PCP WISE

Climate & Water Resilience – The Role of Earth Observation & digital technology

PCP-WISE Webstival – Webinar 5

23 April 2025 – 10:00-11:30

Funded by the European Union

This project has received funding from the Horizon Europe Framework Programme (HORIZON) under grant agreement N° 101182917

The PCP WISE Webstival

Webinar 4 - Scaling Water Innovation – The Private Sector & Venture Capital Perspective

22 April 10h-11h30

Webinar 5 - Climate Resilience & Water Innovation – The Role of EO & digital technology

23 April 10h-11h30

Webinar 6 – Closing Webinar

28 April 15h-16h30

Watch previous webinars on the PCP WISE website www.pcp-wise.eu

Housekeeping rules

Welcome to the 5th PCP WISE Webstival Webinar!

Here's how to make the most of the session:

- 🔇 **Stay Muted** – Please keep your mic off unless invited to speak.
- 💬 **Use the Chat** – Questions? Thoughts? Drop them in the chat anytime!
- 🙋 **Raise Your Hand** – Want to speak? Use the raise hand ✋ feature.
- 📸 **This session is recorded** – So we can share the magic with others later!
- 📹 **Cameras Optional** – Feel free to keep your camera on if you'd like—we love seeing your faces!
- 🌍 **Be Respectful** – We're an inclusive, global community—let's keep it kind and constructive.

Agenda

10:00 – 10:10	**Welcome & Introduction** by Rocío Beneyto Calvo, Barrabés, PCP WISE Project Coordination Team
10:10 – 10:20	**PCP-WISE's upcoming Open Market Colsultation** by Joost Buntsma, Het Waterschapshuis, PCP-WISE
10:20 – 10:30	**Regional Resilience – Lessons learned from the Pathways2Resilience project** by Laura Pando, Climate KIC, Pathways2Resilience
10:30 – 10:45	**Impact of Climate Change on Water Resilience** by Hans van Leeuwen, STOWA
10:45 – 11:05	**Showcasing Solutions: NBRACER conceptual model for implementing Nature Based Solutions** by Ignacío Perez Silos, University of Cantabria, NBRACER
11:05 – 11.20	**Showcasing Solutions: the VALORADA project – EO for place-based climate resilience** by Cristobal Reveco, GERICS, VALORADA & Marc Tondriaux, TerraNIS, VALORADA
11:20- 11:30	**Q&A and wrap up**

Welcome & Introduction

Rocío Beneyto Calvo, Barrabés, PCP WISE Project Coordination Team

10:00 – 10:10

PCP WISE general overview

PCP-WISE is an innovative project aimed at **developing cutting-edge solutions (up to TRL 8) for water management** and climate resilience across Europe using the **Pre-Commercial Procurement (PCP) instrument**. By leveraging **space technology and Environmental observation data**, PCP-WISE seeks to address critical challenges related to **floods, fires, and infrastructure impacts both in rural and urban areas**. This collaborative effort brings together public buyers, research institutions, and industry experts to create and implement advanced climate services that will **enhance Europe's ability to adapt to and mitigate the effects of climate change**.

PCP WISE Consortium

- EU-funded project via Horizon Europe Programme
- Builds on the preparatory action from PROTECT project
- 26 partners covering 9 countries
- 11 Public buyers and 15 support partners
  - Lead buyer: hetWaterschapshuis
  - Project coordination: Barrabés
- Duration: 36 months
- Overall budget: €19M

Project’s mission and objectives

1

Innovative Solutions

Develop and test state-of-the-art technologies for climate adaptation using space and Earth observation data

2

Cross-Border Collaboration

Foster cooperation between regional water management, cities, communities, and crisis organisations across EU Member States

3

Enhanced Information System

Create common operational information products on local and regional water, soil, and climate systems to improve decision-making

4

Demand-driven Approach

Establish an active user network for exchange, validation, and continuous improvement of climate services through the PCP approach

Expected results

Scientific Impact	Economic Impact	Societal Impact
Advanced soil-water balance insights based on space information	Cost savings through improved risk prevention and mitigation	Enhanced climate change preparedness for communities
Long-term event forecasting for water and crisis management	New business opportunities in climate services sector	Increased resilience of urban and rural areas to climate risks
Contribution to Earth observation systems and climate science	More efficient resource allocation in water management	Improved public safety through better crisis response

Purpose of the PCP WISE Webstival

- Kick off the PCP WISE innovation procurement journey
- Create awareness about the upcoming PCP tender
- Bring together all project target audiences
- Lay the groundwork for a collaborative and transparent process
- Inspire market engagement for smarter, water-wise solutions

Presenting the upcoming OMC

Joost Buntsma, Het Waterschapshuis, PCP-WISE

10:10 – 10:20

Overview of the Open Market Consultation (OMC) activities

- Purpose of the OMC
- Timeline / dates
- Possible outcomes

Purpose of the PCP WISE OMC

- **Exchange of information** PCP WISE consortium and market, v.v.
- **Dialogue** with market entities on the feasability of the PCP WISE-objectives
  - Technical feasibility?
  - Realisation within the time frame? and
  - Within the proposed budget?

--> See the OMC-document and the EU-survey / RFI

- **Dialogue** with buyers group:
  - Questions and answers from market entities
  - PCP is a competition with level playing field
  - All given information will be public

--> See Q&A's website and e-platform, OMC document

Purpose of the PCP WISE OMC

Buyer objectives:

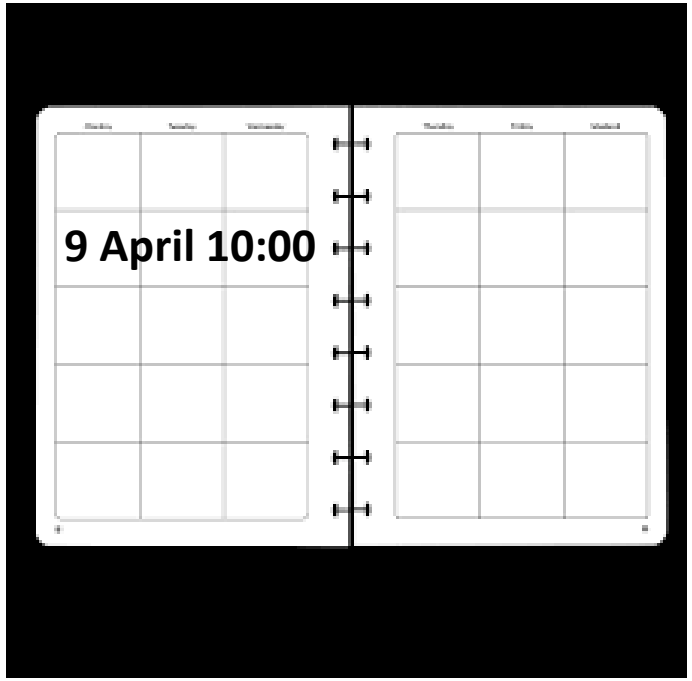
1. Express the Public Buyers requirements to the market.
2. Validate the findings of the State-Of-The-Art (SOTA) analysis and the viability of the set of technical and financial provisions.
3. Obtain information on existing (or to be developed) technologies.
4. Raise awareness of the industry and relevant 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. Explain innovation procurement aspects to the market (including IPR related issues).

Benefits for participants:

1. By providing information, the call to tenders will be tailored to the needs and capabilities of the market as a whole
2. Participation in the events allows you to connect with other suppliers that are part of the consortium
3. Gain early insights in the needs of PCP WISE to anticipate on the future call for tenders
4. It allows you to verify early ideas for a solution with the public buyers

Where are we and important dates?

- **PIN and OMC-document**
  - Published on TED, website and our e-Platform
- **Webstival**
  - several webinars in april
- **Info day(s)**
  - 28th May
- **Open Market Consultation**
  - Webinar 3rd June
  - Hybrid event 12th June during Expandeo in Brussel
- **Tender documents**
  - Publishing 5th September



Possible OMC-outcomes

- Refinement of the objectives
- Refinement of budget
- Refinement of timeline
- Stop the procurement procedure

- Results to be public in the OMC- document and Tender documents.

Regional Resilience – Lessons learned from the Pathways2Resilience project

Laura Pando, Climate KIC, Pathways2Resilience

10:20 – 10:30

Pathways2Resilience

Co-developing adaptation pathways towards resilient regions in Europe

Laura Pando Martínez

Climate-KIC, Co-Coordinator of P2R

23rd of April 2025

Funded by the European Union under grant agreement No 101093942. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or of CINEA. Neither the European Union nor the granting authority can be held responsible for them.

What is the Pathways2Resilience project?

Pathways2Resilience contributes to the implementation of the Mission Adaptation objectives

- Empowers at least 100 regions and communities to design pathways to climate resilience
- Total budget: 29,609,362.50 EUR from which 21M EUR is reserved for funding regional projects through public calls
- Duration: 5 years

Mission Objectives

Starts M1
Jan 2023

Current = M28
Apr 2025

Ends M60
Dec 2027

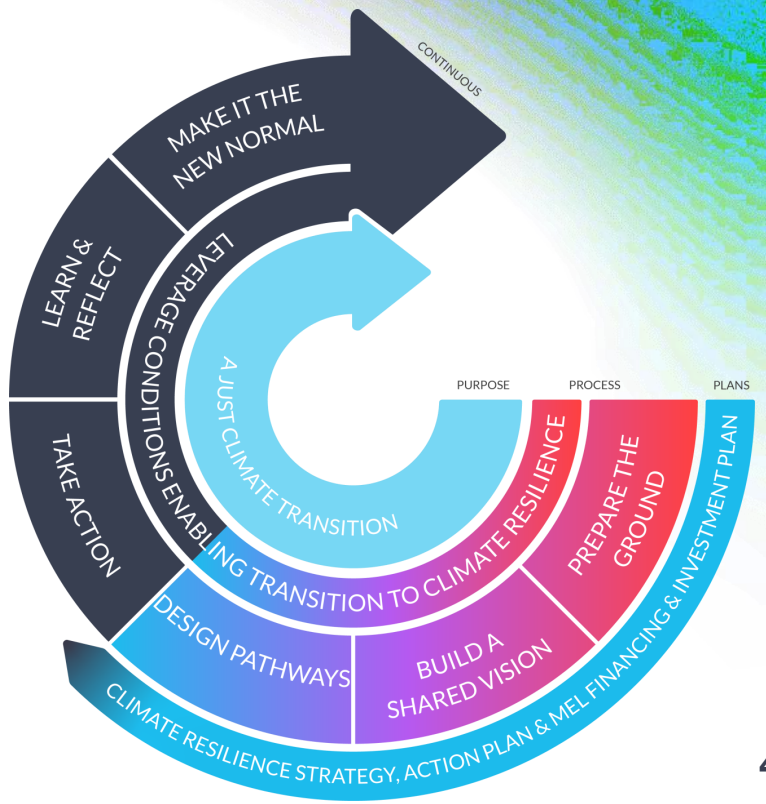
PATHWAYS2RESILIENCE

Pathways2Resilience accelerates climate adaptation in Europe

The Pathways2Resilience programme will allocate €21M in sub-grants via two open calls to support at least 100 European regions and communities to co-design pathways towards a climate-resilient future, while providing them with support services and capacity-building activities

The Pathways2Resilience programme's transformational adaptation framework – the **Regional Resilience Journey**, will guide regions and communities through different steps to accelerate their path towards climate resilience, resulting in the creation of:

- A Climate Resilience Baseline Assessment
- A Climate Resilience Strategy
- A Climate Resilience Action Plan
- A Climate Resilience Investment Plan



PATHWAYS2RESILIENCE

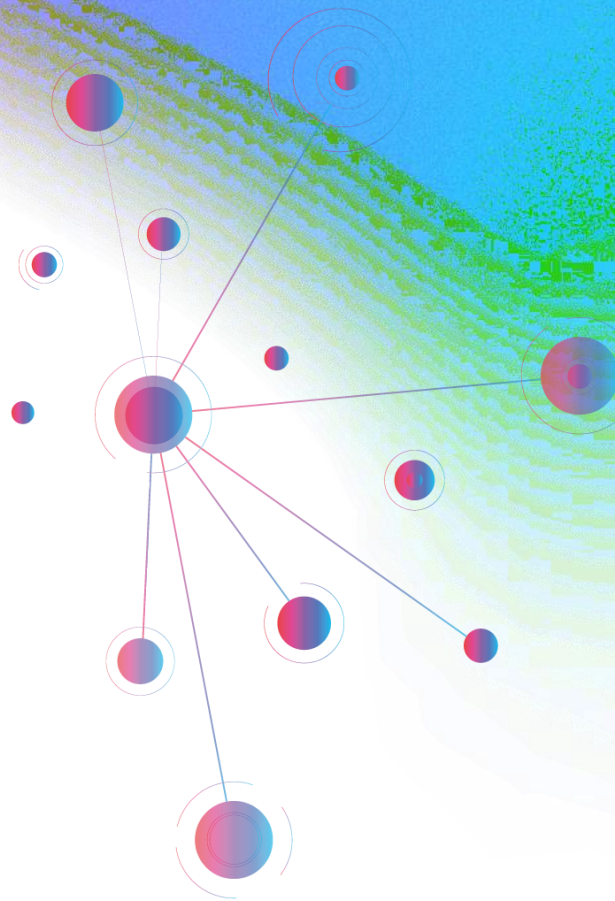
Pathways2Resilience objectives and results

Objectives and key results

- Support 100 regions and communities in designing/improving their **strategies for achieving climate resilience**, including:
  - Description of different **pathways to climate resilience** (including adaptation options)
  - Formulation of an **innovation agenda** and a portfolio of innovation actions
  - Development of a **finance and investment plan**

- **Enhancing the capacity and capabilities** of the 100 regions and communities to continue to lead on their own transition to climate resilience

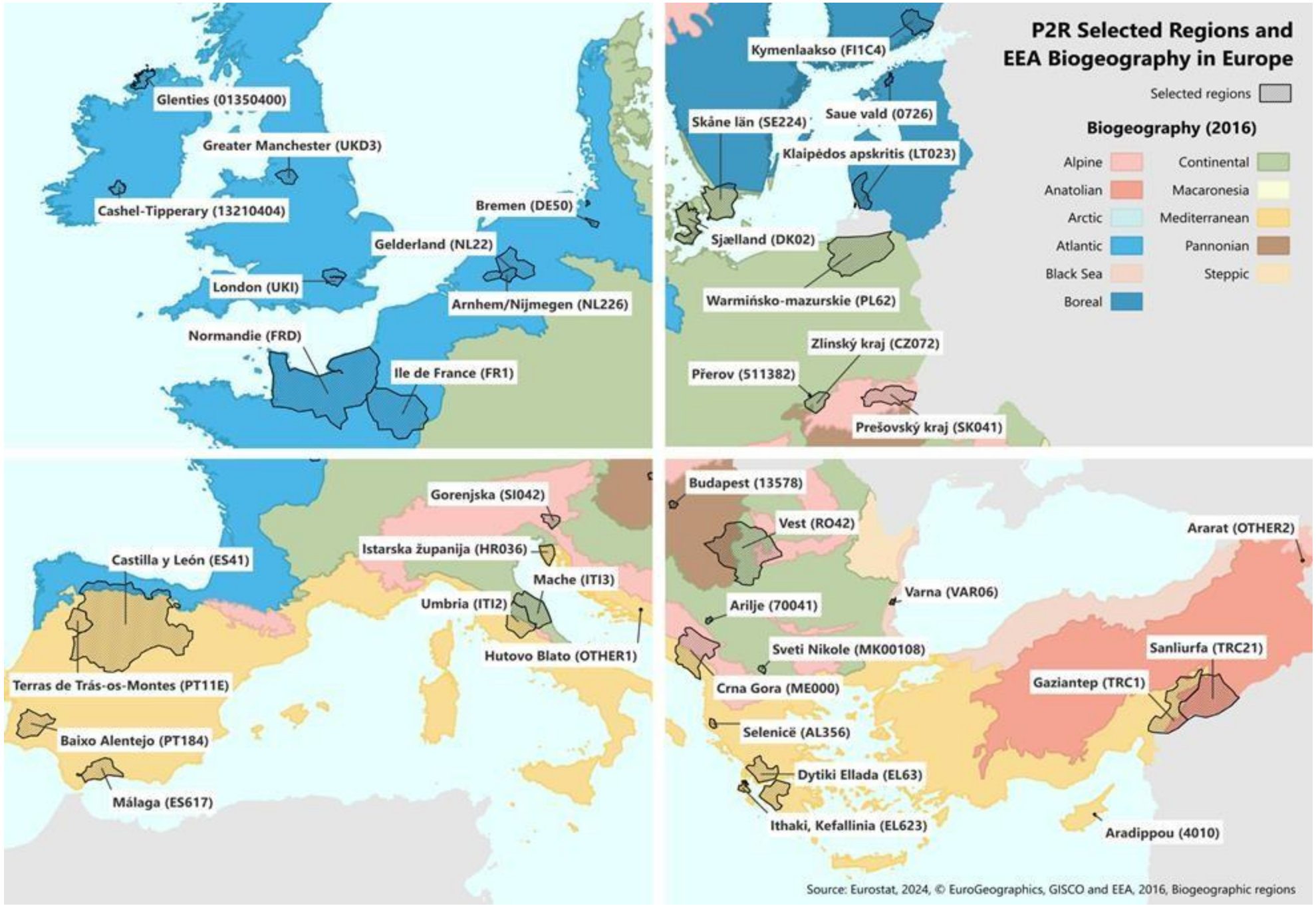
- **Develop, test and validate the Regional Resilience Journey framework, support, and capacity building approach**, learning from the 100 regions and communities



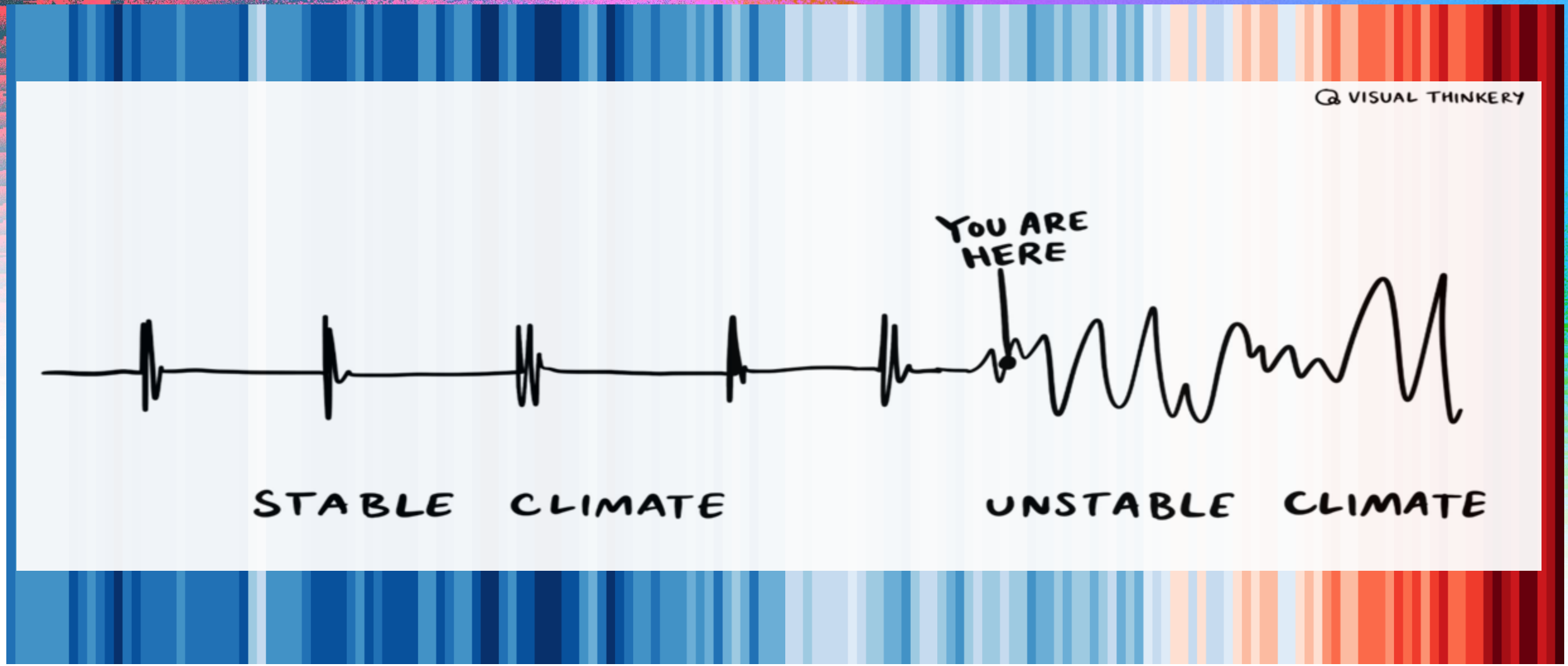
First cohort of regions and communities

Pathways2Resilience first cohort of regions and communities

- The first call for regions and communities was open between November 2023 and May 2024
- 164 applications from 35 countries were received
  - Five applications came from Poland
- First cohort of 40 regions and communities were announced on 18 September. It comprises regions and communities from 30 countries.


P2R Selected Regions and EEA Biogeography in Europe
Selected regions
Biogeography (2016)
Alpine
Anatolian
Arctic
Atlantic
Black Sea
Boreal
Continental
Macaronesia
Mediterranean
Pannonian
Steppic
Glenties (01350400)
Greater Manchester (UKD3)
Cashel-Tipperary (13210404)
Bremen (DE50)
Gelderland (NL22)
London (UKI)
Arnhem/Nijmegen (NL226)
Normandie (FRD)
Ile de France (FR1)
Kymenlaakso (FI1C4)
Skåne län (SE224)
Saue vald (0726)
Klaipėdos apskritis (LT023)
Sjælland (DK02)
Warmińsko-mazurskie (PL62)
Zlínský kraj (CZ072)
Přerov (511382)
Prešovský kraj (SK041)
Gorenjska (SI042)
Istarska županija (HR036)
Castilla y León (ES41)
Mache (ITI3)
Umbria (ITI2)
Hutovo Blato (OTHER1)
Terras de Trás-os-Montes (PT11E)
Baixo Alentejo (PT184)
Málaga (ES617)
Budapest (13578)
Vest (RO42)
Ararat (OTHER2)
Varna (VAR06)
Arilje (70041)
Sveti Nikole (MK00108)
Crna Gora (ME000)
Sanliurfa (TRC21)
Gaziantep (TRC1)
Selenicë (AL356)
Dytiki Ellada (EL63)
Ithaki, Kefallinia (EL623)
Aradippou (4010)
Source: Eurostat, 2024, © EuroGeographics, GISCO and EEA, 2016, Biogeographic regions

P2R's approach



PATHWAYS2RESILIENCE

@ ¥ISUAL THIdKE#ț

IT'S EASY TO THINK THE WORLD IS XED.

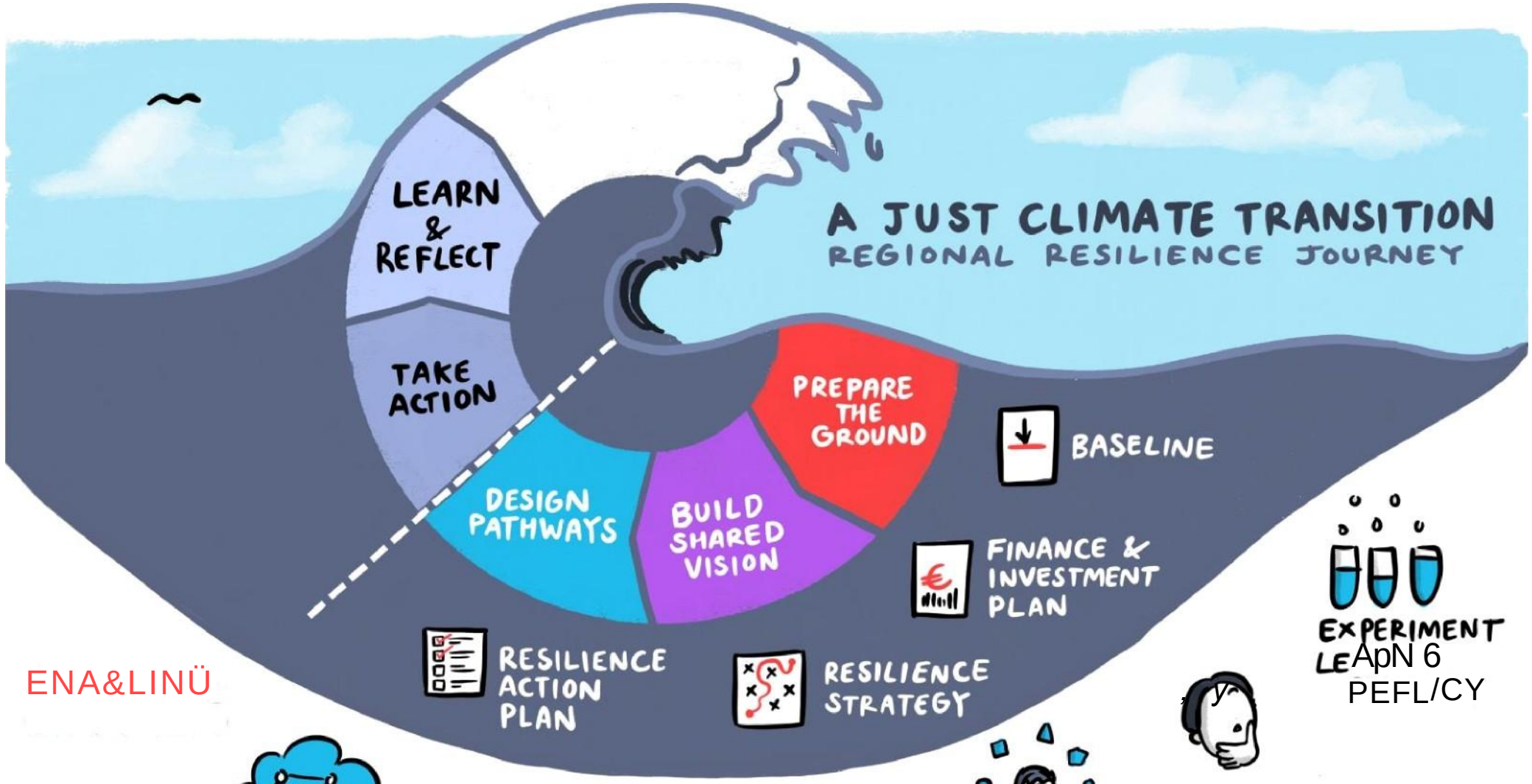
gUY HUNAMS
HAVč 4LwATS

ADAPTED

WE SURVIVE AS A SPECIES BY CHANGING.

PATHwA'rs2RE OILIENCE

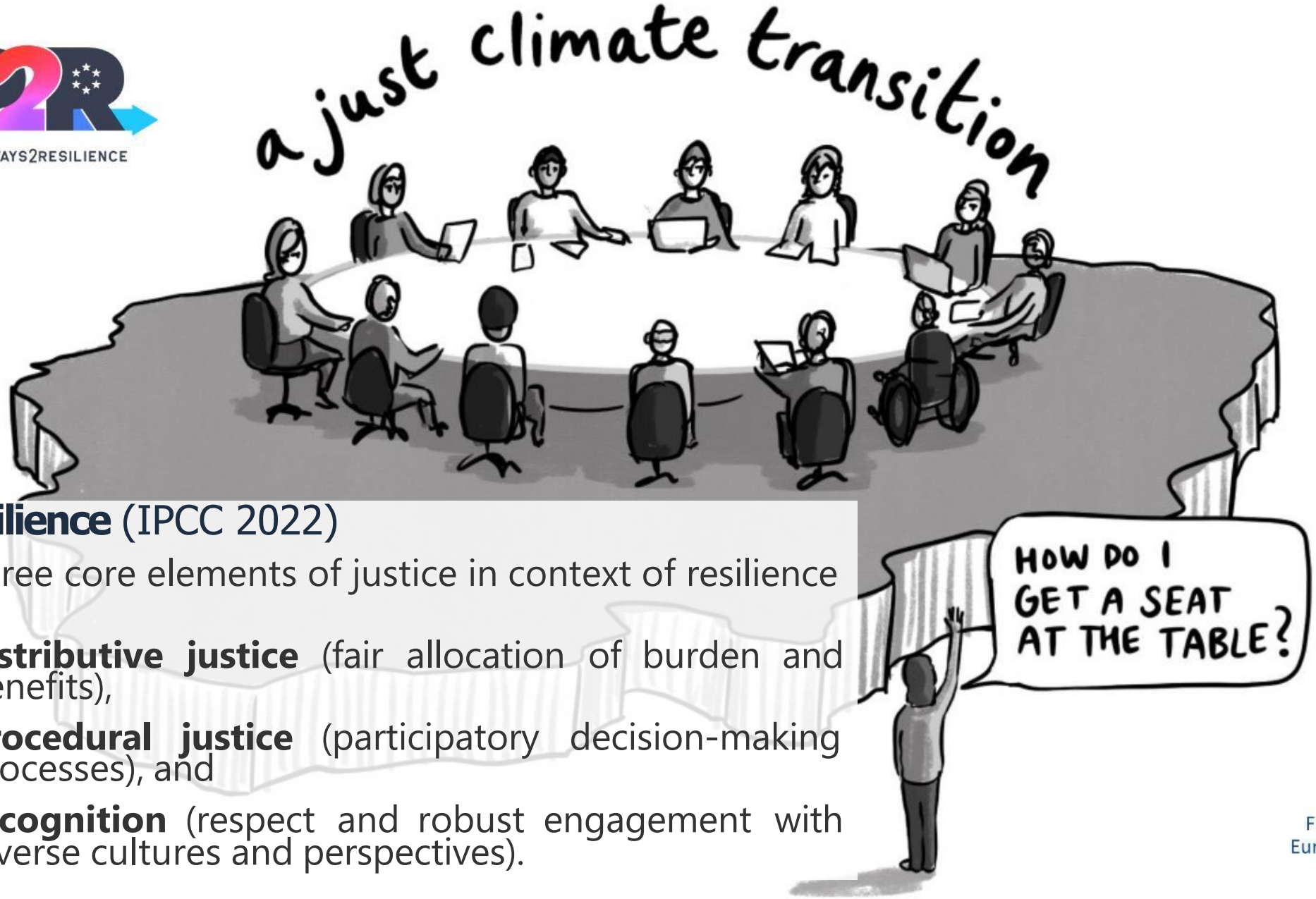
Funded by the European Union



Funded by the European Union

PATHWAYs 2RESILIENCE

PATHWAYS2RESILIENCE



Just resilience (IPCC 2022)

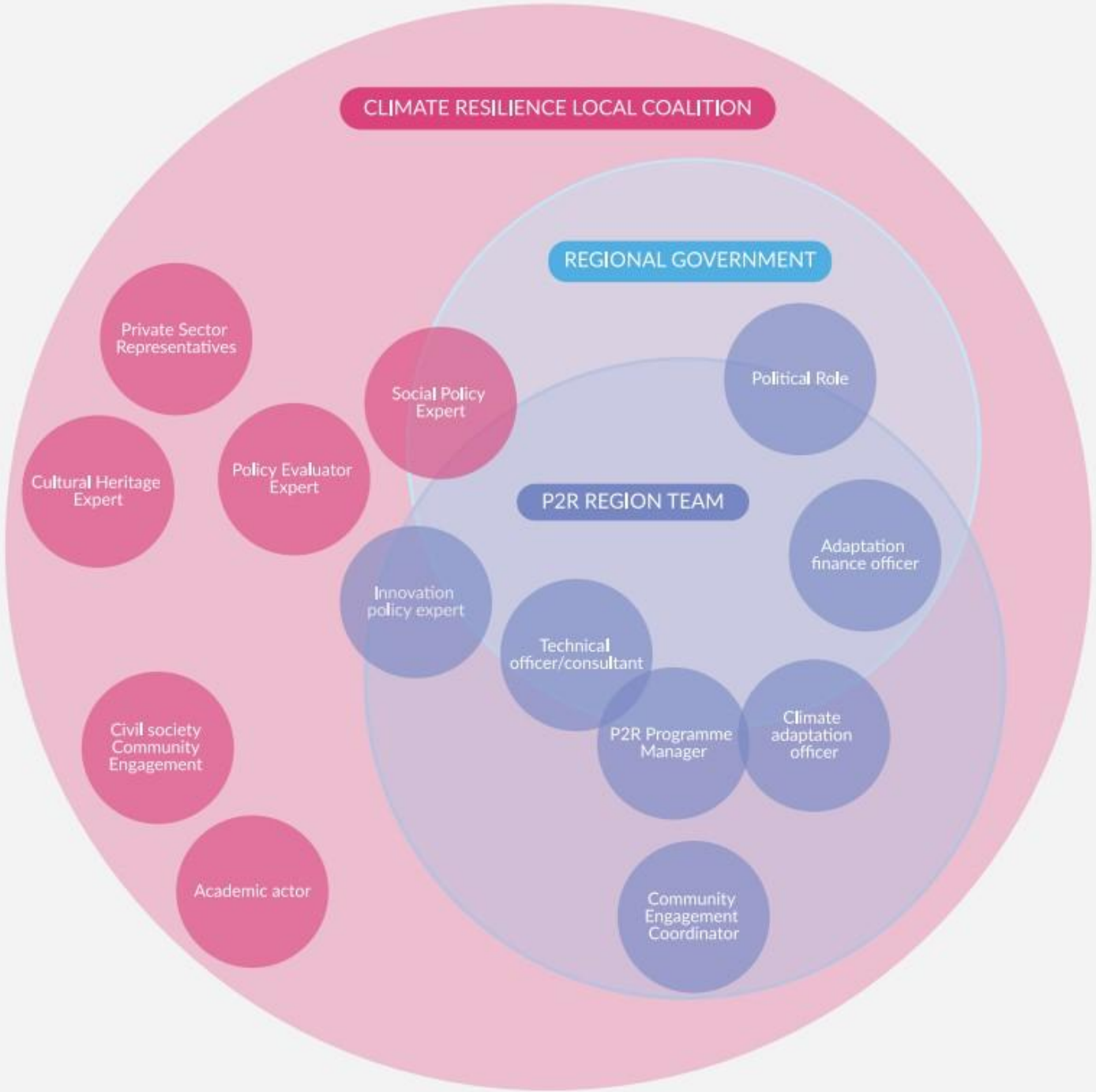
The three core elements of justice in context of resilience are:

- **distributive justice** (fair allocation of burden and benefits),
- **procedural justice** (participatory decision-making processes), and
- **recognition** (respect and robust engagement with diverse cultures and perspectives).

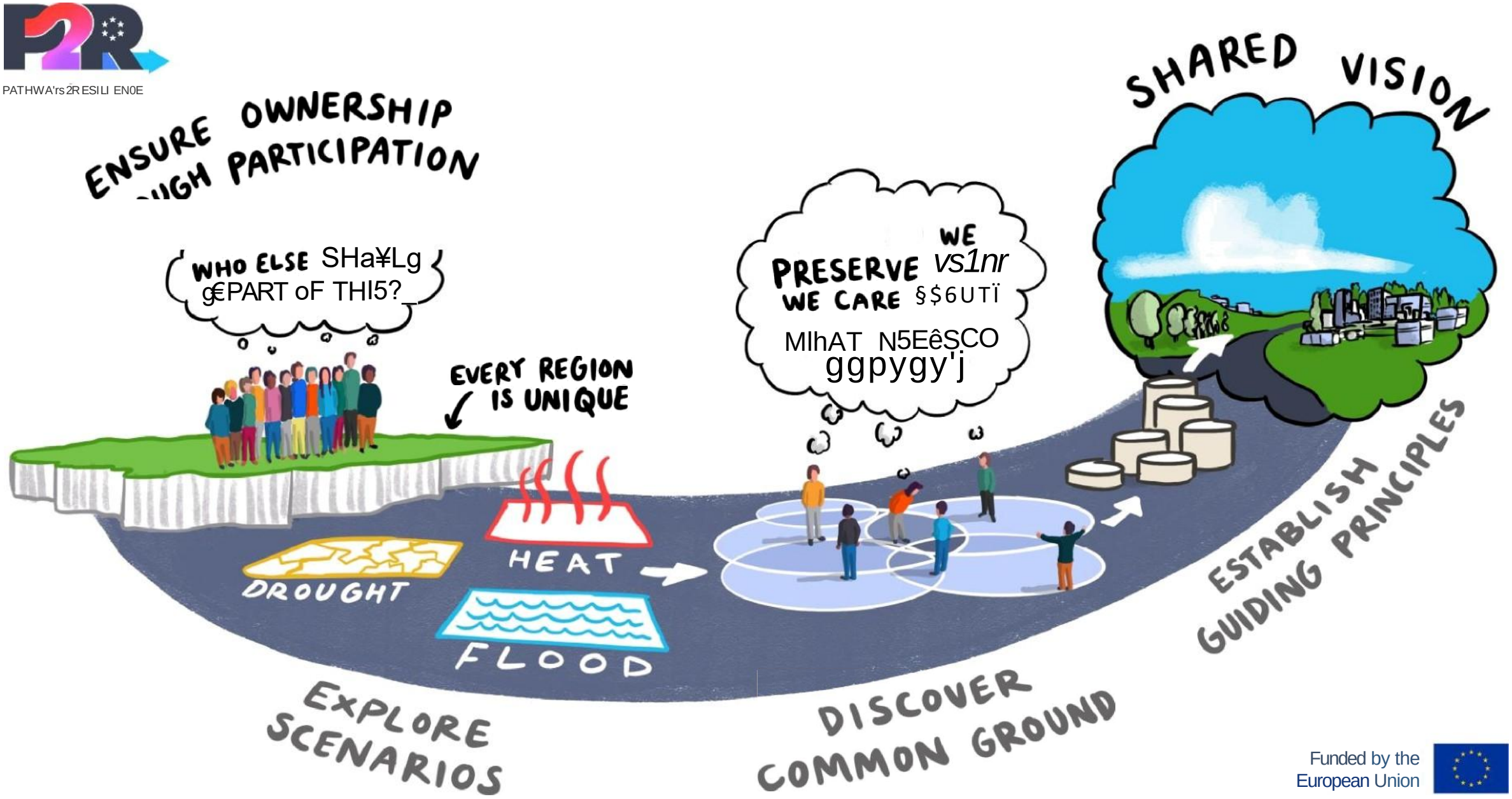
Funded by the European Union

WHO NEEDS TO BE INVOLVED?

Transformative adaptation cannot be achieved by one single person or team. It will require a deeply collaborative and participatory approach that must involve different functions, roles and teams across the local authority, as well as many relevant socioeconomic actors and civic groups.



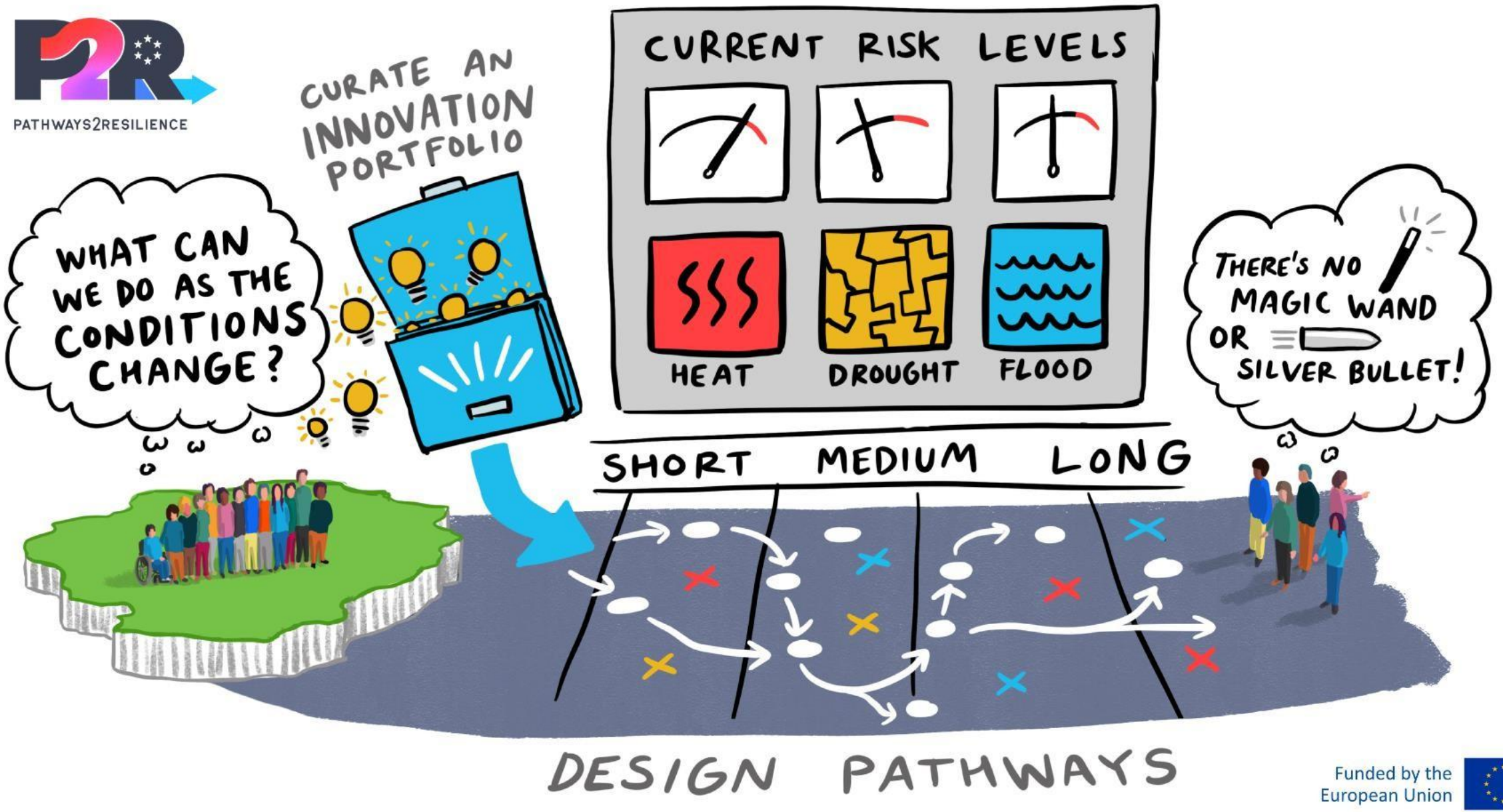
PATHWA'rs2RESILI EN0E



Funded by the European Union

VISU c TNlVrEFj

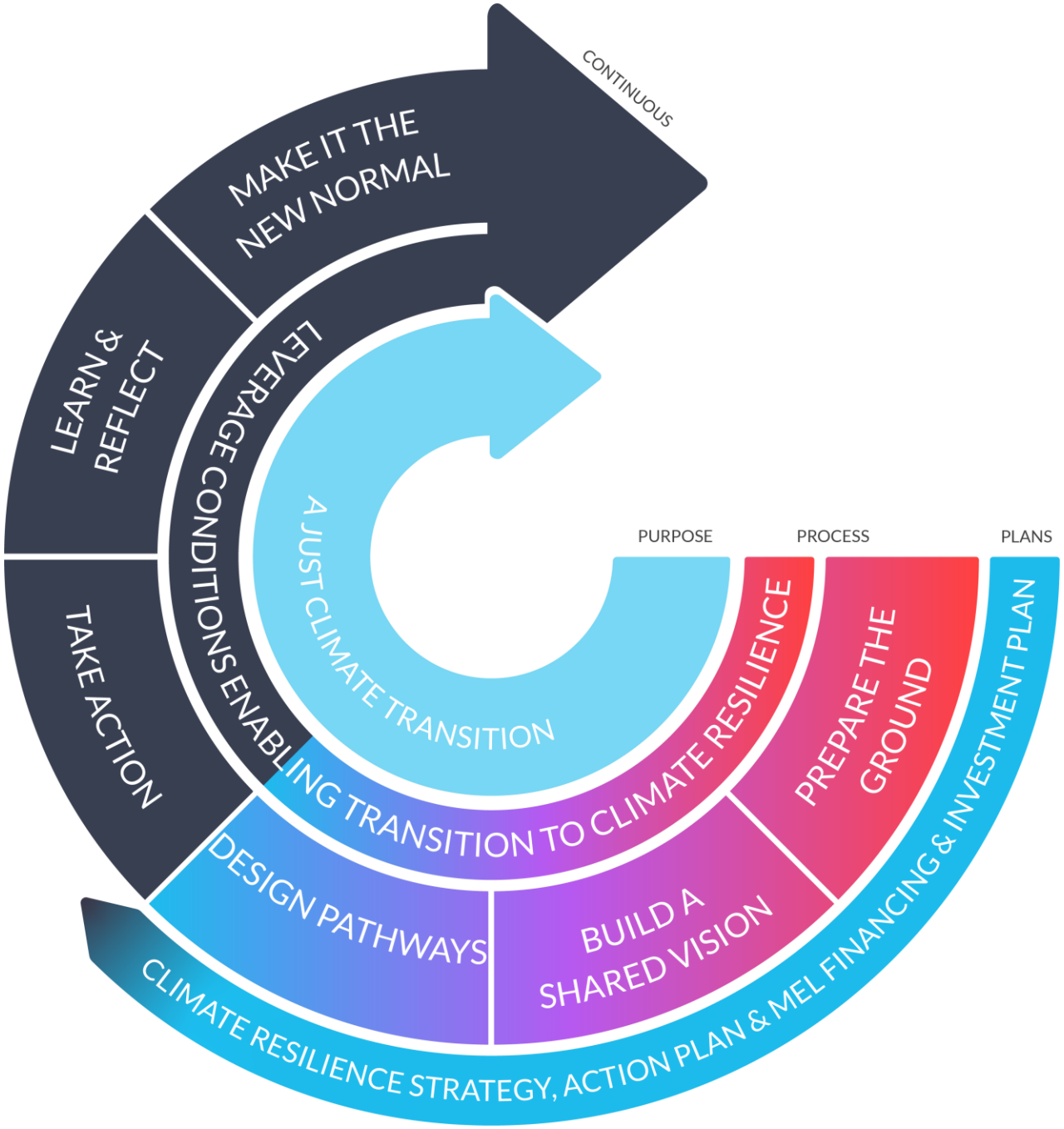
Foster systemic shifts that promote long-term prosperity in the face of climate change



Funded by the European Union

P2R Frameworks & Service Provision

The Regional Resilience Journey



The Regional Resilience Journey

PATHWAYS2RESILIENCE

Phase 1: Prepare the ground

- **1.1 Establish a Baseline**
  - 1.1.1 Gather an evidence base
  - 1.1.2 Frame the problem
- **1.2 Understand the System**
  - 1.2.1 Map relevant system(s)
  - 1.2.2 Identify stakeholders
- **1.3 Assess Risks & Vulnerabilities**
  - 1.3.1 Assess climate risks
  - 1.3.2 Assess capabilities

Phase 2: Build a shared vision

- **2.1 Ensure ownership & commitment**
  - 2.1.1 Secure high-level support
  - 2.1.2 Foster engagement
- **2.2 Explore possibilities futures**
  - 2.2.1 Explore possibile climate resilient futures
- **2.3 Co-Create Shared Vision**
  - 2.3.1 Co-create shared vision for the transition to climate resilience
- **2.4 Develop a Theory of Change**
  - 2.4.1 Reflect on how change is supposed to happen

Phase 3: Design Pathways

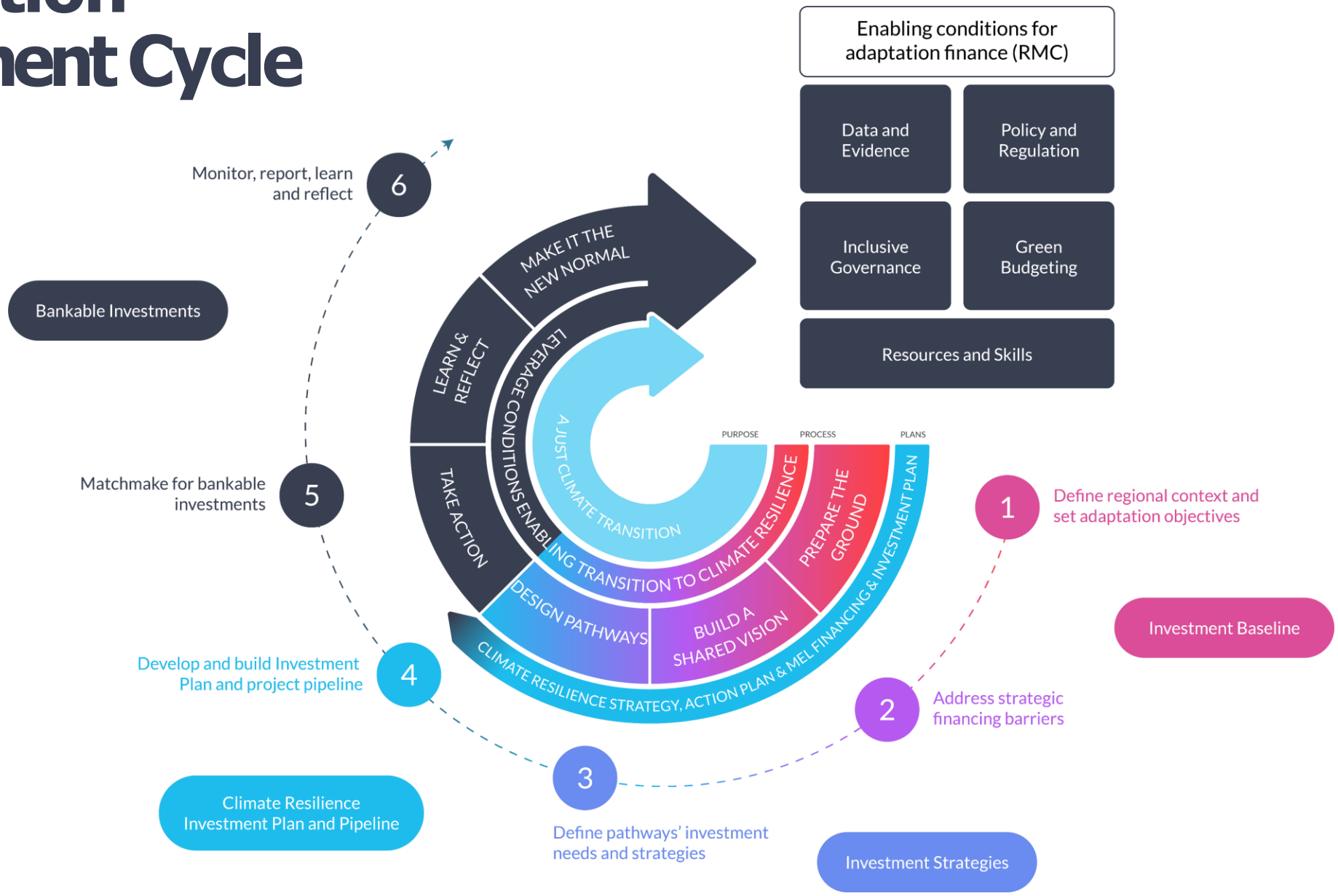
- **3.1 Identify & Assess Options**
  - 3.1.1 Identify options for adaptation pathways
  - 3.1.2 Assess the effectiveness of options for adaptation pathways
- **3.2 Design Portfolio of Interventions**
  - 3.2.1 Formulate pathways to climate resilience
  - 3.2.2 Evaluate pathways to climate resilence
  - 3.2.3 Develop a portfolio of innovation actions
- **3.3 Preparing for Implementation**
  - 3.3.1 Develop action plant to implement your cliamte resilience strategy
  - 3.3.2 Develop a monitoring, evaluation and learning plan

Knowlege & Data | Governance, Engagement, & Collaboration | Finances & Resources | Capabilities & Skills | Behavioral Change | Experiment, Learn &

Leverage Conditions Enabling Transition to Climate Resilience

- Baseline Assessment
- Climate Resilience Strategy
- Climate Resilience Action Plan
- Climate Resilience Investment Plan

Adaptation Investment Cycle



PATHWAYS2RESILIENCE

Pathways2Resilience technical guidance

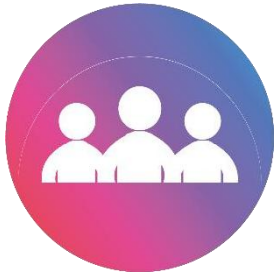
The Pathways2Resilience technical guidance comprises several documents, of which two are key:

- Developing Regional Climate Resilience Strategies and Action Plans
- Developing Regional Climate Resilience Investment Plans

These documents are the pillars of the P2R programme, designed to support you in the deployment of your Regional Resilience Journey framework and the Adaptation Investment Cycle.

PATHWAYS2RESILIENCE

Pathways2Resilience support programme



These practical sessions are designed to build the technical capabilities that regions will need to complete their Climate Resilience Strategy, Climate Resilience Action Plan and Climate Resilience Investment Plan, through novel learning experiences focusing on climate adaptation.

GROUP TRAINING SESSIONS

These are dynamic, interactive working groups that play a crucial role in fostering collaboration and strategic thinking among regions and communities. Organised around specific themes, the groups will engage a broad range of regional experts, citizen groups and practitioners to address key community systems in need of adaptation and the key enabling conditions underpinning transformative change.

INNOVATION PRACTICE GROUPS

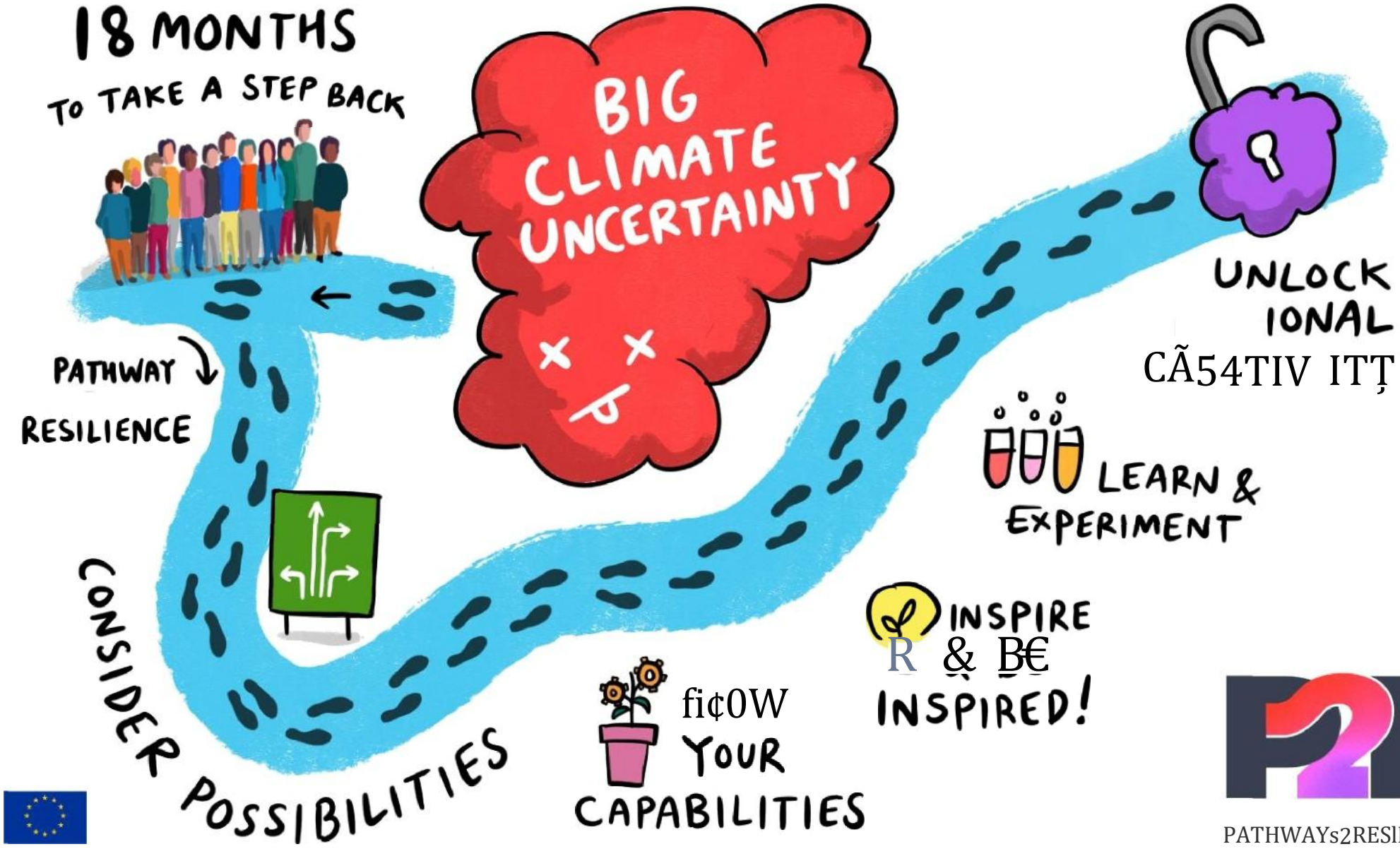
Pathways2Resilience support programme

A peer-led mentoring programme will facilitate learning and knowledge exchange between regions and communities at different stages in their Resilience Journeys. It will foster knowledge flows among the Pathways2Resilience participants in a self-organised, self-motivated, and decentralised way after the programme ends.

PEER-TO-PEER MENTORING

The toolbox contains the tools and materials for developing the Climate Resilience Strategy, Climate Resilience Action Plan and Climate Resilience Investment Plan, as well as additional relevant resources. These will help regions understand what they need to do at each stage of the Regional Resilience Journey and how to meet those objectives. . The toolbox allows you to find tools and resources using different filters, such as your resilience maturity and other needs: for example, specific climate hazards, type of tool, and language.

CLIMATE TOOLBOX



Funded by the European Union

PATHWAYs2RESlLlENCE

@ VlSunk TiJidxEEY

Emerging learning

Emerging learning

- Central support platform approach has provided very high-quality adaptation planning and finance processes – clear they are state of the art.
- Recognition of the value of sub-grants to enable capacity – very high demand for call.
- Good capacity to absorb them – most regions have arrangements in place to spend the funds.
- Early evidence that mission-based approaches can work. The research community is beginning to 'self organize' – collaboration with many other ongoing projects crowding in support and aligning and refining
- Flexible time allowing us to provide direct support to P2R regions and beyond where value added.

Funded by the European Union under grant agreement No 101093942. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or of CINEA. Neither the European Union nor the granting authority can be held responsible for them.

Emerging learning

- Despite all the support, there's a sense that some regions are struggling to get started. Those who have a clearly defined mandate and regional competencies, paired with pre-existing stakeholder engagement have stepped into it more easily.
- Early challenges in identifying a near-term 'entry point' – where does the RRJ / AIC fit in the context of my region? What are the relevant decisions or discussions where this lands.
- 'Head space' of regions - Making sure comprehensive resource and capacity building approach empowers, rather than overwhelms regions.
- Developing a sense of a 'cohort' – although all regions on the same journey – limited resources in P2R to bring together – may need to address in future.
- Significant capacity building needed on finance – limited understanding and skills on economic and finance, or recognition of the need for early consideration.

Funded by the European Union under grant agreement No 101093942. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or of CINEA. Neither the European Union nor the granting authority can be held responsible for them.

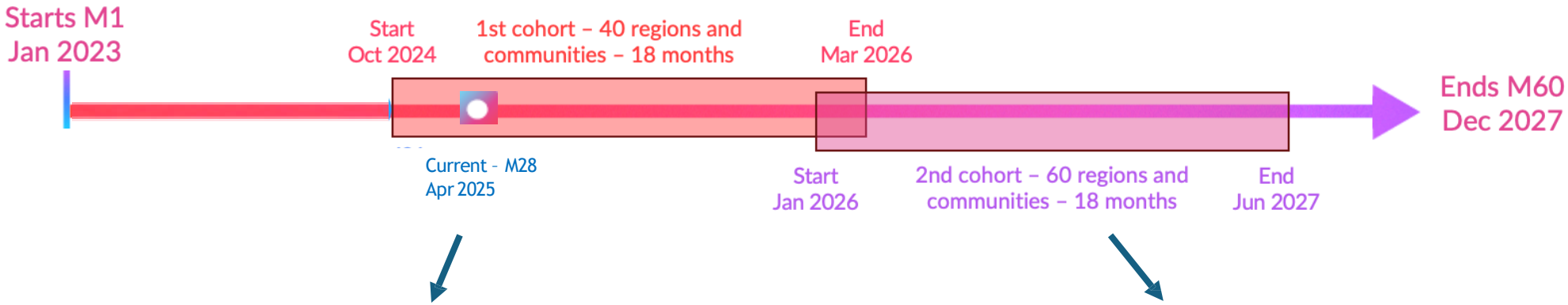
Opportunities ahead

P2R 2nd call

- P2R second call expected to be launched in mid-May 2025 – Regions can express their interest until the 2nd of May at 18:00 CET- EOI
- Goal is to select 60 regions for funding and capacity building program
- Selection process will be refined from the previous experience, check out all previous call information at P2R website

Funded by the European Union under grant agreement No 101093942. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or of CINEA. Neither the European Union nor the granting authority can be held responsible for them.

2nd Call: The estimated timeline



Timeline still indicative

Innovation Practice Groups

2nd IPG week taking place on the 1st week of June (2nd to 6th June 2025)

Critical infrastructure: development of grey and green infrastructure, hybrid NBS, common standards for climate proofing

Land use & food systems: climate risks and vulnerabilities in the food systems, new technologies and business models, upskilling, sustainable diets

Health& Wellbeing: resilience towards health risks resulting from climate risks, protecting vulnerable people

Ecosystems & nature-based solutions: NBS, nature restoration and ecosystem services to achieve climate resilience

Water management: water allocation, innovation in water management, rivers and coastal protection

Local economic systems: climate resilient business models and value chains, re-skilling and up-skilling of professionals under transitions

Behavioural change: use of social tipping points and systemic leverage points to accelerate transformative change.

Finance & Resources: sustainable finance and resources towards adaptation at scale and closing the adaptation gap

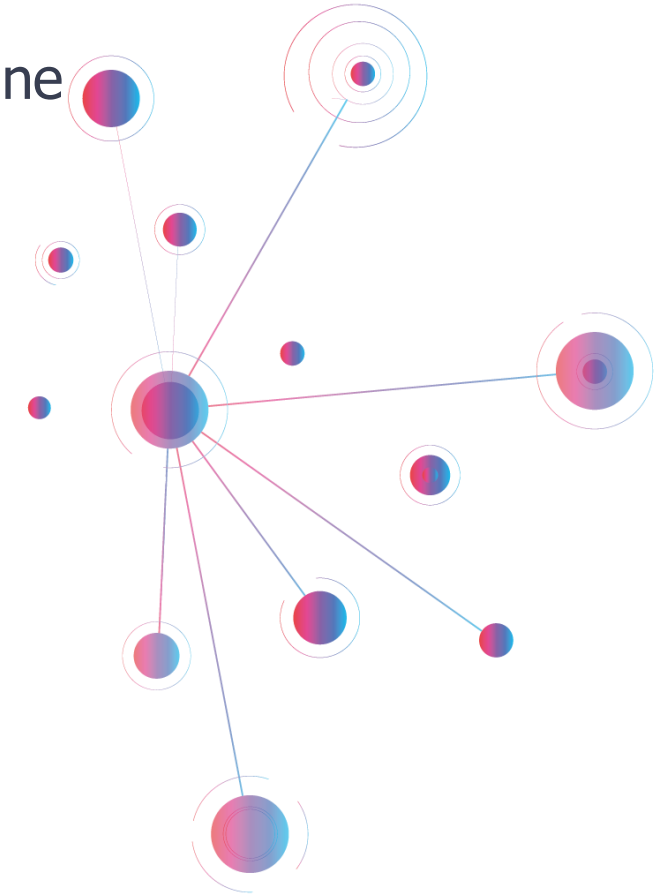
Governance, Engagement & Collaboration: deliberative, meaningful engagement between citizen and stakeholders

Knowledge & Data: incl. Digital services that are critical to manage climate risks

Funded by the European Union under grant agreement No 101093942. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or of CINEA. Neither the European Union nor the granting authority can be held responsible for them.

Other opportunities to connect

- Upcoming P2R visual platform (to be launched in June 2025), where participant regions will profile their work and opportunities to connect and collaborate with other regions/actors.
- Adoption of elements of RRJ and AIC methods as optional adaptation planning process. Could accelerate progress – smaller community with common language may make this possible.
- Experimentation of how innovative approaches can change wider attitudes to transformation.
- Future calls (P2R +, CLIMAAX 2, etc.)



PATHWAYS2RESILIENCE

Pathways2resilience.eu

THANK YOU

laura.pando@climate-kic.org

@Pathways2Resilience

@P2Resilience

hello@pathways2resilience.eu

Funded by the European Union under grant agreement No 101093942. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or of CINEA. Neither the European Union nor the granting authority can be held responsible for them.

Impact of Climate Change on Water Resilience

Hans van Leeuwen, STOWA

10:30 – 10:45

Agenda

- European agenda on climate & water Resilience
- From European to local acting level on Water Resilience
- From Functional to local Information strategy (WISE) by local Actors
- Impact of Climate Change on Water Resilience (WISE) examples
- How WISE could support future local Climate Action in Europe

Climate Change on Water Resilience

- Climate Change in the last decades has a huge impact on our daily lives and forces us to **be better prepared** or resilient for extreme events as a result of this.
- Climate resilience could be defined as the **ability to anticipate, prepare for, and respond to hazardous events**, trends, or disturbances related to climate.
- A relevant portion of hazards in Europe is **water related**. To be more precise they are related to non regular water availability & spatial water distribution.
- In this presentation the **WISE programme is positioned to support local actors** to build and work on climate change related water resilience

European tools to support (water related) climate policies on European scale

- ECWMF/WMO (CAMS and C3S) services (hydrology)
- Copernicus Services Land services, Emergency services (EU-HYDRO roadmap just started)
- ESA (recent strategy on hydrology rolled out)
- …

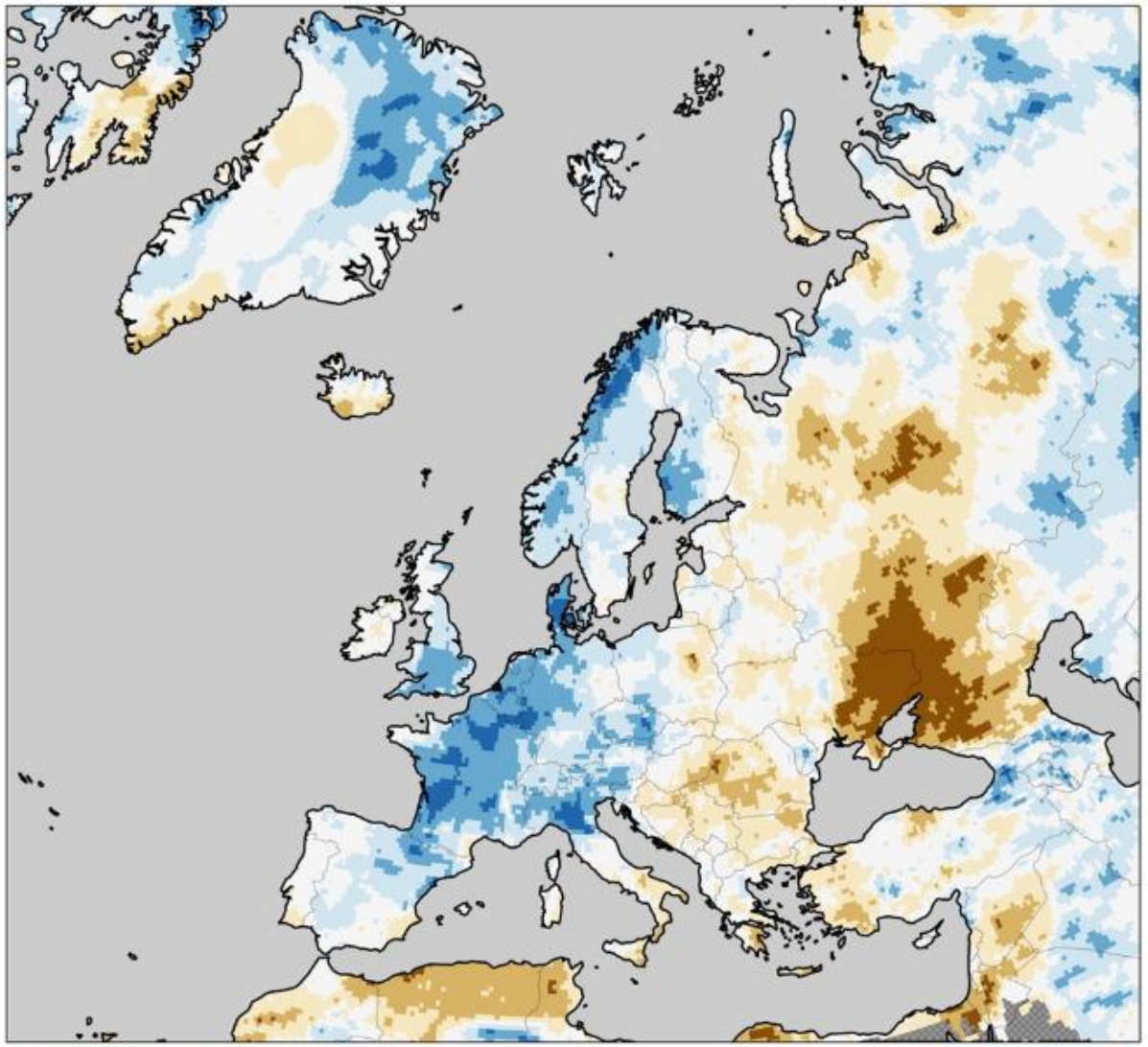
There is a need for an uniform transnational crossborder water management on local Action scale….

Funded by the European Union

PATHWAYS2RESILIENCE

Anomalies and extremes in annual precipitation in 2024

Data: ERA5 (1979–2024) • Reference period: 1991–2020 • Credit: C3S/ECMWF

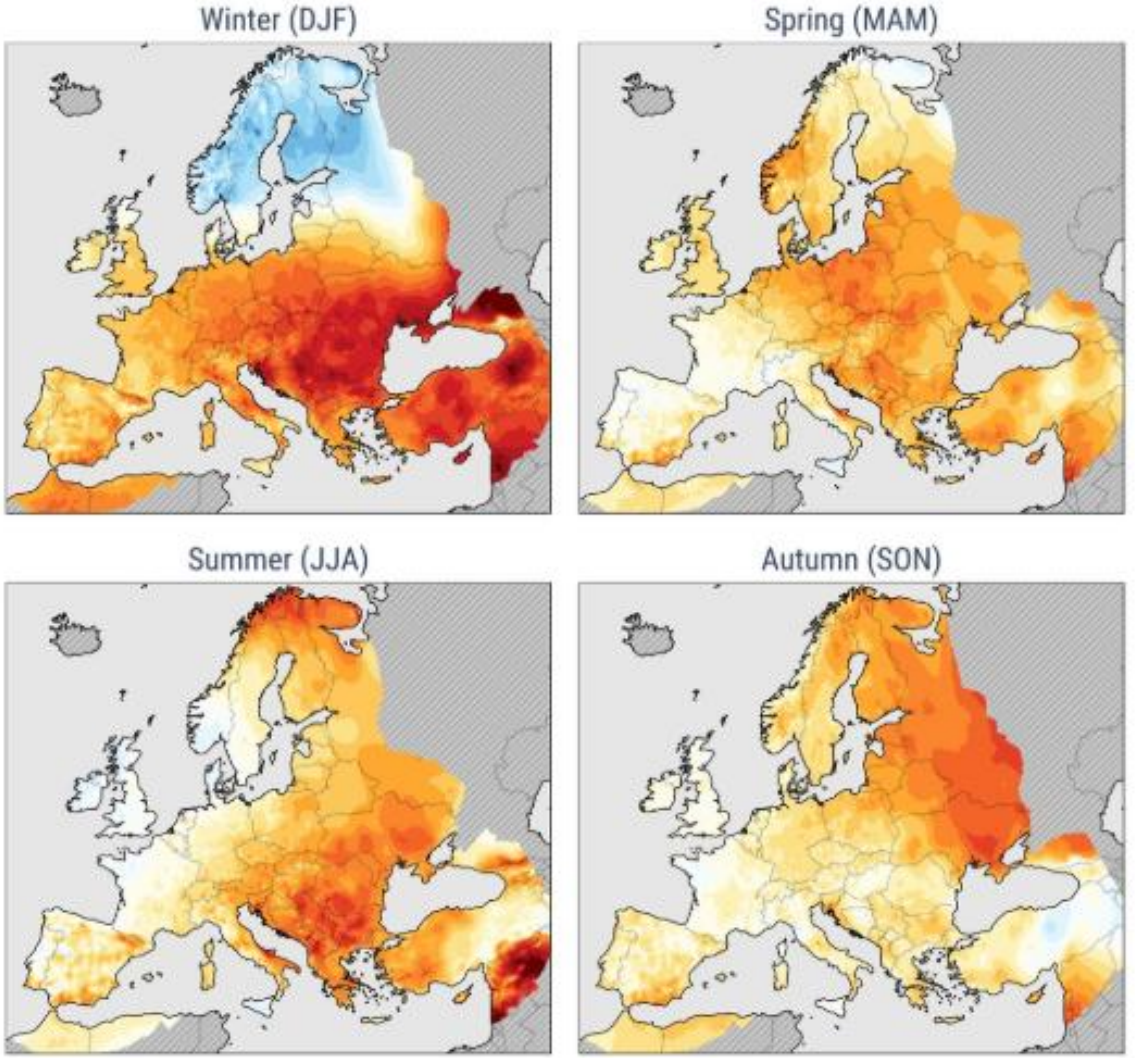


Driest | Much drier than average | Drier than average | Near average | Wetter than average | Much wetter than average | Wettest

PROGRAMME OF THE EUROPEAN UNION | Copernicus | Climate Change Service | IMPLEMENTED BY ECMWF

Anomalies in seasonal average surface air temperature in 2024

Data: E-OBS • Reference period: 1991-2020 • Credit: C3S/ECMWF/KNMI



PROGRAMME OF THE EUROPEAN UNION | Copernicus | Climate Change Service | IMPLEMENTED BY ECMWF

Impact of climate (water related)

Period 2002-2019: About 50% of damage/impact (costs) caused by water related hazards :

- Droughts & fires (0,8%)
- Drought (0,2%)
- Floods (45 %!!)
- Forest Fires (4%)

	Drought and fires	Drought	Earthquake	Severe weather	Floods	Forest fires	Volcano eruption	Other	Total diect damage
2002			1 558 000 000 €		15 135 000 000 €		894 000 000 €		17 587 000 000 €
2003					815 000 000 €	1 281 000 000 €		436 000 000 €	2 532 000 000 €
2004				203 000 000 €					203 000 000 €
2005				2 553 000 000 €	2 590 000 000 €				5 143 000 000 €
2006					891 000 000 €				891 000 000 €
2007				5 470 000 000 €	4 845 000 000 €	2 118 000 000 €			12 433 000 000 €
2008		165 000 000 €			471 000 000 €				636 000 000 €
2009			10 212 000 000 €	3 806 000 000 €	521 000 000 €				14 539 000 000 €
2010				1 425 000 000 €	7 999 000 000 €				9 424 000 000 €
2011			843 000 000 €		723 000 000 €				1 566 000 000 €
2012	807 000 000 €		13 274 000 000 €		382 000 000 €				144 650 000 00 €
2013					10 309 000 000 €				10 309 000 000 €
2014			147 000 000 €	429 000 000 €	4 666 000 000 €				5 242 000 000 €
2015			66 100 000 €	243 000 000 €	2 807 900 000 €				3 117 000 000 €
2016	181 000 000 €		21 879 000 000 €		1 259 000 000 €	157 000 000 €			23 476 000 000 €
2017			155 400 000 €	2 447 000 000 €	878 500 000 €	1 587 000 000 €			5 067 900 000 €
2018					7 284 000 000 €				7 284 000 000 €
2019				182 000 000 €					182 000 000 €
Total diect damage	988 000 000 €	165 000 000 €	48 134 500 000 €	16 758 000 000 €	61 576 400 000 €	143 000 000 €	894 000 000 €	436 000 000 €	134 094 900 000 €

Figure 5. Total direct damage incurred in disasters, as declared in applications to the EU Solidarity Fund, 2002-2019

European Commission: Overview of Natural and Man-made Dis aster Risks the European Union May Face, https://op.europa.eu/en/publication-detail/-/publication/89fcf0fc-edb9-11eb-a71c-01aa75ed71a1/language-en/format-PDF/source-236404726 (last access: 16 January 2025), 2020

Climate Risk from Policy level to Acting Level

Policy level:

The EEA has published the first ever **European Climate Risk Assessment (EUCRA)** to help identify policy priorities for climate change adaptation and for climate-sensitive sectors

Acting Level:

Member States have their own climate (adaptation & mitigation) strategies based on their own national risk assessment.

In this national framework **local (management) authorities** have been set to work (to different extends) to implement short, (and with somewhat less priority) middle and long term **measures to reduce impacts of climate** (extremes)

WISE programme focus on Local Acting level !

The water distribution in European River basins is of transnational importance in this era of dynamic climate change.

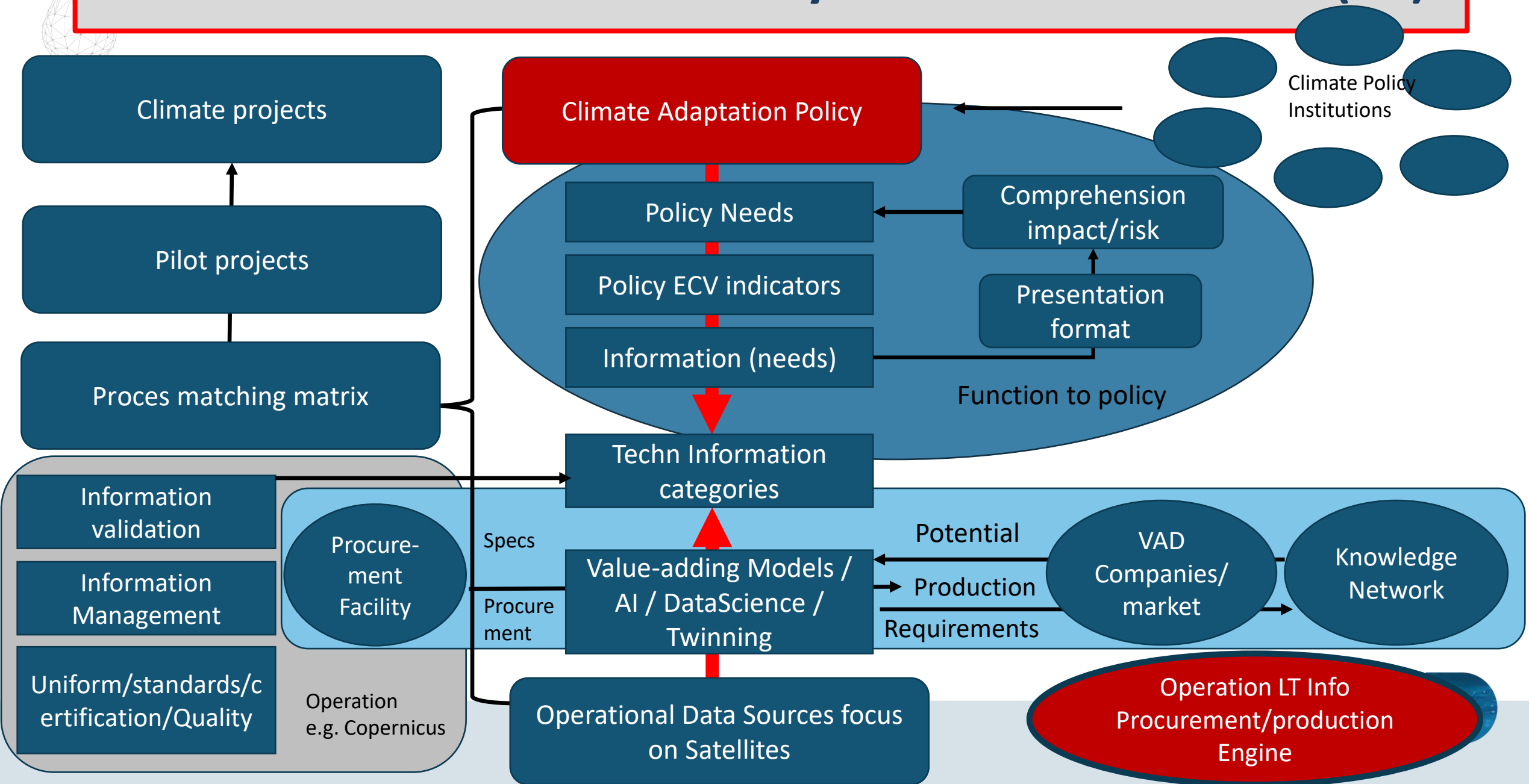
On top of that there is a huge pressure on the wateravailability by numerous sectors (industry, agriculture, nature, consumption, etc).

The consequences of **local shortage or abundance of water in our soils** (groundwater and acquifer systems) and surface waters are increasing and **result in extreme situations to flooding, wildfires**, waterquality, productivity, etc problems.

The **current European climate tools available** give relevant insight in the large scale tendencies on these water related issues, but are **too generic** (but serve as relevant boundary conditions) for local and operational management.

With **WISE we can complement these existing services** and **support local operational measures** in the context of national and European frameworks of adaptation and mitigation

Translation Process from Policy to local Information (RS)

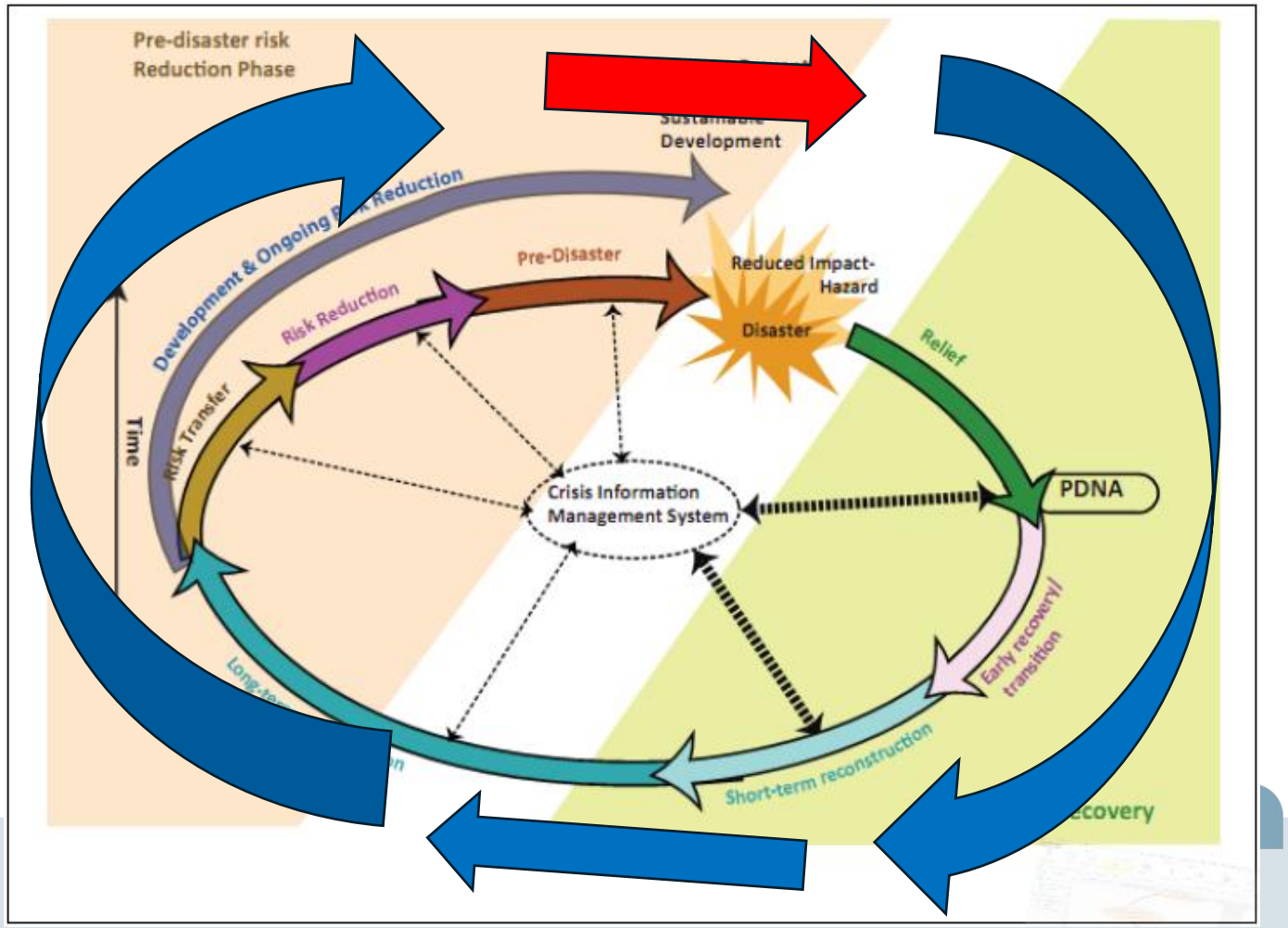


WATER AS common denominator in cross border and mutal riverbasin conditions/regions

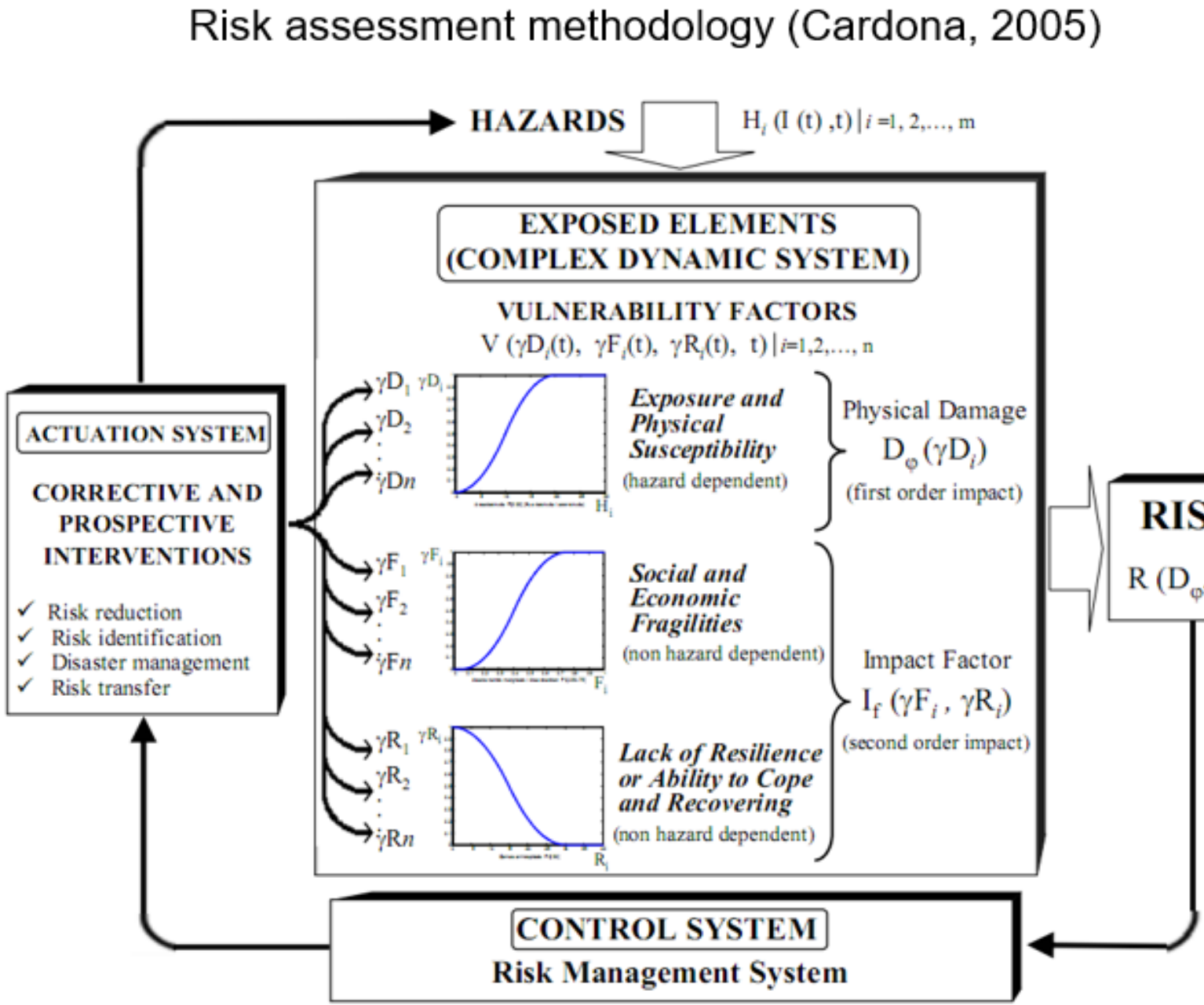
Water Management (regular = blue) supported by space based unique water/climate information/intelligence for climate related crisis challenges (red) for different sectors in

rural/urban areas

(Floods, droughts/Fires, Infrastructure risk assessment & impact)

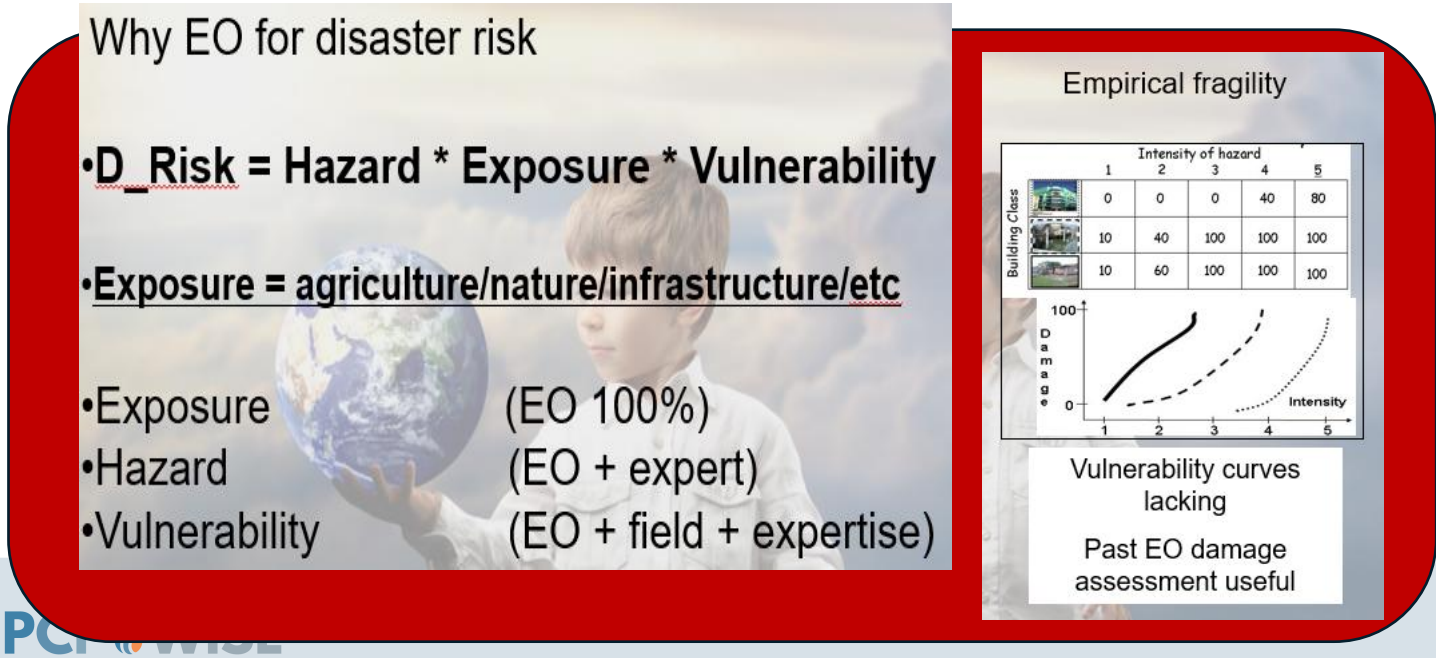


Climate resilience could be defined as the ability to anticipate, prepare for, and respond to hazardous (crises) events, trends, or slow onset disturbances related to climate.

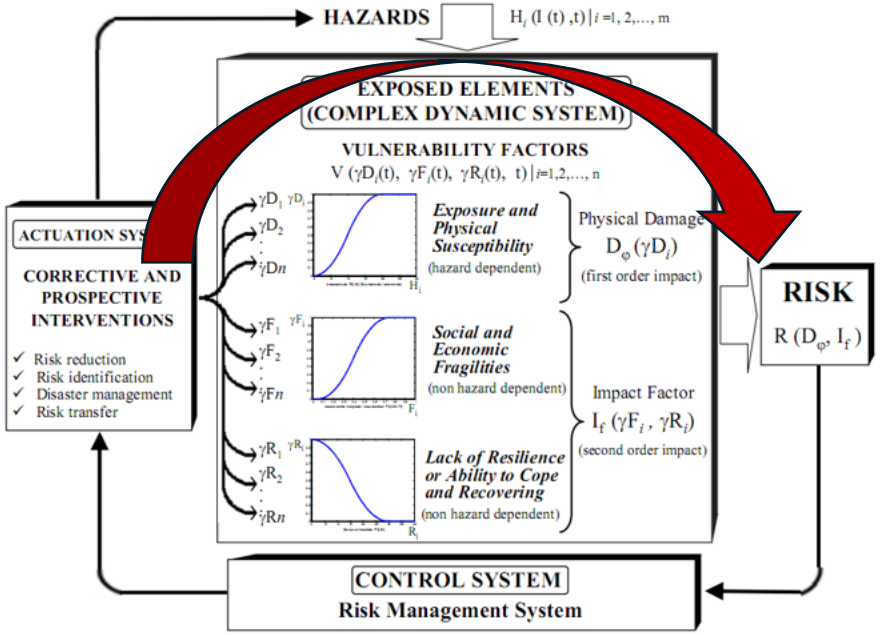


(Water related) sector Risks layer (4)

- The Risk of too dry or too wet conditions is partly determined by the potential impact (physical damage) to various sectors apart from even important if not more (!) alpha factors such as social/economic/community coping/resillience
- Risk = chance x impact or even more practical. Risk is result of the vulnerability of (a sector) to a certain exposure to the occuring hazard category. In each factor Earth Observation has a potential function!
- EO also helps in creating data for learning processes (AI e.g. for vulnerability assessment) and development of a better uniform Risk Language

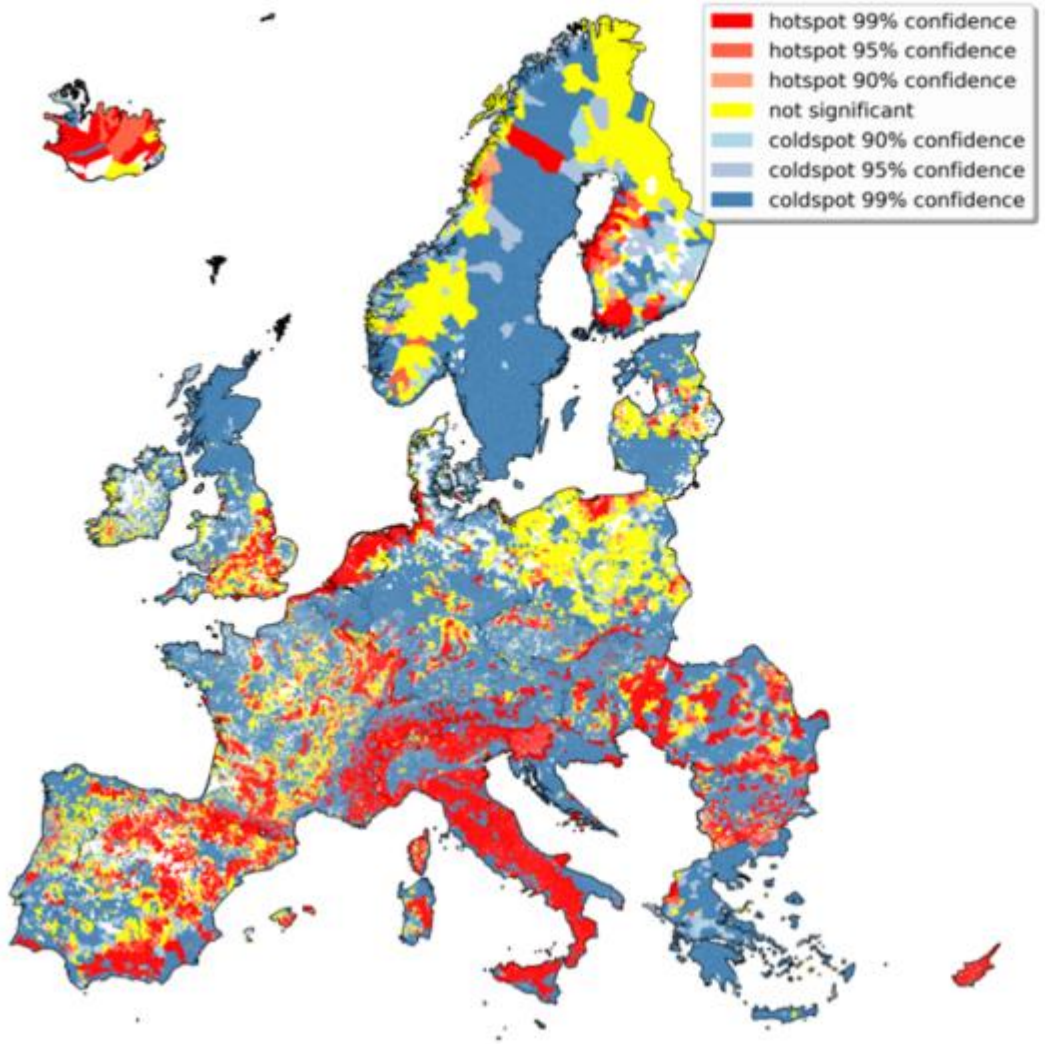


Risk assessment methodology (Cardona, 2005)



- An indication of nr of people exposed to multiple hazards
- As said before 50% of these hazards costs or impact is related to flooding/drought/fires problems

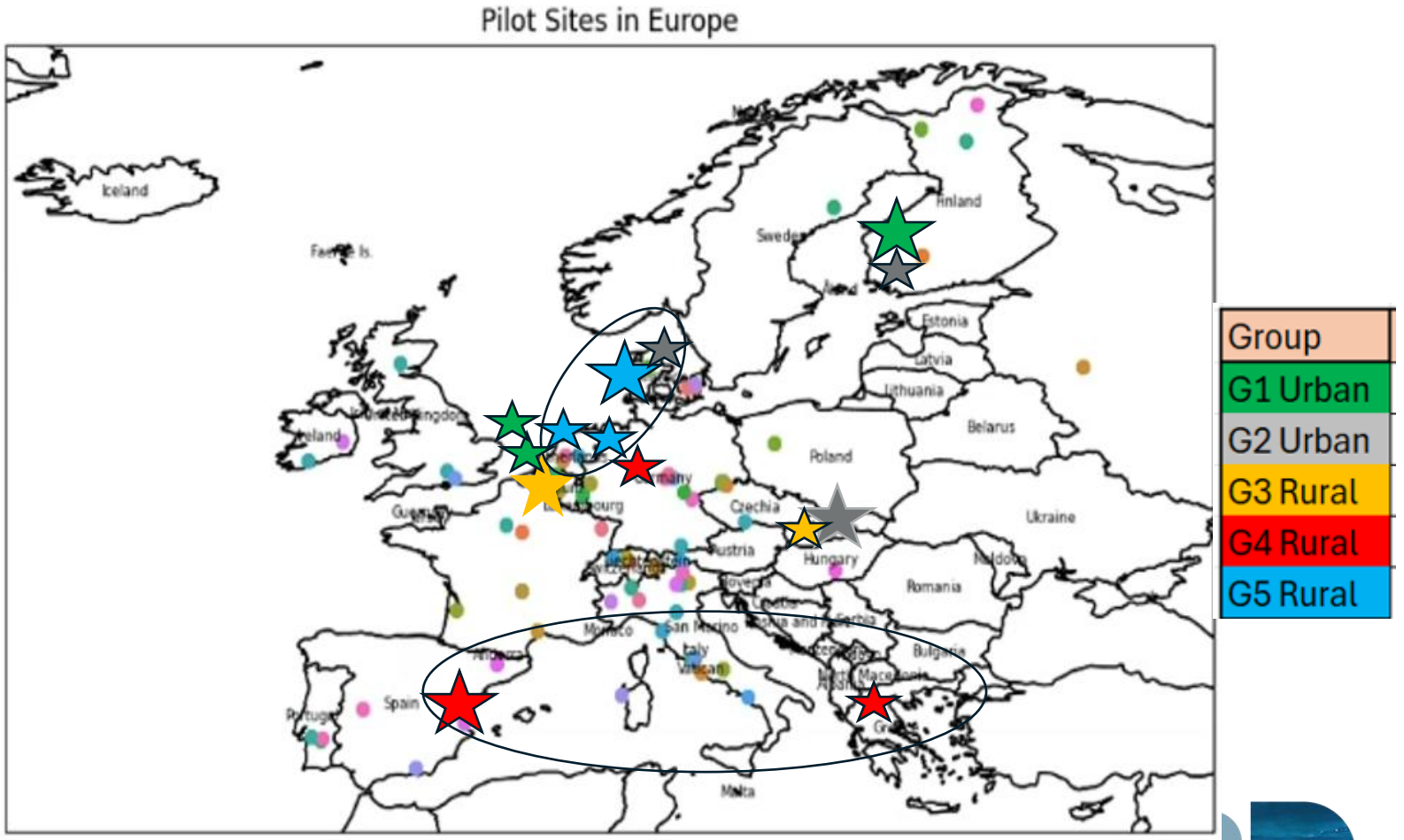
In terms of population, Italy has the highest number of people exposed to multiple hazards, with 21.4 million residents exposed. Together with the Netherlands, France, Spain, and Germany, these five countries account for 55% of the EU's population exposed to multi-hazards.



Local Administrative Units (LAUs) with population exposed to multi-hazards (identified with various confidence levels).
Source: https://nhess.copernicus.org/articles/25/287/2025/

BUYER/user sites & European Groups & WISE coverage

Group-Lead site: Local & Regional scale (red) Insitu (buyers, international)
Group Partners site (Green): No validation but extended area monitoring by market service



Use cases Update

Use cases PCP-WISE	Fast Onset Crises (FOC)		Slow Onset Crises (SOC)	
RURAL (R)	RFOC1	Flash Flood Summer 2021 in Ahr Valley, GER, Limburg NL	RSOC1	Slow Onset River Flood 2023/24 in Lower Saxony, GER Rural
	RFOC2	Vegetation and peat fire 2018 lower Saxony, GER	RSOC2a	Drought Impact Model on Agricultural Production - Catalonia region, Andalusia or other (Spain)
	RFOC3a	Wild Fires: Slovak republic (National level), Self-governing regions Banska Bystrica BB (Regional level), Spisska Nova Ves SNV (District level)	RSOC2b	SOIL MOISTURE: Spatiotemporal surface & root zone soil moisture determ. Catalonia region (Ebro Delta Spain)
	RFOC3b	Floods: Slovak republic (National level), Self-governing regions Banska Bystrica BB (Regional level), Spisska Nova Ves SNV (District level)	RSOC4	Drought: Subsidence in rural agricultural grass/peatlands in the water management area of waterauthority HDSR (NL)
	RFOC5	Floods:civil protection initiative for the Mygdonia catchment area (Central Macedonia)	RSOC5	Wild Fires: Nature area Kalmthoutse Heide (NL Belgium)
			RSOC6	--> USOC6
URBAN (U)	UFOC1	Flash Flood Summer 2021 in Ahr Valley, GER	USOC1	-->RSOC1
	UFOC2a	Wild Fires: Slovakia Bratislava (Local City level)	USOC2	Heat Island/subsidence: Multi Climate change scenario's in existing urban area's (Haarlem city, NL)
	UFOC2b	FLoods: Slovakia Bratislava (Local City level)	USOC3	Soil saturation: Shallow ground water, Lemvig, Denmark
	UFOC4	Floods/Stormwater: City critical watermanagement	USOC4	Subsidence: Terrain subsidizing Lemvig Denmark
			USOC5	Subsidence: City Infrastructure Rotterdam
			USOC6	Nature/Rural: control ecosystem/residential area on groundwater/greening (in former airport region of Helsinki)

Urban and Rural usecases (Flood & Drought) 5 groepen

Urban	Hazard	Rural	Hazard
G1: Helsinki (2)	F & D	**G3: Kalmthout Belgium/NL (1)**	**D**
Rotterdam (1)	F	SK:BB,SNV (Slovakia)	F & D
Haarlem (NL) (1)	F & D	**G4: Catalunya, Spain (1)**	**D**
G2: SK:BA Slovakia(1)	D	Central Macedonia, Greece (1)	F & D
Helsinki (2)	D (F)	Lower Saxony, Germany (2)	**F & D**
Lemvig, (Dk) (1)	D	**G5: Lemvig Area (living Lab, Dk)**	**D**
		HDSR subsidence (NL) (1)	D
		Lower Saxony, Germany (2)	D

Information Requirements analysis (General)

- **Urban Regular:** Soil matrix/groundwater conditions (monitor) now- and ST forecast, specific apps on subsidence, heat islands (evapotranspiration), park/green monitor, waterstorage
- **Urban Crisis:** spatial (weighted) riskmapping (sector limits) now- and ST forecast,
- **Urban Climate**: Historical Trends, input to future scenario's

- **Rural Regular:** Soil matrix/groundwater conditions monitor(now- and ST forecast), specific apps on agriculture, nature
- **Rural Crisis:** spatial (weighted) riskmapping (sector limits) (now- and ST forecast)
- **Rural Climate:** Historical Trends, modelbased inputs to forecast/scenarios

The WISE basic Solution Direction:

- Regular (daily) **Monitoring Soil-Water-Vegetation conditions** in general (core product)
- Production (daily) intelligence **on Risks** (as a consequence of too wet/dry) per **sector**

On top of that specific RS apps:

- Problem Specific user/sector problems with RS – based solutions
- Smart Processing and presentation of results (proces/model/AI related)

PCP-WISE general output?

- Operational Blue print (European) Procurement model
- Blue print new standardized info solutions for (local) watermanagement in Europe
- Cross border cooperation model (in riverbasins) with memberstate water management colleagues

WISE potential climate functions

- Cooperation & Interoperability between local regions cross border using soil-water information (spatio-temporal informatation daily, 100m)):
- Hindcast (2 to 3 decades back)
- Now and near future forecasts (seasonal, multi-anual)
- Long term forecasting (2 to 3 decades in the future) based on European climate scenarios
- Reference/Evaluation/Adaptation mechanisms with WISE information on local measures
- Reporting/statistics (spatial/temporal) on climate (water) induced problems
- Building on DRR planning and prevention mechanisms (learning by doing)

Showcasing Solutions: NBRACER conceptual model for implementing Nature Based Solutions

Ignacío Perez Silos, University of Cantabria, NBRACER

10:45 – 11:05

NBRACER
Nature Based Solutions
for Atlantic Regional Climate Resilience

Showcasing Solutions: NBRACER conceptual framework for implementing Nature based-Solutions

Climate Resilience & Water Innovation – The Role of EO & Digital Technology

Ignacio Pérez-Silos (IHCantabria; University of Cantabria) 23 April 2025

perezsi@unican.es

Funded by the European Union

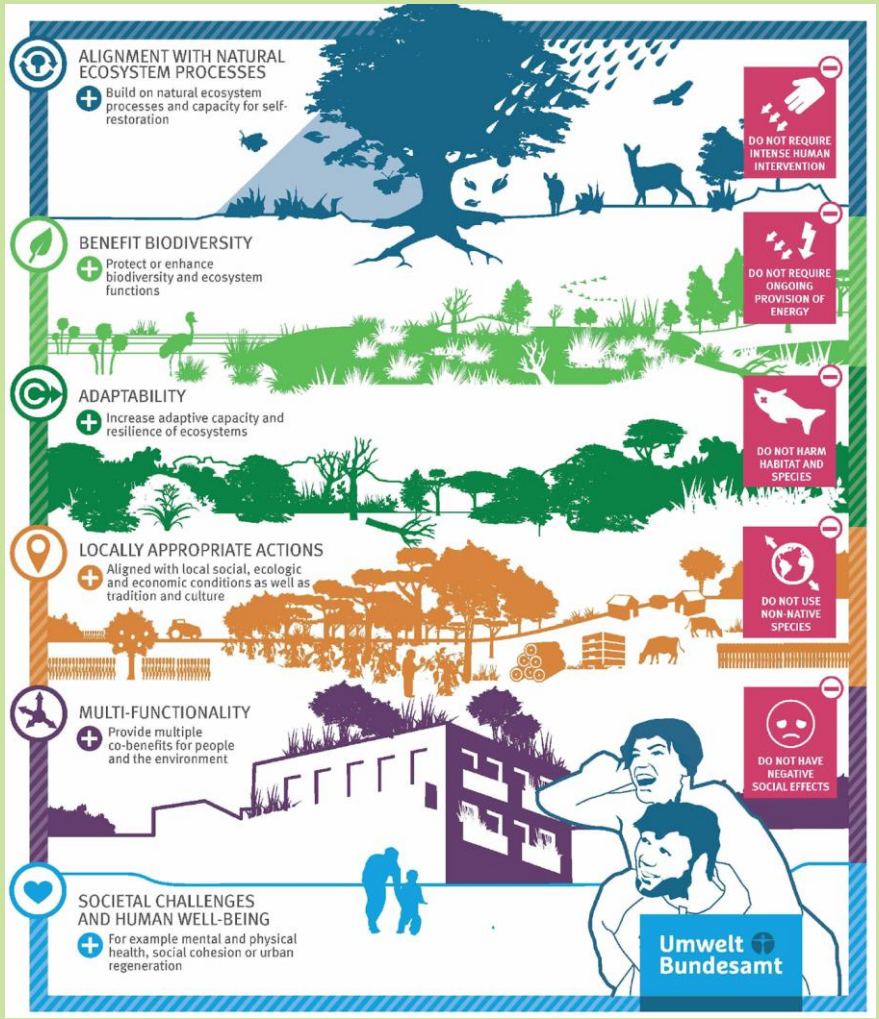
Index

NBRACER
Nature Based Solutions
for Atlantic Regional Climate Resilience

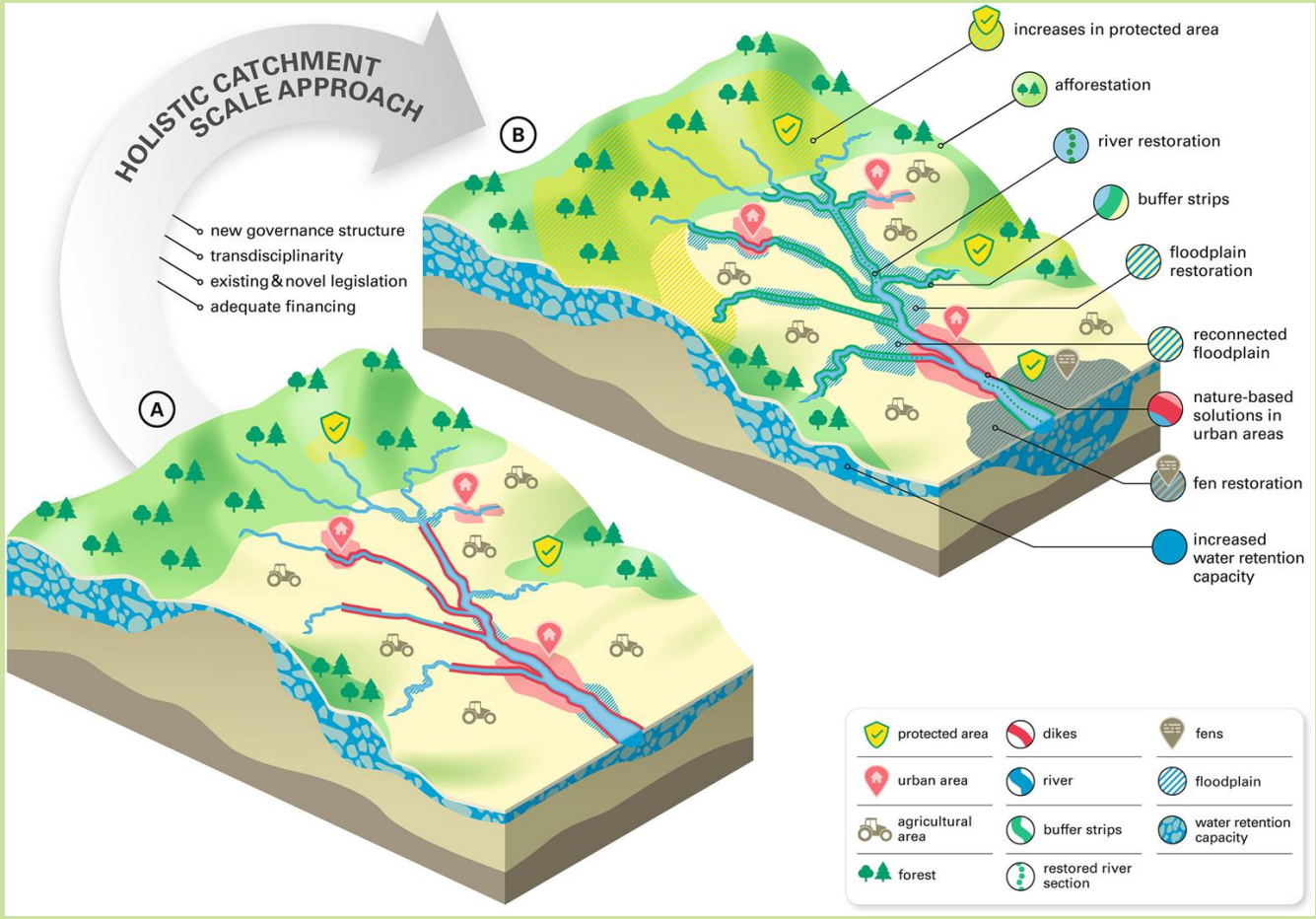
Funded by
the European Union

Background- Towards dynamic and integrative landscape management to regulate climate risks

NBRACER
Nature Based Solutions
for Atlantic Regional Climate Resilience



Riese et al. *Climate Change* (2021)



Haubrock et al. *WIREs WATER* (2025)

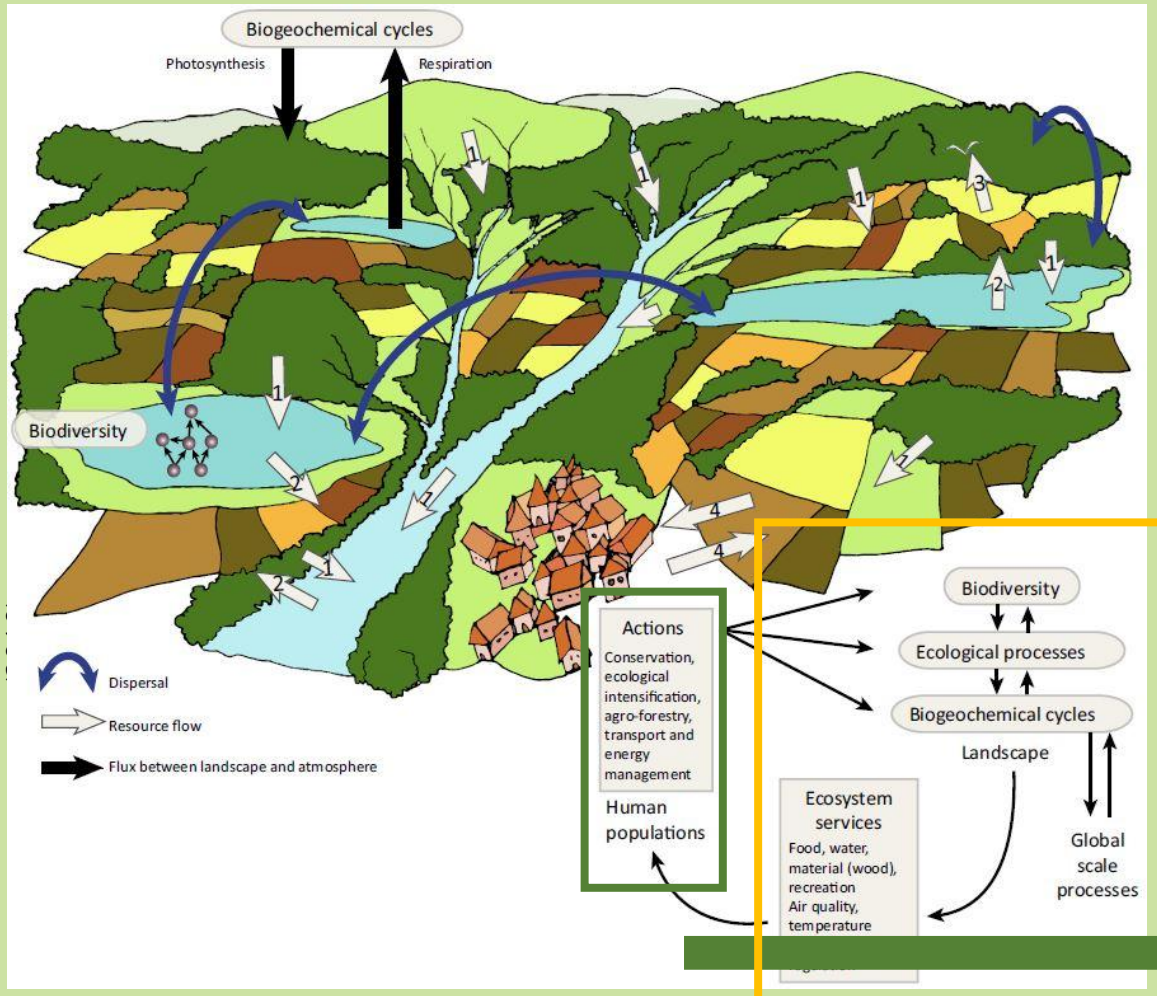
Risk management using Nature-based Solutions (NbS) requires answering at least the following questions:

- Where does the risk occur?
- How do the risk factors propagate impacts across the landscape?
- What types of ecosystems can be used to reduce risks?
- What management and governance strategies are needed to effectively implement measurements over the ecosystems to regulate risks?

Funded by the European Union

Background- Socio-Ecological foundations of the conceptual framework

NBRACER
Nature Based Solutions
for Atlantic Regional Climate Resilience



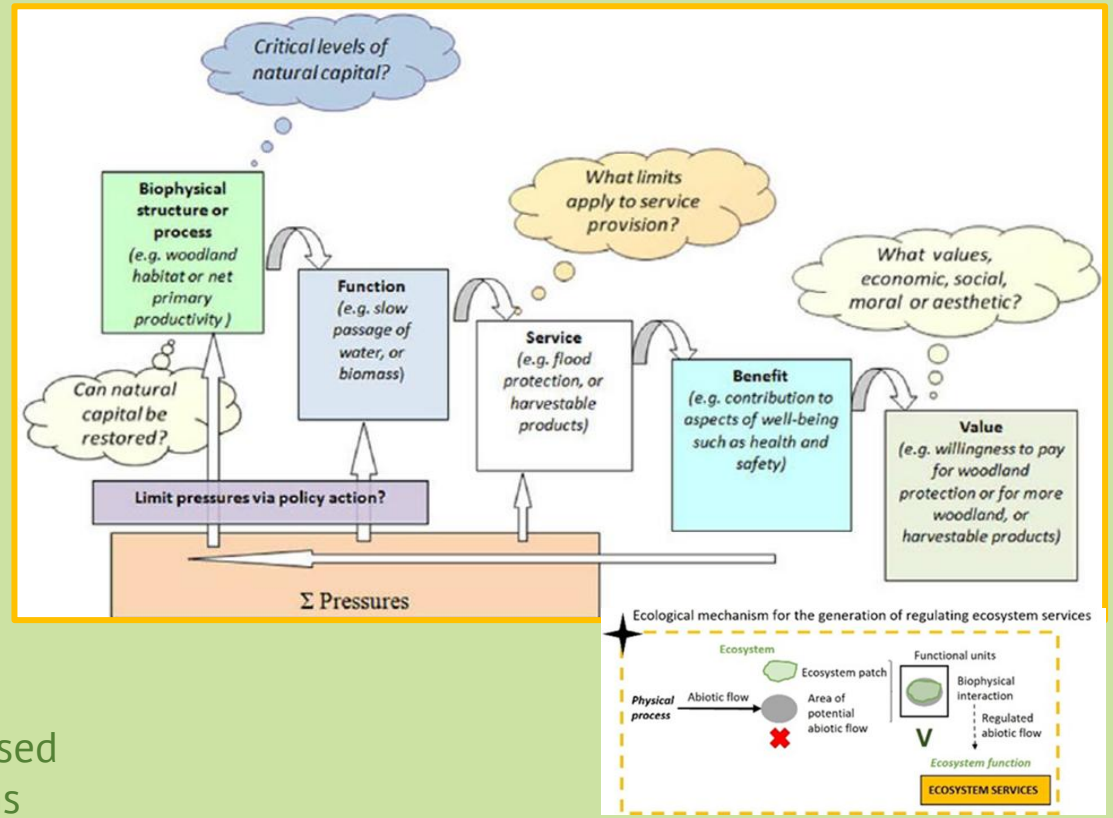
Gounand et al. *Trends in Ecology & Evolution*

Meta-ecosystem theory

Spatial flows circulating within the landscape generate interdependencies between different habitat patches

Ecosystem Services

Potschin and Haines-Young *PPG: Earth and Environment* (2011)



Nature-based Solutions

Identify **ecosystem-based actions** to control the spread of local perturbations by considering ecological interactions at multiple levels within the cycles of **matter and energy**

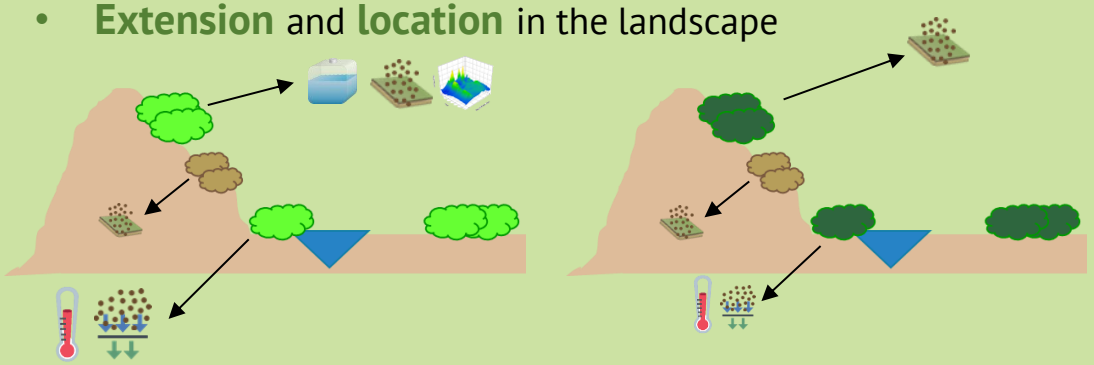
Funded by the European Union

Background- Socio-Ecological foundations of the conceptual framework

NBRACER
Nature Based Solutions
for Atlantic Regional Climate Resilience

Supply of ecosystem services depends on the ecosystem:

- **Intrinsic features** (e.g. type of ecosystem, biodiversity or ecological status)
- **Extension** and **location** in the landscape



Mature forest

Forest plantation

Shrubland

Ecosystem services

Regulating

- Life cycle and habitat protection
- Hydro regulation
- Erosion control
- Material filtration
- Water temperature
- Carbon sequestration
- Flooding mitigation

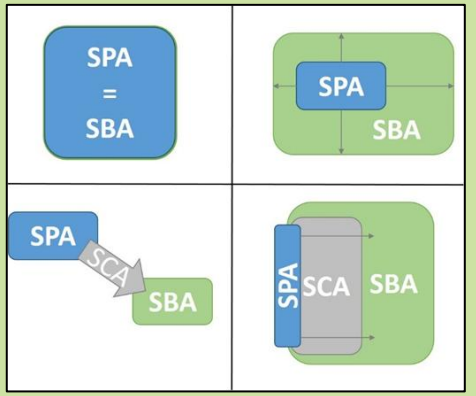
Provisioning

- Wood provision
- Water

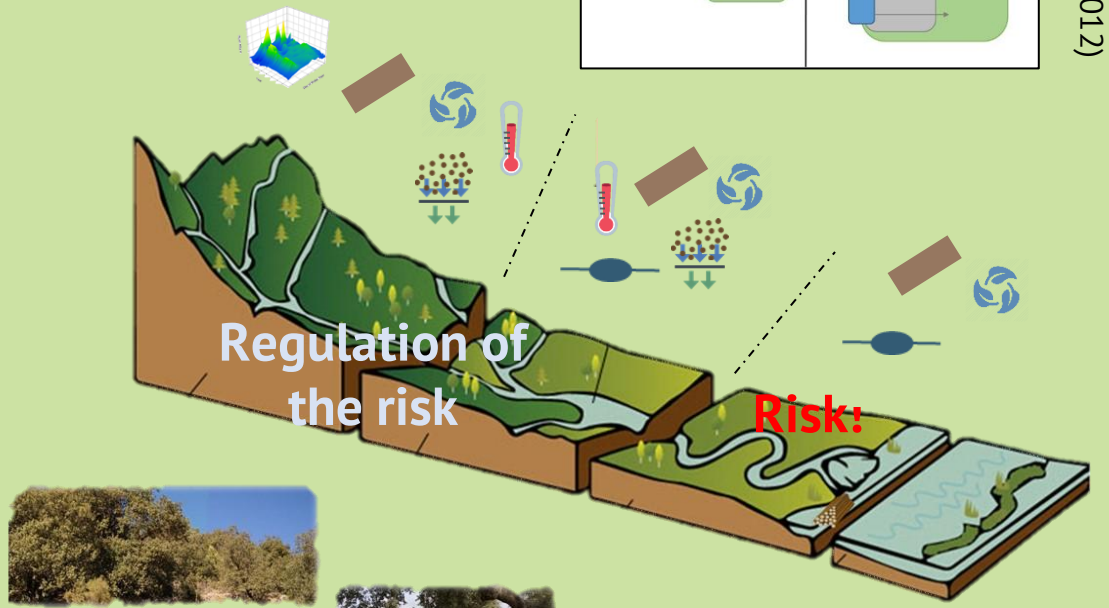
Funded by the European Union

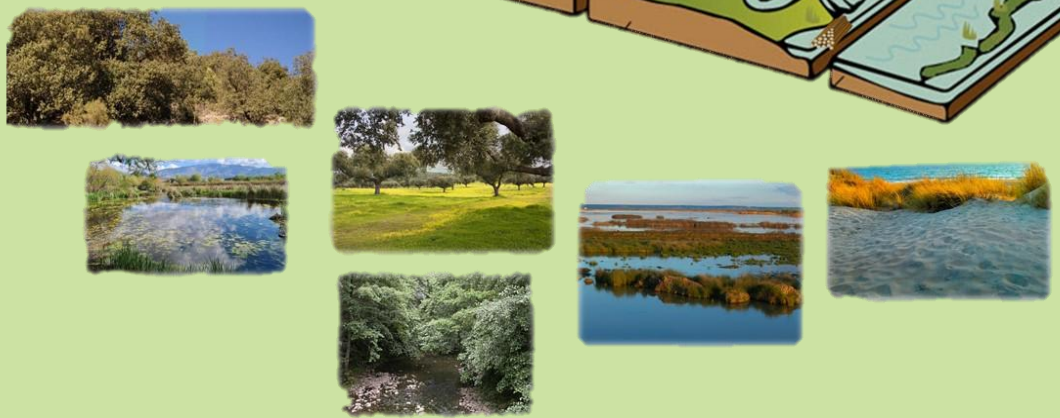
Spatial and temporal ecosystem services dynamics: supply and demand area usually delocalised

SPA: service providing area
SCA: service connecting area
SBA: service beneficiary area



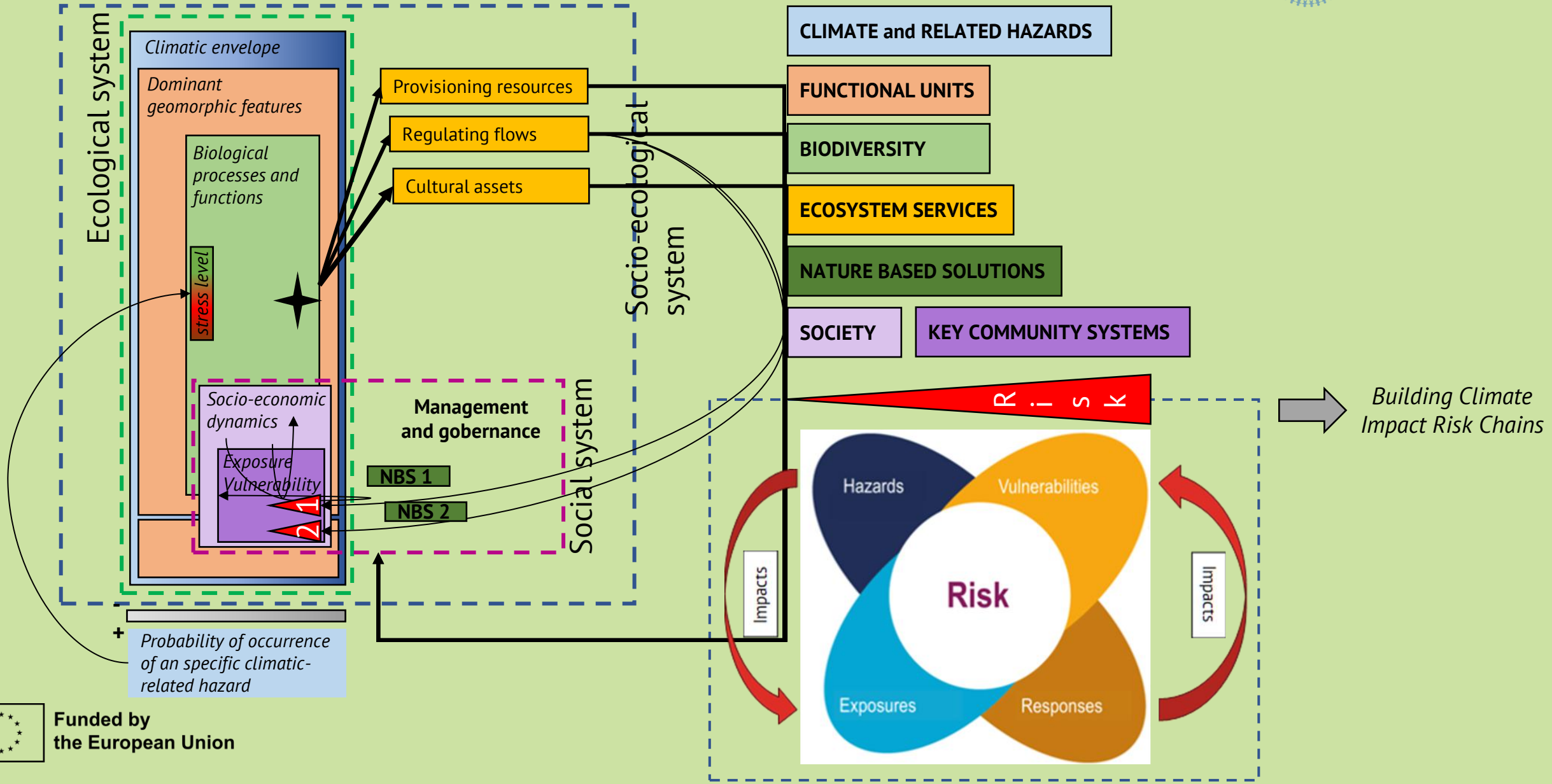
Syrbe and Walz *Restoration Ecological Indicators* (2012)





The conceptual framework- Rationalization of the conceptual framework

NBRACER
Nature Based Solutions
for Atlantic Regional Climate Resilience

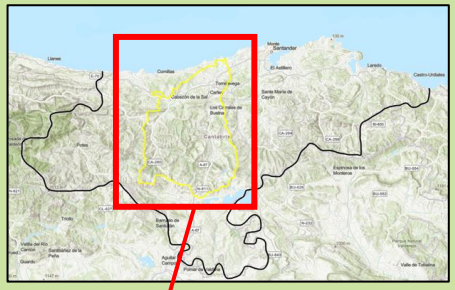


Funded by the European Union

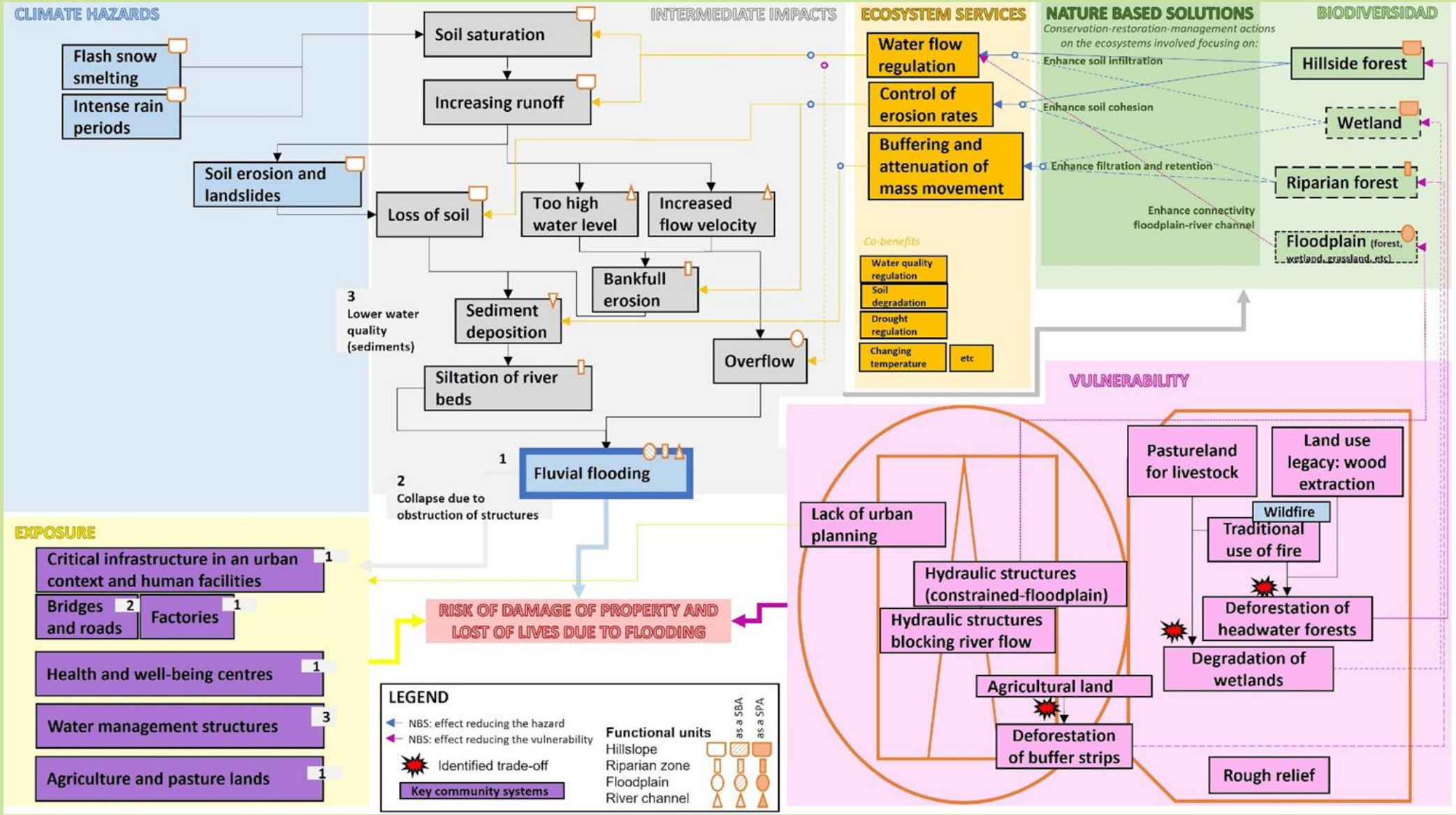
The conceptual framework- Climate Impact Risk Chain for flooding risk

NBRACER
Nature Based Solutions
for Atlantic Regional Climate Resilience

Application case: a Cantabrian mountain catchment



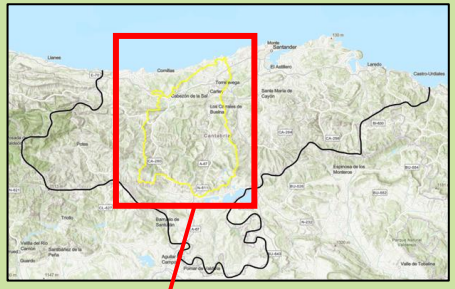
Funded by the European Union



Operationalization of the conceptual framework- An applied case in a Cantabrian mountain area

NBRACER
Nature Based Solutions
for Atlantic Regional Climate Resilience

Application case: a Cantabrian mountain catchment



FLOODING RISK

Climate Risk Impact Chains for identifying potential NbS

Service Providing Areas (potential NbS implementation)

- *Hillslope*
- *Riparian zone*
- *Floodplain*

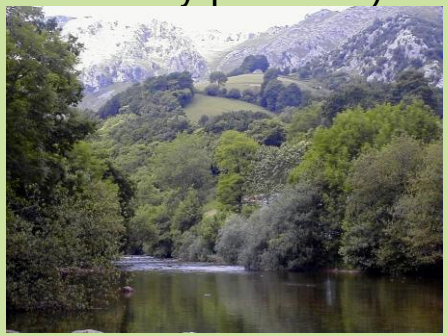
Service Benefiting Areas (risk areas)

- *Floodplain*

Forest management

(conservation – restoration – and good forestry practices)

Runoff regulation



Erosion channel regulation

Floodplain management

Temporal water storage

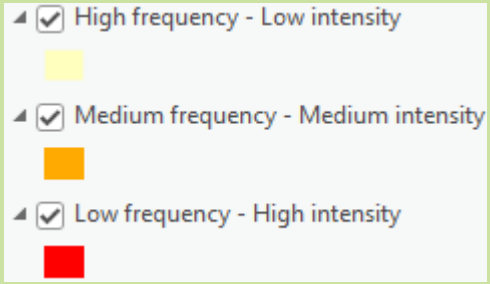
Urban areas and infrastructures

Funded by the European Union

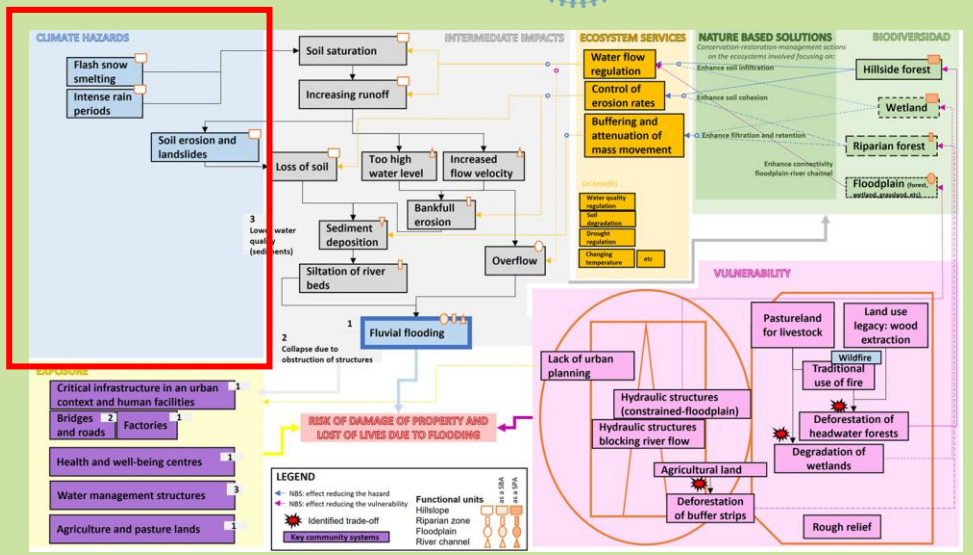
Operationalization of the conceptual framework- An applied case in a Cantabrian mountain area

NBRACER
Nature Based Solutions
for Atlantic Regional Climate Resilience

Mapping the hazard



Hydraulic models

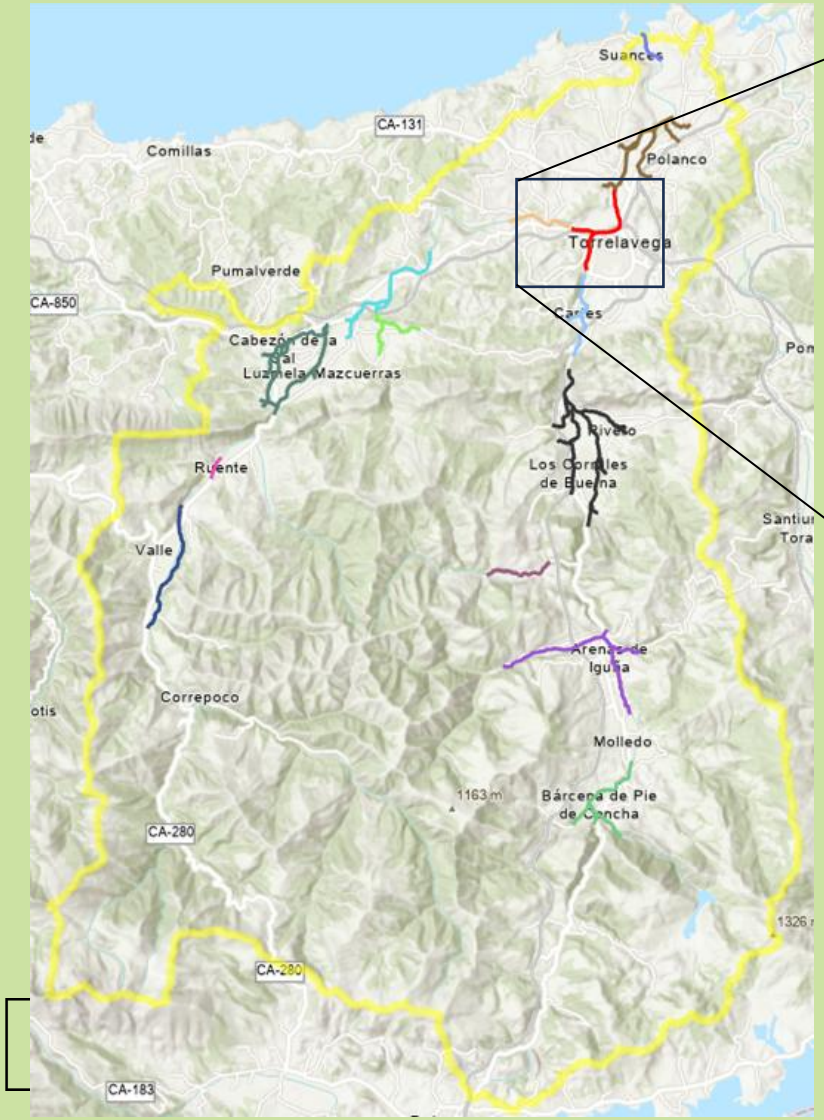


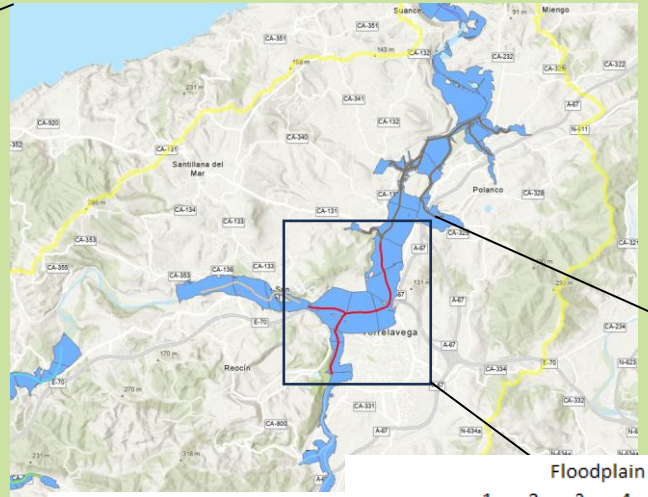
Funded by
the European Union

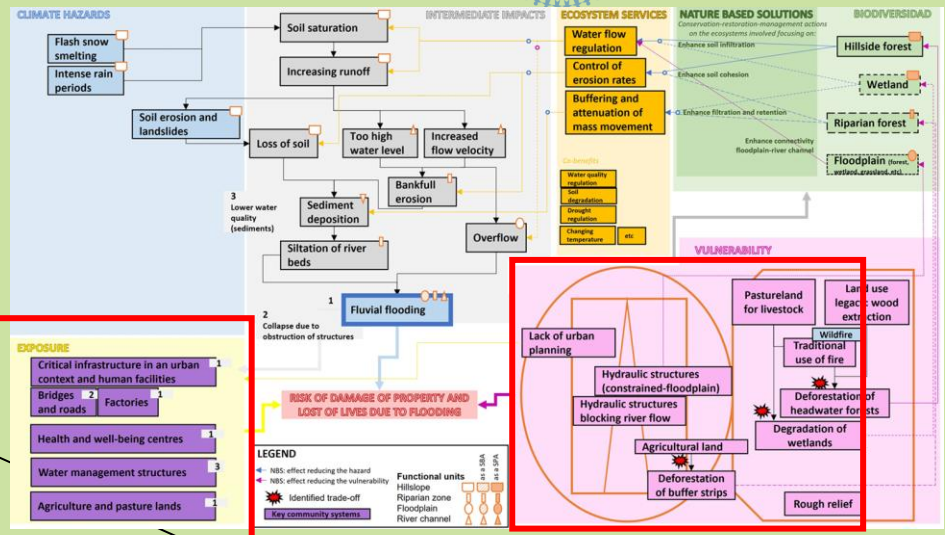
Operationalization of the conceptual framework- An applied case in a Cantabrian mountain area

NBRACER
Nature Based Solutions
for Atlantic Regional Climate Resilience

Mapping exposure and vulnerability



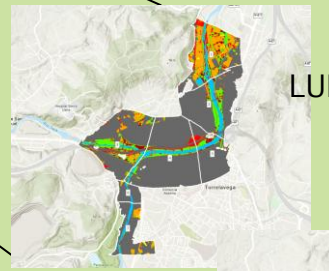




Forest (FOR)
Tree plantations (PLT)
Shrublands (SSH)
Agricultural land, crops (AGR)
Pasture and grassland (PAS)
Denude rock and bare soil (DEN)
Urban and human-derived areas (UHI
Water ecosystem (WAE)

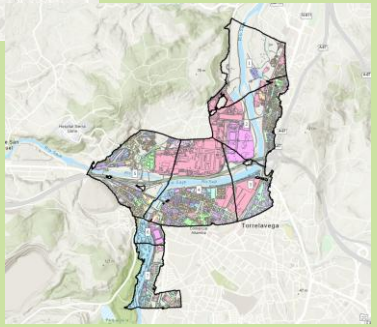
Floodplain UF

LULC	1	2	3	4	5	6	7
FOR	12	9	5	5	11	1	2
PLT	1	0	0	0	0	0	0
SSH	5	1	2	0	3	0	0
AGR	2	0	0	0	0	0	2
PAS	39	2	1	1	10	2	9
DEN	11	2	5	3	4	0	1
UHD	22	77	80	86	67	89	77
WAE	8	8	6	5	4	7	8



LULC level 1

LULC level 2



LULC level 2_Urban and human-derived areas (UHD)

- Comercial
- Cultural
- Deportivo
- Dotacional de otros tipos
- Educativo
- Industrial o manufacturero o logístico-almacenaje
- Instalación agrícola o ganadera
- Otras infraestructuras
- Recreativo y de espacios libres
- Redes ferroviarias y terrenos asociados
- Redes viarias y terrenos asociados
- Religioso
- Residencial en vivienda colectiva
- Residencial en vivienda no colectiva
- Sanitario y asistencial
- Servicios administrativos o de oficinas
- Sin edificar
- Turístico u hostelero u ocio y espectáculos

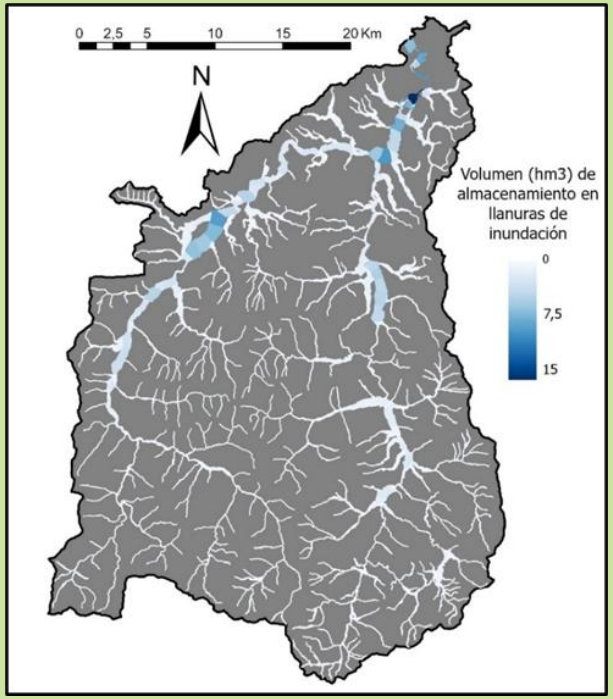
Operationalization of the conceptual framework- An applied case in a Cantabrian mountain area

NBRACER
Nature Based Solutions
for Atlantic Regional Climate Resilience

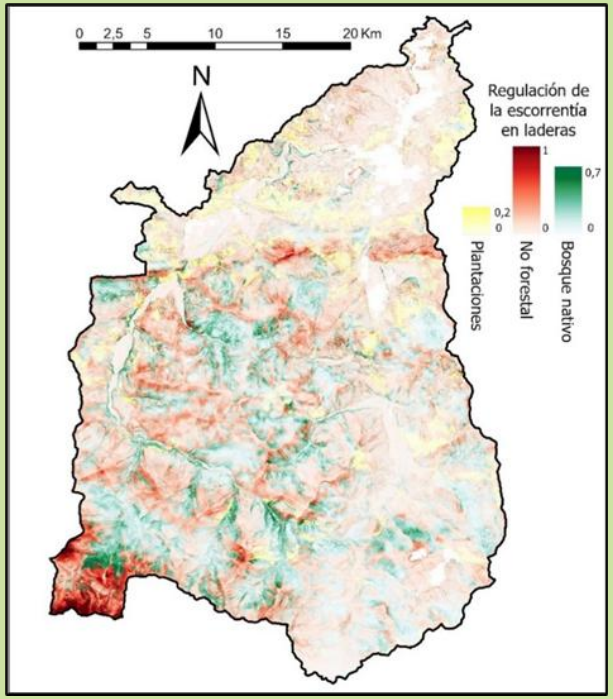
Mapping vulnerability: adaptive capacity

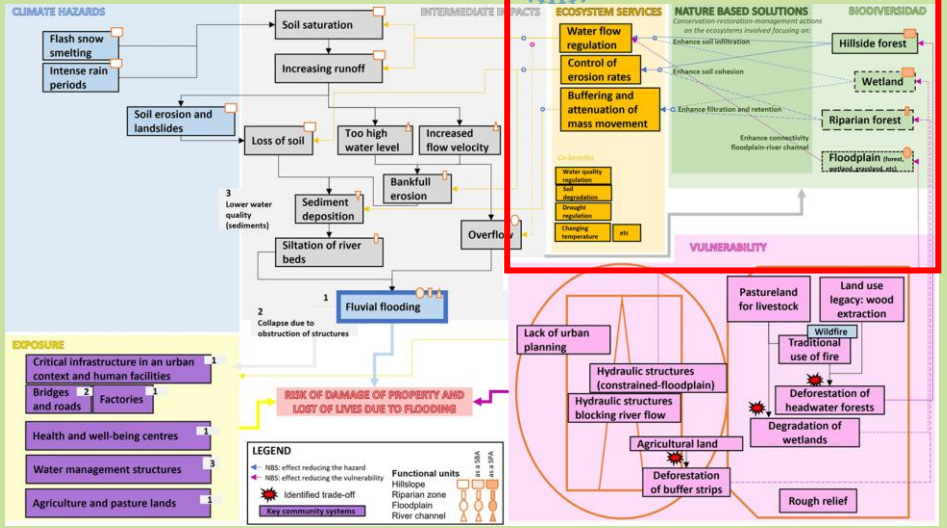
where we can regulate hazard-related abiotic flows (potential ES)

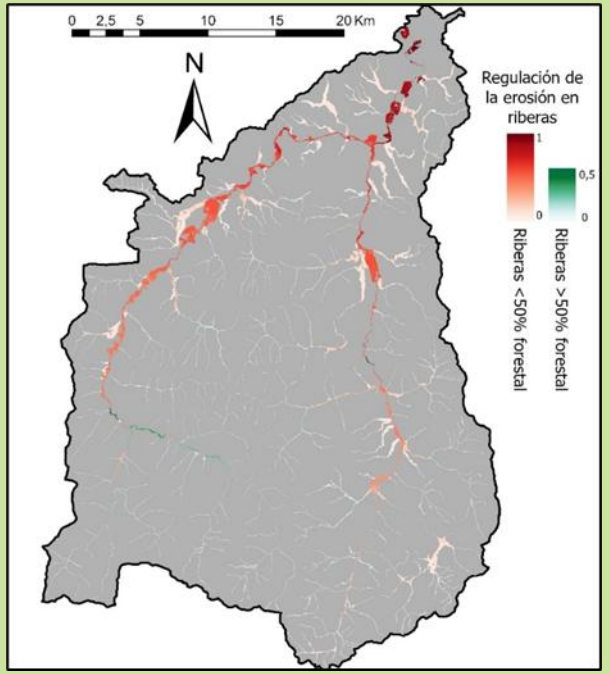
Temporal water storage



Runoff regulation







Erosion channel regulation

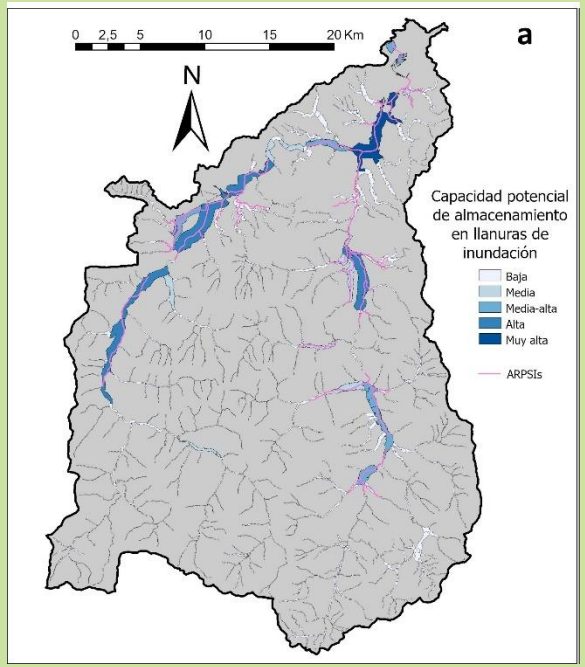
Funded by the European Union

Operationalization of the conceptual framework- An applied case in a Cantabrian mountain area

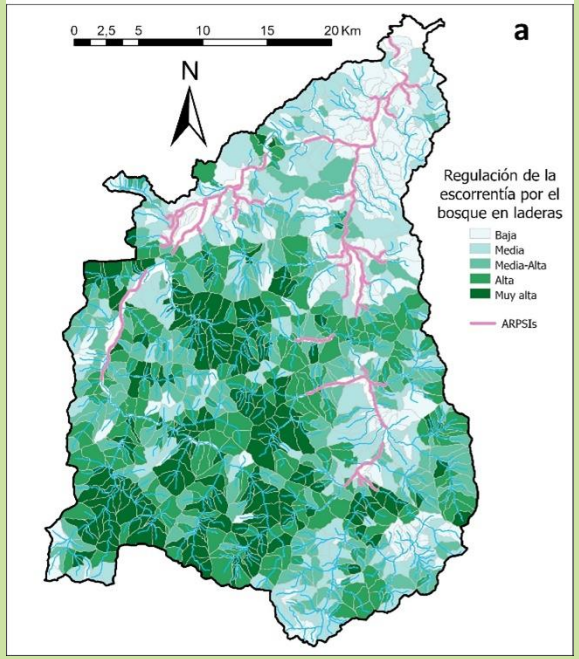
NBRACER
Nature Based Solutions
for Atlantic Regional Climate Resilience

Mapping the areas for the potential implementation of NbS

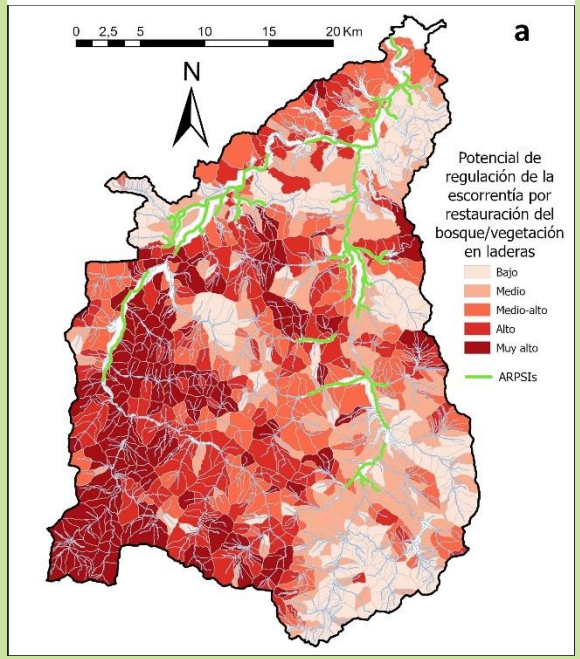
Floodplain management



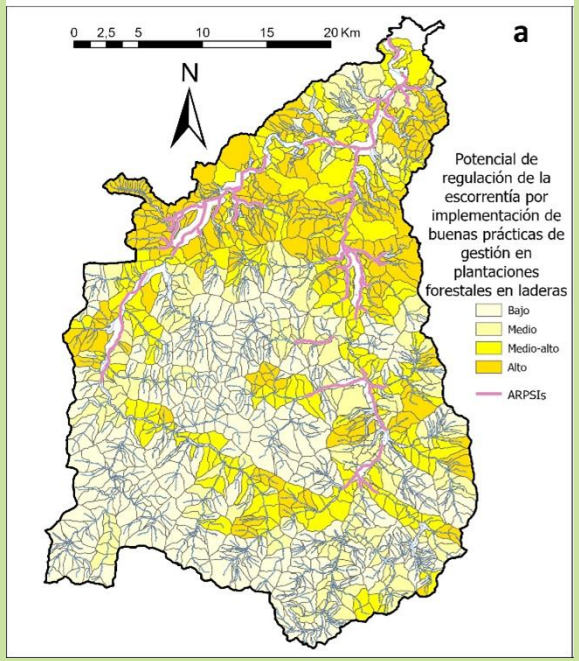
Hillslope forest conservation



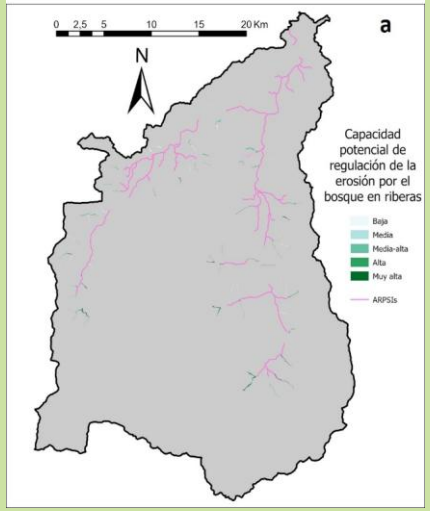
Hillsope forest restoration

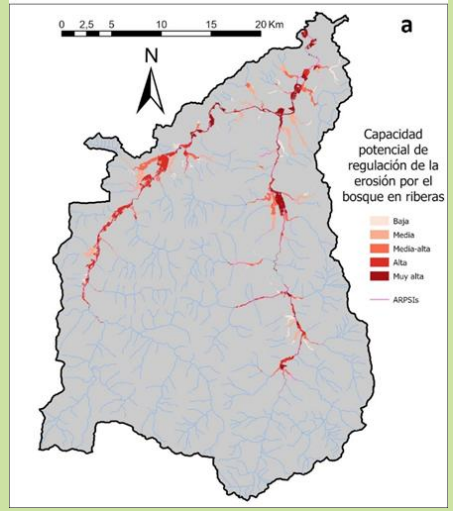


Good forestry practices



Riparian forest conservation





Riparian forest restoration

Funded by
the European Union

Conclusions

NBRACER
Nature Based Solutions
for Atlantic Regional Climate Resilience

The **conceptual framework** we have developed enables the integration of ecological principles related to ecosystem management and the provision of **regulating services** with the **climate risk management** framework.

In doing so, it allows us to conceptualize within Climate Impact and Risk Chains (CIRC):

- **which ecosystems** can regulate specific risks
- **where** these ecosystems are located across the landscape
- what types of management measures could be applied to these ecosystems to utilize them as **Nature-based Solutions (NbS)**

The **operationalization** of the conceptual framework—through models that map climate hazards, exposure, and vulnerability, as well as the distribution of ecosystems, their functions, and the services they provide—makes it possible to identify functional hotspots across the territory where NbS would offer the greatest benefit in regulating a specific risk.

Funded by
the European Union

NBRACER
Nature Based Solutions
for Atlantic Regional Climate Resilience

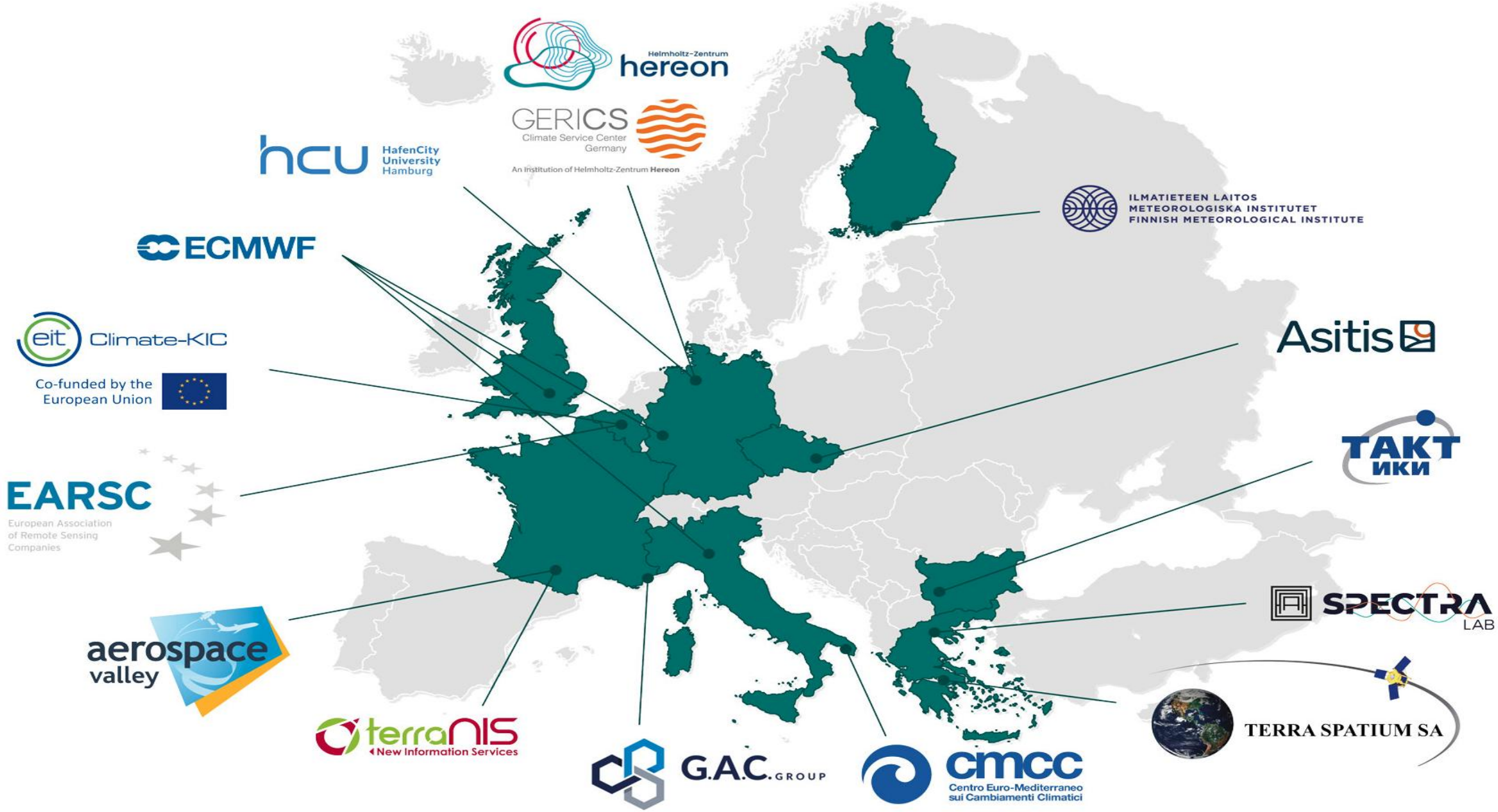
Thanks for your attention

Funded by
the European Union

Showcasing Solutions: the VALORADA project – EO for place-based climate resilience

Cristobal Reveco, GERICS, VALORADA & Marc Tondriaux, TerraNIS, VALORADA

11:05 – 11:20


Helmholtz-Zentrum
hereon
GERICS
Climate Service Center
Germany
An institution of Helmholtz-Zentrum Hereon
hcu
HafenCity
University
Hamburg
ECMWF
ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE
eit Climate-KIC
Co-funded by the
European Union
Asitis
ТАКТ
ИКИ
EARSC
European Association
of Remote Sensing
Companies
SPECTRA
LAB
aerospace
valley
terraNIS
New Information Services
G.A.C. GROUP
cmcc
Centro Euro-Mediterraneo
sui Cambiamenti Climatici
TERRA SPATIUM SA

VALORADA: some context needed

Different and changing climate risks

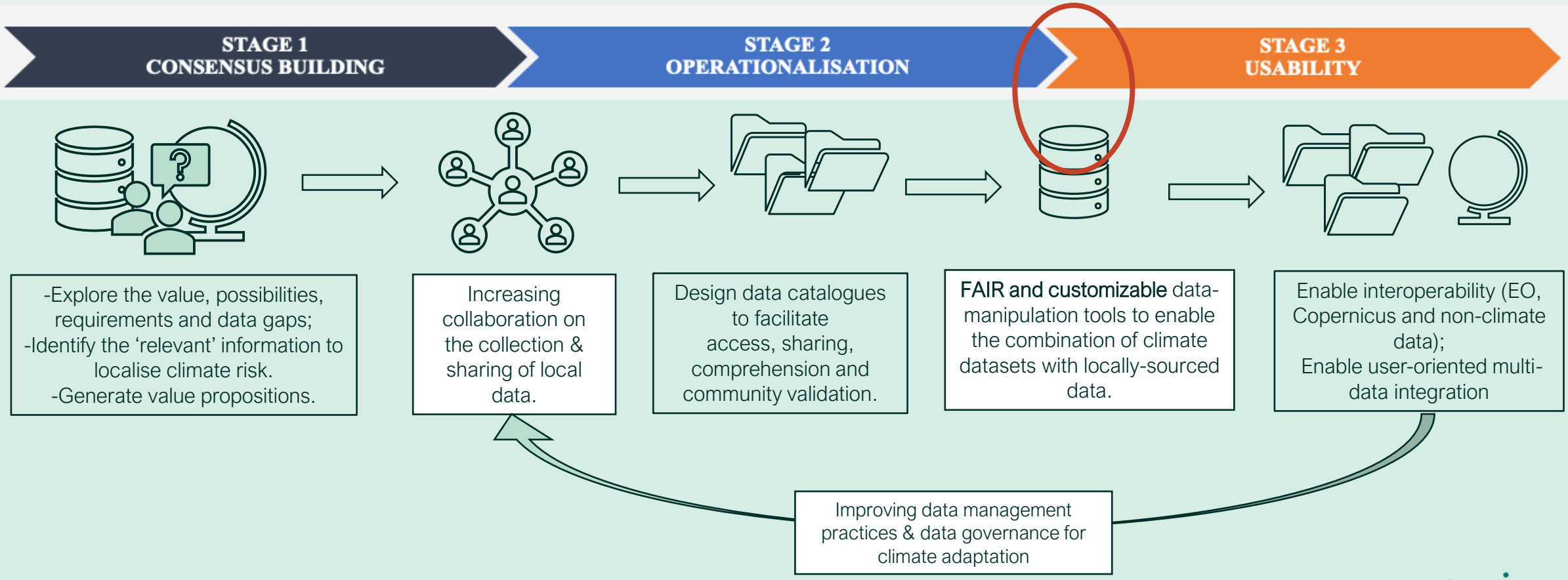
- Current data available?
- Current and future data needs?
- Future data applications?

1. Which data is needed to **contextualise** climate risk?

2. Which data is **already available** for this purpose?

3. Which **value propositions enhance the climate value of** locally-produced data?

4. How can we link locally produced data with climate data and **ensure their usability**?



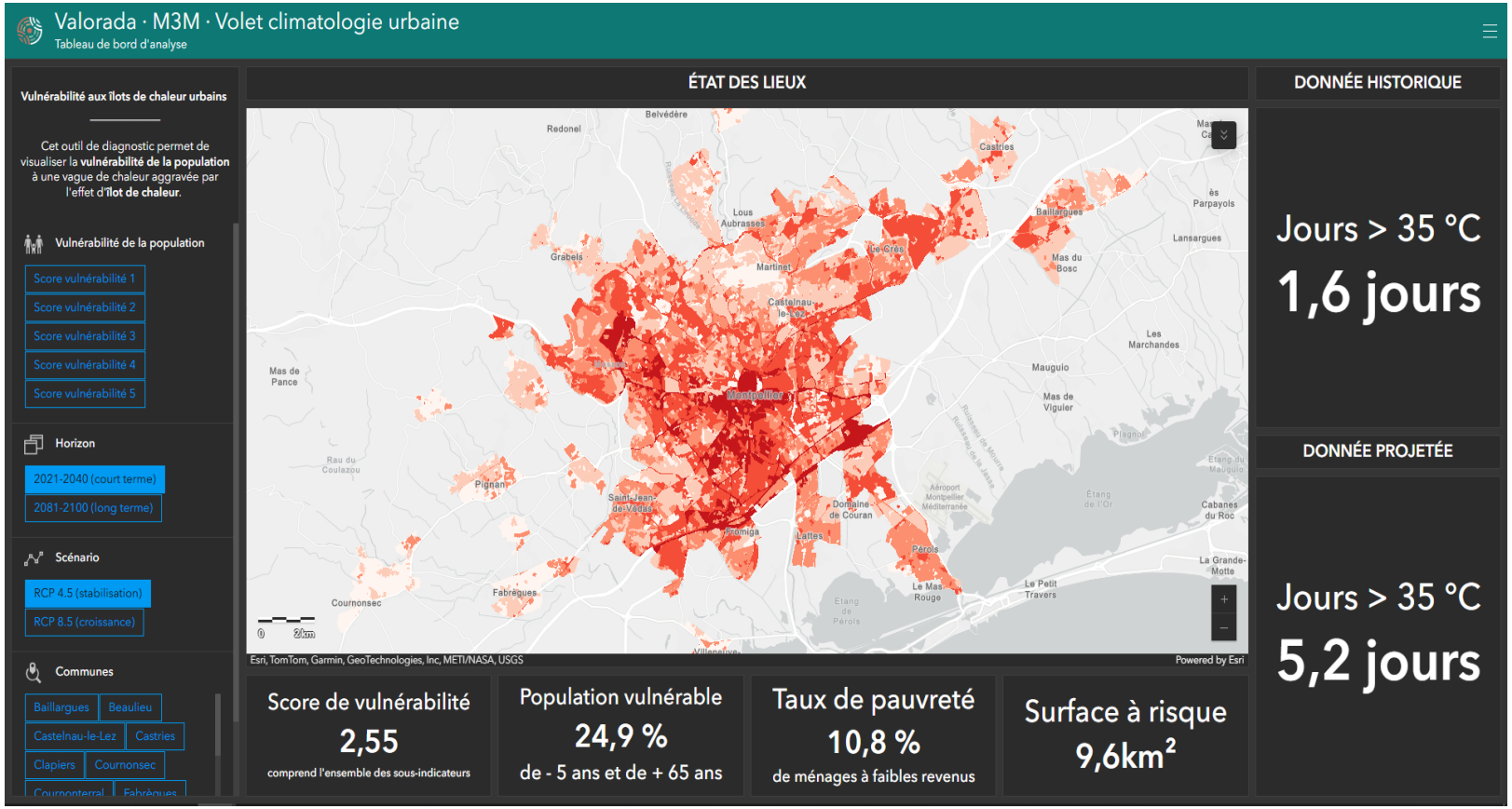
Social Media and communications

www.valorada-project.eu

LinkedIn

Follow us on social media!

Heat Islands in MONTPELLIER



TOOL Landia

CLIMATE RISK Vulnerability of the population to urban heat islands effects

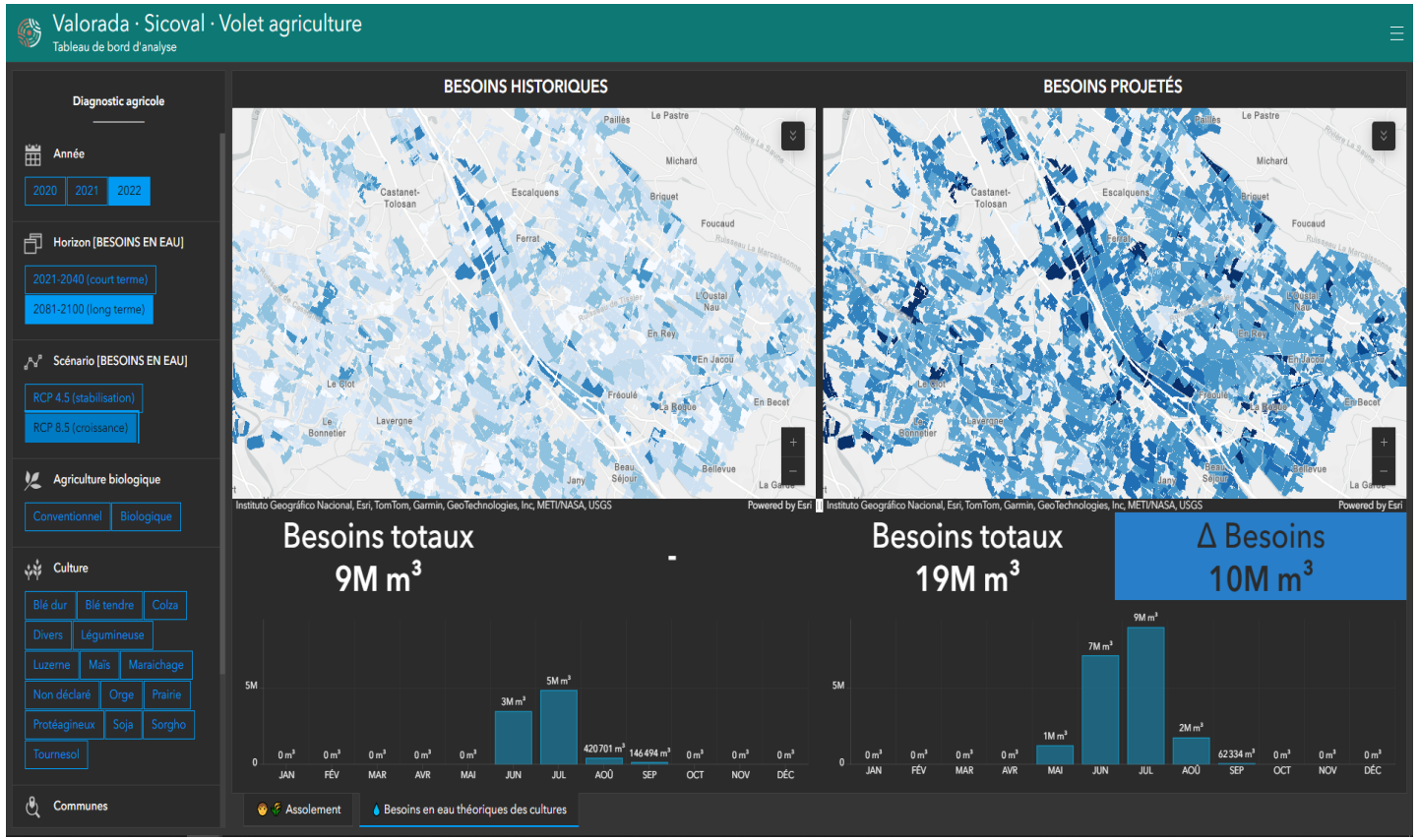
LOCATION Montpellier Métropole

OPERATOR TerraNIS

DEVELOPMENTS

- Integration of local data (demography, buildings configurations), High resolution EO images, temperature and climate data and projections.

Agriculture and water in SICOVAL (near Toulouse)



TOOL Landia

CLIMATE RISK Water deficit for agriculture

LOCATION Sicoval area (group of small communes near Toulouse)

OPERATOR TerraNIS

DEVELOPMENTS

- Integration of agriculture local (parcels delineation, types of crops, irrigation) and climate projections (precipitations, evapotranspiration,..)
- Assessment of several scenarii (change of crops, of farming practices,..)

Coastal erosion and wild fires in Central **GREECE**

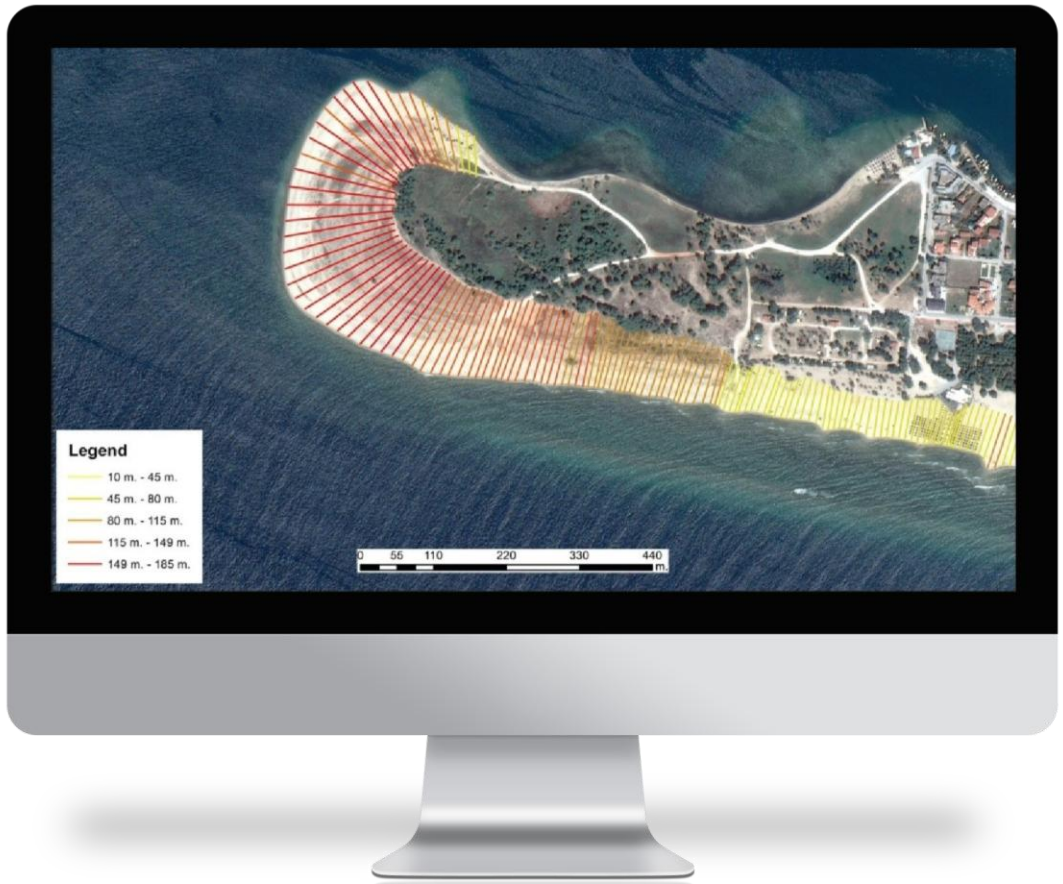
CLIMATE RISKS

🌊 Assessment of island beach erosion due to sea level rise in the Mediterranean coastal area.

🌱 Assessment of soil erosion and land degradation risks on agricultural and woodland areas.

🌡️ Monitoring of drought and forest fires

TERRACOAST IN EVOIA



TOOL TerraCoast

CLIMATE RISK Coastal erosion

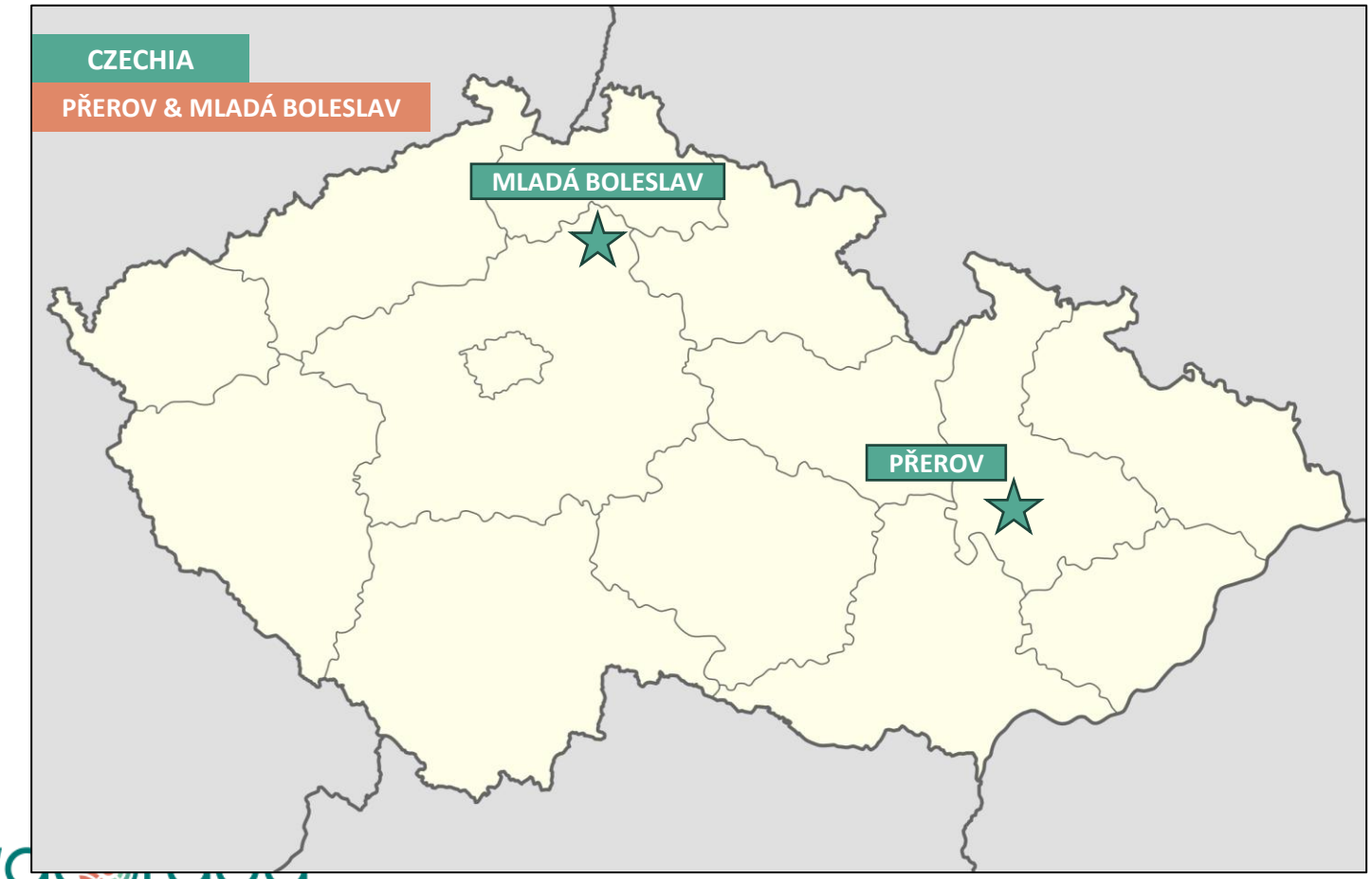
LOCATION Island of Evoia

OPERATOR TerraSpatium

DEVELOPMENTS

- Integrate local data and projections for rise of sea level

Drought and flooding in **CZECHIA**



CLIMATE RISKS

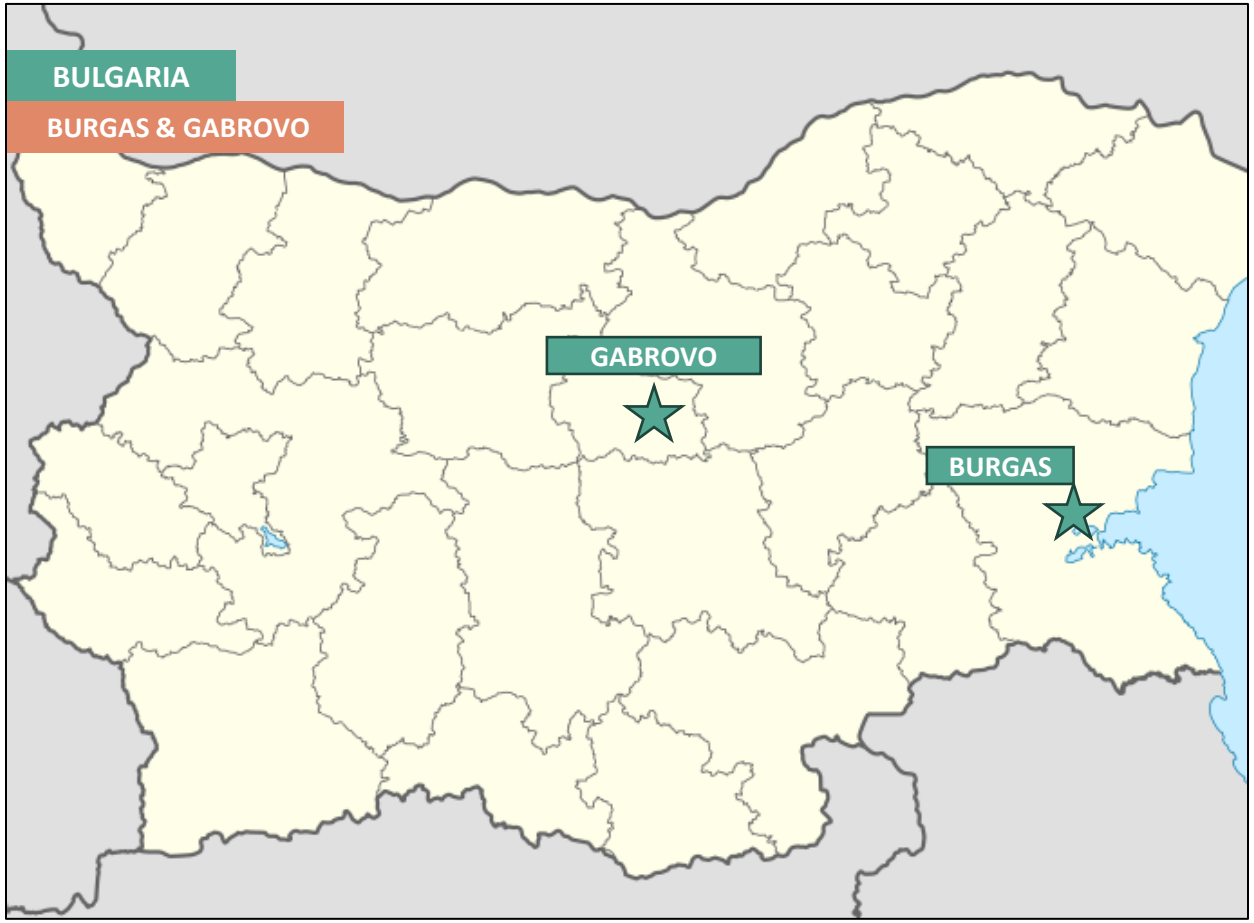
🌿 🌡️ Vulnerability to drought based on climate projections, type of surface and population data

💦 Vulnerability to flash floods

TOOL Landia (Terranis)

OPERATOR ASITIS

Flooding and forest fires in **BULGARIA**



CLIMATE RISKS

💦 Monitoring of flash floods and extreme rainfall

🌡️ Monitoring of drought and forest fires

TOOL Landia (Terranis)

OPERATOR TAKT-IKI

Water and agricultures in **MOLISE region (Italy)**

CLIMATE RISKS

- Assessment of the risks for the agriculture and livestock sector linked to climatic changes

TOOL Landia (Terranis)

OPERATOR CMCC

Q&A and Wrap Up

11:20 – 11:30

Thank you very much!

More information:

www.pcp-wise.eu