



I-CISK  
HUMAN CENTRED CLIMATE SERVICES

Deliverable D6.7  
Exploitation and Sustainability plan

August 2025





Innovating Climate services through Integrating Scientific and local Knowledge

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## Acronyms

Acronym	Definition
<b>AEMET</b>	State Meteorological Agency of the Spanish Government
<b>ARPAE</b>	Regional Agency for Prevention, Environment and Energy of Emilia-Romagna, Italy
<b>CAP</b>	Common Agricultural Policy
<b>C3S</b>	Copernicus Climate Change Service
<b>CC</b>	Climate Change
<b>CCA</b>	Climate Change Adaption
<b>CDS</b>	Copernicus Climate Data Store
<b>CEMS</b>	Copernicus Emergency Management Service
<b>CHIRPS</b>	Climate Hazards Group InfraRed Precipitation with Station data quasi-global dataset
<b>CLMS</b>	Copernicus Land Monitoring Service
<b>CNN</b>	Convolutional Neural Network
<b>CS</b>	Climate Service
<b>DMA</b>	Disaster management agency
<b>DRR</b>	Disaster Risk Reduction
<b>DX.X</b>	I-CISK deliverable (X.X refers to deliverable number)
<b>EAP</b>	Early action protocol
<b>ECMWF</b>	European Centre for Medium-range Weather Forecasts
<b>EO</b>	Earth Observation
<b>EU</b>	European Union
<b>EWS</b>	Early Warning System
<b>FAO</b>	United Nations Food and Agriculture Organisation
<b>FTP</b>	File Transfer Protocol
<b>GDHY</b>	Global Dataset of Historical Yields
<b>GEOSS</b>	Global Earth Observation System of Systems
<b>GloFAS</b>	CEMS Global Flood Awareness System
<b>ITA LL</b>	The Italian Living Lab - Emilia-Romagna Living Lab
<b>KEA</b>	Key Exploitable Assets
<b>KNMI</b>	Royal Netherlands Meteorological Institute
<b>KPIs</b>	Key Performance Indicators
<b>LL</b>	Living Lab
<b>LRCS</b>	Lesotho Red Cross Society
<b>MAP</b>	Multi actor platform
<b>MOOC</b>	Massive Open Online Course
<b>MSX</b>	I-CISK Milestone (X refers to milestone number)
<b>NCCC</b>	National climate change committee
<b>NDVI</b>	Normalised Difference Vegetation Index
<b>NEA</b>	National Environment Agency of Georgia
<b>NGO</b>	Non-Governmental Organisation
<b>NUST</b>	Namibia University of Science and Technology
<b>OAK</b>	Organization for the Development of Crete (OAK in Greek)
<b>OKIR</b>	Hungarian National Environmental Information System
<b>PET</b>	Potential Evapotranspiration
<b>PER</b>	Preparedness for effective response
<b>PERT</b>	Program Evaluation Review Technique (diagram/chart)
<b>REDIAM</b>	The Environmental Information Network of Andalusia, Spain
<b>S2S</b>	Subseasonal to Seasonal
<b>SEECOF</b>	Southeastern Europe Climate Outlook Forum
<b>SMHI</b>	Swedish Meteorological and Hydrological Institute

<b>Acronym</b>	<b>Definition</b>
<b>TAMSAT</b>	Tropical Applications of Meteorology using SATellite data and ground-based observations
<b>TX.X</b>	I-CISK Task (X.X refers to work package and task number)
<b>UHI</b>	Urban heat islands
<b>UN</b>	United Nations
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organisation
<b>VOI</b>	Value of Information
<b>WFP</b>	World Food Programme
<b>WPX</b>	I-CISK Work Package (X refers to work package number)

## Summary

This report, part of Work Package 6 of the I-CISK project, presents the exploitation activities undertaken and scheduled within the project. The I-CISK Exploitation and Sustainability Plan outlines how the project's results—developed through co-creation with stakeholders in seven Living Labs across Europe, Africa, and Georgia—will be maintained and expanded beyond the lifetime of the project. The project's Key Exploitable Assets are highlighted: the co-creation framework and guidelines, the modular open-source cloud-web CSIS platform, pre-operational climate services tailored to local needs, an educational MOOC on human-centred climate services, and a suite of research outputs. The plan sets objectives to bridge from science to business, ensure transferability, align with policies, and sustain services over time. Seven exploitation pathways are identified, including cross-learning, brokerage events, market development, scientific dissemination and policy engagement.

For each asset, the plan details targeted users, exploitation leaders, and tailored exploitation pathways—ranging from public hosting of tools and open learning platforms to integration into institutional workflows and licensing-based business models. Current status of the relevant impact indicators (communication, dissemination, and exploitation KPIs) is presented. As shown, most of these KPIs have been met, with measurable impacts. Sustainability will be ensured through ongoing hosting by partners, licensing agreements, policy alignment, and continuous promotion via networks, events, and training.

# 1 Introduction

This report describes the work undertaken for the drafting of the exploitation and sustainability plan, in the frame of the 6<sup>th</sup> Work Package of the project (Communication and Dissemination, Policy outreach, Exploitation and capacity building), under Task 6.7. This task focuses on maximising the exploitation opportunities of the exploitable assets identified in the project, explore pathways to maximise exploitation, and ensure sustainability of project results. The report presents the identification of Key Exploitation Assets (KEA), the exploitation objectives of the project and the pathways towards achieving these objectives. Further, the exploitation strategy is presented, broken down and specialized for each KEA identified. Finally, current status of exploitation project and aspirations beyond the I-CISK projects are discussed.

## 1.1 Definition of Exploitation

There is an established connection between dissemination, communication and exploitation activities. In this connection, exploitation can be defined as the utilisation of results in (1) further research activities other than those covered by the action concerned, (2) developing, creating and marketing a product or process, (3) creating and providing a service and (4) standardization activities, as summarised in Figure 1.



Figure 1: From communication and dissemination to exploitation (modified from: PrimeWater project, D6.6, 2023, Grant Agreement No 870497)

## 2 Towards the exploitation of I-CISK assets

This chapter provides a description of the exploitation objectives of the I-CISK project, as they have been formulated based on the initial exploitable assets identified, the exploitation aspirations from the partners of the project and the relevant business stories and plans which have been developed. Additionally, it reports the actions and pathways taken to achieve these objectives.

### 2.1 Exploitation objectives

The Key Exploitable Assets (KEA) have been identified from the very beginning of the project, and are presented in Table 1. KEAs have been further broken down and combined with the perception of each of the partners of the exploitation assets, given the different types of partners within the consortium, different mandates as well as various expertise and involvement in the project. Table 2 identifies these perspectives in regard to the exploitation strategy and for each main type (business, scientific etc.) of consortium partner.

Table 1: Key Exploitable Assets (KEA) of I-CISK

Key Exploitable Assets (KEA)	Short Description
<b>KEA 1:</b> I-CISK co-creation framework & guidelines for CS coproduction	Guidelines to adopt the I-CISK co-creation framework that has been developed within the project and tested in the seven living labs, including experiences and best practices on co-design and co-development of human-centred CS, which can be exploited to support the creation of next generation of CS across Europe and beyond.
<b>KEA 2:</b> I-CISK cloud-web CSIS platform	The CS platform has been developed as a modular cloud-based framework featuring different open-source libraries and frameworks. The CS platform drives the different CS of the LL that visualize co-designed climate related information products for end users on the ground. This solution is run on the Open Telekom Cloud based on Kubernetes technology.
<b>KEA 3:</b> Preoperational CS in each of the LL	At least one pre-operational CS has been established in each of the LL. These have been tested with stakeholders, and can be adopted for future operational use in the LL, with upscaling potential for similar regions and sectors.
<b>KEA 4:</b> Educational products (MOOC)	A Massive Open Online Course (MOOC) has been developed under I-CISK, underpinned by the key outputs and exploitable assets generated by the I-CISK project such as the co-creation framework, pre-operational climate services and a web-based climate service platform. This MOOC developed from the key results from I-CISK (further including research outputs, models and tools, and communication materials) serves societal educational goals by providing unlimited and free access.
<b>KEA 5:</b> Beyond the climatic services	The project has created new insights in the scientific domains of climatic, hydrologic, environmental, business economics and social sciences, which are of value to many stakeholders, from local level up to European level and for the public and private sector alike. Future activities will support the exploitation of the main research findings and outputs arising from I-CISK beyond the market uptake. Tools and products which have been developed within the project offer market opportunities for those consortium partners who take part in the development of climate information and data products (see also Table 2)

Table 2: Partners perspective towards exploitation

Category	Key partners	Partners perspective
<b>Business partners</b>	EMVIS GECO IDEAS 52N SMHI	<ul style="list-style-type: none"> <li>The main mechanism is the uptake of the I-CISK Climate Services (CS) by targeted end-users. The Business Model and the market communication activities (see D5.5, Ziogas A. et al, 2025) plan and support such actions.</li> <li>Strengthen operational and innovation capacity and services future development. Building on the knowledge and services that I-CISK is generating, future development activities will be pursued. Pre-operational CS, providing decision-support climate information for seasonal and end-of-century horizons, targeting various sectors. Significant potential for commercialization and scale-up is recognized through: (a) Spatial transferability (use cases beyond the demonstration context of the I-CISK project) and (b) Sectoral transferability (co-development framework and cloud-web CSIS platform are examples of ready-transferable assets)</li> </ul>
<b>Scientific partners</b>	IHE ECMWF SMHI VUA CREAF UPPS UCM 52N	<ul style="list-style-type: none"> <li>Continuation of research with other proposals. Building on the knowledge that I-CISK generated, future proposal activities will be pursued.</li> <li>Dissemination of scientific achievements in scientific papers, international conferences and in national and regional fora and events.</li> <li>I-CISK network, built and expanded through the establishment and expansion of the Living Labs (LL) is a valuable asset. International networking and collaboration will ensure I-CISK's generated values continuation.</li> <li>Communicate the I-CISK outcomes, experiences and success stories to science-policy institutions.</li> <li>New funding opportunities (calls and tenders) for setting up or developing already provided CS</li> </ul>
<b>Policy and market influencers</b>	IHE ECMWF SMHI RC510 CENN	<ul style="list-style-type: none"> <li>I-CISK, through the development of end-user oriented, CSs which support mitigation and adaptation to current and future climate related risks, contributes directly to the implementation of Global, EU-wide and National policies (e.g. UN Framework in CC, the Paris Agreement, the SENDAI Framework, the UN Sustainable Development Goals, and the European Union's Water Framework Directive, the EU floods directive, Green Deal, Climate Adaptation Strategy and corresponding National Adaptation Plans).</li> <li>Continue the active dissemination of I-CISK achievements through the website and in international conferences, fora and events.</li> <li>Communicate the I-CISK outcomes, experiences and reflections on the contribution of CS in the development of European and international policies, to science-policy institutions (see Policy Brief, Masih et al., 2025).</li> </ul>
<b>Implementation</b>	<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>Up-take of developed CS, incorporation in decision-making process, provide gains (economic or reputational)</li> </ul>

Summarising the above, the exploitation objectives, of the projects can be identified as:

- Bring science closer to business.
- Understand the social and institutional determinants for CS adoption
- Demonstrate transferability and establish confidence to potential users
- Business development
- Reputational gains
- Ensure service sustainability
- Be aligned with policy context and societal needs.
- Raise awareness

## 2.2 Pathways to exploitation pursued within I-CISK

Beyond exploitation perspective by each partner, I-CISK identified a series of Exploitation Pathways in order to achieve the main exploitation objectives and KEAs, as described in the previous. In order to implement those pathways, I-CISK's teams identified key target groups per KEA, and modified accordingly the pathways to reach the exploitation goals. In the process, additional pathways have been identified and implemented. Key activities and pathways, as formulated during the implementation of the project, are summarised in Table 4. Connections between KEAs, target groups and exploitation pathways are described in Table 5.

Table 3: Pathways to exploitation

Exploitation Pathway	Description
<b>Exp.Path1 – Cross-learning</b>	Facilitated cross-learning between the stakeholders in the LL and the project partners to benefit from the knowledge and experience across the multiple-sectors and the multiple hazards, time scales and institutional settings. During the pre-operational service development, various LL meetings and MAP workshops have been attended by project partners and developments in other LLs have been discussed and communicated. General Assemblies or co-creation events have been used to bring into contact local stakeholders with other project partners. Newsletters and communication events supported this pathway also.
<b>Exp.Path2 – Brokerage Events</b>	Events organized and used to provide opportunity for CS providers and users, both from the public and the private sector to explore the business potential of the outputs of I-CISK for developing CS to meet their needs (ECCA 2025 conference, side events at conferences e.g. INESCO 2024, UNESCO 2023, UR2024, EGU 2025 etc, for more details see Castellana, D., Masih, I., et al., 2025)
<b>Exp.Path3 – MOOC</b>	Developed and available as an open access project deliverable on the I-CISK website, with supporting material in the I-CISK MOOC, and as an online tool available through <a href="https://icisk.eu/co-creation-guide/">https://icisk.eu/co-creation-guide/</a>
<b>Exp.Path4 – Market</b>	Market potential and value proposition of Human Centred Climate Services. Commercial exploitation strategies were developed early in the project (see MS25). A value chain has been identified for all the CS developed under the project. Further, more than one Business Story has been developed for each LL (Task 5.5, see D5.5, Ziogas et al., 2025)
<b>Exp.Path5 – Networks &amp; Communities of Practice</b>	Engage and contribute to existing Communities of Practice (CoP). This includes existing forums such as the online user forums organised by Copernicus, the EU Green Deal, the Missions for Adaptation
<b>Exp.Path6 – Science</b>	The new insights in the scientific domains of climatic, hydrologic, environmental, business economics and social sciences, which were created, have been communicated through various channels (scientific publications, conference presentations, scientific brokerage events etc.). Research findings and outputs arising from I-CISK foster innovation beyond the project and support the development of downstream services, further promoting their uptake and accessibility across user communities.
<b>Exp.Path7 – Policy</b>	Co-creation activities and user engagement supported the drafting of actionable recommendations to catalyse the co-creation and use of climate services to address multiple climatic and hydrological risks across sectors and scales

Table 4. KEAs, as achieved through exploitation pathways and associated key target groups

Key Exploitable Assets (KEA)	Exploitation Pathways	Target groups
<b>KEA 1:</b> I-CISK co-creation framework & guidelines for CS coproduction	<b>Exp.Path1</b> – Cross-learning	Academics and practitioners interested in co-creation of climate services or climate-related interventions (including disaster risk reduction and adaptation activities)
<b>KEA 2:</b> I-CISK cloud-web CSIS platform	<b>Exp.Path2</b> – Brokerage Events	LL leaders and partners of the project (knowledge purveyors), Key stakeholders in every LL
<b>KEA 3:</b> Preoperational CS in each of the LL	<b>Exp.Path3</b> – MOOC	Key stakeholders in every LL, including all spectrums of society, from professionals in the sectors involved (agriculture, water, tourism, energy, transportation, urban planning), to decision makers, knowledge providers and citizens
<b>KEA 4:</b> Educational products (MOOC)	<b>Exp.Path4</b> – Market	Can be exploited by a series of knowledge providers such as universities, but also entities targeting practitioners and end users to support the co-creation of next generation climate services and building resilience towards climate-related risks. This includes key actors in the climate service value change (climate service providers, purveyors and end users) but also professionals, citizens and decision-makers.
<b>KEA 5:</b> Beyond the climatic services	<b>Exp.Path5</b> – Networks and Communities of Practice	Scientific groups, knowledge purveyors and policy makers
	<b>Exp.Path6</b> – Science	Scientific and academic community, business, policy-makers, general public
	<b>Exp.Path7</b> – Policy	Policy makers at European and at local level, European institutions, environmental agencies, local and national authorities

### 3 Exploitation Strategy per Key Exploitable Asset

#### 3.1 Exploitation vision for MOOC

Title	MOOC
<b>Short Description</b>	This Massive Open Online Course (MOOC) for “Co-Creation of Human-Centred Climate Services” is a freely accessible, online, self-paced course. The main objective of this course is to share knowledge, raise awareness and facilitate co-creation of human-centred climate services contributing to improvement of society's resilience to the impacts of climate change, with users empowered and well-informed to understand, process, and use climate information in decision-making in support of climate adaptation and increasing resilience to extreme events (droughts, heatwaves, floods).
<b>Exploitation Leader</b>	IHE
<b>Implementation Partners</b>	VUA, SMHI, GECO, UPPS
<b>IPR</b>	<p>The MOOC is hosted on IHE Delft’s Open Course Ware Platform. This online platform provides free access to any user/participant. Users need to have an account to access the IHE Delft Open Course Ware platform. The account can be easily created through registering on: <a href="https://ocw.un-ihe.org/">https://ocw.un-ihe.org/</a>.</p> <p>The contents of the MOOC (PowerPoint presentations, recorded videos, supporting materials) have been developed by individual project partners. These thus constitute a result of the project, and are individually owned by the party that has created them (see Article 26 of the Grant Agreement and Article 8 of the Consortium Agreement).</p> <p>The course is available on IHE Delft’s Open Course Ware Platform. It may, however, be transferred to any other open learning platform, such as in use by other project partners.</p> <p>When using the asset, the full reference to the project partners and deliverable should be included.</p>
<b>Targeted users</b>	<p>The primary target group include the key actors in the climate service value chain. This includes:</p> <ul style="list-style-type: none"> <li>• Climate services developers and providers</li> <li>• climate services purveyors</li> <li>• Climate services users (professionals, citizens and decision-makers to support climate relevant decisions to address risk posed by multiple water and climate related hazards such as floods, droughts, heatwaves, and climate/hydrological variability and change)</li> </ul> <p>The course is also relevant for a wider secondary group comprised:</p> <ul style="list-style-type: none"> <li>• Climate researchers and academics</li> <li>• Students interested in use of climate services to support climate adaptation</li> </ul>
<b>Adding Value</b>	<p>The added value of this MOOC is that it introduces participants to the concepts of climate services, and specifically to how these can be co-created with users, to ensure climate services are credible, salient, and legitimate. These are three key factors to promote uptake of climate services to support informed decision making in climate adaptation and increased resilience to extreme events.</p> <p>The MOOC is of added value to the project and its partners through increased reputation and exposure, recognising the specific expertise of each of the contributing partners. Through linking</p>

Title	MOOC
	to supporting materials developed in the project (e.g. deliverables) the course also provides exposure and increases the reputation of the project as a whole, as well as of the EU in supporting actions related to climate adaptation.
Pathway to exploitation	<p>Several pathways of exploitation are identified:</p> <ul style="list-style-type: none"> <li>• The MOOC is available on the open courseware platform hosted by IHE-Delft. All registered users to the platform will be able to sign-up and follow this self-paced course. This platform is independent of the project and will remain in existence for the foreseeable future, thus ensuring sustainability.</li> <li>• The launch of the course will be advertised on the I-CISK website, newsletter, and social media (LinkedIn, Twitter/X).</li> <li>• A launch event/first run of the MOOC in September 2025 will increase the visibility.</li> </ul>

### 3.2 Exploitation vision for co-creation framework

Title	I-CISK co-creation framework
Short Description	Guidelines to adopt the I-CISK co-creation framework that was developed and tested in the project, including experiences and best practices on co-design and co-development of human-centred climate services. These guidelines can be exploited to support the creation of next generation of CS across Europe and beyond.
Exploitation Leader	Institute for Environmental Studies (IVM), Vrije Universiteit Amsterdam
Implementation Partners	IHE, GECO, CENN, UCM, CREA, EMVIS, 510, IDEAS and the LLs
IPR	When using the asset, the full reference to the final framework deliverable should be included.
Targeted users	Academics and practitioners interested in co-creation of climate services or climate-related interventions (including disaster risk reduction and adaptation activities)
Adding Value	The I-CISK co-creation framework has been implemented, evaluated and updated through the I-CISK project activities in seven Living Labs, thereby moving beyond the state-of-the-art in co-creation of climate services, and providing a tailored asset for exploitation by co-creation practitioners. The inclusion of lessons learned provides users with insight into the realistic application of the framework.
Pathway to exploitation	The I-CISK co-creation framework is both available as an open access project deliverable on the I-CISK website, with supporting material in the I-CISK MOOC and as an online tool available through <a href="https://icisk.eu/co-creation-guide/">https://icisk.eu/co-creation-guide/</a>

### 3.3 Exploitation vision for I-CISK cloud-web CSIS platform

The I-CISK cloud-web CSIS platform has been identified to comprise of two main exploitable assets. The whole platform, as well as the climate data ingestor component, which due to the modular nature of the solution can also be exploited independently.

Title	I-CISK cloud-web CSIS platform
<b>Short Description</b>	<p>The CS platform has been developed as a modular cloud-based framework featuring different open source libraries and frameworks. The CS platform drives the different CS of the LL that support the co-designed climate related information products for end users on the ground.</p> <p>This solution is run on the Open Telekom Cloud based on Kubernetes. The open source software components together with the underlying architecture and deployment pipelines constitute a key exploitable asset of I-CISK.</p>
<b>Exploitation Leader</b>	GECO / 52N
<b>Implementation Partners</b>	LL hosts and identified stakeholders
<b>IPR</b>	<p>The asset is published as an open source implementation (available on Github) that can be re-used under the corresponding Licenses.</p> <p>When using the asset, the full reference to the project's deliverable should be included.</p>
<b>Targeted users</b>	The LL and further local or regional authority
<b>Adding Value</b>	<p>The CS platform connects heterogeneous data sources with ease and provides a unified endpoint to spatial and spatiotemporal data. It also includes processing capabilities that can be used for bias correction, downscaling and derivation of information products from raw input data. The developed software can be re-used as is, but also adopted to specific needs beyond the scope of the I-CISK project. The CS platform can be used to configure and, deploy and operate user tailored CS with ease featuring a cloud solution and interactive web-frontends to make complex data easily accessible.</p>
<b>Pathway to exploitation</b>	<p>The CS platform will remain hosted for at least 6 months to serve as a showcase. It has been and will further be presented at conferences and fairs to raise awareness about the solution and attract interested parties.</p> <p>Further, the platform, during the project, has been used by the knowledge purveyors and LL leaders as a mean to communicate needs and data gaps between end users and CS providers</p>

Title	Climate data ingestor
Short Description	The Climate Data Ingestor unifies access to heterogeneous climate, hydrological, and geospatial sources and outputs cloud-ready datasets (standardized schemas, metadata, provenance). It includes processing pipelines (aggregation, downscaling/resampling, QA/QC) and exposes results for direct re-use in front-end components and APIs.
Exploitation Leader	GECO, 52N
Implementation Partners	GECO and 52N
IPR	<p><b>Proposed approach:</b> • <b>Code:</b> release core framework under <b>Apache-2.0</b> (or EUPL) to maximize adoption; optional proprietary connectors can remain under contributor ownership if needed • <b>Attribution:</b> “ICISK Climate Data Ingestor — GECO (Exploitation Lead) and the ICISK Consortium” • <b>Contact for adoption/commercial use:</b> GECO (Exploitation Lead) and the ICISK Project Office (<b>contacts TBD</b>) • <b>Data licenses:</b> governed by original providers (e.g., Copernicus, national services); the ingestor preserves and surfaces license metadata • <b>Trademarks/brand:</b> “ICISK” retained by the consortium</p> <p>When using the asset, the full reference to the project’s deliverable should be included.</p>
Targeted users	Municipal/Regional authorities (civil protection, environment, water utilities) • Integrators/ISVs building climate-risk dashboards & DTs • Research labs & consultancies needing harmonized inputs • Startups and SMEs in climate/insurtech using ready-to-consume APIs
Adding Value	<p>One interface for multiple data sources (satellite, reanalysis, forecasts, gauges) • Standardized, <b>cloud-ready</b> outputs (Parquet/COGs/Zarr; OGC APIs) • Built-in processing (temporal aggregation, spatial reprojection, bias correction options) • Data lineage &amp; reproducibility (pipelines as code, metadata, versioning) • <b>Lower integration cost/time</b> for apps and front-ends</p> <p>Caching/tiling for fast map rendering and analytics</p>
Pathway to exploitation	<p><b>Packaging &amp; hosting:</b> Managed ICISK cloud service (primary) + self-hosted Docker/Kubernetes option for adopters. <b>Distribution:</b> Public repo for OSS core; container images on a registry; versioned releases and changelogs. <b>Interfaces:</b> REST/OGC API endpoints, Python/JS SDKs, Postman collection. <b>Docs &amp; onboarding:</b> Quickstart, architecture diagrams, connector cookbook, end-to-end tutorial (ingest → process → visualize). <b>Compliance:</b> OGC API-Features/Coverages where applicable; INSPIRE/ISO metadata where relevant. <b>Support:</b> Issue tracker, community forum, office hours; optional paid support via GECO/consortium. <b>Dissemination:</b> Factsheet, tech brief, demo videos, webinars, conference/pilot showcases. <b>Sustainability:</b> Managed-service subscription for hosting/SLAs; community contributions for OSS core; roadmap governed by exploitation board</p>

### 3.4 Exploitation vision for the pre-operational Climate Services

A key part of the exploitation strategy is related to the business model for the pre-operational climate services co-created with users in each of the living labs. Drafting the business model storylines (see D5.5, Ziogas et al., 2025), the core part of the Value Model has been specified and a roadmap has been provided for all the partners in order to implement other key parts of a business model framework, e.g., the Technology Model (innovation management) and the Distribution Model (marketing communication). In the following, a common business strategy is presented, broken down and specialized for each service identified.

#### 3.4.1 Business strategy for I-CISK pre-commercial services

The market potential of pre-operational services has from the start been recognised as a KEA and a potential exploitation pathway within I-CISK and its partners, in order to increase business and operational margins from innovation. Using experience from partners' national client/communication base and I-CISK transnational EU funded project, the internationalising of activities through partnerships may significantly improve innovation derived results.

The pre-operational Climate Services that have been co-created with stakeholders to meet the diverse needs in each of the Living Labs, are foreseen to operate as independent business units. The connection with partners will be two-fold, as presented in Figure 2. Partners under a licensing agreement will offer their service modules for the pre-operational CSs that have been developed. Licensees could also become resellers/distributors of the CS. In this way a European and International presence is achieved with minimal investment, leveraging the service on the partners' national, European and International client base. I-CISK pre-operational CSs will not compete with the partners' business since partners will profit from the license of the service module they contribute. Furthermore, they should expect an increase in business as I-CISK CSs usage increases. User requirements and desired features may be collected from clients and feedback can be sent to service module developers in order to improve the modules as well as the overall services. Apart from the pre-operational services, project partners have their own plans for further building upon I-CISK results.

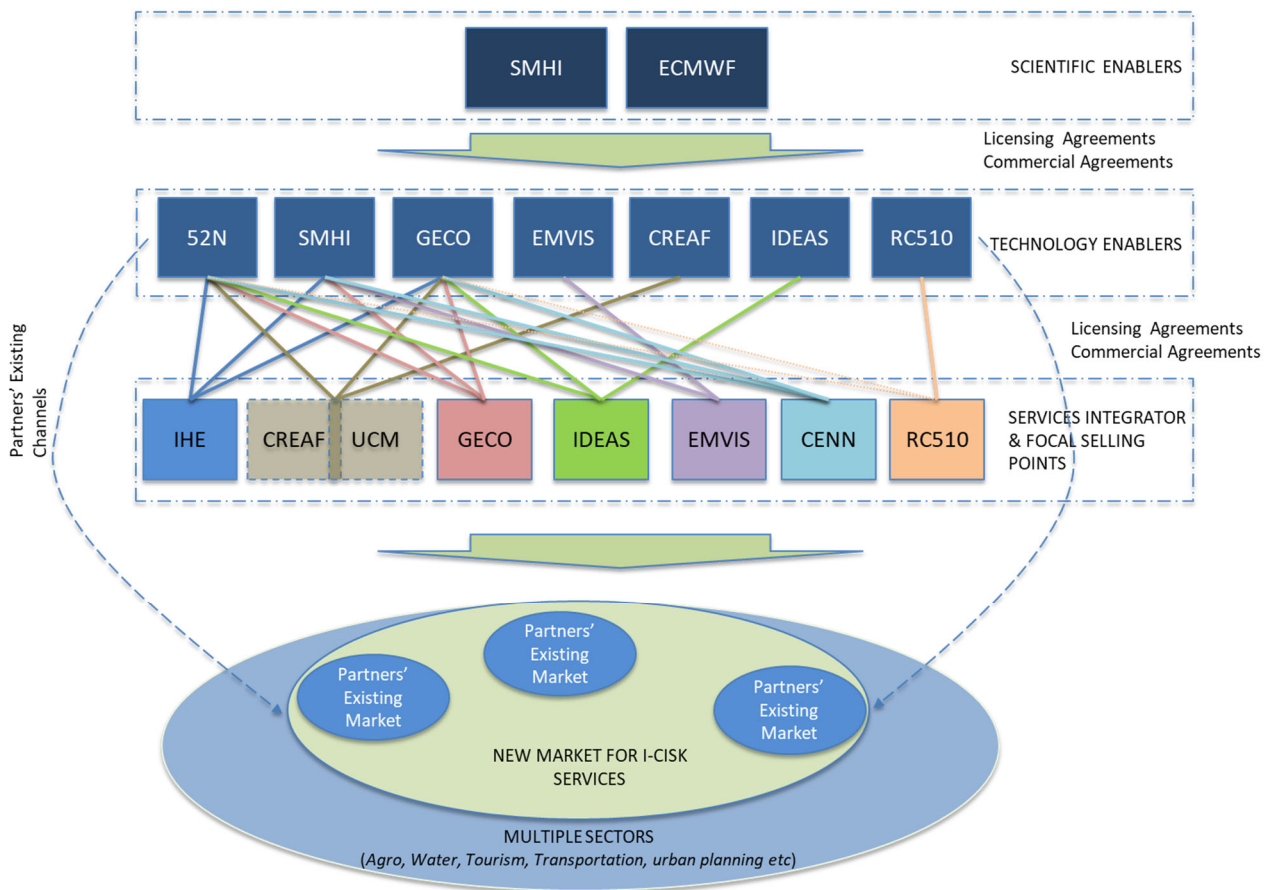


Figure 2: I-CISK business strategy plan for pre-operational CSs. Note that partners may be involved at multiple levels.

### 3.4.2 Climate Services in the Rijnland Living Lab (Netherlands)

<b>Title</b>	<b>I-CISK Preoperational CS: <i>Rijnland drought preparedness service</i></b>
<b>Short Description</b>	The Rijnland drought pilot application provides timely pre-alerts of possible upcoming drought to optimise and better prepare mitigation measures, and for the Rijnland water authority to timely alert water users of these measures and their impacts, along with projected climate change impacts on drought risk.
<b>Exploitation Leader</b>	IHE Delft
<b>Implementation Partners</b>	52North, SMHI, VUA
<b>IPR</b>	IPR of Hydrometeorological forecasts: SMHI of the (bias corrected) seasonal forecast data. IHE, of the CS pilot application (including graphics) and algorithms for drought alerts: 52North, of the Rijnland drought preparedness service (design): IHE Delft, VUA, Rijnland water authority  When using the asset, the full reference to the project's deliverable should be included.
<b>Targeted users</b>	Rijnland water authority, water tourists, horticultural and crop farmers
<b>Adding Value</b>	The Rijnland water authority may reduce costs during and because of droughts, and increase duty-of-care compliance and user satisfaction under drought conditions. Water tourists (boat owners) may better prepare for, anticipate, and respond to adverse drought mitigation actions from the water authority (delay at or temporary closing of ship locks). Farmers may decrease losses due to drought crop damage and operational drought mitigation actions, saving operational costs during droughts by enhanced planning and optimisation for efficiency
<b>Pathway to exploitation</b>	IHE Delft, SMHI, and 52N aim to keep the pilot application running online for 2 years after the end of I-CISK project. The second year will require as a minimum the covering of 52North operational costs. During this period, IHE Delft will engage with the Rijnland Water Authority to cover these costs. The MAP members will be invited to test-use the pilot application and invite peers to also test-use. IHE Delft, SMHI, and 52North will engage with Rijnland and agricultural MAP members that have already shown interest in using the application to further develop the pilot application, e.g. by jointly submitting proposals for research-to-market funding. Rijnland may also decide to fund by themselves a testing period. From there-on, e.g. after two or three years, if potential added value is confirmed, Rijnland is the envisaged user. They will need to decide whether to tender for integrating the drought preparedness CS, or one or several of its components, into their operational Information and Decision Support Systems. Other users, such as agricultural sector representatives, may, in addition, decide to (co-)invest either in the drought service made available by Rijnland or in developing a sector-dedicated service to be provided by a third party that is inspired on the pilot application. The water tourists for the coming years seem to be able to benefit from the freely available service. For this sector, future commercial exploitation of the concept and forecast data may be of interest for a third-party developer of a smart-phone app integrating multiple information sources frequently accessed by boat owners.

### 3.4.3 Climate Services from the Andalucía Living Lab (Spain)

<b>Title</b>	<b>I-CISK Preoperational CS: 5 complementary climate services (CS) for improved drought management in Los Pedroches rural region (Andalusia, Spain)</b>
<b>Short Description</b>	<p><b>Climate service 1</b> seasonal (6-12 months) monthly precipitation and temperature predictions at a spatial scale adapted to the needs of the users (200 m)</p> <p><b>Climate service 2</b> 10 years climate impact projections regarding monthly precipitation and temperature that is adjusted to the spatial scale of the relevant to users (approximately 200 m)</p> <p><b>Climate service 3:</b> historical temperature and precipitation data in a format adapted to the preferences and needs of the users.</p> <p><b>Climate service 4:</b> agroclimatic indicators based on historical climate information (CS 3) and historical production data from OLIPE cooperative in order to estimate future production based on climate predictions (CS2) and projections (CS 1).</p> <p><b>Climate service 5:</b> a hydrogeological characterization of groundwater bodies in the region including continuous maps, vectoral maps and qualitative information based on local experiences contrasted with literature</p>
<b>Exploitation Leader</b>	CREAF and UCM, in collaboration with Living Lab partners, are working to ensure the long term sustainability of the service. REDIAM and CICAP are potential candidates to lead the exploitation of the CS. Extensive discussions have been held, though a final decision is pending.
<b>Implementation Partners</b>	UCM – CREAM + MAP (REDIAM, COVAP, CICAP, OLIPE, IFAPA, Guadiana River Basin Authority, Guadalquivir River Basin Authority, Sierra de Cardeña y Montoro Natural park, Cazorla Environmental education site, ADROCHES, FAC
<b>IPR</b>	The APP will be publicly available and managed by the exploitation leader. (TBC)  When using the asset, the full reference to the project's deliverable should be included.
<b>Targeted users</b>	Four main economic sectors: Natural Park managers, livestock farmers (dehesa extensive livestock farmers and milk producing livestock) and olive oil producers.
<b>Adding Value</b>	The climate service information impacts the core decision making process for olive oil, milk and <i>dehesa</i> farmers, as well as it provides key input for forest management, like restoration actions, as well as envisioning scarcity management needs related to groundwater exploitation in the region. The climate service contributes to enhancing adaptation and resilience towards drought in the region, allowing to improve production and economic management decisions.
<b>Pathway to exploitation</b>	REDIAM is a public body providing climate information in the region of Andalusia. The entity is part of the MAP and actively participated in the LL. Given this institutional role, REDIAM is the designated MAP member to sustain the CS. Bureaucratic obstacles are currently being tackled with the support of the other MAP members to allow for the publication and maintenance of the CS after the I-CISK project comes to an end. If REDIAM finally is not able to incorporate the tool the services they provide, alternatives within the region are being explored. MAP members are interested and committed to use the tool and disseminate it towards their networks and key stakeholders. The APP is tailor-made for the target audiences and user friendly, and additional explanatory material is available in the dedicated webpage in Spanish for the LL participants to refer to. The final workshop organised locally will further consolidate the dissemination of the tool and communication actions, such as a video, and allow reaching new target audiences.

### 3.4.4 Climate Services from the Emilia Romagna Living Lab (Italy)

<b>Title</b>	<b>I-CISK Preoperational CS: SmartRiverService – Sub-Seasonal Discharge Forecast &amp; Decision-Support Service</b>
<b>Short Description</b>	A cloud-hosted climate-service prototype that merges 1-to-few-weeks discharge forecasts (including open Copernicus GloFAS source) with near-real-time gauging data (ARPAE) for an important hydraulic node in the Region. Through a React / OpenLayers web GUI, users visualize probabilistic hydrographs, flow thresholds and cumulated volumes to plan water abstraction (to irrigation), plants operations and maintenance.
<b>Exploitation Leader</b>	GECOSistema Srl – environmental-engineering SME
<b>Implementation Partners</b>	Emilia-Romagna Region, for the inclusion of such services in the ongoing Regional Water Protection Plan (PTA) revision, SMHI (data provision).
<b>IPR</b>	No specific IPR registered, anyone may replicate the concept, but commercial roll-out or site-specific customization can be contracted to GECOSistema Srl (info@gecosistema.com). Forecast inputs licensed under Copernicus remain free; any proprietary forecast data streams to feed the service must be negotiated directly with the data provider.  When using the asset, the full reference to the project’s deliverable should be included.
<b>Targeted users</b>	Irrigation & land-reclamation consortia, Multi-utility drinking-water companies, Small-/medium-scale hydropower operators, Regional Governments and Environmental Agencies
<b>Adding Value</b>	Reduces yearly administrative burdens for Regional public authority. Once the CS is included among accepted tools in the overarching Water Protection Plan (PTA) and in approved local Resilience plans; enables adaptive ecological-flow management and provides earlier drought warnings for local water users and utilities.
<b>Pathway to exploitation</b>	Promote the forecast tool among those recognized as an innovative solution for water management in the forthcoming Regional Water Protection Plan (PTA). Once the plan is approved, publicise the service via a space on the webpage of GECO, project news and targeted adds, while emphasising eventual available opportunities for users of co-financing further support and development of the CS through CAP-Rural Development grants and complementary LIFE/resilience funds.

### 3.4.5 Climate Services from the Budapest Living Lab (Hungary)

Title	I-CISK Preoperational CS: <i>Urban Heat Planning Service</i>
<b>Short Description</b>	<p>The service of the Budapest LL addresses the current limitations of heat data collection and processing in an integrated manner by: (a) combining drone thermal imagery with manual temperature measurements, (b) using drone thermal imagery to downscale satellite imagery to update heatmaps, (c) provide an advanced solution to the shortcomings of current data collection methods, which have limited coverage and are static in time.</p> <p>The CS developed two specific tools:</p> <ul style="list-style-type: none"> <li>• Time-series analysis: Utilizing orthophotos as a high-resolution baseline for time-series analysis of thermal data, allowing for tracking changes in urban heat over time with a clear reference to the physical changes in the urban landscape.</li> <li>• Energy balance modelling with detailed surface information, to interpret urban heat dynamics more accurately</li> </ul>
<b>Exploitation Leader</b>	SCIENCE KFT (IDEAS)
<b>Implementation Partners</b>	IDEAS
<b>IPR</b>	<p>No specific IPR registered, anyone may replicate the concept, but commercial roll-out or site-specific customization can be contracted to IDEAS S.A. Satellite inputs licensed under the data provider.</p> <p>When using the asset, the full reference to the project’s deliverable should be included.</p>
<b>Targeted users</b>	Tourists, Local Residents and Institutions, City Management and Decision-Makers
<b>Adding Value</b>	Rich, high-quality dataset, localization of data, citizen engagement, transformation of raw data into actionable Insights, high-resolution predictive service, scalability and adaptability, improved urban planning, protection of vulnerable groups and boosting city resilience.
<b>Pathway to exploitation</b>	<p>Bring science closer to business and enhance quality of services by offering state-of-the-art and innovative solutions</p> <ul style="list-style-type: none"> <li>• Demonstrate transferability and establish confidence to potential users</li> <li>• Ensure service sustainability and cost effectiveness.</li> </ul> <p>Deployment of the developed services for new customers/end-users (follow Business model storylines, see D5.5, Ziogas et al., 2025), raising awareness over the service through promotion material and targeted actions</p> <p>Further development of the service through other projects.</p>

### 3.4.6 Climate Services from the Crete Island Living Lab (Greece)

Title	<b>I-CISK Preoperational CS: Climatic Forecasts for Tourism, under a multi-sectoral approach</b>
<b>Short Description</b>	The CS addresses climatic challenges in the Tourism sector beyond the typical approach of touristic services sector. Under the frame of a multi-sectoral approach, the service supports decision making challenges for cross-cutting sectors, including tourism sector, water management, transportation infrastructure (roads, ports) and energy sector, ensuring that synergies and trade-offs are appropriately considered in the CS. The service offers, operationally and through a web-service GUI environment, climatic information in the form of essential climate variables and tailored indices, for temporal scales which span from seasonal (6 month), to decadal and up to end-of-century, in a various form of tailored graphs and maps.
<b>Exploitation Leader</b>	EMVIS S.A.
<b>Implementation Partners</b>	EMVIS S.A., SMHI, ECMWF
<b>IPR</b>	<p>No specific IPR registered, anyone may replicate the concept, but commercial roll-out or site-specific customization can be contracted to EMVIS S.A. (info@emvis.gr). Forecast inputs licensed under Copernicus remain free; any proprietary forecast data streams to feed the service must be negotiated directly with the data provider.</p> <p>When using the asset, the full reference to the project’s deliverable should be included.</p>
<b>Targeted users</b>	<p><u>Primary</u>: Tourism professionals in the fields of hospitality industry, Destination Management and Policy, Water managers, Transport managers (ports and roads) (for detailed mapping, see D5.5, Ziogas et al., 2025)</p> <p><u>Secondary</u>: Decision makers, professionals in other economic sectors associated indirectly with the touristic product, citizens and society</p>
<b>Adding Value</b>	Informed decision making to address climatic hazards (Policy, Destination managers, involved professionals), increased profit (water and port sectors), better management (road and hospitality sector), overall enhanced touristic services (increase visitors trust, satisfaction rate, re-visit rates, and visitors numbers), benefits to society under climatic challenges (support touristic economy, water availability, infrastructure)
<b>Pathway to exploitation</b>	<p>Bring science closer to business and enhance quality of services by offering state-of-the-art and innovative solutions</p> <ul style="list-style-type: none"> <li>• Demonstrate transferability and establish confidence to potential users</li> <li>• Ensure service sustainability and cost effectiveness.</li> </ul> <p>Deployment of the developed services for new customers/end-users (follow Business model storylines, see D5.5, Ziogas et al., 2025), raising awareness over the service through promotion material and targeted actions</p> <p>Further development of the service through other projects in collaboration with MAP members.</p>

### 3.4.7 Climate Services from the Alazani River basin Living Lab (Georgia)

Title	I-CISK Preoperational CS: <i>Streamflow Prediction System for the Alazani-Iori Basin</i>
Short Description	The I-CISK Preoperational Climate Service for the Georgia Living Lab (Alazani-Iori basin) provides a drought and seasonal streamflow prediction system delivering monthly, sub-seasonal, and seasonal hydrological forecasts. Integrated with historical hydrologic and meteorological data, the service supports water allocation decisions for irrigation, hydropower, and public water supply.
Exploitation Leader	CENN
Implementation Partners	<ul style="list-style-type: none"> <li>- National Environmental Agency (NEA) – Hydrological monitoring and water resource management</li> <li>- GECOsistema – Development of the portal</li> <li>- IHE Delft – co-creation of climate service with users, local knowledge integration.</li> <li>- SMHI – Climate data provider (hydrological and meteorological modelling)</li> <li>- ECMWF – Climate data supplier</li> <li>- Other I-CISK consortium members (e.g., scientific institutes for data processing)</li> </ul>
IPR	<p>GECOsistema has developed the portal within the I-CISK project and it will be transferred to NEA for operation.</p> <p>When using the asset, the full reference to the project’s deliverable should be included.</p>
Targeted users	<ul style="list-style-type: none"> <li>- <b>National Environmental Agency (NEA):</b> Hydrological monitoring and forecasting.</li> <li>- <b>Georgian Amelioration (GA):</b> Managing irrigation water allocation to farmers.</li> <li>- <b>Rural Development Agency (RDA):</b> Informing farmers and communities about water availability.</li> <li>- <b>Hydropower Plants (HPPs):</b> Optimising electricity generation and balancing irrigation needs.</li> <li>- <b>Farmers and Vineyards:</b> Planning irrigation based on water availability forecasts.</li> <li>- <b>Local Municipalities:</b> Maintaining and developing water infrastructure.</li> <li>- <b>Policy Makers:</b> Strengthening water governance frameworks.</li> </ul>
Adding Value	<ul style="list-style-type: none"> <li>- <b>Economic Gains:</b> <ul style="list-style-type: none"> <li>o Farmers and GA: Improved irrigation scheduling reduces water overuse and shortages, enhancing agricultural productivity and reducing costs.</li> <li>o Hydropower Plants: Optimized water use for electricity generation minimizes conflicts with irrigation, potentially increasing revenue.</li> <li>o Municipalities: Reduced maintenance costs for irrigation canals due to better sedimentation management.</li> </ul> </li> <li>- <b>Environmental Gains:</b> Enhanced water management supports sustainable use, reducing environmental degradation from sedimentation and inefficient irrigation.</li> <li>- <b>Social Gains:</b> Increased water security for communities, especially during summer high-demand periods, and improved resilience against flash floods and droughts.</li> <li>- <b>Innovation Gains:</b> CENN enhances its market position by developing advanced predictive tools, while NEA and other partners gain improved data quality through feedback loops</li> </ul>
Pathway to exploitation	The I-CISK Pre-operational CS for the Georgia LL is designed for adoption by the National Environmental Agency (NEA) within their operational workflows. The service will be integrated into NEA’s platform, which is currently under development, to support hydrological monitoring and decision-making. Support will be provided through CENN, GECO (CS platform) and IHE (forecasting & data). User manuals and training sessions will be provided to facilitate integration into existing practices. Scalability will be achieved by testing and validating the current version of the CS using live data to improve forecast accuracy and reliability. Following validation, the model will be expanded to a country-wide scale, covering other river basins in Georgia Based on Copernicus EMS services (GLOFAS in the beginning and EFAS to be expected).

### 3.4.8 Climate Services from the Lesotho Living Lab

<b>Title</b>	<b>I-CISK Preoperational CS: <i>Impact-Based Forecasting portal for droughts in Lesotho</i></b>
<b>Short Description</b>	In collaboration with key stakeholders, we have developed a tailored climate service to enhance efforts in anticipatory action for droughts in Lesotho. The Impact-Based Forecasting (IBF) portal integrates seasonal forecast data, vulnerability indicators, and automated alerts.
<b>Exploitation Leader</b>	RC510
<b>Implementation Partners</b>	Lesotho Red Cross, Lesotho Meteorological Services, ECMWF
<b>IPR</b>	The product is open source under Apache 2.0 license.  When using the asset, the full reference to the project's deliverable should be included.
<b>Targeted users</b>	Lesotho Red Cross
<b>Adding Value</b>	By developing an Impact-Based Forecasting portal, our goal is to empower the Lesotho Red Cross Society to make timely decisions aimed at reducing the impact of droughts on communities in the Southern Lowlands Districts and the Senqu Valley of Lesotho, benefiting a total of 27,000 people.
<b>Pathway to exploitation</b>	The portal is hosted by the Netherlands Red Cross, which is responsible for its maintenance and future updates. A servicing system has also been established in collaboration with the main users, the Lesotho Red Cross Society, to provide technical assistance in interpreting the data, conducting further analyses, delivering additional training, and collecting feedback to continuously improve the portal.

### 3.5 Exploitation vision for the Research findings

Title	Exploitation of the main I-CISK research findings
<b>Short Description</b>	The project offered unique opportunities to increase understanding on the co-creation and the impact of human-centred CS to support climate adaptation decisions, to further develop in-house verification and diagnostics for CS developers and broaden academic research fields.
<b>Exploitation Leader</b>	The responsible scientific partners of each scientific outcome and relevant dissemination work (and researchers who are producing these results)
<b>Implementation Partners</b>	IHE, ECMWF, SMHI, VUA, CREAM, UPPS, UCM, 52N
<b>IPR</b>	Proper references to authors of scientific work  Full reference to the project's deliverable should be included
<b>Targeted users</b>	Water resource managers; Researchers and model developers; Disaster risk management agencies; Policy makers and adaptation planners
<b>Adding Value</b>	New science, reputational gains, support for future funding opportunities, Improved understanding of user needs for climate services that are useful for decision-making, improvement in the quality and usability of data provided, increased uptake of project results and broad accessibility across user communities
<b>Pathway to exploitation</b>	The new insights in the scientific domains of climatic, hydrologic, environmental, business economics and social sciences, which were created, have been communicated through various channels (scientific publications, conference presentations, scientific brokerage events etc.). Research findings and outputs arising from I-CISK foster innovation beyond the project and support the development of downstream services, further promoting their uptake and accessibility across user communities

## 4 Ensuring Sustainability beyond the project

### 4.1 Sustainability of the outputs of the project

The previous sections have outlined the key exploitable assets (KEAs) that have been identified in the I-CISK project and outlined pathways to exploitation of these both within the project and after the project itself has ended. These pathways are important avenues to ensuring the sustainability of the KEAs, bearing in mind that there are several objectives to the exploitation of these assets as outlined in section 2 of this deliverable.

Ensuring sustainability of the more tangible exploitable assets and of those assets that are clearly “branded” as results of the I-CISK project and as contributions of the partners that have formed the I-CISK consortium is important in leaving a clear legacy of the project, once it has come to completion. This is also important to ensure the outputs of the project adhere to the FAIR (Findable, Accessible, Interoperable, Reusable) principles and are open access. The project has implemented these FAIR principles in several ways.

All deliverables that have been developed in the project are open and publicly available and accessible. During the implementation of the project these have been consistently uploaded to the project website (<https://icisk.eu/resources>), as well as to the relevant EU project dissemination website (following approval in the formal review process). The project website itself will be maintained at least five years beyond the end of the project. Additionally, a ZENODO node ([https://zenodo.org/communities/icisk\\_eu/](https://zenodo.org/communities/icisk_eu/)) has been established to which all project datasets and deliverables will be uploaded, ensuring these receive permanent document identifiers (DOIs), and allowing these to remain findable and accessible once the project website is decommissioned.

The FAIR principles have also been followed in the developing of software components within the project, such as those that form the I-CISK Cloud Climate Services Platform. This has been developed as open source software, hosted on the I-CISK Github repository (<https://github.com/icisk>). All software has been developed to support OGC standards for data exchange, ensuring interoperability. This is particularly important where (modular) components of the software may be integrated into developments beyond the I-CISK project, such as the Data Ingestor component, which supports integration of diverse datasets, including in-situ datasets and from platforms such as Copernicus. Scientific publications that research in the project has contributed to acknowledge the support of the I-CISK project and (to date) have all followed GOLD and GREEN publication standards, ensuring these are openly accessible to all. These can be accessed through the DOI links published on the project website (<https://icisk.eu/resources>). Finally, the sustainability of assets such as the MOOC and (online) co-creation guidelines are ensured through hosting the on-learning environments that are independent of the project, such as the IHE Delft Open Courseware environment.

### 4.2 Sustainability of the co-created pre-operational climate services

For the climate services that have been co-created in each of the seven Living Labs, the previous section shows that the exploitation pathways that have been identified are quite different. This strategy has been followed as it is key to the sustainability of these climate services as well as the embedded scientific and local knowledge that has been co-created with stakeholders in each. While these have been developed to the pre-operational stage using the (common) I-CISK cloud platform, their sustainable use and exploitation will depend on these being embedded within the institutional and policy environment of each of the living labs. This is particularly so as the services provided in each LL differ, given the specific context, stakeholders and sectors. The exploitation pathways that have been identified for each of the Living Labs show that in selected LL there is potential for the services as developed using the I-CISK cloud CS platform to the pre-operational stage may well be developed further to the operational stage, depending on institutional and financial support. This is

the case for the Living Labs in Italy and Greece. In other Living Labs, progressing beyond the pilot development may adopt what has been piloted using the I-CISK cloud CS platform, but may also integrate the concepts that have been developed within the operational environments that currently exist. This is the case in the Living Labs in Spain, Georgia, and the Netherlands. For the Living Lab in Lesotho, the concepts that been developed within the project have primarily strengthened existing climate services platforms, such as those that support the Red Cross in implementing early action protocols for droughts and cold-spells. Similarly, in the Living Lab in Hungary, the detailed heat maps contribute to the adaptation strategies within the city.

The latter illustrates an important dimension of sustainability and exploitation. Within the context of climate services, and the co-delivery of climate services, it is the opinion of this project that it is essential to differentiate between the climate service (CS) and the climate service information system (CSIS) through which the CS is provided. To ensure a CS is sustainable, and continues to serve the needs of its users, it is essential that the CS is embedded within the operational and institutional practices of the (mandated) provider of the service. This may be a public entity (e.g., NEA in Georgia, REDIAM in Spain, Rijnland in the Netherlands), or it may be procured as a service from, for example, an SME or NGO (as in the case of GECO for the CS in Italy, EMVIS for the CS in Greece and RC510 for the CS in Lesotho). In some of these LL, the sustainability of the CS may depend on this being provided through the CSIS as it has been developed in the project. In others, sustainability may be guaranteed through incorporating the CS that has been co-created with existing CSIS that a service provider already operated (as shown in the exploitation pathways for the LL in Spain, Netherlands and Lesotho).

### 4.3 Sustainability of partnerships and networks

An important dimension of sustainability of the I-CISK are the partnerships and networks that have been established as a part of this project. There are two important dimensions to these.

The first is within the partners that form the consortium of the project itself. The consortium was constituted through a multi-disciplinary team, with strong representation of social sciences and humanities, natural sciences and information technology sciences. This has resulted in cross-learning amongst disciplines, which has contributed to some of the key insights developed in the project on co-creation of human centred climate services, integration of local and scientific knowledges, and human-climate feedbacks in CS supported adaptation strategies. Several project partners are well embedded in the European and Global CS community, and the cross-learning in the project no doubt encourages a more multi-disciplinary approach in that community, both in research and in practice. Additionally, the partners of the consortium have expressed a keen desire to jointly (or in part) pursue further projects and opportunities.

The second, and perhaps more impactful contribution of the project is through the multi-actor and multi-sectoral platforms the project has established within each of the Living Labs. These differ substantially in each of the Living Labs, have provided spaces within which these multiple stakeholders have convened to address questions of climate adaptation and the coping with extreme events. In several of the LL, MAP members acknowledged this as a key contribution of the I-CISK project, and expressed the desire to maintain these platforms beyond the end of the project. In selected cases, this has already resulted in new initiatives and projects being launched by MAP members (e.g. in Spain), in some with involvement of one or more members of the I-CISK consortium.

## 5 Monitoring and reporting

There is a definite link between dissemination, communication and exploitation activities and their progress reflects the progress of exploitation within the project. Integrated into the project dissemination strategy, dissemination goals and related actions have been identified and implemented, as this is reflected in the results of the specific Key Performance Indicators (KPIs) defined for Dissemination (D), in Table 5 (more details about progress in D1.4, Castellana, D., Masih, I., et al., 2025). According to these results, all dissemination goals which have been set referring to the project implementation period have been achieved. Additionally, six (6) Exploitation KPIs have been set to specifically monitor progress and impact of exploitation (Table 5). Four of them, (E1-E4) are directly to the Exploitation (and business) plan and have been achieved. The other two (E5 and E6), reflect some of the KEAs and pathways, among which only the KPI E-5 has not been yet achieved. This KPI, however, monitors impacts beyond the implementation period of the project and thus cannot be reported at the time of writing.

Table 5: KPIs defined to monitor impact of communication, dissemination (D), and exploitation (E) activities and current status.

KPIs	KPI Description	Target	Link to theory of change components	Means of Verification	Status
D-1	Number of visitors to project website	>3000	output	Web analytics tools	achieved
D-2	Number social media (Twitter, LinkedIn) followers	>300	output	Social Media reporting tools	achieved
D-3	Number of science-policy briefs disseminated	3	output	Policy briefs published online	achieved
D-4	Number of publications on CS in non-scientific sectoral magazines/periodicals & general media	5	output	Publications	achieved
D-5	Number of scientific publications in peer-reviewed scientific literature	>15	output	Papers published/submitted (available online)	achieved
D-6	Number of educational CS videos produced and available online	>4	output	Available online	achieved
D-7	Number of attendees from public and private CS sector to I-CISK online course (MOOC)	>50	outcome	Course completion certificates	Not applicable in M1-M45; expected in year after July 2025 when MOOC will be launched.
D-8	Number of attendees from public and private	>30	outcome	Attendance Lists	achieved

KPIs	KPI Description	Target	Link to theory of change components	Means of Verification	Status
	CS sector at I-CISK CS brokering events				
D-9	Number of impact stories demonstrated in the LL attributed to the project implementation (at least one per LL)	>7	Impact	D1.3 (reflection on the co-production process)	achieved
D-10	Number of events organized to share the (impact and business) stories from the demonstrator CS beyond the LL (at least one per LL country)	>7	activities	D5.5 (Business Stories)	All the living labs are in the process of organizing final events to demonstrate pre-operation CS as well as share the experiences and resources emerging from the I-CISK project. The primary target groups are the MAP members in most cases as living labs are considered the main market for the co-created CS. However, participation beyond MAP members is also expected
D-11	Number of presentations made to disseminate I-CISK results at science-policy (side) events	>4	activities	Certificate of participation/ presentation	achieved
D-12	Number of citizens, end users and decision-makers made aware of the next generation of CS in the LL and beyond	>5000	outcome	Analytics KPI D1-11	achieved
E-1	Number of market segments targeted	7	outcome	D5.5 (Business Stories)	achieved
E-2	Number of SMEs improving their market position	3	impact	Exploitation Plan	achieved
E-3	New jobs creation in full-time equivalents (FTE) for skilled employees within 3 years after the project	>10	impact	Exploitation Plan	achieved
E-4	Number of business stories developed and unique value propositions of CS	>7	impact	D5.5 (Business Stories)	achieved

KPIs	KPI Description	Target	Link to theory of change components	Means of Verification	Status
	identified for upscaling (min 1 for each LL)				
E-5	Co-production framework adopted beyond the project (at least one per country of the LL)	>7	outcome	Requests to share the framework	The co-creation framework is widely communicated and disseminated. The guidelines are under development and will be made public. These efforts are expected to promote the use within and beyond the project.
E-6	Number of users (e.g. citizens, end users, decision-makers, business sectors) using new CS proposed in the I-CISK to make better-informed climate adaptation decisions, to increase resilience to multiple risks and multiple sectors in EU regions and beyond	>50	impact	Web Analytics	achieved

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# I-CISK

HUMAN CENTRED CLIMATE SERVICES

## Colophon:

This report has been prepared by the H2020 Research Project “Innovating Climate services through Integrating Scientific and local Knowledge (I-CISK)”. This research project is a part of the European Union’s Horizon 2020 Framework Programme call, “Building a low-carbon, climate resilient future: Research and innovation in support of the European Green Deal (H2020-LC-GD-2020)”, and has been developed in response to the call topic “Developing end-user products and services for all stakeholders and citizens supporting climate adaptation and mitigation (LC-GD-9-2-2020)”. This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 101037293.

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