OMC document

Open Market Consultation for the future Pre-Commercial Procurement on climate adaptation domain

4th of April 2025

Funded by the European Union

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Disclaimer

The PCP WISE project receives funding under the European Union's Horizon Europe framework program for research and innovation under grant agreement **No 101182917**. The EU is however not participating as a contracting authority in the procurement.

A Prior information notice, or PIN, has been published in TED to announce the Open Market Consultation on potential future procurement activity (notice publication number: 213317-2025).

The original language of this open market consultation is English.

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List of abbreviations

Abbreviation	Meaning
CET	Central European Time
COTS	Commercial Off-The-Shelf
EAFIP	European Assistance for Innovation Procurement
EC	European Commission
EO	Earth and Environmental Observation
EU	European Union
FAIR	Findable, Accessible, Interoperable and Reusable
FRAND	Fair, Reasonable and Non-Discriminatory
GDP	Gross Domestic Product
GDPR	General Data Protection Regulation
GPA	Government Procurement Agreement
HE	Horizon Europe
IPRs	Intellectual Property Rights
OMC	Open Market Consultation
PCP	Pre-Commercial Procurement
PIN	Prior Information Notice
R&D	Research and Development
RFI	Request For Information

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SMEs	Small and Medium Enterprises
SOTA	State Of The Art
SWV	Soil-Water-Vegetation
TED	Tenders Electronic Daily
TRL	Technology Readiness Level
WTO	World Trade Organisation

Key Definitions

Definition	Meaning
Consortium	Group of public and/or private entities (including public buyers and supporting organisations) that are part of the PCP WISE project.
Contractor	A company or entity or consortium of entities that has been awarded a contract under the PCP.
Lead Procurer	A Public Buyer who acts as a Procurer in the PCP and purchases the R&D services on behalf of itself and other Public Buyers (in this case, hWh).
Public Buyer	A public entity who purchases goods or services from the market and is subjected to the public procurement regulation.
Technology Provider	A company or entity who develops and/or sells technology in the market.

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1. Introduction

This document outlines the **(1) objectives** and **(2) rules** for the **Open Market Consultation (OMC)** of the PCP WISE project. This upcoming pre-commercial procurement (PCP) of R&D services aims to challenge the market to develop innovative, beyond state-of-the-art solutions (up to TRL8) to enhance water management. The focus areas include agriculture, nature, urban climate resilience and planning, climate risk management, and resilience to water-related natural disasters. The goal is to provide intelligence and information on rural and urban soil-water-vegetation (SWV) system conditions and related risks for each sector.

By leveraging and combining satellite-based earth observation data, hydrological models, field data, and artificial intelligence, PCP WISE seeks to address critical challenges related to floods, droughts, heat stress, fires, and infrastructure impacts in both rural and urban areas. The project aims to develop an integrated, real-time soil-water-vegetation water intelligence system. This system will provide comprehensive information through monitoring, decadal hindsight, prediction, of the Soil-Water-Vegetation-Atmosphere (SWVA) system for climate change adaptation. The use of space and Earth Observation (EO)-based information will help prevent and mitigate water-related crises, such as floods, droughts, heat stress, fires, and infrastructure impacts, with related spatial risk indicators for each sector.

The following annexes are part of this document:

- Annex I – Request for Information questionnaire.
- Annex II – Use Cases & Test Sites

The annexes form an integral and inseparable part of this OMC document. In the event of any conflict between the provisions of this document and the annexes, the provisions of the OMC document shall prevail.

The interactions organised within this period will allow the PCP WISE Buyers Group to create a more realistic, feasible, accurate and attractive Tender (expected in September 2025) that fits with the industry capabilities whilst still achieving the goals of the buyer group.

This open market consultation is an open dialogue between the public buyers within the PCP WISE consortium and the market, in which we ask for the view of the market to identify the ability thereof to meet the needs of the procurer(s).

1.1. Scope and objectives of the OMC

The OMC begins on the date of the publication of the Prior Information Notice (PIN) in the Tenders Electronic Daily (TED) and ends on the date indicated in this document, unless the involved public buyers decide to terminate it earlier. Through this OMC, the Public Buyers Group of PCP WISE (as identified in Section 2), with Het Waterschapshuis (the Netherlands)

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acting as Lead Procurer, aims to inform the market and gather feedback to support the preparation of the upcoming Pre-Commercial Procurement (PCP). This PCP focuses on developing innovative solutions to address five use cases related to monitoring local water balances (both urban and rural), advancing beyond the current state of the art in climate adaptation. The approach relies on satellite-based Earth and environmental observation (EO) data to help prevent and mitigate water-related crisis challenges, such as floods, fires, heat stress, droughts, and infrastructure impacts:

1. Use Case 1: Urban Drought (North Europe)
2. Use Case 2: Urban Flooding (North-Central Europe)
3. Use Case 3: Rural Drought (Northwest-Central Europe)
4. Use Case 4: Rural Drought & Flooding (Southern Europe)
5. Use Case 5: Rural Drought & Flooding (Northern Europe)

More details on the use cases can be found in Annex II.

In this context, the purpose of the OMC is to inform technology providers, research organisations and other relevant stakeholders about the needs of the Buyers Group and to collect their feedback regarding the PCP WISE challenge. Another objective of the OMC is to understand the technology providers' capabilities to satisfy the public buyers' needs and to gather their input on the feasability of the procurement plans and conditions as described in this document and its annexes.

In summary, the objectives of this OMC are to:

1. Present the Public Buyers needs to the market.
2. Validate the findings of the State-Of-The-Art (SOTA) analysis and the viability of the set of technical and financial provisions.
3. Obtain information on existing (or to be developed) technologies.
4. Raise awareness of the industry and relevant stakeholders regarding the upcoming PCP.
5. Collect insights from the industry and relevant stakeholders (including users) to fine-tune the tender specifications.
6. Facilitate the building of consortia to participate in the PCP.
7. Provide information on innovation procurement procedures, including topics related to intellectual property rights (IPR).

This OMC is performed under the law of the Lead Procurer (hWh), which is Dutch law.

The contracting authorities involved in the PCP WISE project are not legally bound in any way by the outcome of the OMC. Starting an OMC does not mean that the Buyers Group will start a tendering or purchasing procedure. If this OMC is followed by a tendering procedure and/or purchasing procedure, the Buyers Group reserves the right to adjust and/or supplement the solution described in this document on every element. No rights can be derived from statements and/or communications during this OMC in any future tendering procedure and/or purchasing procedure.

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The OMC is not part of any pre-qualification or selection process. No advantage or disadvantage will be given to any technology provider/group of technology providers to the detriment of others during the OMC and the subsequent competitive procedure for the award of contracts.

All information provided during the OMC and other background information will be published online in English (and other languages, if mentioned otherwise).

Where appropriate, parts of the information received from market parties can be shared with the EC.

The PCP WISE Consortium has the right to modify this OMC document, the Request for Information questionnaire and related annexes as deemed necessary to ensure the success of the upcoming PCP. The PCP WISE Consortium is entitled to adjust the planned activities and the timetable included in Table 1, and to include new activities at any time according to the needs and responses of the market. All the potential changes will be broadly disseminated on the same channel as the OMC, to ensure transparency and equal treatment among the participants. Furthermore, it may decide to terminate the OMC for its own reasons at any time. In that case, the PCP WISE Consortium will publish such modifications or termination on TED and the project's website: https://pcp-wise.eu.

1.2. Who can participate?

The target groups of this OMC are technology providers and end users working in the following fields:

- Civil engineering and management, including upscaling
- Hydrology (models, skills, services)
- Crisis risk/impact assessment
- Remote sensing value-add services
- ICT for operational information production (upscaling, back/front-end processing)
- Legal and contracting (EU standards, AI, IPR, etc.)

All interested parties are invited to take part in the OMC. However, please note that technology providers established in countries not eligible to participate in Horizon Europe Innovation Actions in any capacity cannot participate in the upcoming tender of the PCP procedure.

Participation in the OMC is voluntary and non-binding and is at the own expense and risk of market operators. A market operator cannot charge any costs to the Buyers Group for participation in the OMC or for (re-)use of its information in the context of a future procurement procedure.

Participation in this OMC is not a condition for submitting a tender in the subsequent procurement, does not lead to any rights or privileges for the participants, and is not part of any pre-qualification or selection process. The provided input in this OMC will not be used to evaluate future proposals.

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Why participate in the PCP-WISE OMC?
You will learn about the needs of several public buyers across Europe and gain insights of the future tender opportunities. Your feedback will be valuable and relevant to finetune the procurement plans understanding the market capabilities.

1.3. Activities & timetable

The OMC will take place in the form of:

- One Infoday scheduled for 29 May 2025 specifically targeted at market suppliers with the goal to inform them about the OMC events, process and upcoming call for tenders.
- Two main OMC events:
  - One digital event on the 3rd of June 2025
  - One (hybrid) interactive event at EXPANDEO in Brussels (Belgium) on the 12th of June 2025. This event will be carried out in English and broadcasted online. More information can be found in the EXPANDEO WEBSITE
- A Request for Information (RFI) – a questionnaire using the EU Survey tool.
- Other activities as deemed necessary within the scope of the project.
- A matchmaking function through PCP-WISE Community Platform.
- A Q&A document which will be published on the e-Procurement platform addressing all questions received.

Pitching sessions may be held in the scope of the OMC activities.

The timetable of activities and required actions of the OMC is as follows:

Table 1 Overview of PCP WISE OMC events planning

Date	Event
2 April 2025	Publication of the Prior Information Notice (PIN) on Tenders Electronic Daily.
3 April 2025	Open RFI questionnaire (via the EU Survey tool)
4 April 2025	Publication of the Open Market Consultation Document on the PCP-WISE website and e-Procurement platform.
4 April 2025	Open module on the e-Procurement platform to ask questions about the PCP-WISE OMC.
29 May 2025	Infoday (online event)
30 May 2025	Deadline to submit questions about the PCP-WISE OMC through questions module of e-Procurement platform.
3 June 2025	OMC main event 1 – Webinar (online event)

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12 June 2025	OMC main event 2 – EXPANDEO in Brussels (Belgium) (Hybrid event)
13 June 2025	Publication of answers to questions about the PCP-WISE OMC through e-Procurement platform.
15 June 2025 – 23:59 (CET)	Deadline for submission of the RFI (EU-Survey tool)
15 July 2025	Publication of the OMC Report- End of the OMC period

The PCP WISE Consortium is entitled to adjust the planned activities and the timetable above and to include new activities at any time according to the needs and responses of the market. Furthermore, it may decide to terminate the OMC for its own reasons at any time. In that case, the PCP WISE Consortium will publish such modifications or termination on TED and the project's website: https://pcp-wise.eu.

The events celebrated within the framework of the OMC could be recorded. In that case, by attending an on-site event you will consent to be recorded. By using your video and microphone during the webinars you will consent to be recorded. If you do not want your voice and image to be recorded during the webinars, you may ask your questions using the chat. The PCP WISE Consortium shall use those records for the purpose of the project only. These recordings will be made available in the project website for future reference.

In addition, please be aware that photos may be taken during the meetings. The PCP WISE Consortium shall use those photos for the purpose of the project only.

More information on the project will be provided by a series of preliminary informative webinars, in the form of a Webstival organised by the Consortium. The Webstival will take place from the 7th of April until the 24th of April and aimed at raising awareness and spread the word about the PCP WISE project to all project target audiences, as described below:

Table 2 Overview of PCP WISE general events planning

Date	Event
7 April 2025 - 10:00 to 11:30 (CET)	Webstival Webinar 1: Opening - PCP WISE Explained & Matchmaking Launch
09 April 2025 - 10:00 to 11:30 (CET)	Webstival Webinar 2: The PCP Process – From Call to Contract & Matchmaking for Market Readiness
17 April 2025 - 10:00 to 11:45 (CET)	Webstival Webinar 3: EU Project Synergies – Lightning Talks from Fellow Initiatives & Matchmaking for Cross-Project Collaboration
22 April 2025 - 10:00 to 11:30 (CET)	Webstival Webinar 4: Scaling Water Innovation – The Private Sector & Venture Capital Perspective
23 April 2025 - 10:00 to 11:30 (CET)	Webstival Webinar 5: Climate Resilience & Water Innovation – The Role of Earth Observation & digital technology

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24 April 2025 - 10:00 to 11:30 (CET)	Webstival Webinar 6: Closing & Next Steps – From Webstival to PCP Calls + Final Matchmaking Push

More information on all the Webstival can be obtained by the project website.

1.4. Registration and Procedure

Parties interested in participating in the OMC activities are requested to register to the e-Procurement platform. In order to attend the Webstival events, interested parties can register through the Registration Platform.

The OMC starts on the date of its publication in TED and ends on the date set in the timetable presented in Table 1, unless terminated earlier.

Interested parties are requested to register through the aforementioned links in order to participate in the events. The RFI questionnaire should be filled out before the deadline indicated in the timetable above.

The PCP WISE consortium will support interested parties throughout the whole OMC during the events and by answering questions through a Q&A document which will be published on the e-Procurement platform and the project's website. All the questions regarding the OMC are to be asked via the questions module in the e-Procurement platform.

Additional written contributions in the form of a Request For Information (RFI) questionnaire (via the EU Survey tool) aiming to collect market information on innovative and commercial solution are requested. As the questionnaire is intended to explore the market "as is", there are no wrong or right answers. The answers provided will be used as input for the procurement strategy and contract conditions. The responses to the questionnaires may **not** contain any confidential information. Market operators who wish to provide additional confidential information during the OMC can send an email to the following email address: pcpwise@hetwaterschapshuis.nl The information must be clearly marked as confidential. Confidential information will not be included in the OMC report.

After processing and analysing the answers, the PCP WISE consortium will disseminate the results to the widest possible audience. Nevertheless, all answers provided by market parties will be anonymised and treated as confidential. The PCP WISE consortium will therefore not provide information about specific answers from market operators. Only the general findings and a summary of the answers will be provided. The results of this OMC will be published on the e-Procurement platform and the PCP-WISE website to ensure wide dissemination.

In case the information provided in this document and annexes needs further clarification, market operators may ask questions during the events, or via the questions module in the e-Procurement platform. In the case of other issues (e.g. technical issues with the platform), the e-mail address pcpwise@hetwaterschapshuis.nl can be contacted.

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2. The PCP WISE Project

2.1. Context and objectives

PCP-WISE aims to bridge the gap between the existing European (Copernicus) portfolio and operational practices in managing local areas in sectors that depend on meteorology and hydrology. It does so by developing an integrated water intelligence system that harmonizes data from diverse sources—such as Earth Observation (EO) data, in-situ measurements, and Artificial Intelligence (AI) analytics—within the European Union, through innovation procurement.

This unified approach is essential for delivering comprehensive, historical, and real-time insights that support effective decision-making at regional, national, and transnational levels, both in the short term (seasonal/multi-annual) and the long term (decadal). The standardization of data collection and analysis processes under PCP-WISE will improve the ability of public authorities to manage water resources more efficiently. It will also help them respond proactively to climate-related crises, including floods, droughts, heat stress, fires, and infrastructure impacts, thereby increasing long-term climate resilience. The general objective is to enhance climate resilience by improving the availability and use of EO-based information and by aligning regional water management authorities, cities, communities, and crisis organisations across EU Member States and administrative boundaries, particularly within shared river basin systems.

The Core of the Assignment

The tender within the PCP-WISE project will focus on the development of innovative information products to support improved water management in both urban and rural areas. The assignment has two closely linked main objectives:

1. From Information Gap to Integrated Insight: The Foundation for Day-to-Day Water Management

One of the key challenges is to develop a robust, validated, and standardized information base on the soil-water-vegetation (SWV) system. This foundational data is currently largely lacking, yet it is essential for gaining daily insight into the local water balance in both urban and rural environments. Without this information, a reliable and integrated soil-water information system cannot be realized.

The market is therefore challenged to develop this foundation in collaboration with public authorities. This requires combining various types of data — such as remote sensing, field measurements, and model outputs — into a coherent SWV system insight that can be applied consistently across different European contexts.

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Based on this integrated SWV information, a continuous stream of actionable data should be created to support water managers in their routine tasks. This information must be made accessible through user-friendly tools, such as standardized dashboards tailored to local practices.

This task thus forms the first fundamental building block of the challenge.

2. Information Products for Anticipating Extreme Events

In addition to supporting day-to-day management, the challenge explicitly focuses on the development of products that provide insights into current risks, with the goal of better anticipating extreme events such as floods, droughts, heatwaves, and wildfires. These situations are highly context-specific and differ significantly between urban and rural environments, as illustrated in the various use cases.

The market is asked to develop information products that present these risks in an up-to-date and user-friendly manner. This includes spatial maps updated daily, featuring indicators tailored to the needs of different users — from water managers to emergency response agencies. The maps should be relevant for both preparatory actions (such as planning and prevention) and operational response during incidents.

Where the first point forms the foundation of an integrated information system, this component represents its application for risk management and climate adaptation. Together, these two pillars contribute to resilient water management in a changing climate (as a basis for hind-now- & forecasting intelligence)

Additional EO-based services tailored to specific use cases may be requested to provide more localised insights. Generally, two levels of service will be applied at each test site:

- A detailed service at the local test site;
- A contextual service at the intermediate (river basin) scale.

In Summary

This broad scope calls for information that is still largely missing today: validated and standardized information on the SWV system, built upon a robust interoperable hydrological model. This model is essential for achieving integrated, climate-resilient water management. The market is therefore challenged to help develop this SWV model and to seamlessly integrate it with other necessary data sources. Only then can a future-proof soil-water information system be created — one that supports both regular operations and crisis situations.

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2.2. The PCP WISE common challenge, main requirements & benefits

2.2.1. Common Challenge and main requirements

The envisaged future PCP – i.e. a joint cross-border procurement of R&D services – is intended to be launched to reinforce public demand-driven innovation on the climate adaptation domain. PCP has the potential to be an effective demand-side innovation action and a useful tool to close the gap between supply and demand for innovative solutions. Solutions are expected to achieve TRL 7-8 at the end of Phase 3 as depicted in figures 1 and 2.

The future PCP should deliver successful innovative and fully tested product(s) and/or service(s) that meet the common challenge of the Public Buyers Group to procure research, develop innovative marketable solutions, speed up the time-to-market and provide best value for money.

The Public Buyers Group aims to develop an innovative solution to tackle the five use cases concerning climate adaptation, namely:

Use Case 1: Urban Drought (North Europe)

It focuses on urban drought issues in North-Western Europe, dealing with water distribution problems in city undergrounds due to various human and external factors. This use case aims to mitigate water shortages impacting infrastructure and living conditions.

Use Case 2: Urban Flooding (North-Central Europe)

It addresses urban water excess in Eastern and Northern Europe, where the abundance of water affects city infrastructure. This use case focuses on managing issues exacerbated by regional factors like sea-level rise.

Use Case 3: Rural Drought (Northwest-Central Europe)

It tackles rural drought in North-Eastern Europe, where extreme climate variations impact agriculture and nature, leading to issues like wildfires and production losses.

Use Case 4: Rural Drought & Flooding (Southern Europe)

It deals with rural drought and flooding in Southern Europe, where structural drought periods and intense rainfall affect agricultural processes and cause significant production challenges.

Use Case 5: Rural Drought & Flooding (Northern Europe)

It focuses on rural drought and flooding in North-Eastern Europe, addressing problems caused by extreme groundwater conditions that impact land use and infrastructure. This use case aims to manage soil moisture conditions to prevent issues like organic oxidation and underground peat fires.

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For each use case, the innovative solution is expected to cover the different needs as described in Annex II.

2.2.2. Benefits of the end users

The use cases within the WISE project have been systematically categorized according to several key criteria. These include the geographic context (Urban or Rural), the availability of potential physical test sites, and their geographic distribution across Europe (North, South, West, and East). Additionally, the classification considers the primary focus of each use case — whether it addresses flood, drought, subsidence, fire, or other concerns — and distinguishes between issues of a regular nature and those arising from crisis situations.

1. Use Case 1: Urban Drought (North Europe):

Focus: *Urban areas are increasingly facing challenges with spatial water distribution underground, caused by local human activities and external factors like climate change. Low groundwater levels, due to insufficient water storage, infiltration, and evapotranspiration, lead to subsidence of streets, buildings, and critical infrastructure, while also worsening urban heat and reducing green and open water areas. To address this, proactive management of groundwater and soil conditions is essential to protect urban infrastructure and improve resilience to drought.*

Benefits:

- Empower cities to manage shallow groundwater more effectively by integrating Earth Observation and ground-based data.
- Provide early warning systems that protect residents and businesses from groundwater risks.
- Support long-term planning with an improved understanding of urban water dynamics under various climate scenarios.
- Enable continuous monitoring and prevention of subsidence-related risks.
- Enhance urban water resource management, strengthening resilience to drought and climate impacts.

2. Use Case 2: Urban Flooding (North-Central Europe):

Focus: *Urban areas are also challenged by excess underground water, driven by human activities and external factors such as rainfall, seepage and sea-level rise. This abundance of water, combined with limited local storage and infiltration capacity, can damage streets, buildings, and critical infrastructure. Additionally, the broader river basin context influences city water conditions. Strengthening urban resilience requires managing excess water, infiltration, and groundwater impacts to protect infrastructure and essential services.*

Regular benefits:

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- Deliver a comprehensive overview of flood risks to improve decision-making and urban planning.
- Enable early identification of high-risk areas and prediction of potential water-related events.
- Drive more efficient management and sustainable development of cities and districts.
- Ensure equal access to information for all stakeholders, fostering coordinated actions.
- Improved climate water management and adaptation planning.
- Provide actionable insights on where drainage is needed, where water can be stored, and how soil moisture evolves with flood and sea-level risks.
- Improve understanding of shallow groundwater availability, efficient drainage locations, and impacts on wetlands and biodiversity.

Crisis benefits:

- Equip cities with real-time flood overviews for faster and more effective crisis responses.
- Minimize the impacts of floods on infrastructure and communities.
- Enable the water operators to respond to crises by taking actions

3.Use Case 3: Rural Drought (Northwest-Central Europe):

Focus: *Rural regions in Northern and Middle Europe face climate extremes with intense rainfall and periodic droughts, disrupting seasonal agricultural and natural cycles, leading to wildfires and crop losses. Unlike Southern Europe, the main challenge is not permanent water scarcity but uneven water distribution. Improving resilience requires enhancing wildfire preparedness, water management, conservation efforts, public safety, and cross-border cooperation through real-time data.*

Benefits:

- Support better water management through dynamic tracking of soil moisture and groundwater, ensuring sustainable resource use.
- Improve wildfire preparedness with real-time fire risk assessments, enabling first responders to take proactive mitigation actions.
- Enhance conservation strategies with data-driven insights, optimizing habitat restoration and ecosystem protection.
- Increase public safety by enabling risk-aware visitor management to reduce human-induced wildfire risks.
- Strengthen cross-border cooperation between Belgium and the Netherlands through joint data platforms for shared climate resilience efforts.

4.Use Case 4: Rural Drought & Flooding (Southern Europe):

Focus : *Rural areas in Southern Europe face growing challenges from extreme climate variations, with periods of heavy rainfall and prolonged droughts. These shifts disrupt seasonal*

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agricultural and natural processes, leading to production losses, crop failures, and increased wildfire risks. Addressing these issues requires reducing climate risks and improving water resource management to support agriculture and rural communities.

Benefits:

- Improve monitoring of surface soil moisture in time and space, enhancing situational awareness.
- Provide operational methods to assess root zone soil moisture, supporting efficient water use in agriculture and nature management.
- Deliver risk maps for floods and wildfires, highlighting threat levels, exposure, and vulnerabilities.
- Enable better forecasting and early anticipation of extreme weather events.
- Reduce risks of droughts, floods, and wildfires, safeguarding livelihoods and ecosystems.
- Support better water resource management and allocation in rural areas.
- Better risk-mitigation practices during infrastructure and land-use planning.

5. Use Case 5: Rural Drought & Flooding (Northern Europe)

Focus: *Rural areas are increasingly impacted by extreme fluctuations in groundwater levels, causing problems for land use, infrastructure, and utilities. Seasonal and long-term soil surface movements, especially in peat-clay or peat-sand areas, lead to subsidence, soil instability, organic oxidation, and even underground peat fires. Addressing these risks involves using subsidence, groundwater, and soil moisture data to protect infrastructure, support planning, enhance crisis response, and ensure sustainable resource management.*

Benefits for utilities and planning:

- Minimize subsidence rates and protect infrastructure by using daily groundwater level information and predictive planning tools.
- Improve identification of damaged infrastructure and reduce water losses.
- Enhance long-term planning and decision-making with detailed data on terrain settlements, hydrological changes, and environmental impacts.
- Unlock financial benefits by supporting water companies, municipalities, and infrastructure stakeholders in risk management and infrastructure investment decisions.
- Support sustainable water management and agricultural practices with better data on subsidence and soil moisture, enabling informed drainage and land-use planning.
- Strengthen policy evaluation and climate adaptation strategies across sectors.

Benefits for crisis response:

- Provide a unified information base for all stakeholders, improving coordination.
- Enable smarter prioritization of response and resource allocation.

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- Support fire response decisions with data-driven insights, helping to deploy resources, declare states of emergency, and create fire breaks.
- Estimate the potential extent and spread of fires and assess populations and infrastructure at risk.
- Facilitate effective evacuation planning based on real-time situational awareness.

Benefits for crisis preparedness:

- Improve fire hazard and risk mapping to support pre-event decision-making.
- Enable continuous situation monitoring for early warnings and preparation.
- Support civil protection planning by validating resource availability (firefighters, equipment, etc.).
- Strengthen reconnaissance efforts to detect and prevent fires or criminal activity early.
- Raise awareness among communities, property owners, and infrastructure operators.
- Provide realistic, scenario-adjusted training for first responders and command staff through simulation exercises.
- Facilitate cross-border and multi-agency collaboration through an aligned taxonomy and common terminology.

2.3 The Pre-Commercial Procurement Approach

This OMC concerns a future PCP of R&D services which should be performed in their majority (>50%) in the EU Member States or Associated Countries.

PCP is an approach that allows public procurers to buy R&D from several competing technology providers in parallel, compare alternative solution approaches, and identify the best value-for-money solutions that the market can deliver to address their needs. In PCP, there is a risk-benefit sharing under market conditions between the public procurer and the technology providers and a clear separation between the PCP and the deployment of commercial volumes of end-products.

PCP is characterised by the following **five features**:

1. Competitive development in phases to identify the solutions offering the best value for money

PCP targets situations that require radical innovation or R&D and for which there are typically no solutions on or close to the market yet. Different competing providers may have different ideas for solutions to the problem. As R&D is yet to take place, there is not yet any proof as to which of these potential alternative solutions would best meet customers' needs.

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PCP therefore awards R&D contracts to a number of competing contractors at the same time, in order to compare different approaches to solving the problem. It thus offers innovators an opportunity to show how well their solution compares with others. It also allows a first customer test reference to be obtained from countries of the procurers that will test the solutions.

The R&D for the PCP is split into 3 phases (Phase 1: solution design, Phase 2: prototyping and lab testing, Phase 3: original development, installation, wider field testing and validation of a limited set of 'first' products or services).

Evaluations after each phase will progressively identify the solutions that offer the best value for money and meet the customers' needs. This phased approach allows successful contractors to improve their offers for the next phase, based on lessons learnt and feedback from procurers in the previous phase. Using the phased approach with gradually growing contract sizes per phase will also make it easier for smaller companies to participate in the PCP and enable SMEs to grow their business step-by-step with each phase.

Depending on the outcome of the PCP (whether it will result in innovative solutions that meet the tender requirements and offer good value for money), procurers may or may not decide to follow-up the PCP with a public procurement to deploy the innovative solutions (PPI).

2. Public procurement of R&D services

PCP addresses mid- to long-term public procurement needs for which either no commercially stable solutions yet exist on the market, or existing solutions exhibit structural shortcomings which require further R&D to resolve. PCP is a way for procurers to trigger the market to develop new solutions that address these shortcomings. PCP focuses on specific identified needs and provides customer feedback to businesses from the early stages of R&D. This improves the likelihood of commercial exploitation of the newly developed solutions.

PCP is explained in the PCP communication COM/2007/799 and the associated staff working document SEC/2007/1668. The R&D services can cover research and development activities ranging from solution exploration and design, to prototyping, right through to the original development of a limited set of 'first' products or services in the form of a test series. Original development of a first product/service may include limited production/supply in order to incorporate the results of field-testing and demonstrate that the product/service is suitable for production/supply in quantity to acceptable quality standards. R&D does not include quantity production or supply to establish the commercial viability or to recover R&D costs.[1] It also excludes commercial development activities such as incremental adaptations or routine/periodic changes to existing products, services, production lines, processes or other operations in progress, even if such changes may constitute improvements.

3. Open, transparent, non-discriminatory approach — No large-scale deployments

[1] [1] See Article 16(f) of Directive 2004/18/EC (Article 14 of Directive 2014/24/EU), Article 24(e) of Directive 2004/17/EC

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Unless there are specific participation and/or control restrictions, PCP procurements are normally open at least to all operators in EU Member States or HE associated countries, on equal terms, regardless of the size, geographical location or governance structure.

Access is extended to operators from WTO GPA signatory countries and other third countries if there are not sufficient operators in EU Member States or associated countries that can perform the R&D work.

In all cases, there is, however, a place of performance requirement that a predefined minimum percentage of the contracted R&D services must be performed in EU Member States or Horizon Europe associated countries (or a more restricted list of countries).

Any subsequent public procurement of innovative solutions (PPI), for the supply of commercial volumes of the solutions developed in the PCP, will be carried out under a separate procurement procedure. Participation in the PCP is thus not a prerequisite for the provisioning of a solution on a commercial scale.

4. Sharing of IPR-related risks and benefits under market conditions

PCP procures R&D services at market price, thus providing contractors with a transparent, competitive and reliable source of financing for the early stages of their research and development.

Giving each contractor the ownership of the IPRs attached to the results (foreground) they generate during the PCP means that they can widely exploit the newly developed solutions commercially. In return, the tendered price must contain a financial compensation (i.e., it must be lower) for keeping the IPR ownership —compared to the case where the IPRs would be transferred to the procurers (the tendered price must be the 'non-exclusive development price'). Moreover, the procurers must receive license-free rights to use the R&D results for internal use, and licensing rights subject to certain conditions.

The contractors will retain ownership of the Intellectual Property Rights (IPRs) that they generate during the PCP and will be able to use them to exploit the full market potential of the developed solutions.

For more information, *see PCP on the Europa website*.

5. Exemption from EU Public Procurement Directives, WTO Government Procurement Agreement (GPA) and EU state aid rules

PCP procurements are exempted from the EU Public Procurement Directives because the procurers do not retain all the benefits of the R&D (the IPR ownership stays with the contractors).

They are also exempted from the WTO Government Procurement Agreement (GPA)[2] because this Agreement does not cover R&D services[3] (— the PCP being limited to such services and

[2] See also Article XV(1)(e) WTO GPA 1994 and the Article XIII(1)(f) of the revised WTO GPA 2014.
[3] See the EU's Annex IV of Appendix I to the WTO GPA.

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any subsequent PPI procurements relating to commercial-scale supply of such solutions not being part of the PCP procurement).

PCP procurements do not constitute state aid under the EU state aid rules[4] if they are implemented as defined in the PCP communication[5], namely by following an open, transparent, competitive procedure with risk- and benefit-sharing at market price. The division of all rights and obligations (including IPRs) and the selection and award criteria for all phases must be published at the outset; the PCP must be limited to R&D services and clearly separated from any potential follow-up PPI procurements; PCP contractors may not be given any preferential treatment in a subsequent procurement for provision of the final products or services on a commercial scale.

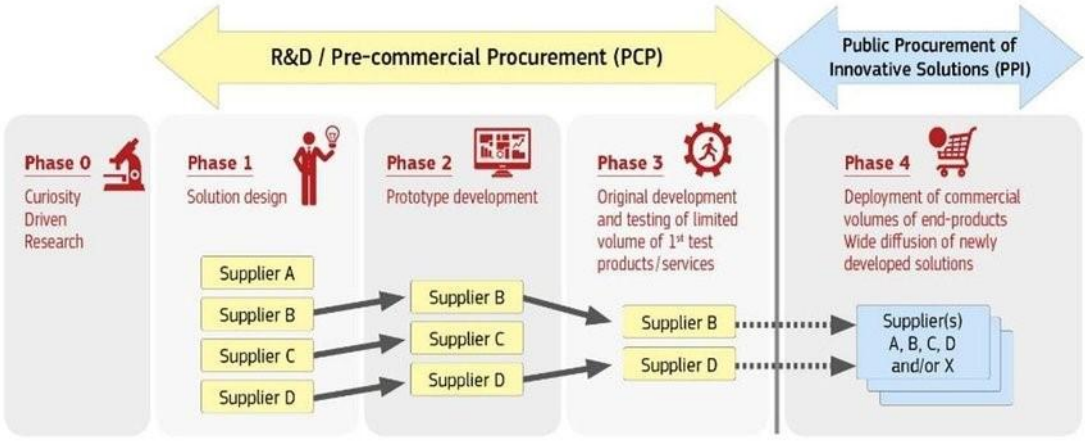

Figure 1 PCP and PPI, according to the European Commission (2016). Based on "Pre-commercial procurement: driving innovation to ensure sustainable high quality public services in Europe", COM(2007) 799 final.

The PCP tender will start with the publication of the contract notice along with the request for tenders, the framework agreement, and the phase contracts. After evaluating the offers submitted by the technology providers according to the rules established in the tender documents, the contracts will be awarded, and a contract award notice will be published. The process will be monitored to ensure sound deployment, integration and validation of the PCP.

The PCP procedure is composed of three phases of solution design, prototype implementation, and validation and demonstration of the solutions.

- **Phase 1. Solution design:** During this phase, the contractors will be asked to describe the solution providing the complete architecture and design thereof and verifying the technical, economic and organizational feasibility of their solution to address the PCP challenge.

[4] See Point 33 of the Commission Communication on a framework for state aid for research and development and innovation (C(2014) 3282).

[5] Commission Communication: Pre-Commercial Procurement: driving innovation to ensure sustainable, high quality public services (COM(2007) 799) and PCP staff working document (SEC(2007)1668).

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- **Phase 2. Prototype implementation:** This phase concerns the development of the first prototypes of the solutions, which will be tested. Contractors will develop a first prototype based on the design documents delivered in the previous phase and test their solutions in lab conditions. Prototypes will be tested and verified to provide a measure of the technical performance of each solution in a controlled environment. During and at the end of the phase 2, the Public Buyers will request from the contractors a series of deliverables in order to evaluate their progress and the performed activities and obtained results.

- **Phase 3. Validation and demonstration of the solutions:** It will validate the final solutions (at least two) in diverse conditions, using the detailed scenarios and processes developed in the verification and validation strategy. During phase 3, a feedback mechanism will be established between the Public Buyers Group and the selected contractors in order for the latter to receive requests for improvements directly from the end users. The Public Buyers will request from the contractors an Integration Report. Finally, a Field Acceptance Report related to the accomplishment that the two final solutions which have been deployed and that the validation tests have been successfully performed in a real operational environment will be requested.

After each phase, intermediate evaluations will be carried out to progressively select the best of the competing solutions. The contractors with the best-value-for-money solutions will be offered a specific contract for the next phase.

Under PCP WISE, the timeline for the implementation of the PCP procedure is summarised in the image below:

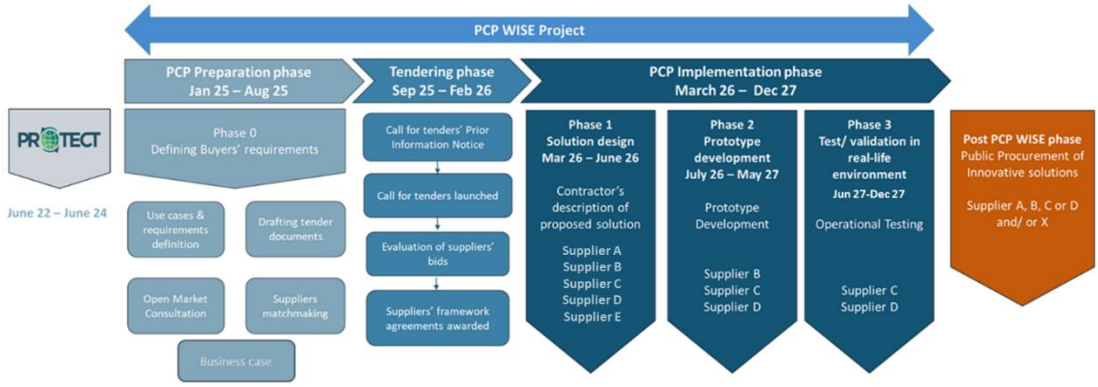

Figure 2 PCP WISE timeline[6]

The estimated number of the participating contractors, budget distribution between the three Phases, as well as the foreseen duration of the phases are depicted in the below table:

[6] The timeline included in this figure is subject to change and may not be the final one included in the tender documents (expected in September 2025).

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Table 3 3 Budget Overview per Phase[7]

PCP Phase	Contractors	Duration	Budget per contractor	Total Budget
Phase 1	5	4 months	300.000,00 €	1.500.000,00 €
Phase 2	3	11 months	2.400.000,00 €	7.200.000,00 €
Phase 3	2	6 months	1.532.669,40 €	3.065.338,80 €
			Total	**11.765.338,80 €**

Contracts implementation

During the contract implementation of PCP WISE, effective tools will be used in order to monitor performance of the R&D suppliers and provide regular feedback during each phase. Each contractor will be assigned a main contact person (their supervisor) appointed by the procurers as the main point of contact.

More specifically the monitoring process will be divided in 3 set of activities:

- **Pre-monitoring:** A kick-off meeting per contractor will be scheduled at the beginning of each PCP phase and the selected contractors will be requested to present their implementation schedule for the PCP phase that they are entering in. During the same meeting, the supervisor will present the framework for the review. The objective is to establish a close and fruitful communication channel with the contractors, in order to ensure from the early beginning of the action that the project is implemented according to the needs of the buyers.

- **Monitoring:** Contract implementation will be monitored and reviewed against the expected outcomes for each phase. The intensity of monitoring and communication between the Public Buyers Group and the contractors will increase from phase 1 to phase 3. For instance, regular meetings with the contractors by videocall or face-to-face, on-site visits to the contractors' locations to check and discuss the status of the work and progress, or any other suitable way. Ad-hoc meetings and on-site inspections are also possible in the event that the R&D development has halted or slowed down.

  The contractors are mandated to present monthly the current status of the work and describe the progress made. All the documentation generated by the contractors will be reviewed and the ideas and recommended areas to pursue will be highlighted in post-review activities.

- **Post-monitoring:** At the conclusion of the monitoring activities, the supervisor will provide written feedback for each contractor at each PCP phase. This feedback will

[7] The budget included in the table is subject to change and may not be the final included in the tender documents (expected in September 2025).

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generally consist of overall comments and remarks about the contractor's outcomes under review. Monitoring activities will be continued after the PCP is completed. Specifically, it will be checked whether the contractors are successfully commercializing the R&D results within the call-back period defined in the PCP framework agreement. If that is not the case, the PCP WISE Consortium will ask the R&D suppliers to give licenses under FRAND terms to other third parties, or will ask to transfer back the ownership of results to the Public Buyers Group.

More detailed information will be provided in the tender documents to be made available in September 2025.

2.4. The Public Buyers Group

The PCP WISE Consortium brings together 12 public buyers from different EU Member States (the Netherlands, Finland, Slovakia, Germany, Greece, Belgium, Denmark, and Spain). For the purpose of the PCP, the Public Buyers Group will be represented by hWh as the lead procurer.

1. Het Waterschapshuis (hWh). hWh is the central IT and digital innovation organization for Dutch water authorities. It facilitates data-driven decision-making, modern IT infrastructure, and advanced water management solutions. hWh plays a key role in digital transformation, ensuring efficient governance and resilience against climate change-related water challenges.
2. STOWA (Foundation for Applied Water Research). STOWA supports Dutch water authorities by conducting research on water systems, flood protection, and ecosystem restoration. It fosters innovation in sustainable water management and climate adaptation, working closely with government agencies, researchers, and stakeholders to develop practical, science-based solutions.
3. FORUM VIRIUM HELSINKI (FV-Helsinki). Forum Virium Helsinki is the innovation unit of the City of Helsinki, focusing on smart city development and digital transformation. It leads projects integrating AI, IoT, and big data into urban planning, with a strong emphasis on sustainable solutions for climate adaptation, mobility, and water resilience.
4. Ministry of Interior of the Slovak Republic (MoI). The Ministry of Interior (MoI) oversees national security, crisis management, and disaster preparedness. It plays a key role in implementing climate resilience strategies, civil protection measures, and emergency response coordination to mitigate the impacts of extreme weather events and environmental hazards.
5. City of Haarlem. Haarlem is committed to sustainable urban development, emphasizing green infrastructure, water resilience, and flood prevention. The city actively engages in climate adaptation projects, integrating nature-based solutions, smart technologies, and citizen participation to create a more resilient urban environment.
6. BUNDESANSTALT TECHNISCHES HILFSWERK (THW). THW is Germany's federal agency for civil protection and disaster response. It provides expertise and technical assistance in managing climate-related emergencies, including floods, storms, and infrastructure

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damage. THW collaborates with national and international partners to strengthen resilience against environmental disasters.

7. Region of Central Macedonia (RCM). RCM is responsible for regional planning and environmental policies in northern Greece. It focuses on climate adaptation, flood risk management, and sustainable urban-rural development. RCM actively participates in European initiatives promoting smart climate solutions and cross-border cooperation.
8. FORENINGEN KLIMATORIUM. Klimatorium is Denmark's international climate adaptation hub, fostering innovation, research, and collaboration between public authorities, businesses, and academia. It specializes in water-related climate challenges, such as rising sea levels, stormwater management, and resilient coastal infrastructure.
9. BENEGO – GRENSPARK KALMTHOUTSE HEIDE (Grenspark). Grenspark facilitates cross-border cooperation in environmental management, biodiversity conservation, and climate adaptation. It works on transnational water governance, ecological restoration, and sustainable landscape management to enhance resilience against climate change impacts in shared regions.
10. City of Rotterdam. Rotterdam is a global leader in climate resilience and water management, pioneering innovative flood protection measures such as floating urban infrastructure, stormwater retention systems, and smart water technologies. The city integrates sustainability into its urban planning, ensuring long-term environmental and economic resilience.
11. Slovak Environmental Agency (SEA). SEA supports environmental policy implementation, ecological monitoring, and climate adaptation strategies at the national level. It works on sustainable land and water management, biodiversity conservation, and integrating digital tools to assess and mitigate environmental risks.
12. CARTOGRAPHIC AND GEOLOGICAL INSTITUTE OF CATALONIA (ICGC). ICGC specializes in geospatial data analysis, mapping, and geographic information systems (GIS) for environmental monitoring and climate resilience. It supports public authorities in disaster risk assessment, spatial planning, and predictive analytics to enhance regional adaptation strategies.

3. State-of-the-art analysis: preliminary results

This section presents the preliminary result of the market analysis and, in particular, the state-of-the-art (SOTA) analysis. It incorporates insights from PROTECT CSA, which provided valuable input on the available market solutions and their respective TRL levels. The objective of this updated analysis was to identify existing technologies that can tackle the procurement challenge together with an analysis of the related patents, publications and COTS, and to estimate the TRL thereof. During our preliminary research, no existing or planned solutions that meet PCP WISE´s needs was found. As a result, an innovation procurement process,

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specifically a PCP, is required. This involves using public procurement to drive research and development, stimulating the creation of new solutions tailored to the specific needs Additionally, using public procurement ensures that a solution that is “publicly purchasable” becomes available, helping to overcome societal challenges while ensuring the necessary technology is developed and implemented.

Patents:

The patent analysis revealed a range of existing technologies utilising earth observation data, remote sensing, AI-based modelling, and UAV/satellite integration to tackle challenges related to floods, fires, droughts, and infrastructure impacts. These patents demonstrate advancements in disaster monitoring, early warning systems, water resource management, and environmental assessment. However, most solutions focus on specific hazards independently, rather than offering a comprehensive approach that integrates multiple disaster types and their increasing effects on infrastructure which is the procurement challenge of PCP WISE. Furthermore, while many patents propose innovative methodologies, they often lack real-time adaptability, interoperability, or scalability to address the complexities of both urban and rural environments. These gaps highlight the need for a more holistic, integrated EO-based solution that enhances predictive analytics and decision-making in different environmental scenarios.

In terms of Technology Readiness Levels, the patents related to fire monitoring and prevention generally fall within TRL 4-6, with validated prototypes and some operational systems, particularly in satellite-based fire detection and early warning models. However, real-time fire spread prediction and integrated command systems still require further refinement. For flood monitoring and prediction, we have the highest average TRL among the challenges, technologies are at TRL 6-9, with strong developments in remote sensing and hydrological modelling and real-time flood risk assessments. These TRL assessments indicate that while promising technologies exist, further integration, validation, and operational deployment are required to fully meet the needs of PCP WISE.

Publications:

The initial results of the investigations using desk research, data-based foresight methods and initial market analyses to determine the current state of technology and research for the five use cases show that promising research and development activities and technologies with considerable potential for PCP WISE exist worldwide, but have not yet made the step towards commercialisation. In particular, technologies that utilise non-commercial satellite data such as Copernicus play a key role here. Even if valid and reliable TRL information is difficult to obtain, it is becoming apparent that the technologies of interest for PCP WISE largely only have a TRL < 6, but show a high potential for innovation. The exception here are technologies for flood analyses, which can also have TRL > 7. It needs to be highlighted that the majority of publications and providers come from outside Europe.

COTS:

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According to the preliminary COTS search, runoff floods have not yet been addressed as a specific use case, but individual components are available to develop a commercial product.

From the analysis, it become apparent that data on soil coverage (including roads and artificial soil), daily precipitation, and soil temperatures, combined with a rich historical dataset, enable accurate modelling. Soil infiltration and evapotranspiration are already at TRL 5-6, with soil saturation levels expected to follow. In this regard, existing initiatives such as GRACE-FO, SERVIR, SWAT, and Copernicus provide valuable insights into shallow water tables, complementing PCP Wise´s approach.

For water damage to infrastructure, including historical buildings and roads, mature technologies exist, but no commercial solutions are available. Similarly, while precipitation and water levels can be linked to vegetation health, the Consortium has not identified a commercial product that support this linkage. However, river level monitoring is already available as part of commercial solutions. Regarding water quality, all the necessary data and technologies already exists. Only further maturation to support new applications is required.

4. Request for Information

The Request for Information survey (Annex I) is part of the OMC of the PCP WISE project. It should provide the PCP WISE Consortium with feedback from the market about the challenge described in section 2 and the use cases analysed in Annex II.

Technology providers are invited to answer all the questions of the survey (one survey per company). The results will be considered when drafting the tender documents for the future PCP.

The survey should be filled out online and submitted via the following link: https://ec.europa.eu/eusurvey/runner/PCP-WISE.

Personal data will be collected, processed, stored and used by the PCP WISE Consortium with the only purpose of gathering information from the market within the framework of the PCP WISE project. Personal data will be treated as strictly confidential according to the General Data Protection Regulation (Regulation 2016/679 of the European Parliament and of the Council - GDPR). Participants may exercise their right to access their personal data and their right to rectify such data by contacting: info-PCP-Wise@group-gac.com

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Annex I – Request for Information questionnaire

This document provides the list of questions of the Request for information questionnaire and instructions for submission.

Objective

The purpose of this request is to collect relevant information to support the Market Analysis, the Procurement Strategy definition and eventually the finalization of the tender documents of PCP WISE.

Instructions for Submission

- All responses must be provided **in English**.
- The deadline for submission is **15 June 2025** (**23:59 CET).**
- Please submit your responses via: **https://ec.europa.eu/eusurvey/runner/PCP-WISE**

QUESTIONS
What is the relevant experience of your organisation in relation to the subject matter of the PCP WISE project? Please elaborate (years of experience, practical examples, etc.):
PCP challenge and requirements
1. Do you know any technological developments related to the aforementioned main challenge in the climate adaptation domain that PCP WISE needs to take into account? Please indicate which technological developments:
2. Do you foresee any barriers to implementing the potential solution? Please elaborate:
3. Can you identify relevant needs that have not been described in the market consultation document? Please elaborate:
4. Do you have knowledge of any suitable technology or combination of technologies that can address Use Case 1 : Urban Drought (North Europe)"? Please elaborate:
5. Do you have knowledge of any suitable technology or combination of technologies that can address Use Case 2: Urban Flooding (North-Central Europe)? Please elaborate:
6. Do you have knowledge of any suitable technology or combination of technologies that can address Use Case 3: Rural Drought (Northwest-Central Europe)? Please elaborate:
7. Do you have knowledge of any suitable technology or combination of technologies that can address Use Case 4: Rural Drought & Flooding (Southern Europe)? Please elaborate:
8. Do you have knowledge of any suitable technology or combination of technologies that can address the Use Case 5: Rural Drought & Flooding (Northern Europe)? Please elaborate:

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9. If you were to develop the solution for all the five PCP WISE use cases, how much time would you need for each of the three phases of the PCP: (1) solution design, (2) prototype development, (3) original development and testing of the solution?
10. If you were to develop the solution for all the five PCP WISE use cases, could you indicate an estimated budget for the development and deployment of the solution? Please justify your answer.
11. Based on your market knowledge, what is the current market value of similar solutions (applicable for all UCs 1-5), and what is your projection for the future market value of the proposed solution(s)? Please justify your answer.
12. Based on your proposed solution(s), what key benefits — both direct and indirect — do you anticipate it/they could deliver to public buyers and stakeholders? Please consider operational, environmental, economic, and societal impacts. Please justify your answer.
13. Are you familiar with the MODFLOW hydrological model as a standard for (operational management) interoperability or do you have suggestions for other standard models or descriptions? Please mention and elaborate with reference/link.
14. Do you have the ambition and the internal (ICT, Human) capacity for future scaling (even at a pan-European level) of the PCP WISE services?
15. Do you have suggestions for developing solutions in areas without existing ancillary information or prior knowledge (worst case)?
16. Can you provide any other recommendations regarding the PCP WISE use cases?
State-of-the-art analysis
17. Do you identify relevant solutions under development or already available in the market beyond the state-of-the-art?
18. Do you know the Technology Readiness Level (TRL) of those solutions/developments? If yes, please indicate them below:
19. Can you identify any patents, standards or publications that are relevant to the challenge? If yes, please indicate them below:
20. Are you aware of any patents that may constitute a barrier for you to deliver a solution in the envisaged PCP procurement? If yes, please indicate them below:
Miscellaneous
21. What information do you still need in order to make a good plan of action for the development and/or implementation of solutions suitable to address the challenge?
22. Do you have specific requirements to achieve the functionalities that PCP WISE should take into account? If yes, please indicate them below:
23. What are the risks associated with the development and implementation of a solution that tackles the functional needs of PCP WISE?
25. What support do you expect from PCP WISE?
26. Do you have any final suggestions and/or remarks?

Annex II – Use Cases & Test Sites

Preliminary remark

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It needs to be noted that during Phase 3, other sites (than the ones included below) will also be used than mentioned in the description of the use cases below. So the efficiency of the solutions can be monitored, at sites without being an actual test site. Indicatively these extra sites are Region of Central Macedonia (GR), Spiss nova vess (SK), Rotterdam (NL), Haarlem (NL), Meppen (D).

Use Case 1: Urban Drought (North Europe)

Partners: Forum Virium Helsinki (Finland), City of Rotterdam (NL), City of Haarlem (NL)

Stakeholders/sector: Urban management & development boards, asset managers, utility sector, national and local waterboards

Description: Use Case 1 is focused on addressing urban water issues in the local city context, specifically in relation to the spatial water distribution of the soil-water system. This involves understanding how various human and external factors (like regional influences and climate conditions) affect water flow in the city. The main focus is on tackling water shortages caused by issues such as local water storage, infiltration, and evapotranspiration, which lead to low groundwater levels. This in turn impacts infrastructure through subsidence (such as damage to streets, homes, and critical systems like utilities) as well as environmental conditions, like heat islands and the health of green spaces and open water areas.

On the other hand, excess water from soil saturation in urban areas often results in flooding and instability in underground foundations, which can threaten infrastructure and other urban assets.

The primary goal is to improve urban water management and strengthen resilience against climate change by using smart technologies like satellites and data science. This includes continuously monitoring various aspects of the urban water cycle—such as soil moisture, groundwater levels, and surface water—to reduce risks like drought, heat stress, subsidence, and flooding. In addition to daily monitoring, the project aims to gather insights from long-term historical trends, refine and assess water-related measures, and develop spatial risk indicators for both water shortages and excess. The overall aim is to create more sustainable, resilient cities that are better equipped to face the challenges of a changing climate.

Main Service: Regular (and historical) monitoring of soil moisture and groundwater, along with the development of risk indicators for water-related issues that cause instability in city infrastructure, based on historical trends and future climate scenarios.

Specific Services: Monitoring infrastructure subsidence, heat islands, and the condition of green spaces/parks.

Test Site Location: Helsinki City (and surroundings)
(https://maps.app.goo.gl/aiQxTCaFptoxBhpM7)

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Use Case 2: Urban Flood (North-Central Europe)

Partners: Slovak environment agency (Slovakia), Ministry of Interior of the Slovak Republic (MoI), Forum Virium Helsinki (Finland), Klimatorium (Denmark), THW (Germany)

Stakeholders: City of Bratislava, Urban management & development boards, Spišská Nová Ves District Office, Crisis organisations/civil protection, asset managers, utility sector, national and local waterboards, environmental managers, City of Helsinki, Helsinki Region Environmental Services HSY, Finnish Environment Institute (Syke)

Description: Use Case 2 focuses on urban water challenges in the local city context, specifically in relation water distribution affected by various human and external factors, such as seepage and rising sea levels. The main issue is dealing with water abundance caused by problems with local water storage, infiltration, and similar factors, which impact infrastructure like streets, homes, and critical systems such as utilities. The city's location within a river basin adds additional direct and indirect influences on its water conditions.

Sudden high-water events—such as flooding from rivers, the sea, or heavy local rainfall—require proactive measures to reduce risks to city infrastructure, assets, and public housing. On the other hand, water shortages can also pose problems, including infrastructure damage and increased risk of wildfires in Central Europe. **A common goal** is to build better information and understanding about soil moisture and groundwater conditions before extreme events occur.

The primary goal is to improve urban water management and boost resilience against climate change by leveraging smart technologies like satellites and data science. This includes regular monitoring of various aspects of the urban water cycle, such as soil moisture, groundwater levels, and surface water, with a focus on mitigating risks, particularly those related to flooding, wildfires, and water quality issues. In addition to daily monitoring, the project aims to analyze historical trends over several decades, improve and evaluate measures, and develop evolving spatial risk assessment indicators for both water scarcity and abundance. The overarching objective is to create more sustainable and resilient cities that are better equipped to tackle the challenges posed by climate change.

Main Service: Regular (and historical) monitoring of soil moisture, groundwater, and surface water, along with the development of risk indicators for water-related and flood-related crises that may damage city infrastructure and the surrounding rural area.

Additionally, long-term monitoring of water shortages and excess—based on past (spatio-temporal) trends and future climate scenarios for both the local and surrounding regions—is essential to develop sector-specific risk indicators.

Specific Service: Crisis management intelligence, including daily spatial risk indicators and local information, presented in a user-friendly dashboard that is linked to existing crisis response procedures**.**

Test Site Location: Bratislava City (https://maps.app.goo.gl/wq4BhV8TgZgEMXnR8)

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Use Case 3: Rural Drought (Northwest-Central Europe)

Partners: BENEGO (Belgium, Netherlands) , Ministry of Environment SEA (Slovakia) , Ministry of Interior of the Slovak Republic (MoI)

Stakeholders: stakeholders, crisis management organizations/civil protection, national and local water authorities, municipalities and provinces, drinking water companies, agricultural sector representatives, land management organizations, private landowners

Description: Use Case 3 addresses rural challenges related to extreme local climate variability, including periods of intense rainfall and prolonged drought in Northwest and Central Europe. These climate extremes affect seasonal natural and agricultural processes, leading to incidents such as wildfires and reduced or failed crop yields. Unlike Southern Europe, where water scarcity is often structural, the challenges in this region are primarily related to uneven water distribution, which varies from year to year. There is a shared interest in building knowledge about soil and groundwater conditions in advance of extreme events.

The primary objective is to support water management and enhance resilience to climate change through smart technologies, such as satellite data and data science. This involves continuous monitoring of various elements of the rural water cycle, including soil moisture, groundwater levels, surface water, and evapotranspiration (through soil and vegetation/biomass analysis). The goal is to anticipate and mitigate risks associated with rural drought, including wildfires and losses in agricultural production and ecosystem biodiversity.

In addition to day-to-day monitoring, it is crucial to leverage long-term historical data to improve and assess interventions using evolving spatial risk indicators that highlight both water shortages and surpluses. The overarching aim is to foster more resilient rural ecosystems and stable agricultural outputs, thereby increasing preparedness for the impacts of climate change.

Main Service: Continuous (and historical) monitoring of soil moisture and groundwater, alongside the development of risk indicators for drought-related issues that may trigger rapid-onset crises affecting ecosystems and agriculture.

In addition to this long-term climate-based monitoring—grounded in historical spatio-temporal trends and applied to future local and regional river basin climate scenarios—it is essential to develop sector-specific risk indicators for nature conservation and agriculture.

Specific Service: Crisis intelligence on wildfires through daily and spatially explicit risk indicators, supported by both local and regional data. This service will be integrated into an intuitive dashboard for end-users and aligned with existing crisis response protocols. Additional components include assessments of water availability and biomass (as fire fuel) for both natural and agricultural vegetation.

Test Site Location: Kalmthoutse Heide (https://maps.app.goo.gl/qM1kuDvppvBE96bA9)

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Use Case 4: Rural Drought & Flooding (Southern Europe)

Partners: ICGC/IEEC (Spain), Region of Central Macedonia (Greece)

Stakeholders: Crisis organisations/civil protection, national and local waterboards, agriculture and environmental managers

Description: Use Case 4 focuses on rural challenges caused by extreme local climate variations, including intense rainfall and prolonged droughts in Southern European regions. These climate extremes significantly impact seasonal ecosystem processes, particularly in agriculture and forestry, affecting production, biodiversity, and wildfire risks due to changes in biomass, fuel loads, and soil moisture.

The ongoing decline in water availability is creating increasing conflicts over groundwater and surface water use among agriculture, natural ecosystems, industries, and public consumption. Reduced soil moisture and forest degradation further accelerate wildfire spread and make ecosystem recovery—such as addressing soil degradation and erosion—more difficult. At the same time, extreme rainfall events are becoming more unpredictable, heightening flood risks in densely populated coastal areas and river basins with limited water management capacity. These dual challenges highlight the urgent need for improved water management strategies and climate resilience planning.

A key objective is to identify, monitor, and map soil moisture (both surface and subsurface), root zone conditions, and groundwater levels (including aquifer resources). These indicators are essential for detecting environmental changes, assessing their impact, and evaluating soil capacity and forest stress levels. This approach supports real-time (daily) monitoring and enables the development of effective mitigation and adaptation policies based on weather patterns and climate variability. Additionally, since the rural water balance is primarily driven by evapotranspiration, regular monitoring of soil conditions and vegetation biomass is crucial.

Effective risk management requires assessing and mitigating climate hazards through proactive strategies. This includes reducing vulnerabilities, limiting exposure, and addressing potential threats before they escalate—key elements in disaster prevention.

Beyond real-time monitoring, analyzing long-term trends over past decades and continuously improving spatial risk assessment indicators for both water scarcity and excess is vital. The overarching goal is to develop more climate-resilient rural ecosystems and ensure stable agricultural production in the face of changing climate conditions.

Main Services:

- Continuous monitoring of soil moisture (surface, subsurface, and root zone), groundwater, and evapotranspiration levels.

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- Integration of smart meteorological data and Earth observation datasets (spectral analysis) to develop risk indicators for drought-related crises affecting agriculture and ecosystems.
- Long-term climate monitoring based on past spatio-temporal trends to forecast future climate scenarios and assess risks in different sectors (agriculture, forestry, and natural ecosystems).

Specific Services:

- Water availability and biomass/production monitoring for both natural and agricultural vegetation.
- Daily wildfire and flood risk intelligence, using spatial risk indicators combined with local and regional data, presented in a user-friendly dashboard that integrates existing crisis management procedures.
- High-resolution heat balance monitoring, particularly for wildfire prediction and post-fire forest health assessments (e.g., detecting reduced resilience against diseases).
- Monitoring of river basin streambed changes to track long-term hydrological shifts.
- Assessment of drought impacts on agricultural production.

Test Site Location : Catalunya Region (https://maps.app.goo.gl/M6znxAHGY3KKzu496)

Use Case 5 : Rural Drought & Flooding (Northern Europe)

Partners: Klimatorium (Denmark), THW (Germany)

Stakeholders: HDSR Waterauthority (The Netherlands), National and local waterboards, Utility sector, agriculture/nature managers, Crisis organisations/civil protection, small rural city managers.

Description: Use Case 5 focuses on rural challenges caused by extreme fluctuations in groundwater levels—both excessively high and low (also known as shallow groundwater conditions). These extremes create various land-use problems and impact city infrastructure, utilities, and crisis response efforts.

A major concern is that fluctuating soil moisture levels cause seasonal and long-term shifts in the ground surface, leading to both subsidence and uplift. These height variations—occurring over seasons (hysteresis) and over decades (gradual land subsidence)—can result in structural damage to rural and urban infrastructure. In particular, extreme moisture conditions in peat-rich soils (often mixed with clay or sand) can trigger irreversible organic oxidation, increasing the risk of underground peat fires. Additionally, high groundwater levels can cause seepage into wastewater systems, overloading sewers and leading to significant operational challenges.

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Key Objectives:

- Identifying, monitoring, and mapping soil moisture (both surface and subsurface), root zone conditions, and groundwater levels to understand the seasonal and long-term effects of extreme soil moisture fluctuations and surface water dynamics.
- Supporting real-time (daily) monitoring and developing adaptive and reactive mitigation strategies based on weather patterns and climate variability.
- Assessing land use and biomass changes in relation to evapotranspiration, which plays a critical role in the rural water balance.

Risk Management & Climate Resilience:

In extreme scenarios—such as underground peat fires or severe flooding—effective risk management requires proactive measures, including reducing vulnerabilities, limiting exposure, and addressing potential threats before they escalate. This contributes to better preparedness and crisis response capabilities.

Beyond real-time monitoring, analyzing historical trends over multiple decades is essential for improving risk assessment and evaluating long-term mitigation strategies. Developing spatial risk indicators for both water scarcity and excess is crucial to ensuring resilient rural ecosystems and stable agricultural production in the face of climate change.

Main Services:

- Continuous monitoring of root zone soil moisture, vegetation health, groundwater levels (including evapotranspiration), and surface water conditions using smart meteorological (spatio-temporal) inputs.
- Development of risk indicators for drought and flood-related crises affecting agriculture, ecosystems, and rural infrastructure.
- Long-term climate monitoring to analyze historical trends and forecast future water availability in local and regional river basin areas, helping to create sector-specific risk indicators (agriculture, nature conservation, and rural infrastructure).

Specific Services:

- Long-term rural subsidence monitoring (over decades) to track land stability.
- Sector-based risk indicator monitoring for both slow-onset (long-term) and fast-onset (emergency) events such as fires and floods.
- Crisis intelligence systems that provide real-time, spatial risk indicators and local insights, integrated into a user-friendly dashboard that supports existing crisis response procedures.

Funded by the European Union

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Test Site Location : Klimatorium (Denmark) (https://maps.app.goo.gl/zgfxhHi2YyRnTgD47) & Central Nederlands HDSR/Zegveld (https://maps.app.goo.gl/Fs4DBEsFziJHM2Cr6)

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