IMPETUS

Planning ahead: adaptation pathways for resilient futures

Explore how adaptation pathways guide flexible, long-term strategies under climate uncertainty, enabling inclusive and transformative planning processes

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THETIS

Wednesday, July 8th, 2025

Open Training Session #10 - Accelerating regional climate resilience: innovation, tools & pathways for action

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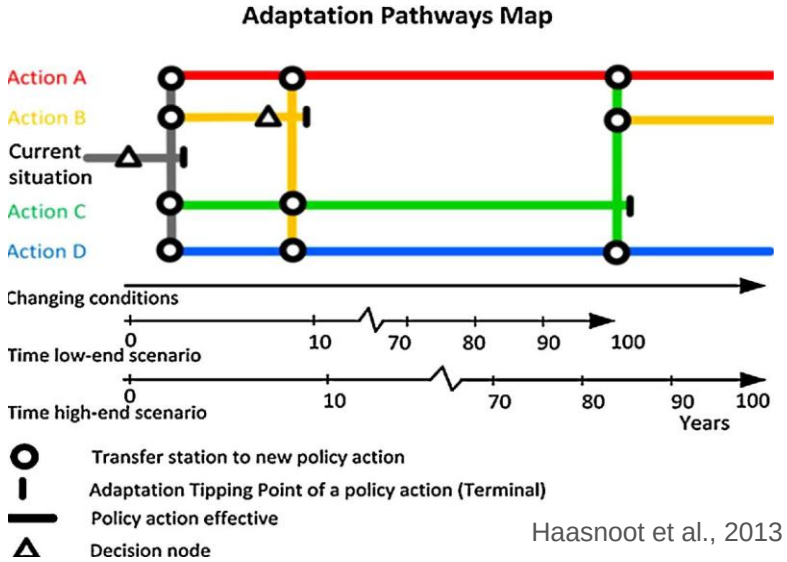
IMPETUS Project

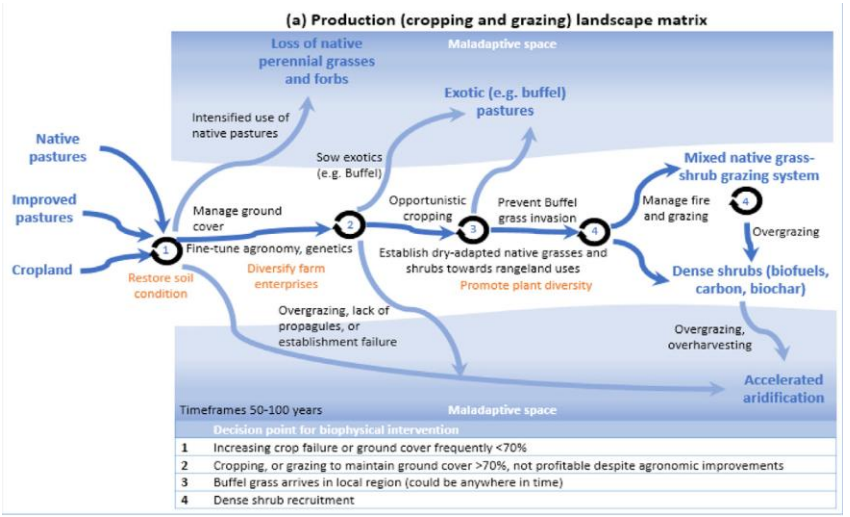
- **Funding source**: Horizon 2020 research
- **Duration**: 2021-2025
- **What we want to achieve**: Turn climate commitments into tangible, urgent actions to protect communities and the planet
- **What we do**: analysing solutions, boosting knowledge, and creating packages of adaptation measures that other communities can use as a pathway towards a climate-resilient and sustainable future.
- **Who we are**: 32 partner organisations based in 9 European countries
- **Where we work**: 7 Demo-sites in different European regions

Introducing the topic of adaptation pathways

- Alternative **sequences of actions**
- Identifying under what conditions (**tipping points**) new measures are needed
- Diverse visualization for Adaptation **pathway maps**
- Gradually **evolving concept** and implementation domains
- Tools for **dynamic adaptation planning**
- Tools for **stakeholder engagement**
- Tools for boosting **transformational adaptation** and **climate resilient developments**



Haasnoot et al., 2013



Prober et al., 2017

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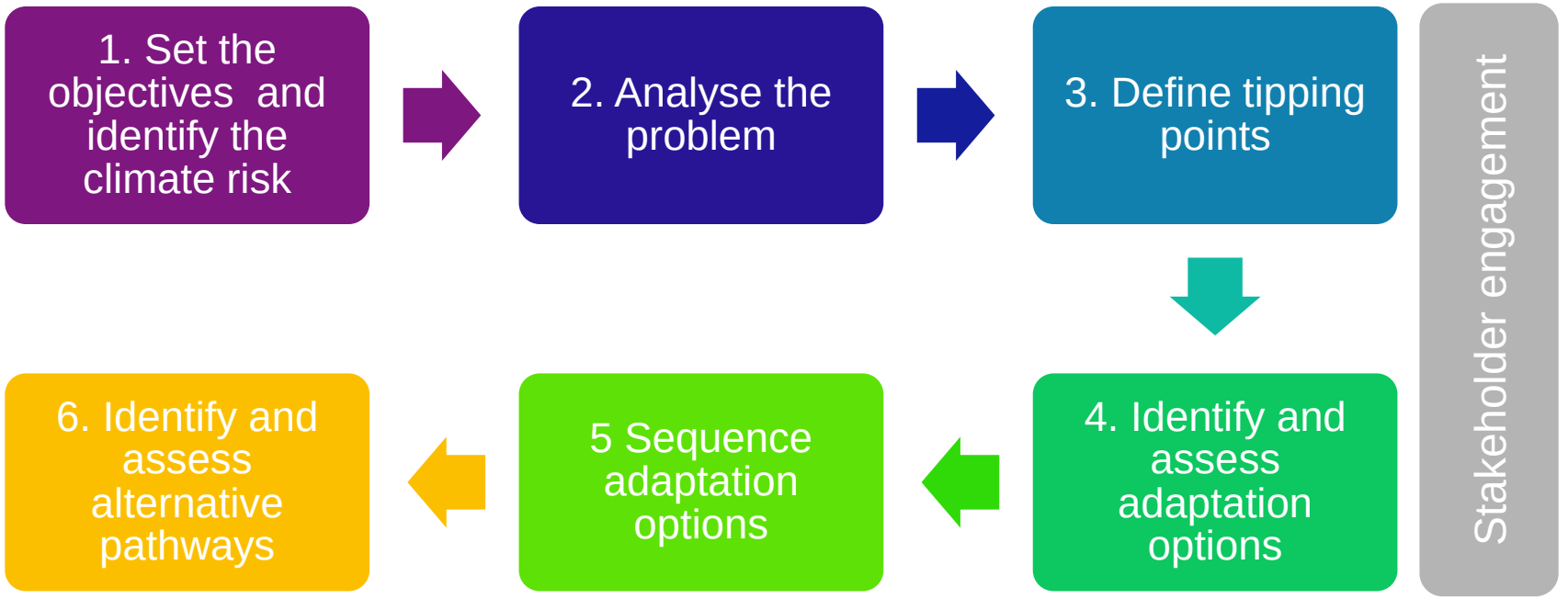
IMPETUS WP5: Regional adaptation pathways

- **Several guidance documents** for adaptation pathways
- **No standard approaches** defined at EU level
- Need for working with a **common but flexible methodology**

- **Step-wise methodology**



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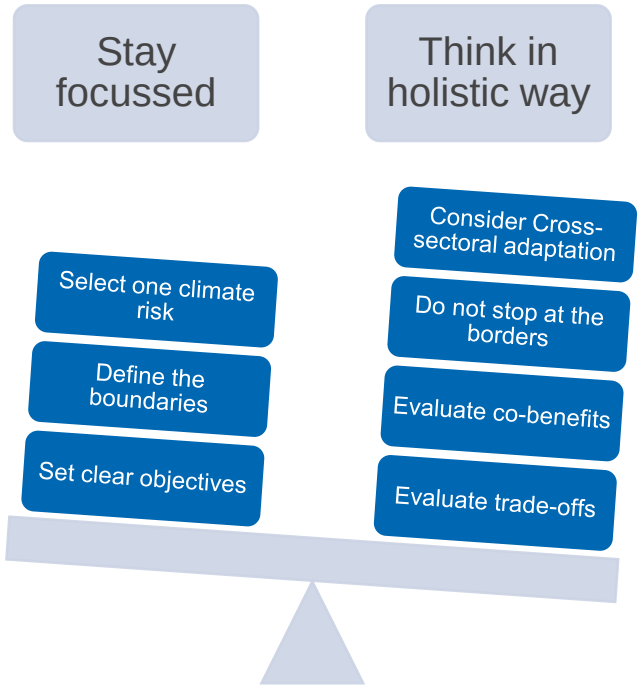
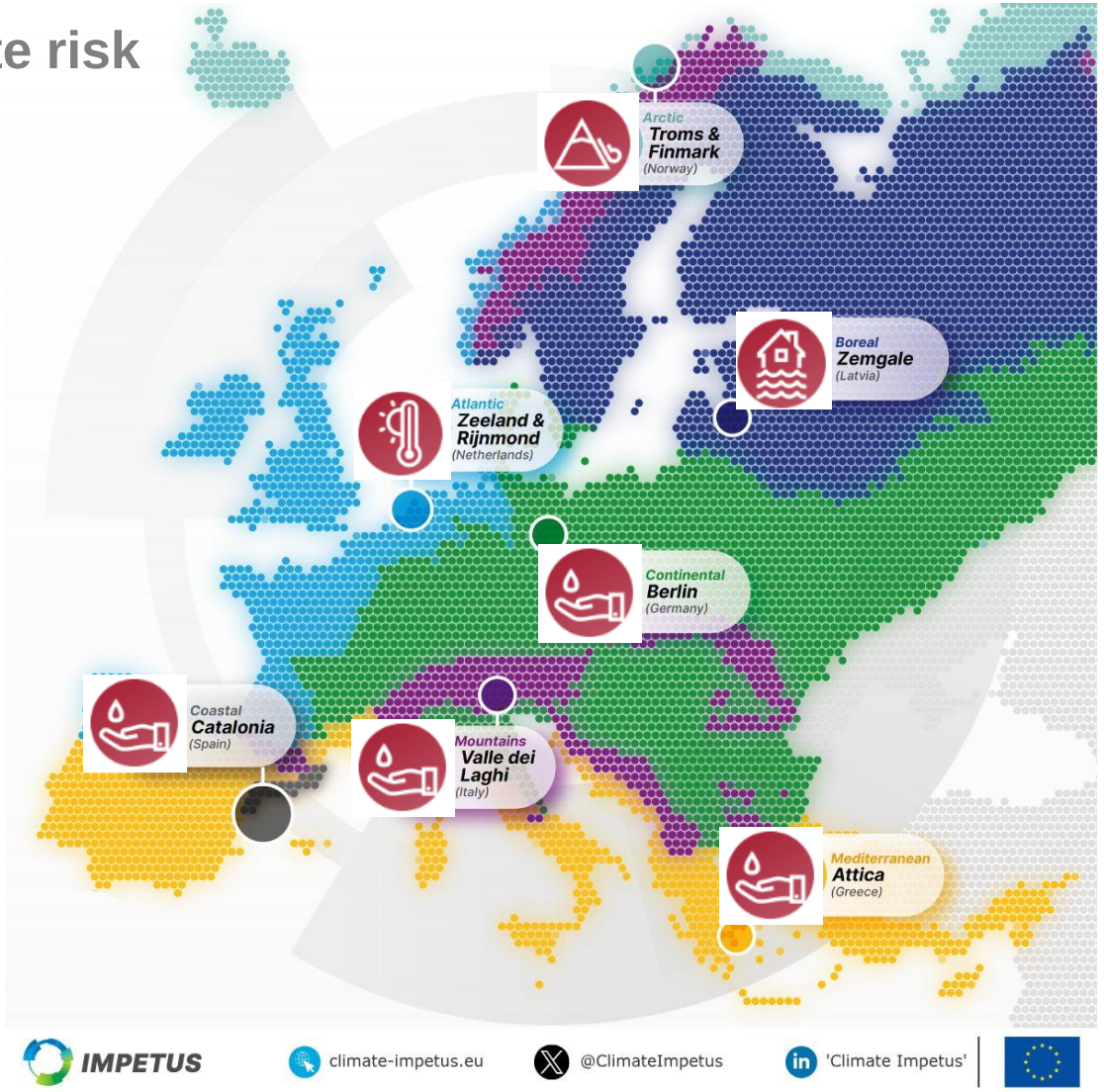
Step 1 - Set the objectives and identify climate risks

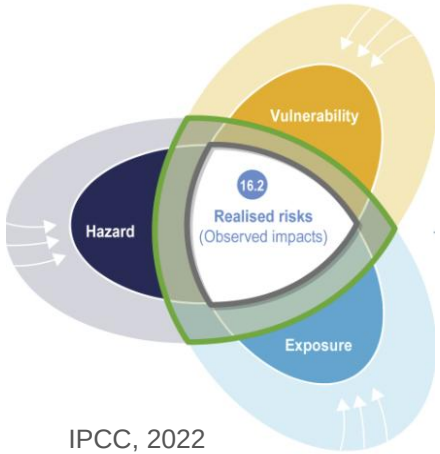
- ✓ Set adaptation **objectives** centred on a **climate risk**
- ✓ Possibly define an **indicator**
- ✓ Define the **study area**
- ✓ Simple but key step for the following activities



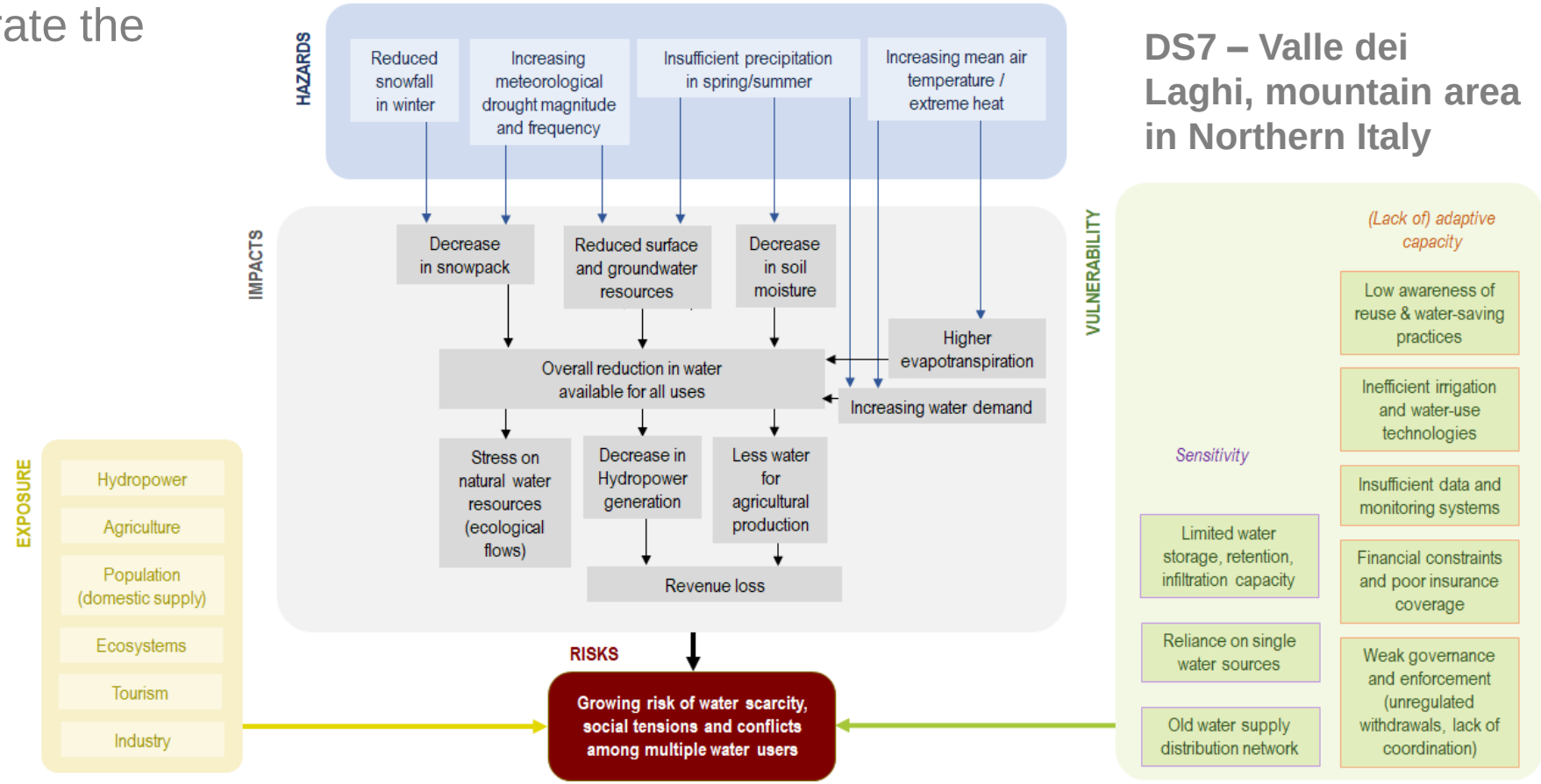


Step 2 - Analyse the problem

- Understand how climate **hazards**, **exposure** and **vulnerability** elements interact to generate the climate **risk**
- Build an **impact chain**



IPCC, 2022

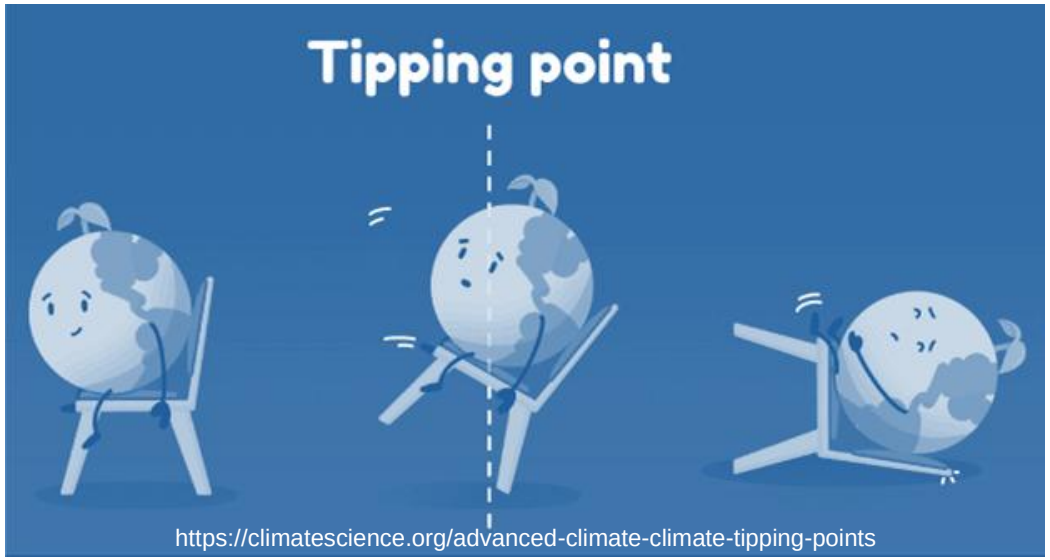


DS7 – Valle dei Laghi, mountain area in Northern Italy

Own elaboration from GIZ and EURAC, 2017; Zebisch et al., 2022, 2023

Step 3 - Define tipping points

- Identifying potential **critical conditions** that impose to think about alternative or additional solutions
- Scenario-dependent **timing** of tipping points
- **Decision points** vs Tipping points



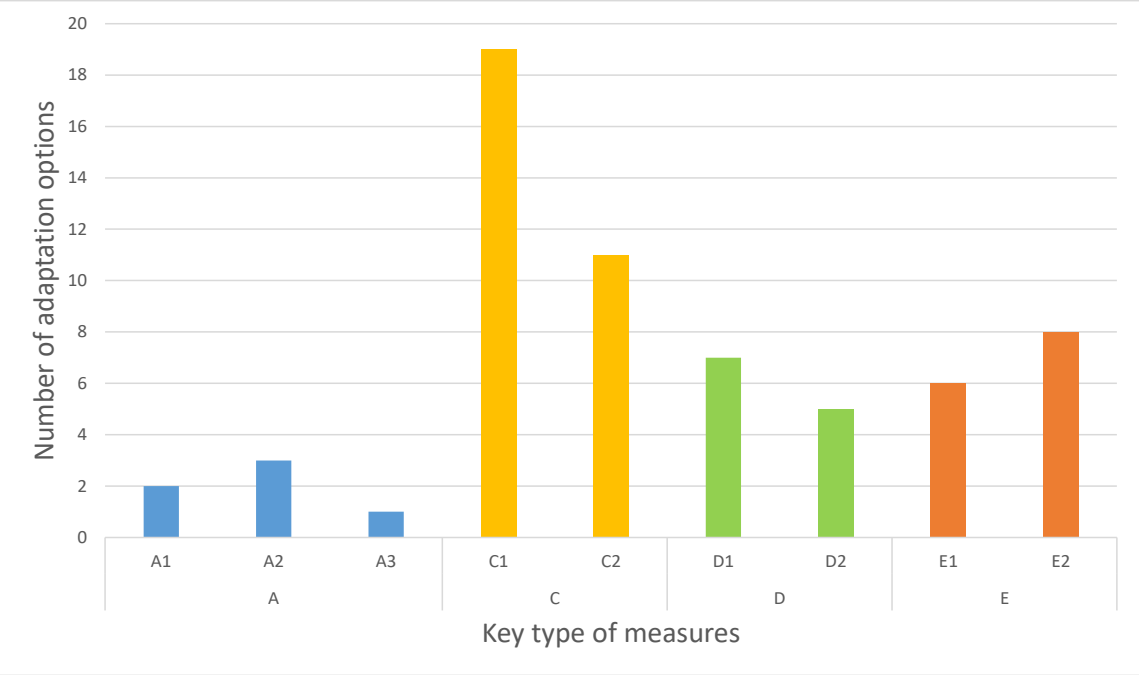
…

- *Water availability in watersheds falling below 15% or 100hm^3*
- *Number of incorrect avalanche forecasts higher than the number of correct forecasts*
- *Heavy rains not manageable by the urban drainage system (32 mm in 24 hours)*
- *Increasing discomfort PET thresholds*

…

One of the most **challenging Step** due to the complexity of the system, not known cascading effects, concertation with stakeholders

Step 4 – Identify and assess adaptation options

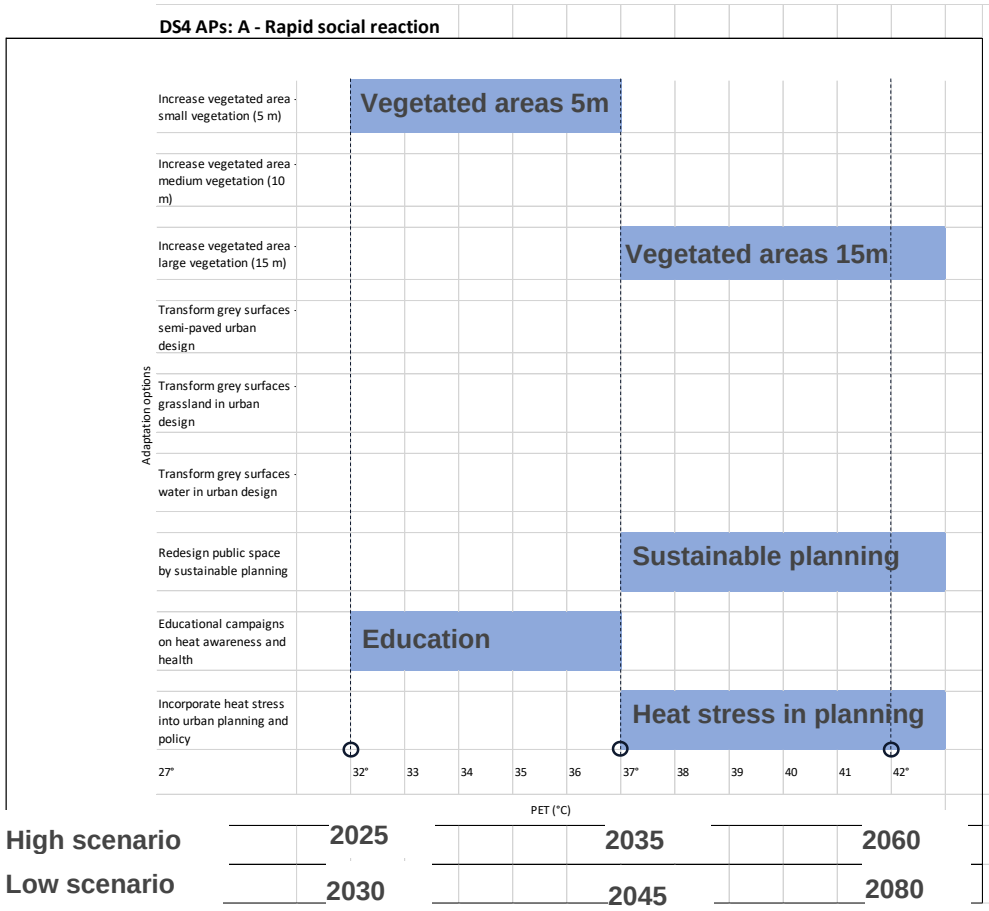


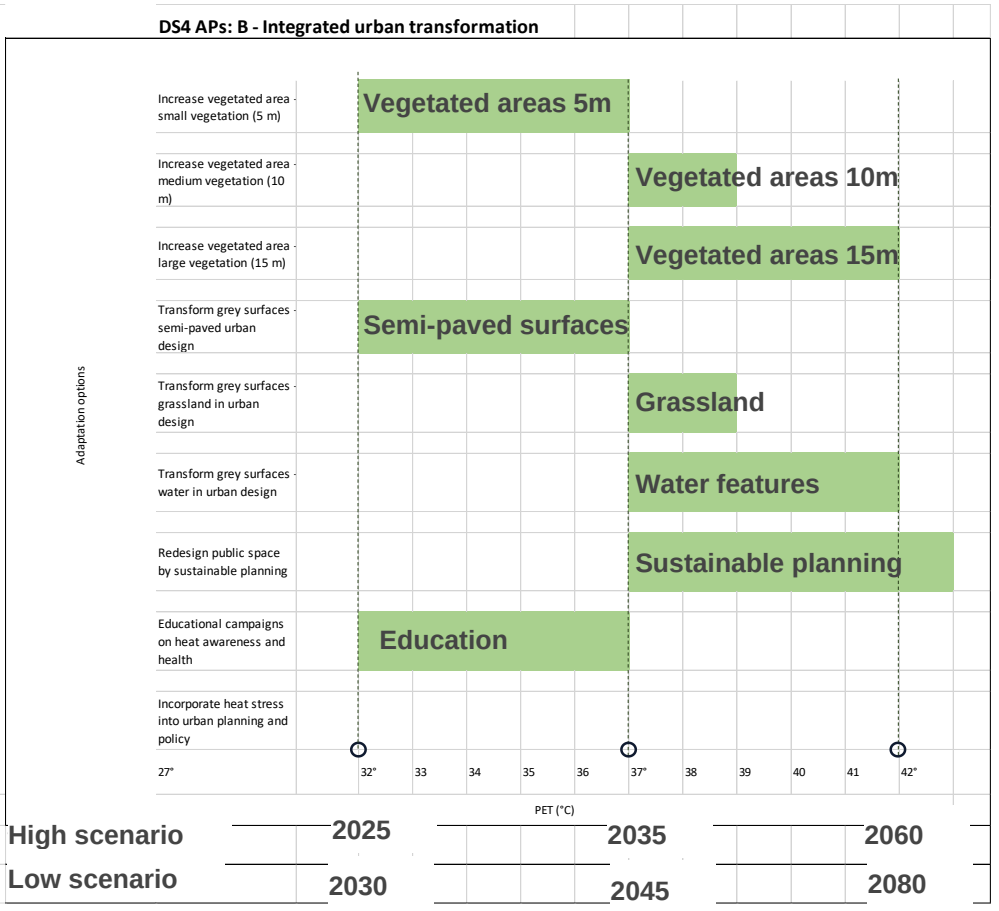
- Effectiveness
- Feasibility –TRL
- Feasibility – SRL
- Economic Costs
- Co-benefits
- Unintended effects/hidden risks
- Implementation time
- Lifetime/ sell-by date/sell-by condition

Step 5 and 6 - Sequence options and identify pathways

Zeeland province, the Netherlands

- Develop a **plausible sequence** of adaptation options
- Create a **first visual map**
- Play with **different combinations** or different sequences of adaptation options





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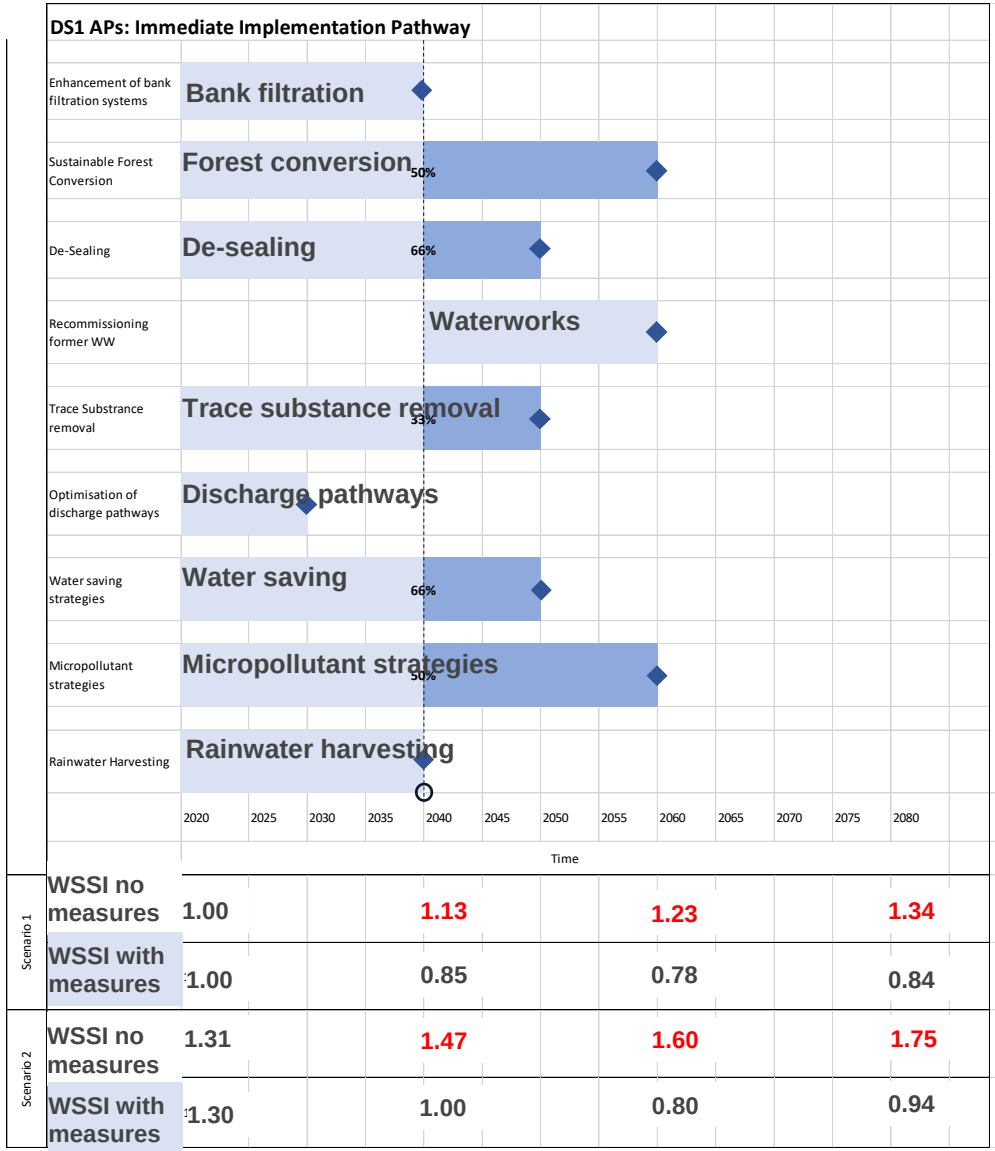
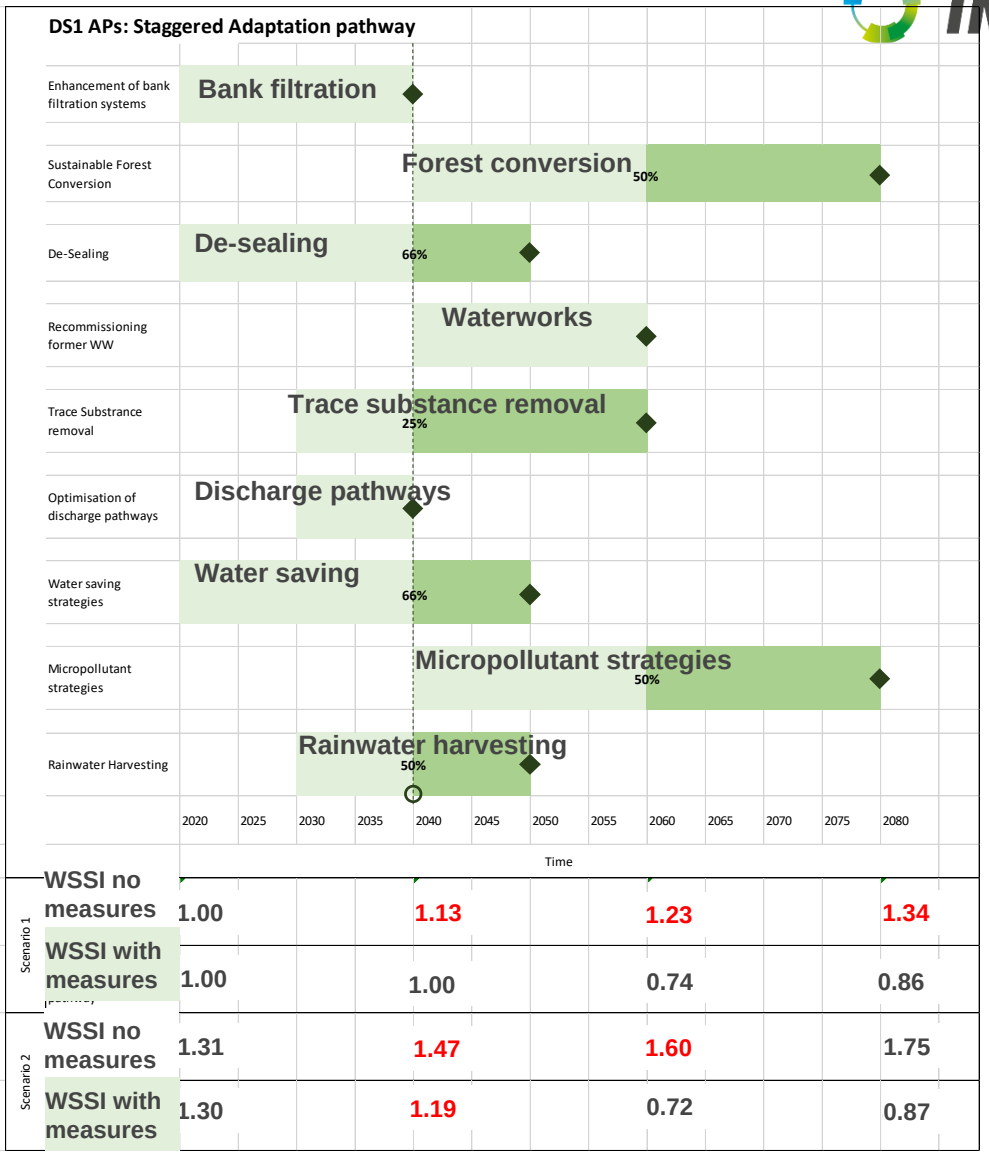
Berlin, Germany





Scenario 1	WSSI no measures	1.00	1.13	1.23	1.34
	WSSI with measures	1.00	0.85	0.78	0.84
Scenario 2	WSSI no measures	1.31	1.47	1.60	1.75
	WSSI with measures	1.30	1.00	0.80	0.94

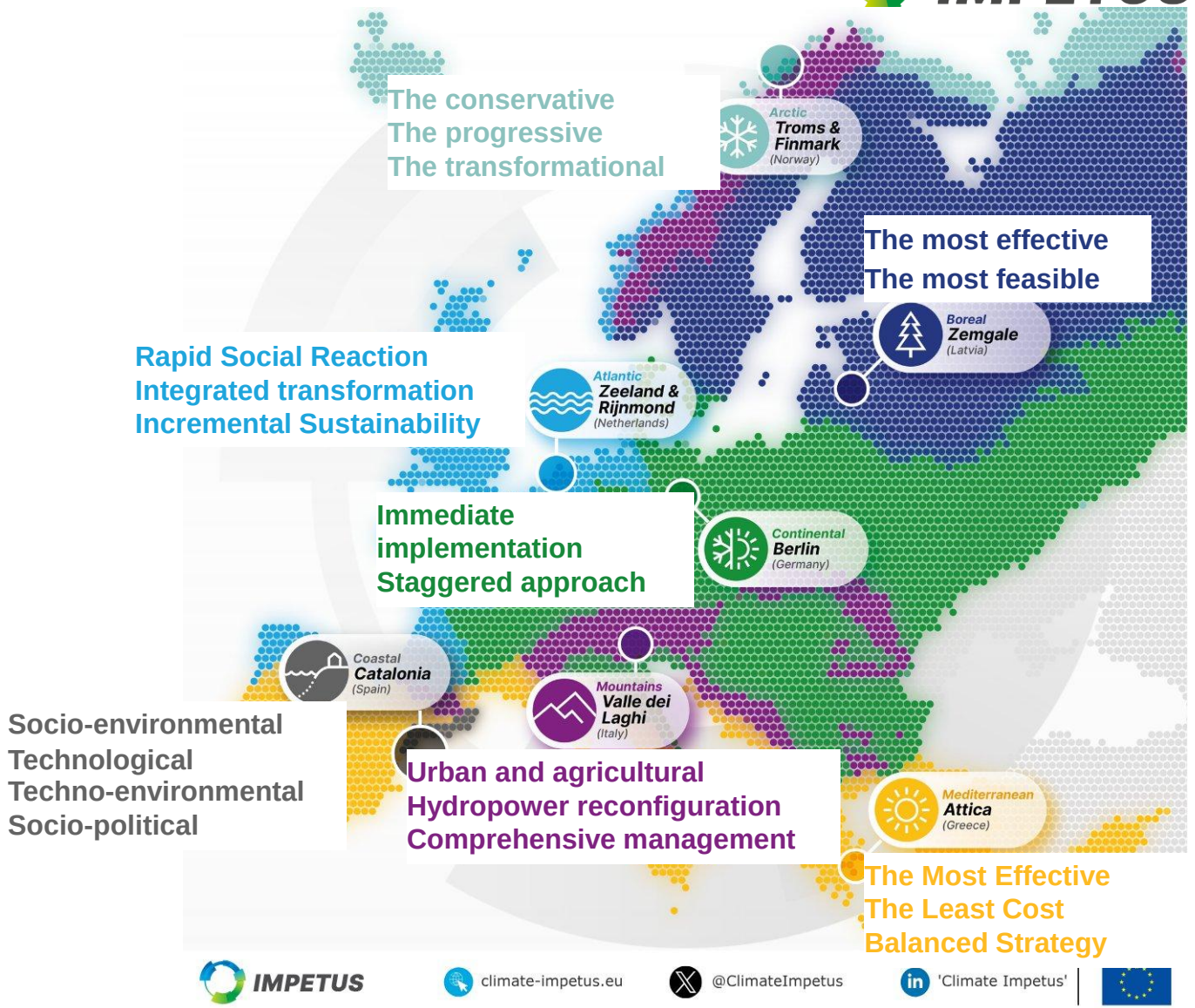
Scenario 1	WSSI no measures	1.00	1.13	1.23	1.34
	WSSI with measures	1.00	1.00	0.74	0.86
Scenario 2	WSSI no measures	1.31	1.47	1.60	1.75
	WSSI with measures	1.30	1.19	0.72	0.87

About 20 adaptation pathways

- Different **timing** of planned interventions
- Different strategic **visions**
- Different **objectives**
- Different target **sectors**

Co-created with public administrations partners of the project and other stakeholders

Berlin senate, Berlin water service BWB (Germany), EYDAP water service (Greece), Union of municipalities Valle dei Laghi (Italy), Catalan Office of Climate Change (Spain) etc.



The adaptation pathway potential: stakeholder feedback

"Visual **communication** and planning instrument"

"Fosters **strategic dialogue** within public utilities and administration"

"Helps frame **policy discussions**, align sectoral priorities, and foster informed debate"

"**Long-term** water resource planning"

"Potential to very well **explore the impacts of different strategies**"

"**Stepping stone** for future work and a guide for possible avenues to pursue"

"Fosters **informed and resilient decision-making** processes at different levels"

"Contribution for the ongoing development of the **Mitigation and Adaptation Strategy** on climate change"

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Challenges: stakeholder feedback

For elaborating pathways

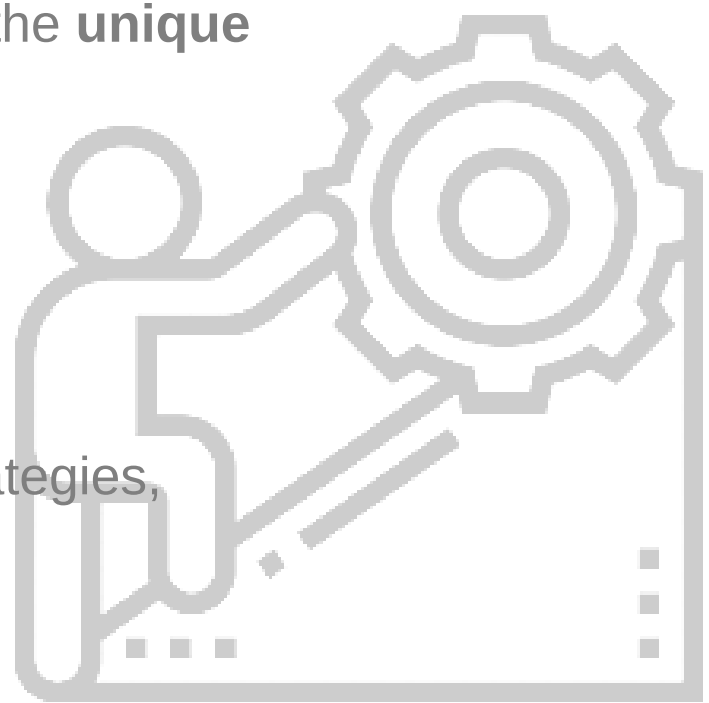
Need for **examples** that illustrate how to define hybrid tipping points

Diversity of **stakeholder perspectives**

High number of **assumptions** in indicator use and calculation

Balance between applying a structured methodology and responding to the **unique context and dynamics of the DS**.

Need for **more data**, **modelling** capacity, **time** and **resources**



For implementing pathways

No institutional mechanism to link AP outputs to official adaptation strategies,

Fragmented responsibilities and limited coordination

Significant financial investment based on **highly uncertain pathways**

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Turning climate commitments into action

Thank you

Any questions?

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