in March. Reviewers will need to be found. Last week of March is Easter -> deliverables to be ready by mid-March. Task leaders have been asked to think about potential reviewers. Martin to also make short overview with deliverables and expertise need to be circulated before discussion on candidates.
- WP2 deliverables due: 2.4 n 2.5
- WP7: Deliverable 7.4 – Conrad indicates it will be ready in time
- 2 milestones due in Jan: MS11 (UNEXE) -> Mehdi -> connected to WP3 and WP4. Working prototype is available. MS15 (ATH) – to be checked (concerns data hub).

WP5 feedback on open call for tenders.

- A lot of good responses received for most of the CS
- Evaluation is next step. – to start on Tuesday next week at the latest. Being prepared now.
- CS1 received most applications (21) -> 3 committee members -> 7 proposals each -> count on ~5 hours needed for this (possibly more)
- Som feedback received from tenderers that holiday season was a problem – therefor some deadlines extended by a few days.
- At least 4 good applications needed for each CS. CS that is a concern is CS2 -> same innovators offered same solution for multiple ports. CS4 also did not receive a great number of applications. CS9 -> some applications were not complete -> please contact the innovators to indicate that completed applications are needed in order for them to be considered. CS2 and CS4 -> WP5 working together with them to improve communication about the tender -> trying to get a few more responses. But evaluation also CS2 and CS4 to start next week.

All CS have been notified about work on D3.10 (uncertainty analysis). Please check the post from Dimitris and ask anything where clarification is needed.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Weekly meeting held. Main points: 1) National Observatory of Athens presented results from hot spot analysis, which will help in selecting the right NBS. Hot spot analysis is multi layer analysis based on maps. Air quality, temp, accessibility and socioeconomic analysis done so far were taken into account. Based on this first analysis -> discussion -> goal is to meet representatives of new administration in Athen (Mayor if possible). Feedback from decision makers to be included. 2) dissemination event in Grece on 9-10 February (Larissa) – event focusing on technology for humanity. Discussed what ARSINOE can present. Meting with ATHENA colleagues -> idea to present the VR experience. High level event,, with representatives from ministries -> will give good visibility for ARSINOE.

CS#2: Mediterranean ports	AUEB		Monday meetings this week cancelled. Before holidays meeting with WP3 was held to discuss projections.
CS#3: Main River (Germany)	LMU	VKU	Before holidays LMU and VKUI met with innovator selected in first round of tender to discuss activities. This week with second innovator took place. Work on innovation pathways progressing. Meeting with reps from Bavarian Environmental Agency to discuss plans for improving resilience of water infrastructure.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Internal meeting with CS partners today. W.r. innovation call – it will be prolonged to receive more application. Innovation pathways are finished -> meeting to discuss this scheduled. Meeting with WP8 to discuss competition and materials needed for this.
CS#5: Canary Islands	ULL		CS meeting held on Tuesday. Focusing on uncertainty analysis. Meeting with Carola to check roadmap. Feedback from Alice received on innovation pathway.
CS#6: Black Sea	AUTH		Happy there was a lot of interest in the innovation tender. Romania deadline has been extended to get some more. Working on uncertainties. CS meeting next Tuesday.
CS#7: Southern Denmark	EM	TUD	Meetings with potential innovators took quite some time last weeks. Happy with number of applications. Eager to start reviewing the applications. Weekly meeting held last Monday. Conclusion – new schedule for this coming year needs to be set up – feeling work needs to be speed up. Meeting needed to coordinate exchange and testing of tools from cS7 and CS8. Meeting with other Waddensea municipalities (yesterday). Discussed was local comm. Strategy. Before holidays -> comm plan updated and reported to Carola. Meeting planned to discuss on Jan. 22nd. Next step – online meeting of participants in Utrecht meeting (CS7-CS8) -> CS7 to propose a date to Mehdi.
CS#8: Torbay and Devon County	UNEXE	TC	Weekly meeting yesterday. Flooding scenarios discussed, especially related to extreme events (e.g. 10k yr. return events). Probability modelling with coastal and pluvial flooding being investigated.

			Meeting with local authorities on cascading effects modelling. New item: pharmacies to be classified as critical infrastructure. This is to be included in the modelling - data is being collected. Meeting with WP2 to discuss the produced stakeholder mapping and how to keep track of interactions with stakeholders.
CS#9: Sardinia	AGRIS		Last weeks focused on sowing of the field (finished yesterday !). Two internal meetings this week to discuss innovation pathways and stakeholder engagement strategy. Meeting with potential applications for open tender -> that did not have enough time to complete their submission. Extension of deadline has been given
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Working on: • Reviewing stakeholders engagement plans. First impressions – there are drafts – meetings with each CS to discuss. • Reporting template for this task has been circulated. Deliverables: • Contributing to uncertainty deliverable * working on innovation pathways
WP3	TUD	LMU	Meeting last Wednesday. Deliverables are topic tracked each week. Tasks being divided. Feedback in this meeting to be given each week. Martin confident all will be delivered in time. Discussion on how to get data on critical infrastructure from open street map. (QuickOSM) – plugin that can be used to map specific amenities automatically. Mehdi gives a quick demonstration.
WP4	UNEXE	ICCS	See above
WP5	BRC		
WP7	AUEB		More news next week.

WP8	GAC		Support for WP5 open call continued. Video of Chrysi discussing results from first 2 years has been posted online. https://youtu.be/pohxJFqDTr4?si=zjG57GP625LtmOaF

18 January 2024

- WP5: 12 additional applications after the deadline. Specific numbers on Teams (numbers to be copied here). All apart from one, have at least 7 applications. Evaluation package in preparation. Also video to be provided tomorrow for guidance. **Tomorrow morning (January 19) all will be ready.**
- After reading the guiding material and filling the poll, there will be individual meetings with each CS after January 29. To be arranged on a first come/first served basis.
- From tomorrow until Jan 29, each CS does the individual evaluations.
- Feb 8 the ranking needs to be finalized. After this date the invitations for full proposals will go out. The innovators will have one week to prepare the application and the CS will need to evaluate them in the following two weeks. Invitations will go out as soon as each CS is ready. They don't need to be sent at the same time.
- The innovators need to include the EU and project logo and GA number in everything they publicize. They also should include the logos of the partners in each CS.

Information needed for the 1st open tender about the contracts (i.e. whether the contracts have been signed). (To Inna)

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Discussed and decided on what will be presented at the Innovation Forum (Larisa): MINKA, SustainGraph, VR, the NOA work (heat islands). Progressing with innovation pathways, preparing the next stakeholder meeting, 41 schools for MINKA (1 primary school-7 year old, 40 secondary school). ABM tool progresses/Distributed model.
CS#2: Mediterranean ports	AUEB		Not present
CS#3: Main River (Germany)	LMU	VKU	Internal meeting cancelled, progress on the innovation pathways, planning events for the next month. Working with one of the innovators (supporting): to establish "tap water friendly" cycle route along the Main river. Request for communication by CS#1.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Yesterday meeting with WP2 (Carola) about the engagement of the stakeholders. This roadmap is finished. Today internal meeting and UTH (Mellios) for the SDM. The hydrological model serving as a basis for the SDM will be ready in mid-March, to be followed by meetings. Innovation pathways finished. Meeting with WP2 (Alice) next week about this.
CS#5: Canary Islands	ULL		Jua Carlos in El Hierro for the sensors (info to be extracted). Signed the contract with the innovator. They will create a platform to provide info and downscaling of data for future scenarios, because these do not exist for the Canary Islands. Free to access for all the people in Canary Islands.
CS#6: Black Sea	AUTH		Meeting last Tuesday internal, discussion about the innovation pathways and the uncertainties-setting a meeting with Dimitris. Internal deadline: 1st week

			of February for the contributions to D3.10. The discussion about the Digital Twin for CS#6 will start after the Milestone (end of March 2024).
CS#7: Southern Denmark	EM	TUD	Meeting tomorrow. Planning a meeting between CS#7 and CS#8 (doodle sent) for the collaboration and testing of the models (flooding).
CS#8: Torbay and Devon County	UNEXE	TC	Weekly meeting yesterday, working on the dashboard and the link to the knowledge graph, also Mehdi working on the model for the SG, models are being developed, results on the transportation model (Barry) and the cascading model (Alex). Waiting for data from SWW. Meeting with REGILIENCE/TRANSFORMAR planned about the CS at the same location (WRT working on it).
CS#9: Sardinia	AGRIS		Planning to install the probes next week, also carrying out field checks on the impact of dry soils (drought impact). Discussing the innovation pathways to be finalized next week.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Internal meeting yesterday, next meeting 21 February 2024. Two Deliverables for the end of March. Internal reviewers for both needed. Next WP6 meetings to discuss with all the CS about the Newsletters and the stakeholder engagement roadmap. Working on the uncertainties deliverable. Planning meetings with CS#3, CS#7 and CS#9 for next week. All the other meetings done.
WP3	TUD	LMU	D3.10: Contributions from all the CS needed. **Deadline 20 February 2024**-Any questions to Dimitris. Working very hard on Deliverables and Milestones. 6 Deliverables and 1 Milestone. All planned.
WP4	UNEXE	ICCS	Working on 2 Milestones, also interlinked work with WP3. All planned.
WP5	BRC		On top the update. Information needed for the 1st open tender about the contracts (i.e. whether the contracts have been signed).
WP7	AUEB		Not present
WP8	GAC		Not present because they are travelling. WP8 activities are continuing smoothly and according to the plan

25 January 2024

- Reviewers for the Deliverables due in M18, TBD.
  - D2.5 : (ATHENA): Reviewer Lydia (KWR)
  - D2.3: (UT): Reviewer Maria Papadopoulou (NECCA)
  - D3.3: (ICCS): Reviewer Gerardo (BRIGAID)- reviewer of the previous version
  - D3.5: (DTU): Reviewer Marino Marrocu (CRS4) -reviewer of the previous version
  - D3.7: (LMU): Reviewer Nefta Votsi (NOA) + Inna Petrenko (BRIGAID)
  - D3.8: (UNEXE): Reviewer TBD we need an external- check with Slobodan (UNEXE)-ok
  - D3.10: (UTH): Reviewer Joep (KWR)
  - D3.11 (CSIC): Reviewer TBD (suggestion: either Svetlana or Sarah-WRT)
  - D7.4: (AUEB): Reviewer TBD (help from Martin DTU-external)
  - MS14: (Digital Twin): Nicos (AUTH)to have a look
  - MS17: Data fusion: (NOA) Giorgos Papaggelhs.

Dates: Submission of draft version **March 8** for all the Deliverables. Review results by **March 15**. Approval of revised version **March 22**. Final submission/upload by Giannis **March 27-28**

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting on Tuesday, Evaluation of the open call has started (22 applications), ABM model god progress, all progressing.
CS#2: Mediterranean ports	AUEB		CS#2 the only CS without data/info for D3.8. UNEXE has contacted them, delivery pending deadline: Tomorrow. Meeting this week, exercises with WP7 (related to T7.2-questionnaire filled), progressing with the financial model for CS#2. Stakeholder engagement map: no progress yet, meeting with stakeholders planned (GR, CY), Valencia to participate and report.
CS#3: Main River (Germany)	LMU	VKU	Meeting with WP2 on Tuesday, Wednesday meeting with AUEB about the innovation pathways, enlarging the stakeholder network (LMU), Innovation partners started working on Dec 1, but still admin issues (although not holding up the project).
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	WR2 inputs are almost complete, support from WP2 provided, Input to 3.10 to be sent next week to UTH, 18 applications for MK, 8-9 for AL, initial meeting tomorrow for the evaluation. Modelling progressing, working on adaptation measures, difficult to estimate financial issues (monetary benefits) alternative method needed than the one followed in SIA. Probably to discuss with CS#7. TBD next Thursday more.
CS#5: Canary Islands	ULL		Not present.
CS#6: Black Sea	AUTH		Meeting today about the uncertainties with Dimitris (UTH), internal deadline end of next week to finalise it.

CS#7: Southern Denmark	EM	TUD	Meeting with CS#8 (Mehdi) on Tuesday about the cascading engine. Meeting with WP2 planned for next Tuesday. Dates for the evaluations set.
CS#8: Torbay and Devon County	UNEXE	TC	CS meeting yesterday. Proceeding with the evaluation of the open tenders, internal meeting 3 evaluators (Mike, Jess, Sarah) planned, then meeting with WP5. New results from the INFOWORKS model (Mike), report from September event/flood to be sent by Dave. Meeting about the CSOs last Monday (Mehdi, Sarah, Dave) and other meeting about flood modelling (UNEXE team).
CS#9: Sardinia	AGRIS		CS partners have started the evaluation, collaborating with CRS4 for real time data collection. Data collection finalised for AQUACROP (AGRIS), field inspections decision to postpone the installation of probes due to persisting drought (delays for the project are not expected). Next meeting with WP2 scheduled for the stakeholder roadmap.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Newsletter announcement. First draft about the uncertainties sent to UTH (Dimitris) Newsletter questions discussed with the CS
WP3	TUD	LMU	Meeting yesterday-Deliverables/MS also for WP4.
WP4	UNEXE	ICCS	Cascading failure visualization tool (Mehdi) invited by REGILIENCE to be presented at the meeting with the MISSION secretariat on Feb 1, 2024. Discussed the digital twin also with CS#6.
WP5	BRC		Need CS#2-Piraeus and CS#4-AL to set dates for the evaluation committee by the end of the day. Also CS#1 to reply if Chrysi can attend.
WP7	AUEB		Working with CS#2, see above at CS#2. CS#1 has delivered the material for the Deliverable.
WP8	GAC		Not present.

February 1, 2024

- Milestones MS11 and MS 15 uploaded yesterday

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Working on 6.3.1 developing a syllabus for educational purposes and a documentary for CS#1. Working on hotspot analysis, sensitivity analysis and D3.10.
CS#2: Mediterranean ports	AUEB		Resilience wheel delivered, working for WP7 and WP2, questionnaire to be ready next week for CS#2 (see also WP7). Working also with WP7 for the finalization of the financial reporting model.
CS#3: Main River (Germany)	LMU	VKU	Working with the innovators, helping them enlarge their network in the region. Newsletter article about project funded through 1st OTI. Planning Climate adaptation lunch meetings for stakeholders. Meeting LMU and VKU. New member in the LMU group: Andrea Boehnisch (as of today), Inga Beck (as of Feb 15th)
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Meeting with WP2 yesterday (with Alice) about the innovation pathways. 1st draft complicated-needs to be made simpler. Internal meeting about the innovation call and the submitted innovations, decided on the top 5 innovations. Next meeting planned with WP5 for the final decision. Working also on the Newsletter (WP2) for the stakeholders.
CS#5: Canary Islands	ULL		PEST analysis sent to WP2 (Alice), progress with the sea-level rise model sent to WP3. Included in a regional government environmental group representing ARSINOE (6 months) to work together to find a project to be funded locally (significant for the impact of the project).
CS#6: Black Sea	AUTH		Meeting last Tuesday and WP2 (Alice) for the stakeholder engagement, internal report about uncertainties expected next week to be sent to WP3 for D3.10. Delays with the 2nd payment for some partners (RO and BU). This is a pre-requisite for signing the contracts for the Innovations.
CS#7: Southern Denmark	EM	TUD	Meeting today with WP5 about the 14 innovators to select the top 5 (2 from Denmark, 3 International). Meeting with WP2 needs to be re-scheduled and also planning for the next months.
CS#8: Torbay and Devon County	UNEXE	TC	Internal meeting yesterday, reviewing the open tenders, meeting with WP5 scheduled for Monday 5/2. Collecting additional info about the flood last September, useful for modelling (UNEXE), also meteo data (historical events). Chasing the MetOffice for nowcast data to be used for defining critical locations.

CS#9: Sardinia	AGRIS		Internal meeting about the open tenders, currently individually evaluating. In contact with the Principal of the Agricultural Technical School of Cagliari to invite them to use MINKA. CSIC to come to Sardinia to discuss with the school about MINKA. Water consumption data for the crops received (to be used for the SDM).
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	-touch base meeting for stakeholder engagement roadmap with CS9 -touch base meeting for the roadmap postponed by CS7 because Martin was not available and there is no update of the roadmap template at the moment. We need to push for this -material has been circulated to WP8 for a factsheet on LLs and SIA -Claudia, Ingrid and Isabelle are continuing their work on D2.3 on governance -Isabelle and Marco and Jean-Phililippe CORBELLINI (IT cameraman from UT) launched the activities for the documentary movie on durum wheat.
WP3	TUD	LMU	Working on several deliverables. Modelling teams working on Land Surface response: Template coming to all involved for update: making an extended abstract (2-5 pages based on previous material) to include in the Deliverable (main partners are UNEXE/KWR (CS#8), ULL (CS#5), CS#1 and CS#2 wave model, LMU (CS#3), CS#4, CS#6 (Hydrological model and perhaps more-Nicos to find out), CS#7, and CS#9. **Do not send unpublished material**
WP4	UNEXE	ICCS	Working on the deliverables- Video recorded by Mehdi for the MISSION meeting, but it was not presented, although 2 videos were prepared.
WP5	BRC		Evaluation ongoing for the open tenders, meetings to close the evaluations (ranking). Already took place with CS#2 (Cyprus) and CS#7. Scheduled for CS#2 (Valencia) and with CS#6 (Romania) tomorrow. The others next two weeks.
WP7	AUEB		Working with CS#2 to fill in the questionnaire, then to be circulated to the other CS to fill in, without a previous workshop (not needed).
WP8	GAC		Not present.

8 February 2024

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Evaluation meeting about open calls held, stakeholders meeting to be planned, Progress regarding Distributed Models, ELIAMEP/ Municipality (Mayor) meeting held positive feedback about project and prospects about synergies, ARSINOE represented in Larissa event/ meeting
CS#2: Mediterranean ports	AUEB		WP7 related tasks close to finalizing, 2 out of 3 ports met with WP5 already (Peiraeus still to hold a meeting next week), working on 3.10 contribution, Stakeholders meeting to be finalized by next week (date t.b.d.)
CS#3: Main River (Germany)	LMU	VKU	Continued working with innovators funded through the open call, event for climate adaptation to be organized
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Evaluation of tenders meeting scheduled for Monday, d3.10 contribution finalized, working on modelling (feasible adaptation measures, evaluation of ecosystem services)
CS#5: Canary Islands	ULL		Modelling work continuing (two models, sea level rise and groundwater models), participated on Tuesday in 2nd meeting with local authorities as part of working group, working on newsletter, working on roadmap for stakeholder engagement
CS#6: Black Sea	AUTH		Working on D3.10 (uncertainty exercise) contribution, continuing work on modelling and activities within CS and sub-CSs
CS#7: Southern Denmark	EM	TUD	Weekly meetings are being held, CS8 collaboration regarding modelling discussed, 2nd evaluation to the 5 shortlisted evaluators discussed (they will produce a 2nd document)
CS#8: Torbay and Devon County	UNEXE	TC	On Monday meeting with WP5 held, 6 innovations shortlisted, working on proposal template for next stage, input-data are incorporated in cascading effects model, newsletter preparation
CS#9: Sardinia	AGRIS		
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Working on D2.3, touch base meetings with some CSs to be held, internal meeting within 2 weeks, working on D3.10
WP3	TUD	LMU	Deliverables discussed and preparations

WP4	UNEXE	ICCS	
WP5	BRC		CS4 evaluation sessions planned next week and CS2, all others successfully done, to send out invitations for Limassol (CS2), others pending
WP7	AUEB		
WP8	GAC		Next ARSINOE seminar to be held on 29/2 (climate change effects on biodiversity), fact-sheet on LLs to be shared, participation on GD meetings

15 February 2024

- Deliverables progressing. For any issues let Giannis know.
- Generic question: How will the innovators interact with the different people win the project? **Clarification by WP5 needed. Will WP8 also communicate with them? Next week special info by WP5**

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Regular weekly meeting. Event in Thessaly (promotion of ARSINOE-ministers present- VR demonstrated on 9/10 Feb 2024-Innovation centre. D3.3-discussion with ICCS about the content regarding feedback from CS#1 (text by NOA). Ebun invited collaboration with SDSM Global (GA). They will prepare a documentary. Looking how to link with the other activities.
CS#2: Mediterranean ports	AUEB		Weekly meeting last Monday. Finalised the questionnaire form WP7, discussion about the open calls. Meetings with WP5 done. Meeting with stakeholders from the 3 ports arranged for Feb 28
CS#3: Main River (Germany)	LMU	VKU	Weekly meeting VKU and LMU, working on innovation pathways, Discussions with climate resilience managers from various municipalities- looking how to support the project. Question: How to align the activities of the innovators with the other WPs. How to be approached?
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	12 Feb meeting with WP5 about NM, 14 Feb meeting with the AL team, 15 Feb meeting in NK discussing also the innovation pathways and uncertainty analysis
CS#5: Canary Islands	ULL		Uni closed 2 days (Carnival). In 2 weeks attending congress in Dubai, presenting ARSINOE
CS#6: Black Sea	AUTH		Meeting on Tuesday, proceeding with the innovators (shortlisted TR and BU, selected in RO). Feedback about uncertainties received-finishing. Meeting with WP8 about the newsletter.
CS#7: Southern Denmark	EM	TUD	Not present- holiday week
CS#8: Torbay and Devon County	UNEXE	TC	Weekly meeting yesterday-continuing with Mehdi's model, meeting with the DK partners. Proceeding with the innovations. Mike doing additional work on Infoworks to investigate discrepancies with CAFLOOD. Digital twin proceeding. Discussion about the dashboard: Stakeholder meeting about the content of the dashboard. Plan: In the summer.
CS#9: Sardinia	AGRIS		ARSINOE fertilising successful. Internal meeting to complete D3.10 (uncertainty) Link with local week-meeting scheduled to be confirmed by 15 Match. Interviewees defined (Isabelle) CRSO working on the general data set- last cropping season. Open tender selection-short list of applicants stood out.

			WP5 to invite them for Stage 2.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Lorena starting today-preparing WP2 meeting next week (presenting herself). CNRS building in Nice. Working on D2.3. Meeting with CS about the innovation pathways-working on this. Booking interviews for the film (docuwiki)-contacts needed with FAO and such organisations- Ask Marco and all for help. Internship starting.
WP3	TUD	LMU	Working on the Deliverables-Nav: reaching to the CS for final feedback for the wheel (framework)-By the end of next week, all will have been contacted. Response expected in 2 weeks after receiving the material from Nav.
WP4	UNEXE	ICCS	Not present- Working for the dashboard.
WP5	BRC		Not clear what the innovators expect (see also under CS#3). Sessions with all the CS for the evaluation. Only CS#2 Piraeus is behind schedule (to finish on the week Feb 25)- Hopefully the contract for them by the end of March. CS#4 please send your short lists.
WP7	AUEB		Monday finalised the questionnaire for CS#2. 10 min next WP6 meeting for presentation by Conrad. Then the questionnaire available to all the CS. Help will be provided by WP7. Discussion about the changes to the choice experiment. Questionnaire to be sent before. 15 min (with questions)
WP8	GAC		Answer by Lisa (Nav asking) about the videos taken at KWR in October. The videos will come out a few at a time. If there are specific deadlines, then let Lisa know to work on the specific video. Meeting today with the sister projects-common session to be planned for the EU green week (29-30 May) EU RIS ECHO (26 and 28 June –Valencia). Specific topic to be presented. WP2 wants to continue to discuss about stakeholder engagement. If any partner will go, then to tell Lisa. Announcement today at the Teams. Relaunch a campaign about women in the project-short interview. Previously: Phoebe and Teresa. Opinion papers to be written on climate resilience themes-volunteer: Mirac (TR). Video by Ebun published. IP registration reminder.

22-02- 2024

- Amendment has been approved. New documents are available in Teams.
- Please try to make the deadlines for all the deliverables.
- D3.7 – cases still need to provide information. Please provide outstanding contributions in time!

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Regular meeting this Tuesday. Minka application discussed. Changes to be implemented – and item of attention remains to find validators for the data collected. Guidance to be developed for validators. To be completed in coming month. Notified shortlisted innovators to submit implementation plans. Once received evaluation will continue. WP2 – innovation pathways still to be submitted.
CS#2: Mediterranean ports	AUEB		Meeting last Monday. Focused on providing input for D3.7 and D3.10. Working on tasks for WP2 (innovation pathways), trying to initiate newsletter and completing stakeholder engagement roadmap.
CS#3: Main River (Germany)	LMU	VKU	Calls with stakeholders from CS-region. Innovation pathways submitted to WP2. Helped innovator with preparing launch of innovation. Featured ARSINOE in VKU newsletter (innovator activity). New LMU colleagues are introduced to the team.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Internal meeting today, finished innovation pathways concept. Innovation call – NM side -> 5 innovations that go into 2nd state. For ALB side 9 innovators go through. Tomorrow is deadline for implementation plans. Deliverables inputs to be expected by next week. Comm with innovators to answer questions regarding the call.
CS#5: Canary Islands	ULL		Tuesday held internal meeting – sent information for D3.7 and 3.8. Also provided information for woman's day (WP8). Organizing event for world water day next month.
CS#6: Black Sea	AUTH		To provide final version of uncertainties by today. Will provide D3.7 input by next week. Greek sub-case of CS6 – primary input for Deliverables, but investigated if other sub-CS can also contribute.

			Guideline for CS newsletter shared amongst sub-CS leaders.
CS#7: Southern Denmark	EM	TUD	Not present. WP2 – indicates that input for innovation pathways is required. Coming two weeks will be important to get input.
CS#8: Torbay and Devon County	UNEXE	TC	Weekly meeting yesterday. Focus on D3.10 – uncertainty information. Work divided between CS members. Expect to upload information by today. Gareth circulated draft digital twin for Torbay.
CS#9: Sardinia	AGRIS		CRS4 has retrieved energy flow data for the CS9 SDM and is working to finalize the climate scenario data, also for the CS9 SDM, to be provided to Alexandra; AGRIS has successfully tested remote monitoring connections for the irrigation water flow in Smart Irrigation fields in collaboration with SME Blue Gold; UNICA continues crop modelling activities based on the historical data provided by AGRIS.
Task 6.2	UT	AUEB	Conrad
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	D2.3 and D2.5 – on good track. Innovation pathways and stakeholder engagement roadmap -> happy that each CS is implementing their own Newsletter. To be discussed with WP8 to discuss how WP2 newsletter could help ARSINOE communication.
WP3	TUD	LMU	Preparing for modelling for CS7. Work to start next month. D3.10 – contributions from almost all WPs have been collected and for 3 CSs. **Today is deadline**. Deadline extended until 23-02-2024 if needed..
WP4	UNEXE	ICCS	Dashboard milestone on track.
WP5	BRC		Waiting for CS8 and CS9 for feedback, need in order to send out invitation. Piraeus session planned for next week. Deadline for innovator selection is next week Thursday. Other CS are on track.
WP7	AUEB		Conrad presents the questionnaire. The Template is stored HERE: https://uthnoc.sharepoint.com/:x:/r/sites/ARSINOE/Shared%20Documents/General/WP%207/Worksho

			p/WP7_Adaptation_Finance_Workshop.xlsx?d=w1994493277d542e5940681cdd873404a&csf=1&web=1&e=ypl5k5 You can use as an example the completed templates from CS2, HERE: https://uthnoc.sharepoint.com/:f:/r/sites/ARSINOE/Shared%20Documents/General/WP%207/Workshop/Sample?csf=1&web=1&e=hBhos3 Although is not mandatory, it will be helpful to read our 24th Month Deliverable 7.1, D7.1 HERE: https://uthnoc.sharepoint.com/:b:/r/sites/ARSINOE/Shared%20Documents/General/WP%207/Deliverables/D7.1/ARSINOE_D7.1_fv.pdf?csf=1&web=1&e=dsEJzM All the concepts are discussed in great detail in the deliverable, so it might be helpful in getting familiar with the terminology and concepts. For Transboundary Case Studies it is advised, each Team to complete the questionnaire independently, WP7 will compile the results and the Inferences at CS level. All questions are self explanatory, and examples are included. Please do not hesitate to ask from WP7 to attend to your weekly meetings in order to help you with any issues you may face upon completing this task. The Deadline is set for the 14th of March 2024. For transboundary CS – would be best to fill out the template for each country, as instruments available might be different between the locations.
WP8	GAC		Wp8 meeting this morning. In September – international conference on sustainable development. Session booked – please share ideas for topics to present. Also share if you intend to attend. Living lab factsheet being prepared for release next week.

February 29, 2024

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Regular meeting Tuesday- Ebun and Alice with CS#1 about the innovation pathways (ongoing). Meeting with UNSDN Global about an educational program to involve ARSINOE (related to the educational activities within CS#1-ELIAMEP is involved). Synergies planned for the last year of the project. Also linking with Guido (CS#1 and CS#2) about Citizen Science.
CS#2: Mediterranean ports	AUEB		Regular meeting on Monday-finalising inputs for Deliverables and the Innovation Pathways-Working with WP7.
CS#3: Main River (Germany)	LMU	VKU	Attended a Conference on Water and Land Use-Climate adaptation impacts about the CS, completing questionnaire for WP7 about Financing-presented ARSINOE to the kick-off meeting with the project from the open tender-discussing also with new stakeholders.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Meeting today-finished with Innovation Pathways-scheduling meeting with Alice about the next steps-Newsletter discussion to be translated in 4 languages-2nd stage of the open tender call-preparation about the student competition (probably in AL-TBD)
CS#5: Canary Islands	ULL		Newsletter sent yesterday, finished the questionnaire for WP7, discussing with Alice about 2.4-finished.
CS#6: Black Sea	AUTH		Meeting last Tuesday with all the partners and Alice about the Innovation pathways (almost finished)-Contributions to D3.7 almost finished, addressing comments on D3.9, D3.10 contribution finished. Newsletters: different newsletters for each country at local language, and at least 2 International Newsletters (in English).
CS#7: Southern Denmark	EM	TUD	Interviewing innovators (3)-2nd stage today deadline. Next week evaluation 2nd stage. This Friday weekly meeting- on the Wheel and reviewing/compiling a list of things to do (related to WP2 and WP3)
CS#8: Torbay and Devon County	UNEXE	TC	Weekly meeting yesterday: open tenders preparing for round 2-to go out this week the invitations. Flood modelling working on how to link with the digital twin, discussion on forecast data, also about how to link with the traffic model, newsletter: contributions next week-to get it out in 2-3 week. March 6: meeting TORBAY and IMPETUS (CS Netherlands-N&S) about potential synergies.
CS#9: Sardinia	AGRIS		D3.8-internal meeting about the wheel. Working on the innovation pathways-tomorrow to be sent to Alice-shortlisting about the open tenders finalized-invitations sent yesterday. Working also on synergies about MINKA between CSIC-ICM and the Technical

			Institute of Agriculture (Cagliari). 13-17 March MINKA people in Sardinia to meet the teachers and students there.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	D2.3-on time, Newsletter info needed from all the CS. UT sent info to WP8 about women day (March 8). Innovation Pathways update (issues): - CS#7 meeting needed to align the Milestones with the Innovation Pathways - CS#9 update tomorrow - End of May Deadline for all
WP3	TUD	LMU	D3.11 submitted for internal review. Other deliverables progressing. D3.7 input needed deadline March 4
WP4	UNEXE	ICCS	Working on the Milestone (T4.1)
WP5	BRC		Not present.
WP7	AUEB		Working finalizing D7.4 to be ready on Monday. Working with CS#2 about the reporting model for the CS.
WP8	GAC		Preparing the video about the wheel https://youtu.be/Ut3jldAwkXg?si=WEZbX4TwvRTkAsaC Fact sheet on the LLs prepared; CS#4 supported about the student competition; women day interviews with Loreno, Marion, Noelia. Webinar today WE about biodiversity and climate change CS#1 presented (Chrysi), Maria Paraski (CS#6), representatives from IMPETUS and TRANSFORMAR. Another webinar coming up UNSDSN – Spain event with sister projects (23 May)- CS#5 not contacted yet (to check). Open letter by REGILIENCE already prepared and sent. Looking for reviewers (after the publication). Link not sent yet.

[March 7], 2024

- **WP2: Links to newsletters to be provided to WP2 by all. A.s.a.p.**

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Working on contributions to the pending deliverables. Review of the VR content by experts for it to be scientifically robust for the choice experiments for CS#1. **Contribution to D3.7 needed**
CS#2: Mediterranean ports	AUEB		We had our regular meeting this week, we worked in finalizing and we had successfully delivered all CS2 inputs for Deliverables: D3.7 (delivered to Martin/Ralf), D3.8 (delivered to Otto/Nav) and D3.10 (delivered to Dimitris). Also we discussed about the newsletter and we agreed: 1. Newsletter to be unique for all 3 ports and we will distribute every second month. 2. We did finalise the first version of the Innovation Pathways file. This file will be validated and probably updated during our meeting with the stakeholders late March (One meeting facilitated in English, with representatives from all 3 ports.
CS#3: Main River (Germany)	LMU	VKU	Working on climate services, also on the questionnaire by WP7, continuing working on the PESTLE analysis (WP2-T2.4).
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Regular meeting today. AL, MK working on the open tender calls, MK to finalise the evaluation and decision by the end of next week. Meeting with Alice (WP2) tomorrow about the innovation pathways. Working on the student competition, main work AL partner. Meeting with WP8 on the diss material for the student competition. Contribution to Deliverables submitted (e.g. D3.7)- not sure about D3.8 and D3.10.
CS#5: Canary Islands	ULL		Meeting with innovator this week about the next steps. Now they are gathering info, in April/May to approach ULL about which variables they are mostly interested in. Meeting with WP8 about the newsletter, preparing activities for the World Water day-they will invite stakeholders.
CS#6: Black Sea	AUTH		**WP2:** We were informed by Alice and set deadlines for completing the Innovation Pathways and continue with the PESTLE Analysis. Our Turkish colleagues have already concluded their part in PESTLE (1 out of 4 LLs) **WP3:** We have sent our contributions for D3.7 (Land Surface), D3.8 (ARSINOE Wheel) and D3.10 (Uncertainties) **WP8:** During our last meeting we have discussed about focal points for each sub-CS and started

			preparing the content. We cannot follow the suggested layout of WP8 as it is only available in the paid version of Mail Chimp, but we will follow the general guidelines for the id of the project, develop our own layout and then communicate it to WP8 for approval. GAC to let WE know about this.
CS#7: Southern Denmark	EM	TUD	Working on the evaluation of the open tender (5 innovators)-back to the stakeholders for the final selection. Looking into the cascade failures-meeting also with UNEXE (Mehdi). Students to collect data for Mehdi-they can also do programming-to prepare the data for the new model. April 11 meeting about it (Mehdi to attend too)
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday-invites for 6 innovators have gone out. Submission on March 12 (3 confirmed). Sarah working on the review about MINKA-investigating whether it can be applied also CS#8. Working also on the flooding for D3.7. Mehdi working on V2 for the cascading failure.
CS#9: Sardinia	AGRIS		MINKA: Organising the meeting-2 days in South and 2 days in North Sardinia next week. Working also on the innovation pathways-started organizing the GA for next October. Scheduling interview for the durum wheat film (durum wheat week/program). Open tender : 7 applications shortlisted and they submitted their tenders. Working on the contribution to D3.7. New person to work on ARSINOE (CS#9) by WP2/UT (MSc Student) to work on the film-WP8
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	D2.5 submitted for internal review. D2.3 to be submitted for review. Talking with CS#7 for a conference in Finland (Sustainability Research Innovation Congress https://sricongress.org/the-2024-sustainability-research-and-innovation-congress-will-be-held-in-finland/ (organized by Lisa Andrews-KWR/IMPETUS 10-14 June 2024-Special Session. Bodil also to attend (CS#7). Links to newsletters to be provided to WP2 by all.
WP3	TUD	LMU	Meeting yesterday-following up on the Deliverables- working on making the internal deadline for review. **D3.7: No input from CS#1-heatwave modelling.**
WP4	UNEXE	ICCS	Ongoing improvements (Gareth) (Digital Twin)- MS for the end of March.
WP5	BRC		49 proposals for the open tender (52 invited) , expecting more from CS#2 and CS#8. TR, CY and

			RO in contracting phase. T5.4- engaging with the innovators from 1st round-meeting scheduled. Updates next week.
WP7	AUEB		We did successfully deliver all WP7 inputs to Deliverable D2.5 (delivered to Ebun) We worked on finalizing D7.4, which is ready and circulated to WP7. I am planning on gathering comments from partners and then share with Martin on Monday 12/3 for internal review. We did initiate the discussions for the implementation of the VR Choice Experiment for CS2.
WP8	GAC		MailChimp may have issues for all the CS, because it needs a paid version. Investigated whether ARSSINOE can pay for all. GAC please ask Maria (WE). Lisa: Maybe to create a special account for ARSINOE for all to log-in and use. So, all will use the same template. Lisa: Video (Albert) about CAFLOOD. Material for the student competition sent (under review). Interviews Marion, Noellia, Anna Lorena (women in science) done. ICT4WATER newsletter (Climate scenarios-Martin and Ralf)

[March 14], 2024

- Deliverables update: D2.5 under review, D2.3 under review, D3.3 under review, D3.5 postponement because the new climate data have not been published yet (to M36), D3.7 finishing – to be submitted to the reviewers today, D3.8 internal review completed, to be submitted for external review (Slobodan), D3.10 under review, D3.11 review returned, D7.4 finished, under internal review, tomorrow for external review,
- Milestones: MS14 (WP4-UNEXE T4.1 practically ready), MS17 (WP4-ICCS- Ready)
- Deadline for finishing everything: **March 28, 2024.**
- UNEXE: PhD academy (Climate and Water) planned for the summer – Venice International University (Albert/Nav and Ralf teaching)- material from ARSINOE and some PhD students. (59 applications for 25 places)

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting on Tuesday- discussing the Deliverables, planning meeting with Nav about the ABM, finalizing the content of the VR experiments, meeting today with AUEB/ELIAMEP about the video development by UNSDN (co-creating the content-educational material).
CS#2: Mediterranean ports	AUEB		Meeting on Monday- working with WP7 for the reporting model for CS#2; discussion about arranging an event with visiting students (from CUT) to Athens/AUEB-F2F event. Finished with the last actions about the open calls with Piraeus.
CS#3: Main River (Germany)	LMU	VKU	Joined meeting LMU/VKU, discussion about the development of climate services; working on the innovation pathways with stakeholders; working on the questionnaire by WP7.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Working on the open call, until next week the final evaluation; WP2 meeting with Alice about gaps and barriers for the new questionnaire; meeting with WP8 about the competition (AL probably); working also on the newsletter. Also working on the questionnaire for the financial instruments (WP7)-
CS#5: Canary Islands	ULL		Newsletter sent for the LL colleagues (2 sent) about the activities. President of the Government of the Canary Islands coming to the workshop open to the general public, students and colleagues. Juan Carlos won a prize from Leon-he prepared a presentation of ARSINOE at the University of Leon.
CS#6: Black Sea	AUTH		**WP2** In communication with Alice to finalise the Innovation Pathways and proceed to the PESTLE analysis **WP5** Things are progressing.

			Türkiye: Contract to be signed in April Bulgaria: 4 candidates were shortlisted and are currently being evaluated Romania: Shortlisted candidates **WP7** D7.2 (Financial Pathways and Business Plans) contribution was sent to Conrad
CS#7: Southern Denmark	EM	TUD	Not meeting this week. 2 meetings planned for next week, discussing also the cascading failure (Mehdi's model), still working on the innovation pathways and WP7 questionnaire. National "nature and environment" (the biggest in Denmark): ARSINOE to be presented there.
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday, discussing the final evaluation (6 candidates); planning event with stakeholders (May or June) to present also the version of the dashboard for comments (F2F or hybrid); discussion on the dashboard.
CS#9: Sardinia	AGRIS		1) contribution of CS9 for the deliverable D3.7 finalised and submitted; 2) CS9 Innovation Pathways revised and nearly ready to be submitted to Alice by the end of this week (hopefully!); 3) shortlisted applications for CS9 Open Tenders (i.e. Demonstrator proposals - CS9) currently under selection; 4) arrival of Jaume and his crew (i.e. Xavi and Berta) from MINKA platform yesterday morning. Preliminary meeting with Principal and Teachers from the Agricultural Technical School of Cagliari-Elmas achieved yesterday. Demonstration field meeting to present aims and methodology of MINKA currently in progress. Visit to the AGRIS experimental farm of Ussana to show ARSINOE field activities scheduled this afternoon
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	[NAME] to work with the documentary video (UT); may contact some partners about info. Videomaster from CNRS to work on this too (food security and CS#9)
WP3	TUD	LMU	Meeting about the Deliverables
WP4	UNEXE	ICCS	Meeting about the Milestones
WP5	BRC		Finished with the submissions of the 2nd call. Applicants notified; 3CS have selected the

			innovators (CS#6-RO, CS#6-TR, CS#2-ES) in negotiation. Advice: It takes time, more time needed, not possible to finish by the end of March. Selection should be swift and fast. Meeting about T5.4 (Packages for innovators)-planning to present it to the CS next week.
WP7	AUEB		Deadline for the questionnaire: **21/03/24**. CS#6 delivered the questionnaire; working with WP2 about the environment for the VR experiment. **If any CS have any problems with the questionnaire to contact Conrad to participate in their meeting.**
WP8	GAC		Working on putting the Deliverables on the website; some CS have issues with the newsletter process looking for a solution (WE)-**10-15 min next week for a presentation (by WE).**

[March 21], 2024

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		
CS#2: Mediterranean ports	AUEB		
CS#3: Main River (Germany)	LMU	VKU	
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	
CS#5: Canary Islands	ULL		
CS#6: Black Sea	AUTH		
CS#7: Southern Denmark	EM	TUD	
CS#8: Torbay and Devon County	UNEXE	TC	
CS#9: Sardinia	AGRIS		
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	
WP3	TUD	LMU	
WP4	UNEXE	ICCS	
WP5	BRC		
WP7	AUEB		
WP8	GAC		

March 21, 2024

- Deliverables and Milestones for the end of March: All on track except D7.4 (no news). Giannis to ask Conrad. Review due for tomorrow D2.3 by Maria Paradopoulou (to ask Isabelle).

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting on Tuesday, discussing about the Deliverables, delay with the Innovation Pathways Giannis following up, Discussion about the VR experiments, scenarios defined, feedback by WP7 needed-meeting scheduled for next week. 2 target groups (schools and others)- experiments scheduled also with UN SDSN Global-meeting next week. Open tender negotiations progressing. Cooperation with WP4 about the dashboard scheduled.
CS#2: Mediterranean ports	AUEB		Monday was a public Holiday for Greece and Spain, so the regular meeting did not take place. Case study worked on gathering data for the implementation of the Hybrid Reporting Model for CS2. We are also worked on Finalizing the Innovation Pathways.
CS#3: Main River (Germany)	LMU	VKU	Working on the Innovation Pathways, and also on the WP7 questionnaire (scheduled meeting with Conrad)
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Meeting on Tuesday, Innovation Pathways finished, Gaps and Barriers working on them, WP7: finished -meeting with Conrad planned, Open tenders finishing with Stage 2 with MK, AL to delay (early April).
CS#5: Canary Islands	ULL		Meeting on Tuesday, improving the visualisation of the resources- event with the local government tomorrow
CS#6: Black Sea	AUTH		Submitted to WP7, meeting scheduled for Tuesday with Alice to discuss about the innovation pathways.
CS#7: Southern Denmark	EM	TUD	Scheduled meeting internal +UNEXE about collaboration between CS#7 and CS#8 (cascading failure) for April 11. Meeting with WP2 scheduled for tomorrow (roadmap). (Not present today) CS7 will be absent today and next week (due to Easter vacation in Denmark). Update: This week we had two internal meetings regarding the development of a cascading failures model for Esbjerg. The process is being outlined and a close collaboration with Mehdi has started. We are also working on (i) finalizing our draft of the innovation pathways, meeting with Alice to be scheduled in April; (ii) newsletter; (iii) the WP7

			survey – in contact with Conrad; (iv) the selection of innovators.
CS#8: Torbay and Devon County	UNEXE	TC	Meeting Wednesday, discussing about the Oren Tenders (2 likely to go forward-final choice pending)- working also on the cascading failure model-progressing. Meeting with Alice scheduled for March 27.
CS#9: Sardinia	AGRIS		Working with MINKA people, working with the College, demonstration of the field activities. 2nd visit planned for the end of May/early June. Initial selection finalized for the open tenders. Starting negotiations. Planning field activities with Isabelle (about the film).
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	No more to say
WP3	TUD	LMU	Tracking the deliverables. All ok.
WP4	UNEXE	ICCS	Tracking the milestones. Ok. Discussion about the dashboard-scheduled meeting with CS#1
WP5	BRC		Following up the selection process. Some delays- CS#1, CS#2-Piraeus, CS#2-Cyprus, CS#4 (AL and MK), CS#6-Bulgaria, CS#7. Updates from all. CS#7 update: EM is involving stakeholders in the assessment this week and the next. The final assessment will be ready next week, so we can start the contract process in April. We hope that the innovations can start May 1st.
WP7	AUEB		WP7 will attend next Tuesday to the CS1 regular meeting to discuss implementation of the Choice experiment for CS1. For Adaptation Finance Questionnaire: CS2, CS4, CS5 and CS6 have delivered the questionnaire. Meetings with CS3 (Friday 22) and CS7 (Monday 25 or Tuesday 26) are scheduled so to resolve queries and finalize the exercise. Giannis to follow up with D7.4.
WP8	GAC		EU Green Week participating with IMPETUS (event June 13- 11.00-12.30 as guests- Short presentation about water scarcity (candidate CS#3)- Marion to take this up. WE (Maria) to update about the newsletter: Meetings with some CS, because of difficulties, considered to have an updated account for the CS- but it is not very suitable- decision to revise the templates to be compatible with the free accounts. The CS are asking questions: CS#8 (Sarah), CS#1 (Alexandra). It is not REQUIRED to use Mailchimp for all the CS, but it is RECOMMENDED, because it will facilitate the reporting in the end (in terms of consistency).

March 28, 2024

General:

- Final versions of deliverables due - 31/3 received. No issues expected.
- The 2 milestones due are ready.
- D3.5 – official approval received from our PO that is can be moved to September (M36)

Marco: for GA a list of participants need to be compiled. This will be taken up after submission of deliverables is completed.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Regular meeting (26th) held, discussed deliverables. Innovation pathways – first draft now completed. In comm with Alice, to be finalized by next week and to be submitted to WP2 next week. Meeting today about education docu with SDM Global – to focus on extreme heat. How to link CS1 activities to this docu -> ELYAMAP to be involved. Part of docu to be made at youth event. Main production in the park premises. Re-started discussion on dashboard – meeting with Gareth set.
CS#2: Mediterranean ports	AUEB		Event today in Athens (ATHENA premises) where ARSINOE was presented (incl. implementation). Diss results to be shared this weeks. Innovation pathways to be finished by early next week for all 3 ports.
CS#3: Main River (Germany)	LMU	VKU	LMU and VKU meeting held to discuss. Focus on actions for WP2 (interviews with stakeholders to ID barriers and opportunities). Supported innovators with implementation. Questionnaire for WP7 on financial instruments – continued working on this.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Internal meeting held today. Draft completed of barriers and gaps for innovation pathways. Newsletter – discussed setting up sending (MailChimp). To be finished soon. Financial instruments – draft ready of questionnaire. To be discussed with Conrad. Innovation call – NM side ready with evaluation of applications. Albania committee to be formed (by mid-April) on the assessment. Results from NM to be shared with WP5.
CS#5: Canary Islands	ULL		

CS#6: Black Sea	AUTH		Regular meeting held on Tuesday. D3.10 clarifications provided. Alice was on site – discussed stakeholder engagement and innovation pathways. Discussed the international dimensions. Organized review of milestone M14 (WP4).
CS#7: Southern Denmark	EM	TUD	Not present
CS#8: Torbay and Devon County	UNEXE	TC	Weekly meeting on Wednesday – focus on selection of innovations from open tender. Both requested higher budget than reserved. Discussion on contract ongoing. Mehdi – updated team on cascading effect modelling. To be shared with Torbay for trialling in 2-3 weeks.. Meeting with Transformer project -> to discuss sharing information.
CS#9: Sardinia	AGRIS		Meeting with WP2 concerning the film on Duram wheat. Script and organization discussed. 3 tiers of the argi-food chain to be highlighted. List of people to be interviewed about main topics and problems in food security and agri-food supply chain from their own perspectives. Open tenders – negotiation step completed. All innovators accepted suggestion reduction in budget. Contracting to be started. GA preparations started.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Deliverables 2.3 and 2.5 were submitted. Weekly meeting on Wednesday. Discussed progress with innovation pathways and stakeholder engagement strategy. Meeting with WP8 (last Monday) on newsletter and movie. Meeting with CS7 on event in Helsinki.
WP3	TUD	LMU	Mehdi – gives short updated on cascading failures model. D3.8 reviewer comment received – only 2 CS mention future projections how long in the future they will be run for (how long into the future they are looking). UNEXE to send request to all CS leads.

WP4	UNEXE	ICCS	
WP5	BRC		CS8 and 9 made selection of innovators. Negotiations for contracting started. CS2 (Piraeus and Limassol) and CS6 Bulgaria ready for selection. CS4 NM ready. CS1 – reported delay. CS7 – also needs to proceed with selection. This needs to be completed. Results from the call need to be published on website. This can only be done once the contracts are signed. CS3 – 1 contract has not been signed – necessary to find out what the bottleneck is. LMU needs to provide clarification. Innovator has contacted ICAT about this. Giannis requests update with all this information, so project coordinator can intervene where needed.
WP7	AUEB		Worked on D7.4 comments from reviewer. Meeting with CS3 in relation to the questionnaire for Task 7.2. Based on this discussion – it appears CS3 is well advanced in mapping financial sources and instruments towards implementation. The idea is to use CS3 as frontrunner for financing solution. In general, CS2 – CS6 have delivered the first version of the questionnaire. Finalised first implementation of hybrid reporting model. Next version in visual studio to be developed. All CS to use model to be reported in D7.5.
WP8	GAC		Received request from CITYCLEAN to discuss synergies. (also to involve RETHINK-ACTION). Accepted deliverables are now available on website. Factsheets summarizing the deliverables are being prepared. Stakeholder mapping and 3d modelling are first factsheets to be completed – to be sent to relevant partners for review in coming 1 – 2 weeks.

[April 4, 2024]

- All the Deliverables and Milestones for March 31 submitted !
- Next peak period M36 (End of September)
- During the GA in October we need 1 session about publishing
- REGILIENCE asks for interactions about the dashboard. We have issues with REGILIENCE… (Mehdi, Giannis and more…)

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting this week. Discussion about publishing (papers). Progress on innovation pathways. Innovators in approval stage (it takes time). Dashboard: discussion and another meeting tomorrow to prepare for the meeting with Gareth (April 16). VR experiment meeting took place, now ready to go (target 120 people).
CS#2: Mediterranean ports	AUEB		Finalised innovation pathways, meeting scheduled with Alice next Monday for final comments.
CS#3: Main River (Germany)	LMU	VKU	PESTLE analysis ongoing, discussion about climate services tomorrow.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Weekly meeting today, working on PESTLE, working also on the newsletter, Prof Vassileiadis working on the hydrological model (SDM) to be integrated with the CS#4 model. Open tenders: winner for MK selected and for AL next week.
CS#5: Canary Islands	ULL		Internal meeting with the innovator (FICLIMA) on the timeline and progress-first results expected in July, platform after July. Now collecting info for downscaling-asked for help for 2 of the islands about data-ULL working on it.
CS#6: Black Sea	AUTH		Progressing on the DT model-joined the meeting for WP4-meeting needed to coordinate the dashboard.
CS#7: Southern Denmark	EM	TUD	Not present
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday. Open tenders: meeting with the UK innovator today, ES innovator meeting after April 15 (holiday), modelling: resource allocation working (Otto), rainfall PDF and flood return period work (Barry working), CAFLOOD: Mike to provide data from INFOWORKS to UNEXE (Qian) for validation.
CS#9: Sardinia	AGRIS		Focusing on innovation pathways, proceeding slowly. Working on the contracts too. Contract next week. Innovative system for monitoring assembled activities related to drones being carried out.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		

WP2	UT	AUEB	Working on the newsletter.
WP3	TUD	LMU	Completion of deliverables. Cascading engine V2 finished-meeting tomorrow with CS#7 to adapt the cascading failure engine to their case.
WP4	UNEXE	ICCS	Working on the dashboard (+digital twin). This is the critical activity
WP5	BRC		Timing of the contracting phase -some delays, but not worried, except CS#1 and CS#7, which are still in selection process.
WP7	AUEB		Meeting with CS#1, discussion on the VR experiment, questionnaire: received from the CS except, CS#1, CS#7, CS#8, CS#9
WP8	GAC		Video ICCS (Tasos) shared today, some factsheets under review, REGILIENCE reached out-meeting to be held with them.

[April 11,2024]

- Romanian academy organizes contract, an ARSINOE session can be organized if there is interest, details disseminated in Teams channel
- Case studies with issues regarding innovation calls should contact Giannis directly
- Slot in GA to discuss when and how do the tools developed (e.g. in WP3,4) be communicated to the stakeholders / Preliminary work regarding this to be carried out beforehand

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Progressing with papers, working on dashboard – meeting with Gareth next Tuesday, final preparation for activities (educational, dissemination etc.), meetings regarding ABM restarting with Otto&Nav
CS#2: Mediterranean ports	AUEB		Innovation pathways first version discussed with WP2 and revised, PESTL analysis in progress
CS#3: Main River (Germany)	LMU	VKU	LMU&VKU meeting regarding cocreation of climate services with stakeholders, continued work in PESTL analysis, meeting with innovator tomorrow to discuss next steps, contract with second innovator still pending
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Newsletter discussed – proceeding and to be finished by the end of the month, innovation call finalized from North Macedonia- from Albania next week to be finished, student competition this summer to be organized
CS#5: Canary Islands	ULL		Interview in local radio regarding ARSINOE-already published, preparing event regarding circular economy in June – all of LL stakeholders to be invited
CS#6: Black Sea	AUTH		Innovation pathways discussed in last meeting-progressing good, Turkey & Romania partners completed contracts - the rest on track, digital twin presentation to be held next week during WP3-4 meeting
CS#7: Southern Denmark	EM	TUD	Absent due to overlap with internal all-day meeting at DTU with all local ARSINOE partners regarding a) the resilience assessment in Esbjerg, b) implementation of the cascading failures model. Today: also Q/A with Mehdi. There are regular meeting between Mehdi and DTU students helping with the implementation. A stakeholder meeting aimed primarily at supporting the implementation of the cascading failures model will take place in Esbjerg on May 3rd. Innovations: we target the funding of 3 innovations. 2/3 innovators have accepted a reduced budget, one is still pending. As soon as we have this response, we will move to the contract stage.
CS#8: Torbay and Devon County	UNEXE	TC	Dashboard design on track, looking into bringing real-time data in dashboard, validation and

			calibration of CA Flood model taking place, innovation contracts discussed, issues with VAT inclusion of two participants, meeting took place with one participant and solved, meeting with Spanish innovator next week to solve this, synergies regarding flooding with IMPETUS discussed (Mike&Dave) over meeting.
CS#9: Sardinia	AGRIS		Progress with Innovation Pathways, new version to be shared next week, list of actors to be interviewed, innovative system for remote management and control regarding irrigation tested, preparing final version of contracts regarding open tenders to be reviewed from legal department
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	CSs to update information regarding stakeholder roadmaps
WP3	TUD	LMU	
WP4	UNEXE	ICCS	
WP5	BRC		CSs to keep WP5 updated regarding innovation contracts and timely report any issues.
WP7	AUEB		Working on the launch of the T7.3 choice experiment with WP2, both in paper and VR to compare usefulness – progress good
WP8	GAC		ARSINOE newsletter to be released, resilience post, new video shared (key outcomes from Main River CS), soon to launch campaign regarding innovation calls

[April 18], 2024

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting this week on Tuesday: April 11 MISSION event on adaptation took place in Athens (REGILIENCE) members of ARSINOE CS#1 participated and the CS was presented. Innovators selected by the Municipality- 3 innovators approved (open tenders): (a) A pocket park, (b) digital platform, (c) small scale greening- working on selecting the locations . Gareth collaborated about the dashboard (WP4)-the final user will be the Municipality of Athens (should be bi-lingual)-working on it and what it will show. MINKA event in May, linking also with SDSN Global, also starting a documentary there.
CS#2: Mediterranean ports	AUEB		Working on the PESTLE analysis. Meeting on Monday with Alice, completing the analysis next Monday.
CS#3: Main River (Germany)	LMU	VKU	Bi-weekly meeting, preparing interviews PESTLE analysis to fill the table for WP2 (innovation Pathways), info for WP8 provided, planning for the newsletter (about stakeholder engagement)
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Internal meeting this week, working on the newsletter (all partners), working also on the PESTLE analysis, open tenders: MK partner about to sign the contract, AL still evaluating.
CS#5: Canary Islands	ULL		Internal meeting this week, improving visualization about sea-level rise with the new model (1m resolution-grid analysis-LISFLOOD), also sent the info about the innovation and to WP8 for announcement at the website.
CS#6: Black Sea	AUTH		Meeting about DT with UNEXE (Gareth, Albert) and Martin (TUD). Positive feedback-complimentary to the DT for CS#8.
CS#7: Southern Denmark	EM	TUD	Meeting with WP2 about the Innovation Pathways (Tuesday), another meeting scheduled for May. Last Thursday all day meeting (internal) about failure model (Mehdi) and the resilience wheel. Innovations: 3 innovators-ongoing contract preparation. End users will be the Municipalities. Question: Is it possible to have TUD sign the contract, bit the Municipalities to benefit? Gerardo: It should not be a problem. They will also do an NDA
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday. Innovations: Monday meeting with the Spanish innovator. Discussed also the stakeholder engagement event for late May or June. Flood modelling: Ongoing coupling CAFLOOD with SWMM. Response by the MetOffice about free data to use for the real time simulation model.

			WP7 questionnaire still not completed to be completed next week.
CS#9: Sardinia	AGRIS		Working on the Open tenders-final draft of the contract sent to the innovators for feedback. GA: Conference room assigned at the centre of Cagliari. Working on the film (see previous weeks' notes)-waiting for feedback by Isabelle (WP2). Smart Irrigation crops irrigated.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Thanking the CS who updated the stakeholder activity roadmaps. Working on the WP2 Newsletter, progress also on the Innovation Pathways. Working also with CS#9, interviewing also external people about CS#9 (durum wheat), finalizing the script and booked interviews. Workshops need to be planned for the CS that had the analysis of governance (CS#1, CS#3, CS#5 and CS#9).
WP3	TUD	LMU	Meeting this week with WP4. We need to think about the "evidence-based" issue for the models at the CS. Discussion about how to demonstrate and validate the "tools" in WP3 and WP4
WP4	UNEXE	ICCS	Discussion about the DT and the dashboard.
WP5	BRC		CS#4 (AL) need to select innovations. All the CS are proceeding with the innovators and the contracts. Only 2 innovations in CS#8-not overlapping with CS#1. Gerardo reporting on the contracting status for all the CS
WP7	AUEB		Hybrid reporting model with questionnaire for the last year. Meeting this week. End of April the Choice experiment to be distributed to CS#1- to be done twice with different methodologies.
WP8	GAC		Video released today about Governance analysis (Isabelle); contact needed with Jaume.

April 25, 2024

- No access to the CIW- Ask Gerardo

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting on Tuesday, 3rd Youth Assembly today (ELIAMEP) with High School students >40 people attended. Innovators approved by the Municipality-contracting to start and proceed fast (expected). Update workshop with stakeholders Nov 22 planned (WP2 collaborating)- the feedback procedure need to be in place. Paper in preparation (Risk analysis et al-Extreme heat-urban areas)-Collaborating with Gareth (UNEXE) about the dashboard. MINKA: >8500 observations (!).
CS#2: Mediterranean ports	AUEB		Meeting on Monday-finalising the corrections about the innovation pathways, working on the PESTLE (more on policy and economy interventions). Open tender on track.
CS#3: Main River (Germany)	LMU	VKU	Discussing the stakeholder engagement plan, discussing about visiting other events to reach other groups of stakeholders, interviewing experts about the PESTLE in the coming weeks. Working on a summary of the results to present the work more easily. Open tender: Issues with signing the contract with 1 innovator (another innovator already working)-LMU (legal department) to contact the innovators to sort out the issues.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Internal meeting today, discussing the innovation pathways-GR translated the excel in Greek to send to the stakeholders and then they want a meeting with them. The same to be done with MK and AL stakeholders. Open tender: MK signed the contract yesterday, AL negotiating with 3 innovators and also preparing the contract (Nensi updated). They want the winner to be available even after the end of the contract period-to be replicable and find other funds. Meeting needed with WP5 (Inna) and WP7 (Conrad)
CS#5: Canary Islands	ULL		Participated in radio programme (to be aired in May), meeting with WP2 about the results from the governance analysis- meeting in situ planned for the results to be presented (WP2).
CS#6: Black Sea	AUTH		Meeting on Tuesday: Open tenders: All innovators selected-signing contracts. Work progressing in all the CS-also preparing the national newsletter, WP2 (Alice) participated in the meeting about the innovation pathways. DT in contact with Gareth progressing. Next week meeting with Martin (TUD) in person.
CS#7: Southern Denmark	EM	TUD	Not present

CS#8: Torbay and Devon County	UNEXE	TC	Weekly meeting yesterday- WP7 questionnaire completed, open tenders UK innovator signed, the ES innovator will sign in the next days-all on track.
CS#9: Sardinia	AGRIS		- set up probe connections for monitoring soil humidity in smart irrigation fields in Agris experimental farm; - planned activities (i.e. interviews, locations and datasets) for the documentary on food security and local durum wheat food chain in Sardinia (in collaboration with Isabelle's team from the University of Tours); - selected durum wheat advanced lines in Agris experimental farm; - prepared the final version of the Open Tenders agreements to be signed by next week; - online meeting for Innovation Pathways with Alice Guittard and WP2 team.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		Feedback procedure TBD before the next meetings with stakeholders
WP2	UT	AUEB	Meting yesterday- D2.4 (M34-July)- to be sent for review in mid-June (reviewer: Svetlana or Inna). Governance analysis doing the round of the CS (CS#1-done, CS#3, CS#5, CS#9 in planning). Working with WP8 about a factsheet (stakeholder mapping).
WP3	TUD	LMU	Weekly meeting cancelled.
WP4	UNEXE	ICCS	Ongoing work with the dashboard, working with CS#6 DT, Tool for cascading effects testing a new engine.
WP5	BRC		3 contracts signed (CS#6 RO, CS#4 MK, CS#8 -UK innovator- to be confirmed by the Uni). CS#3 from the 1st call still pending. Also CS#7 have issues (transferring of funds)- Yiannis to follow up about CS#7 (NDA pending). To follow up with the contracted innovators, the CS to provide the info about ten innovators-Inna to contact the CS with instructions. Task 5.4- Started contacting innovators for supporting them- maybe to invite also shortlisted innovators for support to enhance also competition.
WP7	AUEB		T7.2 Most CS have submitted the questionnaire (missing CS#1, CS#7 and CS#9) scheduled meetings next week with each of them to finalise.

			T 7.3- progressing on track as planned. Questionnaires about the choice experiments for CS#1.
WP8	GAC		WP8 meeting today. Video Jaume released (MINKA)- Working on the factsheet about the stakeholder mapping, working on the fact sheet about VR, participation in the EU Green Week (event with TRANSFORMAR)- Marion (VKU) to be the speaker (June 13). Meeting with the sister projects yesterday preparing a joined campaign for the World Environment day). EUROSFO event (Valencia) Conrad to participate and represent ARSINOE.

May 2, 2024

- Preparations for the GA and the 2nd report to start soon (Yannis)

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		No meeting this week (Easter break), next week meeting about ABM, no issues-progress.
CS#2: Mediterranean ports	AUEB		Meeting on Monday-finalising PESTLE and innovation pathways- working on the reporting model for Valencia- Collecting data for the other 2 ports for modelling.
CS#3: Main River (Germany)	LMU	VKU	Interviews for the PESTLE and the innovation pathways. Discussing events about the stakeholders. Discussing with WP2 about progress for governance analysis.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	All partners together are working on the Pestle analyses , excel for barriers and gaps. North Macedonia- -meeting with innovators team (innovation started to be implemented), -interviews with stakeholders regarding the barrier and gaps -Working on newsletter in mail chimp -started with the translation of Minka Greece- -interviews with stakeholders regarding the barriers and gaps -Working on newsletter in mail chimp -Working on Pestle analyses, excel for gaps and barriers Albania -working on the innovation process , this week will finish with the negotiations with the innovators -Newsletter in Mailchimp is finished
CS#5: Canary Islands	ULL		National Holiday
CS#6: Black Sea	AUTH		Holiday (Easter break).
CS#7: Southern Denmark	EM	TUD	Workshop with stakeholders tomorrow (cascading failures) and discussion about the innovations. Collecting data for Mehdi's engine. Signatures for 2 innovators in place-1 missing. One started yesterday, the others to start on June 1st.
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday-New version by Mehdi for the cascading engine- Open tender: 1 signed, 1 to be completed. Dashboard: looking for real time rainfall data by the Met office- to be further elaborated in the following week, Flood modelling:

			ongoing work on calibration, coupling with SWMM, Details about the stakeholder meetings not fixed yet.
CS#9: Sardinia	AGRIS		Open tenders: progress with legal issues. 2 meetings with WP7 about the adaptation questionnaire, planning activities and meetings for interviews with local actors from the durum wheat food chain in Sardinia. Durum wheat crossing for genetic improvement (field activities for ARSINOE).
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Working on the preparation of a survey for T6.5
WP3	TUD	LMU	Meeting yesterday focusing on the presentation of Mehdi's new version (services). Introduction new colleague (TUD) Ophélie Meuriot (ophme@dtu.dk) (to be added to the emailing lists)
WP4	UNEXE	ICCS	Meeting about the dashboard (CS#1) took place, UNEXE (Gareth) invited to an internal meeting with CS#1.
WP5	BRC		5 Signed contracts (1 UK, 2 DK, 1, MK, 1 RO)- 10 processes open across the CS, in touch with all to finalise, CS#1: 3 Innovators selected but not announced-announcement needs to take place soon. CS#2 (Cyprus, Piraeus) and CS#4 (Albania) in the selection process- lagging behind-asking whether it would be possible to shift the dates (March 2025 to be the end). Better to keep the date and not shift it.
WP7	AUEB		T7.2: All the CS have completed the questionnaire-finalising the report. CS#3 had the most detailed responses-planning a meeting with them (frontrunner for the next step-financing of innovation pathways). T7.3: Progress on schedule-choice experiment questionnaires to be distributed in 1-2 weeks. T7.4: completed the reporting model for Valencia-working with the other ports- mid May to start working on the reporting models for the other CS. CS#1 will the 2nd CS in this. End of May schedule for the other CS.
WP8	GAC		Video published (Risk Assessment- Albert). Factsheet about stakeholder mapping published https://arsinoe-project.eu/securstorage/2024/04/ARSINOE-Factsheet-2.pdf

May 9, 2024

- General discussion: LVL: Is there a mechanism for the supervision/monitoring of the innovators? CS#8 suggests to invite the innovators to the regular meetings for each CS. CS#1 decided to interact with providing material and guidance. CS#1 (Dimitris): Could we ask them about means of verification? CS#4: (Dijana): They need to report every 3 months in the template-we can make this more frequent.
- WP5 to prepare a template for the reporting by innovators.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Joint meeting with UNEXE (2 teams) about the ABM and the Dashboard. Good progress. No other meetings due to Easter break.
CS#2: Mediterranean ports	AUEB		Easter break. No meetings.
CS#3: Main River (Germany)	LMU	VKU	Absent because of public holiday today. Bi-weekly meeting LMU & VKU, Interviews for PESTLE
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Meeting today (with AL only), innovation call progress (AL)-process to finish next week- also newsletter to stakeholders. MK: Innovator started with implementation-WP5 sheet completed. GR: Easter break.
CS#5: Canary Islands	ULL		Meeting with the innovator in person (Tenerife)-discussion about data etc. Preview of the platform to be delivered before the summer. Platform expected to finish by end 2024.
CS#6: Black Sea	AUTH		Easter break-no meetings. Last week Nikos met with Martin (TUD) in Denmark- meeting about synergies with WP3. WP2: Pestle sent to Alice, waiting for feedback.
CS#7: Southern Denmark	EM	TUD	Not present-Public holiday. Large internal meeting last Friday- successful, synergies with CS#8 and the tool by Mehdi.
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday-Cascading model -new version to be ready this week for review – Innovator#2 waiting for feedback by UNEXE (admin)-Innocator#1 already working. Planning meeting with the innovators and the stakeholders on June 20, and the innovators on June 21)f2f meeting. (Agenda, invitations etc.). Discussion also about the flood modelling calibration (infiltration).
CS#9: Sardinia	AGRIS		Three f2f meetings with 4 innovators (technical, admin and formal issues) agreements sent out. 3 innovators sent feedback already, expecting for the 4th soon. Carried out the 2nd irrigation for durum wheat fields. New genotypes selected (innovation activity for ARSINOE). Organising a field day for INBESTSOIL-presenting ARSINOE at this meeting.
Task 6.2	UT	AUEB	

Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Isabelle sent email to set up a meeting about T6.5 (Giannis and Lydia). TBD next time. Not present due to holiday.
WP3	TUD	LMU	Meeting yesterday (WP3/WP4). Discussion and progress about the dashboard (Gareth) and the cascading failure tool (Mehdi)-new version ready to be reviewed by TORBAY. Adaptation needed for multiple simultaneous use. CS#7 also collecting data for the cascading failure tool. Progress on the dashboard on track for CS#1.
WP4	UNEXE	ICCS	See above
WP5	BRC		CS#3 sent the signed contract to the innovator, CS#7 signed a contract with 2 innovators (1 more pending), CS#1 waiting for feedback about the final selection. CS#2 (Piraeus) need to finalise the selection, CY finalizing next week. CS#4 (AL) selection to be finalized next week
WP7	AUEB		Easter break-No meeting.
WP8	GAC		Not present due to national holiday.

May 16, 2024

2nd review period coming up. Work to be starting ASAP. Including next report for WP6.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		No meeting this week (due to meeting in Malta). News about open call: administrative company of municipality (that will be the contracting body for the innovation call) has been contacted and positive response about taking on this role. Templates for contacts to be ready shortly (to be shared with WP5 for comments). Meeting about dashboard and ABM by Athens team. UNEXE working on model development, partners of CS1 provide input. Linking with the innovators to be involved in CS1 is on the agenda and needs to be made more concrete. May 27th – celebration at .. park where MINKA will be promoted. Students to be stimulated to make observations with the app. Video & interviews to be made at this event. May 28th – VR activity with ELYAMEP to test the environment with participants that participated in earlier events (e.g. train the trainers).
CS#2: Mediterranean ports	AUEB		Not present
CS#3: Main River (Germany)	LMU	VKU	Marion presenting ARSINOE at conference for municipalities on climate change. Meeting with WP2 on governance analysis – Isabelle invited to present the results to local partners. Contract for innovators has now been sent, awaiting response.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Internal meeting with partners held today. Hydrological model for the whole CS to be finished by June. To be compared with the model(s) for the separate parts of the CS. Albanian partner – innovator selected, contract to be signed ASAP. Interviews with stakeholders concerning Pestle analysis started.

			Newsletters ready to be sent to the partners in June.
CS#5: Canary Islands	ULL		Meeting last Monday with WP2 to discuss governance analysis. Follow meeting planned. 23 October meeting planned to present results to local stakeholders. Tuesday – internal meeting held – focusing on sea level rise model. Paper in preparation.
CS#6: Black Sea	AUTH		Our biweekly meeting had very low participation. As a result, we will have the meeting next Tuesday. In the meantime, we've had bilateral meetings with TR and BG teams informing them about WP2, WP5 and WP8. WP2 we discussed about the finalization of the innovation pathways and their contribution/validation of the developed innovation pathways at the international level. WP5: contracts are pending, but WP5 team is informed and are expected to be signed in the nearest future. Each sub-CS is responsible to monitor the activities of their innovators. This will be done either directly via the innovators' participation in CS6 meetings or indirectly via reports. WP8. A first draft of the newsletter was presented to the partners.
CS#7: Southern Denmark	EM	TUD	All 3 contracts with innovators signed. Kick off meeting with first innovator has taken place on May 13th. Newsletter for all stakeholders in preparation. To meet with Alica on the 17th – Pestle analysis.
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday – innovators attended the meeting and were introduced to the team. Innovator working on the technical innovation (platform) – meeting with Torbay community planned to start working on implementation. Living lab meeting planned on June 20, face to face meetings with innovators planned subsequently.
CS#9: Sardinia	AGRIS		Not present
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Working on proposal for T 6.5.
WP3	TUD	LMU	Regular WP3/4 meeting held on the 15th. Major topic – sustain graph – how to disseminate it? Activities planned according to work plan – but the tool will be maintained. Where should this be reported? Tassos and team have no PM in WP6 for

			implementation – therefore discussion about what is the correct way of representing this ongoing work. Cascading failure model has been adapted and integrated into dashboard (for CS8).
WP4	UNEXE	ICCS	
WP5	BRC		Notification from Albania received that innovator have been selected. Now only Limassol remains to select. Contracts signed for CS3 now and for CS9. Kick-off meetings starting. CS1 contracts and CS2 (Piraeus) and Bul and Tur expected. Request for confirmation letters from contracting parties indication selected parties and justification to be sent out by WP5. Preparing template for regular reporting from the innovators to make monitoring and reporting possible.
WP7	AUEB		Not present
WP8	GAC		Not present

May 23, 2024
General announcements:

- Starting with the preparations for the GA in Sardinia. List to be distributed by Giannis (on line) after discussing it with Marco.
- Starting preparing the 2nd PR for the end of reporting period (Sept 2024). Decisions about financial issues needed to take place in Sardinia-to avoid having remaining budget.
- Suggestion by Nicos: To organize a workshop, where all the innovators will present what they are doing. This is good for synergies (potential). Discussion with WP5.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting on Tuesday-progressing well, next week: MINKA event on Monday (schoolchildren 6-18)-interviews for the documentary to be collected. May 28: event at AUEB for the VR experiments (participants from ELIAMEP-pool of people); progress on the ABM and the dashboard. NOA and ICCS preparing journal papers.
CS#2: Mediterranean ports	AUEB		Working on finalizing the innovation pathways-meeting with Alice for final corrections; introducing policy actions to the pathways. To be finalized this week.
CS#3: Main River (Germany)	LMU	VKU	Working on the PESTLE analysis with people from various backgrounds-to be finalized next week. Meeting with WP2 about the Newsletter-Bi-weekly internal meeting.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Internal weekly meeting +Alice(WP2) present. Discussing the PESTLE analysis (almost finalized). To be finished in early June. Innovations proceeding according to the plan.
CS#5: Canary Islands	ULL		Newsletter sent today with local news +invitation to an event in June. Meeting with WP2 scheduled for October.
CS#6: Black Sea	AUTH		Meeting last Tuesday, discussion about the tasks for WP2-still minor issues with PESTLE to be completed by the end of the month. How to follow the innovation progress-timeline agreed with the innovators: the representatives for each location need to report to the others about the implementation.
CS#7: Southern Denmark	EM	TUD	Not present
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday. Cascading effects model discussion (T 1000 flooding completed-checking results-loos good). Transport model to be added. LL arranged for June 20 + Innovators. Albert+Dave met with IMPETUS (CS Netherlands) about flooding (synergies). Mike met with TCDT (innovators) Davina. Innovators to attend the meetings on Wednesday, but we need to be careful about confidential matters when they are discussed. Also

			problem with confidential data that are already in use for the model. Replacement data found for most (except gas nodes).
CS#9: Sardinia	AGRIS		Field day (Thursday) for ARSINOE and INVESTOIL. Report in preparation for WP8. Monday internal meeting about the innovator from Spain. This week working for WP2 (Isabelle) arranging for interviews- Isabelle next week in Sardinia. Working on the innovation pathways. Final version to be sent next Monday. Field work (durum wheat selection) ongoing.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		Meeting for this task (innovation packages). Conrad to present ideas next week.
Task 6.5	KWR		
WP2	UT	AUEB	Weekly meeting yesterday- Isabelle organizing a Conference in Nice (water and climate change): to contact Giannis. Suggestion to have enhanced participation. Meeting with CS#7 (preparation for the Conference in Helsinki-Bodil). Alice reminds about the deadline for PESTLE next week.
WP3	TUD	LMU	Dimitris working on the ABM for CS#1.
WP4	UNEXE	ICCS	No news (Gareth at another meeting)
WP5	BRC		All -except Limassol (CS#2)- have selected innovators and most have signed contracts. 23 innovators in total (!!!) Calling them for support services. Extended also to shortlisted. Template about monitoring activities to be prepared and presented next week by Gerardo (10 min presentation next week). Request for validation letter sent to the CS, but no replied yet. WP5 to follow up closely.
WP7	AUEB		Started working (7.2) collecting and organizing the workshop. CS#3 will be a frontrunner for the portfolio of financial solutions. Questionnaire ready to be distributed next week. Trial through CS#1 (to provide also feedback).
WP8	GAC		Not present.

30 May 2024

- Final event to be organized in Brussels- Vice President of the EC has been contacted. Also an offer by the Bavarian partners to host it there. Possibly with the sister projects. Last 10 days of September
- WP5 presented the template for the monitoring of the innovators

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting on Tuesday, Schools event MINKA related it went very well (15 schools participated) >8000 entries to MINKA, 2nd round of interviews for the video SDSN Global, educational event for VR had to be cancelled (exams- moved to June 18). Tomorrow meeting planned about the dashboard, UNEXE also to participate. Innovations: 3 innovators, 1 still under negotiation- mid/end June all the contracts will be signed. Mayor wants interventions at Serafeio. Giannis checked that this location is included in the hotspots. Mid November event planned at the site (Governance analysis). ICCS published a new paper (sustain graph) WP8 to be informed. Contribution planned for the European Agency: Urban adaptation in Europe - what works. Reference to ARSINOE included. PESTLE to be finalized tomorrow.
CS#2: Mediterranean ports	AUEB		Meeting on Monday cancelled. Working still on the PESTLE (corrections). Collecting data for Piraeus implementation (WP7 hybrid model).
CS#3: Main River (Germany)	LMU	VKU	Not present – Public holiday
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Meeting with the other partners. Issues with the AL innovation call-still negotiating, to start next week. MK innovator started. Monitoring: Templates to report every 3 months. Finished with PESTLE (WP2)- Nicos (CS#6) on a trip with students to Prespes tomorrow-meeting with the GR organization working on CS#4.
CS#5: Canary Islands	ULL		Holiday-not present.
CS#6: Black Sea	AUTH		PESTLE final version sent. Some additional info from local partners missing. Minor issues with Bulgaria innovation call. Turkey also issues, checking needed. Preparing for the Newsletter. Invited to a Conference in Thessaloniki (REST/ COAST)- 2 presentations (Giannis-ARSINOE and Nicos – CS#6)
CS#7: Southern Denmark	EM	TUD	Not present
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday, modelling continuing, to include also underground culverts, arranged the LL workshop (June 20- Paignton), June 21 meeting with the innovators (additional) at UNEXE. TCCT (Davina) made a presentation about their work (innovator) looking into ecosystems and sites in

			the area, discussing also about Miyawaki forests as a NBS for flooding. Working with schools. Asking about potential interaction with CS#1 (schools)- Contact: Alexandra Ioannou. Giannis to introduce. Sarah Ward is leaving WRT and the project. Replacement Doug Manford (new contact to be added)
CS#9: Sardinia	AGRIS		Not present. CS#9 working on the documentary today.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Dates of the Water and Climate Change Conference in Nice: before June 5 or after June 15 (in June 2025)- Not to clash with WIE. 3rd Newsletter is being prepared.
WP3	TUD	LMU	Modelling – data license issues to be resolved – meeting with NATALIE to be scheduled for synergies on modelling (Albert updated)
WP4	UNEXE	ICCS	Discussion about the dashboard (Gareth sent update) with new functionalities. Discussion also about the long-time implementation of measures (CS#1 to evaluate this functionality). Need for generic design to be applied also to the other CS.
WP5	BRC		CS#1: implementation on the ground no longer than 6 months, CS#2: All goes well-winning bid June 10 (Limassol) and Piraeus not new update. Valencia already signed. CS#7 all clear. CS#6 some issues with Turkey still. First version of the template for monitoring ready. Support services offered to the innovators by WP5-2 responses (T5.4)
WP7	AUEB		Meetings, also working on gathering and visualizing the outputs of the questionnaires (T7.2). Progress as planned. Choice experiment paper to be distributed (around 3000 people) on June 3-1 month for replies.
WP8	GAC		Fact sheet shared this week- ARSINOE factsheet on Virtual Reality: https://arsinoe-project.eu/immersion-and-embodiment-for-citizen-engagement-in-arsinoe-virtual-reality-factsheet/ **Hydrogeological model for the Canary islands with Noelia Cruz Pérez:** https://youtu.be/3elHWiH-2e0?si=S42BZLcvzalEzia5 Video shared about CS#5 Hydrogeological model.

JUNE 6, 2024

- ENRICH GLOBAL new Group (Giannis): Sustainable Research Innovation Conference (Helsinki) next week. Running a session and introducing the new Group. ARSINOE to be a strong partner.
- Discussion with UT about next year Conference 9Water and Climate Change) to find dates. Look at early July. (30 June- July1 July2)

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		In Ohrid for a training school, CS#4 also invited. The training school is part of NEXUS-NET. The whole school was structured along CS-CS#4 promoted. Also CS#9 presented (food aspects) and from CS#1. Finishing today. No meeting (training school)/. Meeting with NOA yesterday about the dashboard: preparing feedback and improvements for Gareth (UNEXE). TBD next Tuesday. Finished the PESTLE and sent to WP2.
CS#2: Mediterranean ports	AUEB		Meeting on Monday about the PESTLE and the innovation pathways. Finalised (3rd iteration). Friday participated on the Net Zero and Climate Resilience Shipping event (Athens) : presented work related to CS#2.
CS#3: Main River (Germany)	LMU	VKU	LMU/ VKU meeting tomorrow. Meeting with the Ministry (PESTLE discussion). Meeting with innovators about the progress and the future tasks. Also shared the document about monitoring the innovations.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	MK meeting with innovators, AL signed the contract with the innovator. PESTLE finished. MK meetings with some stakeholders.
CS#5: Canary Islands	ULL		Not present-sent email.
CS#6: Black Sea	AUTH		Visit to Prespa lakes last week (posted on Teams)-hosted by NECCA (CS#4). Explained to the students links between CS#4 and CS#6. Finished with WP2 – Bulgaria signed the contract. Turkey still issues with the innovators. To be solved in the coming days. Issue resolved (WP5-Ina)
CS#7: Southern Denmark	EM	TUD	Meeting with WP2 for the Sustainable Research Innovation Conference (Helsinki) next week- Bodil to attend (CS#7) and also WP2 (Lorena), supporting the presentation about the stakeholder engagement strategy. Progress about the innovation pathways-communicated to Alice for feedback. Starting with 2 innovations.
CS#8: Torbay and Devon County	UNEXE	TC	Yesterday meeting -discussion about the LL workshop on June 20 (innovators also to attend)-discussion on how to collaborate better-meeting on Friday June 21 with the innovators in Exeter.F2F workshop but link will be provided for WP2 for both meetings. Doug participated from WRT.

			MINKA sent email about continuation of activities with CS#8 from September. Participation to the ICUD Conference (Alex) next week (Delft) with CS#8 research work. PESTLE and innovation pathways need to be finalized (Doug to be notified by Albert)
CS#9: Sardinia	AGRIS		Last week visit to Sardinia by UT for the documentary. Marco working on the preparation of the GA (with AGRIS) (also about funding).
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Alice reports on the progress of PESTLE: The only CS without input is CS#8. Others on track.
WP3	TUD	LMU	Meeting with NATALIE about downscaling climate scenarios. In contact for both deliverables. Internal WP3 meeting on Tuesday about this.
WP4	UNEXE	ICCS	No updates.
WP5	BRC		WP5: CS1 in progress of signing contracts with 3 innovators selected. CS2 Piraeus in progress of contract signature, Limassol in progress with internal selection. Monitoring of demonstrators template: additional suggestion to assign responsible persons for regular communication from both parties: innovator and case study. Validation letters requests are being sent by BRC (Gerardo) individually to each case study - important. Support services to innovators call is continuing: 4 innovators confirmed (3 are contracted through OTI innovators and 1 innovators from the shortlisted applicants) . Suggestion: to appoint 1 person from the CS and 1 person from each innovators for monitoring tasks. To report the names to Ina. If other innovators are interested in the support services, please let Ina know. Support can be provided with business plans, instruments, pitch decks etc.in the framework of ARSINOE.
WP7	AUEB		Meeting next Monday. Working on processing the questionnaires. CS#1 provided comments on the choice experiment-to be distributed next Monday.
WP8	GAC		New video shared today. Nina OLIVIER (External): https://youtu.be/PHIM1YhsnMo?si=d_BB-EzvMcg29znH sent on 06 June 2024 14:35

			Earlier this week World Environment day communication (joint) with the sister projects. Finishing the preparation of an article about the first innovator. WP5 will have a look before making it public. ENRICH Global Climate Change and Sustainability Group (Chrysi leading and Elena co-leading) launched on May 14, during the NEXUSNET Forum-presented also ARSINOE as a CoP to develop-will come back to the partners on how to implement this (questionnaire etc).

June 27, 2024

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		UTH participated in CEMEPE 2024 and presented ARSINOE activities, progressing on dashboard and ABM (with CS8 partners)
CS#2: Mediterranean ports	AUEB		Participated in FMARC conference organized by CAP in Cyprus, currently in Valencia for conference to present ARSINOE activities, finalizing innovation pathways and PESTL analysis (to be delivered by EOW)
CS#3: Main River (Germany)	LMU	VKU	Worked on Innovation pathways, events in the case study region organized, outreach & communication (German centre for climate adaptation), participated in event organized by IMPETUS, WP7 T7.3 discussed with WP7, met with innovators and discussed progress, 1st meeting with 2nd group of innovators (exchanges of data, work plan etc.)
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Several meetings with innovators (North Macedonia and Albania partners), North Macedonia partner meeting with stakeholders, Albanian innovator meeting with local stakeholders, newsletter prepared in local languages by all partners, delivered summary regarding PESTLE and innovation pathways, working on translation of MINKA (N. Macedonia partner)
CS#5: Canary Islands	ULL		Discussed sea level rise modelling and almost finished publication regarding those, compiling template provided by WP5 for meetings with innovators, PESTL analysis completed
CS#6: Black Sea	AUTH		Progress with implementation of innovations discussed, Bulgaria partners meeting with local authorities (very positive feedback) regarding innovation, discussed deliverable D2.4
CS#7: Southern Denmark	EM	TUD	Esbjerg partner (with WP2) attended conference in Finland presenting ARSINOE material, regular meetings with all innovators, PESTL analysis review to be finished
CS#8: Torbay and Devon County	UNEXE	TC	LL took place in Paignton last Thursday updating stakeholders, introduced 2 innovators (WP2 also attended), Friday meeting with UNEXE for details with innovators, innovators progressing with work, cascading effects model updated, dashboard setting up access to live data to innovator (HYDS), ARSINOE presented in ICT4WATER in Brussels
CS#9: Sardinia	AGRIS		Film regarding durum wheat food chain, open tenders progressing, Spanish innovator meeting regarding datasets, started organizing GA (prepared document), finalizing D2.4 input, selection of durum wheat genotypes

Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	D2.4 on good track, contributed to participation in Helsinki conference, T6.5 input prepared (how to set up survey, who to address it to, etc.) , stakeholder engagement roadmaps on Miro (CSs to fill them), 30 June 1-3/7 2025 climate change and water conference in Nice (call to be launched in September) - space for ARSINOE session , WP2 newsletter to be launched on July 1st
WP3	TUD	LMU	Climate scenarios data based on LMU's work
WP4	UNEXE	ICCS	Torbay met with stakeholders, dashboard demonstration and feedback received (look at past events and provide stories for communities)
WP5	BRC		CS1, CS2 to finish contracts, support services for innovators: interest from 4 innovators (tailored to each innovator)
WP7	AUEB		WP7 participating in Valencia conference with representatives from adaptation finance project partners, CS3 meeting for task 7.3 (CS3 will be a frontrunner)
WP8	GAC		NH global meeting to discuss further exploitation steps, on track with WP8 activities, ICT4Water contacted WP8 for next newsletter, Seminar by Water Europe 27/6, factsheet for D4.6 for sustaingraph published, 2nd of July climate adaptation seminar for Spanish partners/ stakeholders (UNSDSN organize this), Transformar webinar in Nature Based Solutions

[04/07/2024]

- @all – indicate whether you will join the GA by early next week (Monday – 8th of July)
- @all – process for 2nd periodic report will be initiated (early due to summer holidays).

- D6.3 is due by the end of September. All CS need to contribute -similar to D6.2 – reporting on the updates of all activities ongoing in the CS. Template for the deliverable to be shared next week.
- With regards to D6.3: All the CS need to think about how the innovations selected through the open calls will fit with the general scope/challenges/storyline of each CS. This will need to be reported at M36 (Deliverable D6.3 due for M36).

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Regular meeting held last Tuesday. Info: sustain graph team sent article to ICT4WATER newsletter. 2 contracts (out of 3) for the innovations now signed. MINKA team have prepared new graphs for the GR version of the application. Work with ABM and dashboard is progressing well. Next week Gareth to join in regular meeting. NOA team updated on NBS simulations for implementation in Athens case study. The impact (T reduction) possible not very big in the area.
CS#2: Mediterranean ports	AUEB		This weeks meting cancelled due to conference. Work continues on D2.4.
CS#3: Main River (Germany)	LMU	VKU	Finalizing PESTLE analysis. Planning several events in the Case Study. Working with innovators – in particular about notice boards/signs along cycle paths. And video production on innovation implementation. Innovator to produce signs and video.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Weekly internal meeting today. Nikos M. joined from CS6. SDM discussed- which is delayed. Hydrological model will require a few more months- causing delay. Innovators in ALB and NM started with implementation of the innovations. WP2 documents – to be submitted. First document is ready. Meeting to discuss report due in September. Newsletter – Question to others – also facing issues with Mailchimp? If sent to someone who has not subscribed to Mailchimp the mail cannot be opened.
CS#5: Canary Islands	ULL		Attended workshop by sustainable solutions development network last Tuesday. All sister projects to ARSINOE Were there.

			Meeting with innovator took place this week. On schedule. First deliverable to be submitted by September.
CS#6: Black Sea	AUTH		Completed D2.4 contribution. Field trip this weekend in GR part of the black sea case study. To install monitoring stations to monitor river water levels. It concerns low costs sensors that might be useful for other CS as well. (DIY solution) – based on images.
CS#7: Southern Denmark	EM	TUD	Not present summer holiday.
CS#8: Torbay and Devon County	UNEXE	TC	Internal meeting yesterday. Barry updated about the progress of the traffic model (discussion on the units to use linking to Mehdi's tool). Progress with flood modelling (coupling with SWMM). HYDS (Jodi-Innovator SME) was present at the meeting-they had a meeting with UNEXE (Albert) last week in Barcelona). Currently collecting data-no issues. Links (possibly) with MINKA , WRT and TCCI-2nd innovator TBD).
CS#9: Sardinia	AGRIS		Engaged in field activities. (field selection, segregation of generation, perform visual selection (in the field) and genotyping. Working on D2.4 – finalized and sent to WP2. Open tender – long term climatological dataset compiled and shared with innovator. To be used to do the climate hazard assessment.
Task 6.2 - **Implementation of the System Innovation Approach in each Case Study (M5-M45)**	UT	AUEB	
Task 6.3 - Resilience framework implementation in each Case Study (M8-M45) - *with nine sub-tasks, one for each CS*	UNEXE	ATHENA	
Task 6.4 - Innovation packages development and validation in each Case Study (M25-M48)	AUEB		
Task 6.5 - Lessons Learned-Evidence based recommendations (M37-M48)	KWR		
WP2 - Systems Innovation Approach	UT	AUEB	Working on D2.4. Emails sent to CS with regards to reporting. Bilateral meetings to discuss being organized.

			Newsletter launched on 1st of July.
WP3 - **Dynamic Multi-Sectoral Resilience Modelling and Assessment Framework**	TUD	LMU	Not present
WP4 - *Environmental Intelligence Management and Services*	UNEXE	ICCS	Weekly meeting (Friday) – to focus on ABM for Athens case study. Handover in UNEXE team.
WP5 - *Portfolio of innovations and support schemes*	BRC		Not present
WP7 - *Financial issues and financing instruments/ Business*	AUEB		AT UNESCO conference with all sister projects. Adaptation finance presented. By the end of the year a meeting with all sister projects to be organized – focusing on WPs dealing with adaptation financing – to bring all findings together. Meeting will be open – further details to follow.
WP8 - *Impact maximization /Exploitation/Communication/Dissemination/Outreach/Replication*	GAC		Continue dissemination on innovators/winners of 1st open tender round. Next week publication on last winner from 1st round to come out. Then in summer materials will be prepared about the 2nd open tender round. Start publishing in September.

[11/07/2024]

- **Data sets** need to be updated and (more) uploaded. This is very important for the project review. There is a link from Giota already sent. **Each CS needs to upload data sets**. Contact: Panagiota Koltsida p.koltsida@athenarc.gr. (From WP4).
- WP2: Book meetings with WP2 (Lorena) for the stakeholder engagement roadmap.
- WP6: We need to include in D6.3 details about what is happening with the **selected innovators** (description, plans of activities, monitoring mode)
- D2.4 in preparation-reviewer Inna. To be sent for review next week. Giannis needs it on July 30.
- Agenda for the GA: Giannis to prepare and share next week with WP Leaders.
- Giannis presented ARSINOE at an event with the sister projects (MISSION event). We are the BEST!!!!

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting on Tuesday + Gareth (dashboard-good progress-also discussed in WP4 yesterday-meeting with the Municipality to improve the visuals); NOA submitted a paper about vulnerability; ICCS working on new papers; MINKA: environmental parameters to be added (September); Innovations: 2 contracts have been signed, small delay with the 3rd. To be finalized at the end of this month.
CS#2: Mediterranean ports	AUEB		Meeting on Monday-concluding with vulnerability analysis- Two extra workshops (Limassol and Piraeus) planned until the end of September to conclude this analysis. Working on the stakeholder engagement actions-report to be finalized next week. Piraeus contract to be signed shortly, also Limassol in the process of signing.
CS#3: Main River (Germany)	LMU	VKU	Exchanges with the innovators about reporting. Preparing events with stakeholders; met with WP2 about stakeholder engagement.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	July 8 meeting with WP2 about the stakeholder engagement report and roadmaps; Internal meeting today about the report and the newsletter; preparing also for the GA; also discussion about the monitoring procedure for the innovators.
CS#5: Canary Islands	ULL		Not present-On holiday Mehdi: Data gathered to start working on cascade failure and the impact of crops.
CS#6: Black Sea	AUTH		Regular meeting on Tuesday, newsletter finalized; meeting with WP2 about the stakeholders engagement; discussion about monitoring and plans for the innovators.
CS#7: Southern Denmark	EM	TUD	Not present summer holidays
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday; progress on the transport model; dashboard; new version for the services; progress on the calibration of the flood modelling; very fruitful discussion with one of the innovators (Torbay Communities), which opens the field for

			collaboration with the services model. Potential for a common paper.
CS#9: Sardinia	AGRIS		On Friday Marco participated in a TRANSFORMAR meeting (common area for a CS)- We are doing better than them. Working on the selected innovations- also on data sets for ATHENA. Experimental plots: working on them (field work).
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	No further comments
WP3	TUD	LMU	No further comments
WP4	UNEXE	ICCS	DATA SETS (see general announcement)
WP5	BRC		Monitoring of the innovations at the WP6 report. Exploitation will go to the reports for WP8; work needed on IPR; On track about communication and profiles-the profiles to be uploaded at the CIW by the end of the summer-ongoing process.
WP7	AUEB		Questionnaire launched-open until September. Now focus on processing the outcomes from the workshops. Participated in a UNESCO conference: Decision to have a meeting f2f with all the teams working on financing from the sister projects-may be other ARSINOE partners to participate
WP8	GAC		Participated in MIP4ADAPT event with all the other MISSION projects. News about the 1st open tenders and the selected innovators are going out. After the summer starting to disseminate about the 2nd call. Diss/Comm file available on Teams and all need to fill it.

[18/07/24]

- Presentation of the SustainGraph by ICCS (Tasos and Eleni), also Giota (DataHub)
- Giannis: MIP4ADAPT to join a seminar for September 17-related to CS. The CS that are interested to contact Giannis-check the post. Deadline Monday 22/07/2024
- Joep: D6.3. Template (provisional) and folder/subfolder for each CS is online for all the partners and CS to contribute. Start thinking about it and whether are any further comments. Deadline for the Deliverable M36 (end of September)
- WP2: D2.4 sent to Inna for review.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting this week-discussed the SustainGraph-dedicated meetings form next Tuesday to collect the data by CS#1. All in progress. Two contracts signed. One contract pending : a consortium of 2 companies applied-admin issue with the 2nd company to be resolved (expected by the end of the month)
CS#2: Mediterranean ports	AUEB		Meeting this week-collecting data from last month to upload for WP4. Data for the wave model to be uploaded. Discussing the updates and the newsletter to be sent at the end of the month. Meeting with all the stakeholders in September (online) to update them about the activities and progress in the last year. Also to introduce the innovators to work closely with them. CY contract signed, GR problems resolved0ready to be signed. Meeting with WP2 needed-Conrad to contact Isabelle.
CS#3: Main River (Germany)	LMU	VKU	Template for stakeholder engagement completed. Prepared for the meeting next week with WP2 on the subject. Meeting scheduled for Friday with the DE Environmental Agency about adaptation.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Meeting with stakeholders in Prespa (MK) about the innovations. GR team also contacted stakeholders and distributed the newsletter. Al in contact with the innovator. The AL Hydro-Meteorological Institute to support the innovator with data and knowledge, also in contact with water bodies authorities to support the innovator.
CS#5: Canary Islands	ULL		On holiday
CS#6: Black Sea	AUTH		Start implementing the sensors for GR (digital twin)-constructed and tested (in the lab) the sensors and selected the locations, but installation postponed due to heatwave. Interview for CS#6 released.
CS#7: Southern Denmark	EM	TUD	Not present – summer holidays
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday, Torbay Community activities reported (next week meeting planned in Paignton about flooding). Discussion about property flood resilience measures. Barry progress on the

			transportation model (details presented)-this is to be imported to the dashboard and the services models. WRT working on the newsletter-Discussion about the dashboard progress.
CS#9: Sardinia	AGRIS		1) July 12 - meeting with our agri-food chain Open Tender innovator to plan activities. 2) Meteorological datasets and technical information on Agris experimental farm collected and forwarded to the Open Tender digital technologies innovator from Spain. 3) Contacts with Giota (WP4) aiming at updating and uploading both agronomic and meteorological datasets. Task to be finalised today with the collaboration of Dr. Marino Marrocu from CRS4. 4) Ongoing fieldwork: - durum wheat field selection of segregating generations; - sampling of durum wheat genotypes from yield trials for chemical and technological analyses
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	No further announcements
WP3	TUD	LMU	Participation in the PhD Academy (24 new researchers from 12 countries), Albert, Nav and Ralf lectured about ARSINOE (Venice)
WP4	UNEXE	ICCS	Presentation and discussion for T4.3-
WP5	BRC		Update about the contracts that were signed. Details under each CS. Information about the innovations selected through the open tenders are collected to be published-exploring funding needs by the innovators.
WP7	AUEB		Working on the financial reporting model for CS#2-working on D7.4 for Sept. 2024.
WP8	GAC		Video interview shared about CS#6.

[25/07/2024]

- Meetings to be cancelled from Aug 1 to Aug 15 (included).
- D2.4 review progress by Ina (to be ready July 30)
- D6.3 (Joep) Template finalized and uploaded, with instructions. Reviewer: Suggestion (1) Ralf (LMU) (2) Tasos (ICCS)- Discussion about the content from WPs in this Deliverable.
- All the CS to contact Giota about the datasets (WP4)

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Review of all the pending actions for September and assigning tasks.
CS#2: Mediterranean ports	AUEB		Meeting on Monday. Collecting enhancements and working on the Newsletter, in local languages (3 versions). Sending them now and resending a Newsletter at the end of September to link with the innovators.
CS#3: Main River (Germany)	LMU	VKU	Attended Conference about Climate Resilience Managers (regional). Planning event on Climate Services. Yesterday webinar on water retention with local organisations.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	MK: Communication with stakeholders and innovators; GR: Data for the Data Hub being collected; AL: In contact with the innovator-meeting on site today, also contact with an organization for a local funding scheme. Innovators to prepare the material for WP8 (Social Media)
CS#5: Canary Islands	ULL		Not present
CS#6: Black Sea	AUTH		We had our regular meeting with our partners on Tuesday. Our colleagues who participated in the innovation bazaar presented the timeline for the implementation and operation of the selected innovations. We will collect all timelines and create a common chart to follow the implementation of the innovations in all sub-case studies of the Black Sea. It is important to note that our partners ensured funding for the operation of the innovations even after the end of the project ensuring thus their sustainability. Yesterday we had a very interesting meeting with Tasos Zafeiropoulos and the team from NTUA regarding data management and the connection of the Digital Twin we are working on with the Knowledge Graph (SustainGraph).
CS#7: Southern Denmark	EM	TUD	Not present – summer holidays.
CS#8: Torbay and Devon County	UNEXE	TC	Meeting with WP2 about the stakeholder engagement report. Weekly meeting yesterday-discussion about dashboard and how to include the flood risk changes and how to show this. Traffic modelling progressing. Discussion about D6.3.

			Working on the Newsletter-section about the LLs and the Innovators.
CS#9: Sardinia	AGRIS		Marco contacted Giota about the datasets (WP4). Data sets uploaded about meteo and agro. Meeting with innovators (agri-food): planning activities for Protected Indication of Origine for Sardinian bread. Working for the Spanish innovators- preparing environmental hazard risk.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Nothing apart D2.4- Meeting on reporting about stakeholder engagement roadmaps (preparing the template for September). Also discussion about RP2.
WP3	TUD	LMU	No news
WP4	UNEXE	ICCS	Discussion about the dashboard (T4.1)- Mehdi to include the transport model to the cascade engine. CS#8 finished. Mehdi working on CS#5 (Tenerife) about the services.
WP5	BRC		Working on meetings with CS#1 to finalise the call with the innovators. Ongoing work on CIW (pitch deck and business plan for the innovators-working with SAFER PLACES (one of the innovators).
WP7	AUEB		Working on the two Deliverables.
WP8	GAC		Nothing further to report.

[August 22, 2024]

- Discussion about the GA.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		No news, due to holiday. Restarting on August 26
CS#2: Mediterranean ports	AUEB		No news, due to holiday. Restarting on August 26
CS#3: Main River (Germany)	LMU	VKU	Just returned from holiday. Only a meeting between LMU and VKU-drafting a survey about financing climate resilience. LMU also working on climate services.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Meeting today-discussing about D6.3 and WP2. Discussion about the innovation implementation process (innovators)-ongoing.
CS#5: Canary Islands	ULL		On holiday. UNEXE (Mehdi working on cascading failure model for CS#5-Tenerife; expected by mid-September online.
CS#6: Black Sea	AUTH		No news, due to holiday. Restarting on August 26
CS#7: Southern Denmark	EM	TUD	Working on the innovations-meeting on August 26 with the innovator (citizen lab/go vocal). Last Monday meeting preparing a workshop with the 2nd innovator (emergency preparedness involving stakeholders0; workshop to take place in November. On Tuesday 27/8 meeting planned with the 3rd innovator. Preparing about the PR. Cascading failure model with UNEXE to be delayed after M42 (UNEXE-Mehdi) because data were not provided.
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday-not lot to report, working on the dashboard and the newsletter (mostly about the innovators/innovations). Working also on D6.3.
CS#9: Sardinia	AGRIS		Not present
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Working on D6.3
WP3	TUD	LMU	2 Deliverables pending. LMU/TUD (climate projection) IPCC still not available. D3.9 One distributed model Barry Evans-mitigating measures (UNEXE).
WP4	UNEXE	ICCS	2 Deliverables for Sep 2024 (on Track). Also the SG deliverable for M42 (working on it) and the DT for M48.
WP5	BRC		Working on D5.3 (update of the CIW)-contacted the innovators and working on their profiles . **All the CS need to verify the profiles of their innovators (missing CS#7, CS#9, CS#1, CS#2)**

WP7	AUEB		Wp7 started the meetings this Monday and we work on finalizing the deliverables
WP8	GAC		Working on the visuals and the articles about the innovators. UNSDSN launching a MOOC https://sdgacademy.org/course/transformative-approaches-to-climate-adaptation-in-europe/ Could be interesting for some ARSINOE people. Initial exploitation plans are being prepared ahead of the GA (we need a discussion at the GA)

29-08-2024

- Reviewers of deliverables – to be discussed next week. Giannis to make a list to be discussed next week.
- GA – online connection for the people not able to join the meeting. No confirmation yet. Agenda for GA to be shared early next week.

D6.3 – request to all CS to actively report when the draft of their contribution has been uploaded to Teams. Also, inform in time should there be a delay in providing the contribution.

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Regular meeting was held this Tuesday. CS members have been assigned tasks for D6.3 writing. D4.7 is in good shape (contribution is progressing).
CS#2: Mediterranean ports	AUEB		Focus on contribution for D6.3. 3 reports with contributions from the 3 ports plus reporting on horizontal activities. Progressing well. CS meeting with WP2 on newsletters. To send 2nd newsletter on Monday (expected)
CS#3: Main River (Germany)	LMU	VKU	Regular meeting VKU and LMU with focus on D6.3. Worked on survey concerning financing and climate resilience. Webinar on protection of critical infrastructures from torrential rain. Working on video on work of one of the innovators.
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Working on D6.3 – progressing well. Communication with WP2 on reporting for WP2 technical report (stakeholder engagement roadmap) – also progressing well. Field trip of Albanian innovator this week. Meeting with stakeholders and innovator scheduled this week.
CS#5: Canary Islands	ULL		On holidays
CS#6: Black Sea	AUTH		Partner meeting last Tuesday. A lot of field activities this summer – so all partners were very busy. The first newsletter has been distributed. Feedback is coming in. Partners warned about the deliverables and that their input is needed. 3 innovators in CS – all have been invited for a meeting at the end of September to present their

			innovations and progress with implementation for the partners. To be repeated on 31st of October (international black sea day) – for this meeting the whole consortium will be invited.
CS#7: Southern Denmark	EM	TUD	Met with all 3 innovators to discuss planning and implementation. All 3 innovators now started with implementation. Bilateral meeting with Esbjerg municipality on D6.3. Meeting with WP2 on stakeholder engagement strategy.
CS#8: Torbay and Devon County	UNEXE	TC	Weekly meeting held yesterday. Working D6.3 and progressing well. Torbay Comm was in the meeting and reported on progress with innovation implementation. Will be starting to deliver their work in September. Newsletter being compiled and to be sent out by end of September.
CS#9: Sardinia	AGRIS		On holidays.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Working on 6.3 and on 2nd newsletter (to be release next week).
WP3	TUD	LMU	WP3/WP4 meeting yesterday. WP3 – working on D3.5. all CS will be asked to confirm on some of the content in this deliverable.
WP4	UNEXE	ICCS	ICCS is preparing D4.7. D4.1 due by end of September and under preparation.
WP5	BRC		Working on D5.3. Following up with CS on profile description of the innovators. Main concern is signature of contracts with last innovators in CS1 and CS2 (only 6 months remain before the delivery date of the innovators).
WP7	AUEB		Focusing on completing deliverables. To be ready by mid-September. (D7.2, D7.3).
WP8	GAC		Video shared today on social media. (link: https://www.youtube.com/watch?v=1xpa5gEYSUs)

[05/09/2024]

- Giannis working on the Agenda for the GA-He will send it in the coming days
- We need reviewers for the Deliverables M36
- List of participants for the GA to be filled (urgent)

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Working on the Deliverables.
CS#2: Mediterranean ports	AUEB		Working on the Deliverables. Event with innovators planned (3 different events per country)
CS#3: Main River (Germany)	LMU	VKU	Presentation at EMS "How can we make information on climate change actionable for users?" (Session: “Communication and Media“); Presentation of living lab results at event on water management in the region; Financing climate resilience; Call with potential partners for hackathon; Video production with innovators
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Meeting on Aug 30, working on the reports (D6.3 and WP2 reports). Field trips with the innovators (AL and MK).
CS#5: Canary Islands	ULL		Working with WP2 for the governance analysis-meeting with stakeholders planned for next October-WP2 to attend. Mehdi (UNEXE) finalized the cascading failure model for Tenerife. Meeting needed. Uploaded D6.3 (Teams). Working with WP2 about the next Newsletter. Working also on publications with CSIC.
CS#6: Black Sea	AUTH		Working on the Deliverables (especially for D6.3). Working on the DT- meeting to be scheduled with UNEXE. Event posted on Teams about an event next week.
CS#7: Southern Denmark	EM	TUD	Working on the Deliverables (D6.3). Meeting with Mehdi (after M36 Deliverables)
CS#8: Torbay and Devon County	UNEXE	TC	Weekly meeting yesterday-Working on D6.3, Mehdi started working of the SG, Alex updated about the criticality of nodes- Deprivation indices to be added. Opportunity mapping for flooding to be included in the dashboard.
CS#9: Sardinia	AGRIS		Statistical analysis of field data results has started. Open tenders: In touch with innovators for the next activities starting in September.
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Updates for D6.3 sent. Newsletter to be sent tomorrow to WP8.
WP3	TUD	LMU	No news to report.

WP4	UNEXE	ICCS	Both deliverables on track for M36.
WP5	BRC		Working on the Deliverable D5.3 (M36). Questions to the CS: CS#2 on Monday the contract to be signed (Piraeus). Some CS updated the profiles of the innovators-Missing CS#7, CS#9, CS#2 (Piraeus)
WP7	AUEB		Working on the Deliverables-
WP8	GAC		Info collected about the innovators from all the CS. News on the website-profile of innovators to be updated there. REGILIENCE: they want to make some kind of dashboard with all the innovations. Diss/Comm file to be completed. Exploitation contacts to start after M36.

12-9-2024

- GA presentation for the CS: (1st session)- General discussion led by Isabelle
- 1 slide for the implementation of innovation (per/innovator) (Isabelle)
- 1 slide about stakeholder engagement plans (last year of the project) (Isabelle)

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		No regular meeting this week (travelling). Finishing the 1st newsletter, working on D6.3, Innovators: Issues with the 3rd innovator-discussed with George Stefas (Municipality) to resolve the issues (which is likely). Meeting planned in October with the innovators (on location-Sarafeio)- Vertical garden to be implemented (Singular Green)- Good results expected.
CS#2: Mediterranean ports	AUEB		Meeting cancelled on Monday (participation in Conferences)- Working on D6.3-part missing to be complete tomorrow.
CS#3: Main River (Germany)	LMU	VKU	Working on Climate services and data needs, meeting with innovators (video and interviews), and 2nd meeting on their needs. Question by them: BRIGAID want info from them, but it is not clear what is needed- WP5 to respond (Inna)
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Weekly internal meeting: report about the stakeholder engagement finished To be submitted tomorrow) D6.3 also finished, Innovators: last trip together with the project partners to the sites. Also meeting about the dashboard. About the data catalogue: planning to upload this week. Discussion about MINKA: Possibility to include meteorological data, TBD with Sonia (CSIC)
CS#5: Canary Islands	ULL		Meeting with Mehdi (UNEXE) about the cascading effect (very impressed with the work!) Stakeholders invited for the governance analysis- next week meeting with the innovator-platform almost finished.
CS#6: Black Sea	AUTH		Meeting last Tuesday- mostly about the reporting- ok. Progress of innovators: going well. Meeting planned on September 23 (all of them) joining AUTH to present the progress (3 different countries). 31/10 is the international Black Sea day-the innovators and project partners to present there and also to present results (innovators)
CS#7: Southern Denmark	EM	TUD	Not present
CS#8: Torbay and Devon County	UNEXE	TC	Weekly meeting yesterday, D6.3 finished, finishing the stakeholder engagement report (WRT). TCC (Davina) provided update- school activities arranged- feedback from previous meetings- preparing meetings with local communities. Asking WP5 is there is a template for the reporting for the Innovators. WP5 to prepare a TOC (at least)

CS#9: Sardinia	AGRIS		GA: Marco reviewed the Agenda and sent it to Giannis. Also the agenda of activities updated. To be uploaded by the end of the week. Analysing data (agri-and meteo- and techno-) data (last cropping season)- Open tenders: updating the profiles according to Inna's instructions. Joep: Contribution to D6.3 not sent (or not on Teams)
Task 6.2	UT	AUEB	Template about the last Deliverable circulated by Isabelle
Task 6.3	UNEXE	ATHENA	Template in discussion
Task 6.4	AUEB		To be discussed (Conrad)
Task 6.5	KWR		Last 3 months-we need to discuss how to do this.
WP2	UT	AUEB	See above
WP3	TUD	LMU	No news
WP4	UNEXE	ICCS	No news
WP5	BRC		See above
WP7	AUEB		See above
WP8	GAC		Not present (at another project kick-off meeting)

[19/09/2024]

- Status of pending Deliverables for 30 September:

D1.5 – UTH

D3.5 – TUD (Martin) ongoing. Reviewer Marino (AGRIS) to be sent on Monday by Martin

D4.1 – UNEXE- TORBAY received the Deliverable for review

D4.7 – ICCS- Mehdi to review. Link received.

D5.2 – BRC- Reviewer GAC Not present

D6.3 – KWR- (Joep) Ongoing (CS#2 received today, CS#9 pending and some minor contributions- reviewer Ralf- to be sent on Monday- All the CS to send the list of co-authors

D7.2 – AUEB- Working on it (Conrad)- TUD to review

D7.3 – AUEB – Working on it (Conrad)- TUD to review

MS 7- ATHENA (Ebun, Vivi)– Reviewer Giannis

MS 23 – AUEB – Conrad- Reviewer Giannis

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Meeting cancelled, because of Deliverable Tasks.
CS#2: Mediterranean ports	AUEB		This week we mainly worked on gathering and finalizing our report for D6.3, which was finalized and delivered today
CS#3: Main River (Germany)	LMU	VKU	Worked on Climate services- Article about the conference and the LL. Reacted to the comments about D6.3
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Weekly meeting today- discussing the data catalogue, adding data. Reports submitted- discussed also the innovations and the monitoring. Template expected by Inna
CS#5: Canary Islands	ULL		Meeting on Tuesday- Yesterday meeting with the innovator- Meeting today with Mehdi (Cascading model)- Changes for D6.3 done, datasets added for WP4, working on the presentation for the GA
CS#6: Black Sea	AUTH		Not present
CS#7: Southern Denmark	EM	TUD	Finished with D6.3- some pending matters with communication to follow up. Meeting with the innovators today to follow up.
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday- dashboard demo, info about rainfall data for prediction and modelling- discussing about future innovations (e.g. green roof impact), cascading effects integrated in the SG for trials with stakeholders. Davina (innovator) attending- HYDS to be alerted because they do not participate in the meetings. Data uploaded for the knowledge graph.
CS#9: Sardinia	AGRIS		Working on organizing the GA. Working also on D6.3 (finished today). Meetings with the

			innovators (renewable energy- and EU branding). Innovator profile completed and shared with BRC. Working also on the agenda about the GA
Task 6.2	UT	AUEB	
Task 6.3	UNEXE	ATHENA	Presentation at the GA for D6.7
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Deadline for the report on Stakeholder engagement. **Missing CS#1, #2, #7, #9**
WP3	TUD	LMU	Nothing new
WP4	UNEXE	ICCS	Nothing new
WP5	BRC		Not present
WP7	AUEB		We are working on Finalizing the deliverables, scheduled to be shared by the end of the week
WP8	GAC		Not present

[26 September 2024]

- Deliverables: Checking (Giannis)

D1.5- ready to be uploaded

D3.5 - ready to be uploaded

D4.1- Review finalised- CI not to be made public (Giannis to inform the EC officer)- Dimitris to add "something" and finalise it

D4.7- Review finished- Tasos preparing the final version.

D5.2- Review received- to be finalised today by Inna

D6.3- Sent to Ralph by Joep (under review).

D7.2 not sent for review yet.

D7.3 under review (TUD)-

MS7- (UTH)- Vivi to send to Giannis

MS23- AUEB (innovation packages)-Conrad- no news.

- Publications to be uploaded for the review (Zenodo)- Instructions at the GA by Giannis

Agenda: Comments from WP2 received-We need to present the innovations. Presentation on Day 1 by the WP Leaders- during the WP2 slot- 1 slide per innovation/CS. Discussing also a timeslot on Day 2 (Inna)

Title	Main partner	Other partner(s)	Actions and activities
CS#1: Athens Metropolitan Area	UTH		Workshop in Thessaloniki (Giannis) Documentation available for WP8. Finalising D6.3
CS#2: Mediterranean ports	AUEB		Not present
CS#3: Main River (Germany)	LMU	VKU	Meeting LMU-VKU. Preparing for the GA-talking to innovators for documenting the progress
CS#4: Prespa-Ohris Lakes	IECE	NECCA, AKPT	Meeting today (internal). Discussing the GA and the preparations for it.
CS#5: Canary Islands	ULL		Presentation sent to Lorena and Isabelle (WP2). Meeting also with WP2 about the governance analysis
CS#6: Black Sea	AUTH		Meeting today with the innovators from the 3 countries to present their innovations to define synergies etc. To maximise impact for the area. "Path for the Future" UN resolution adopted by all- Nikos to send a link to it. Useful for the final Deliverable D6.4)
CS#7: Southern Denmark	EM	TUD	Meeting with innovators to connect with each other. Preparing for the GA.
CS#8: Torbay and Devon County	UNEXE	TC	Meeting yesterday. HYDS participated-updated about the platform and what they are doing. UNEXE also had a meeting with EA - presented ARSINOE and they showed interest.
CS#9: Sardinia	AGRIS		Not present
Task 6.2	UT	AUEB	

Task 6.3	UNEXE	ATHENA	Nav needs to print out material for the GA-Giannis to contact Marco- Nav to send electronically.
Task 6.4	AUEB		
Task 6.5	KWR		
WP2	UT	AUEB	Meeting with Marco (CS#9) tomorrow.
WP3	TUD	LMU	Nothing to report apart from submitting the Deliverable (see above)
WP4	UNEXE	ICCS	Nothing to report apart from the Deliverables (see above). Mehdi (UNEXE) presentation at a CLIMATE ADAPT webinar- details to be sent WP8- presenting the cascading failure engine for CS#8
WP5	BRC		Finalising the Deliverable 5.2 and preparing for the GA- working with the innovators preparing the 2nd call for support.
WP7	AUEB		Not present
WP8	GAC		ICT4WATER contribution for newsletter (Mehdi to send about the cascading failure engine). Interviews next week in Sardinia. To all: Please update the diss/Comm for the review.

Systems Innovation Approach (SIA) addresses the growing complexity, interdependencies and interconnectedness of modern societies and economies, focusing on the functions of the cross-sectoral system? as a whole? and on the variety of actors. The Climate Innovation Window (CIW) is the EU reference innovations marketplace for climate adaptation technologies. ARSINOE shapes the pathways to resilience by bringing together SIA and CIW, to build an ecosystem for climate change adaptation solutions. Within the ARSINOE ecosystem, pathways to solutions are co-created and co-designed by stakeholders, who can then select either existing CIW technologies, or technologies by new providers (or a combination) to form an innovation package. This package may be designed for implementation to a specific region, but its building blocks are transferable and re-usable; they can be re-adapted and updated. In this way, the user (region) gets an innovation package consisting of validated technologies (expanding the market for CIW); new technologies implemented in the specific local innovation package get the opportunity to be validated and become CIW members, while the society (citizens, stakeholders) benefits as a whole. ARSINOE applies a three-tier, approach: (a) using SIA it integrates multi-faceted technological, digital, business, governance and environmental aspects with social innovation for the development of adaptation pathways to climate change for specific regions; (b) it links with CIW to form innovation packages by matching innovators with end-users/regions; (c) it fosters the ecosystem sustainability and growth with cross-fertilization and replication across regions and scales, at European level and beyond, using specific business models, exploitation and outreach actions. The ARSINOE approach is show-cased in nine widely varied demonstrators, as a proof-of-concept with regards to its applicability, replicability, potential and efficacy.

ARSINOE

CLIMATE RESILIENT-REGIONS THROUGH SYSTEMIC SOLUTIONS AND INNOVATIONS

This project has received funding from the European Union's Horizon H2020 innovation action programme under grant agreement 101037424.

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ARSINOE

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