STARS 4 Water

Supporting informed decision-making

By co-creation of policy dashboard for the Drammen river basin

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Deltares

Norwegian Water Resources and Energy Directorate

NVE

Problem and motivation

Problem

- Increasing water-related risks
- Lack clear, accessible information
- Data often fragmented across different sources

STARS4Water Project

- To support sustainable water management under climate change
- EU-funded initiative working in 7 river basins across Europe, including **Drammen basin** (Norway)
- Focus on co-creation, data services, and practical tools

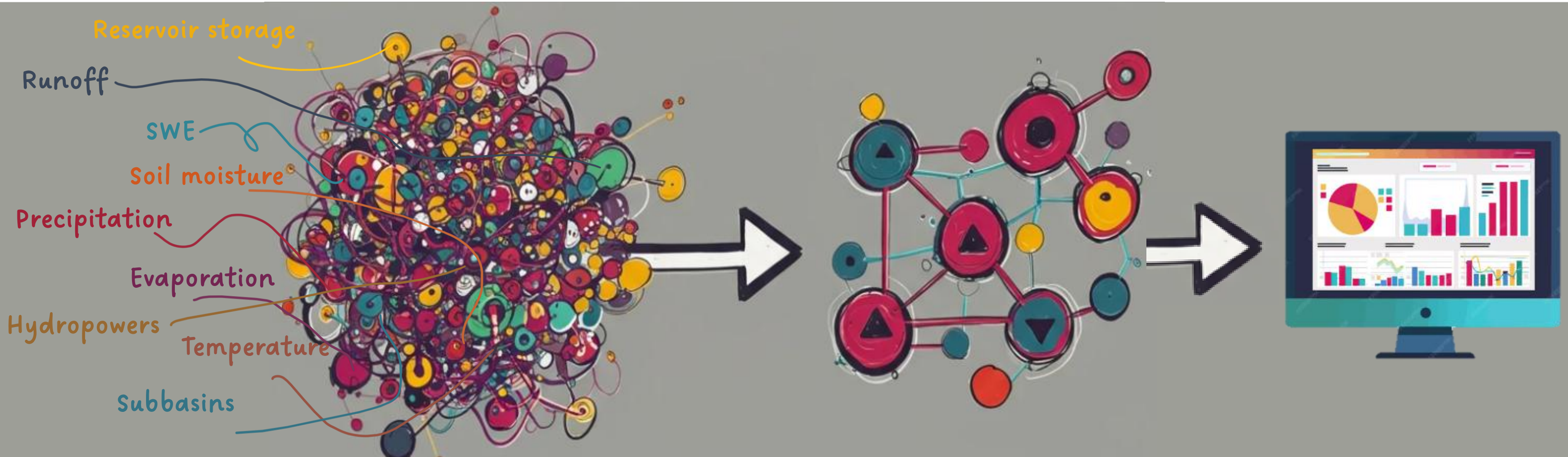
Goal

- Introduce idea of **policy dashboards**, not just tech tools, but collaborative decision-support platforms
  - ➢ Support adaptation by integrating data
  - ➢ Enable better decision-making
  - ➢ Provide a shared understanding of risks and actions needed

Policy dashboard

What is a policy dashboard?

- Decision-support platform for shared understanding → Data consolidate in one place
- Interactive, scenario-based, indicator-driven → Visualize and communicate trade-off
- Aligns with **FAIR** data principles → Findable, Accessible, Interoperable, Reusable

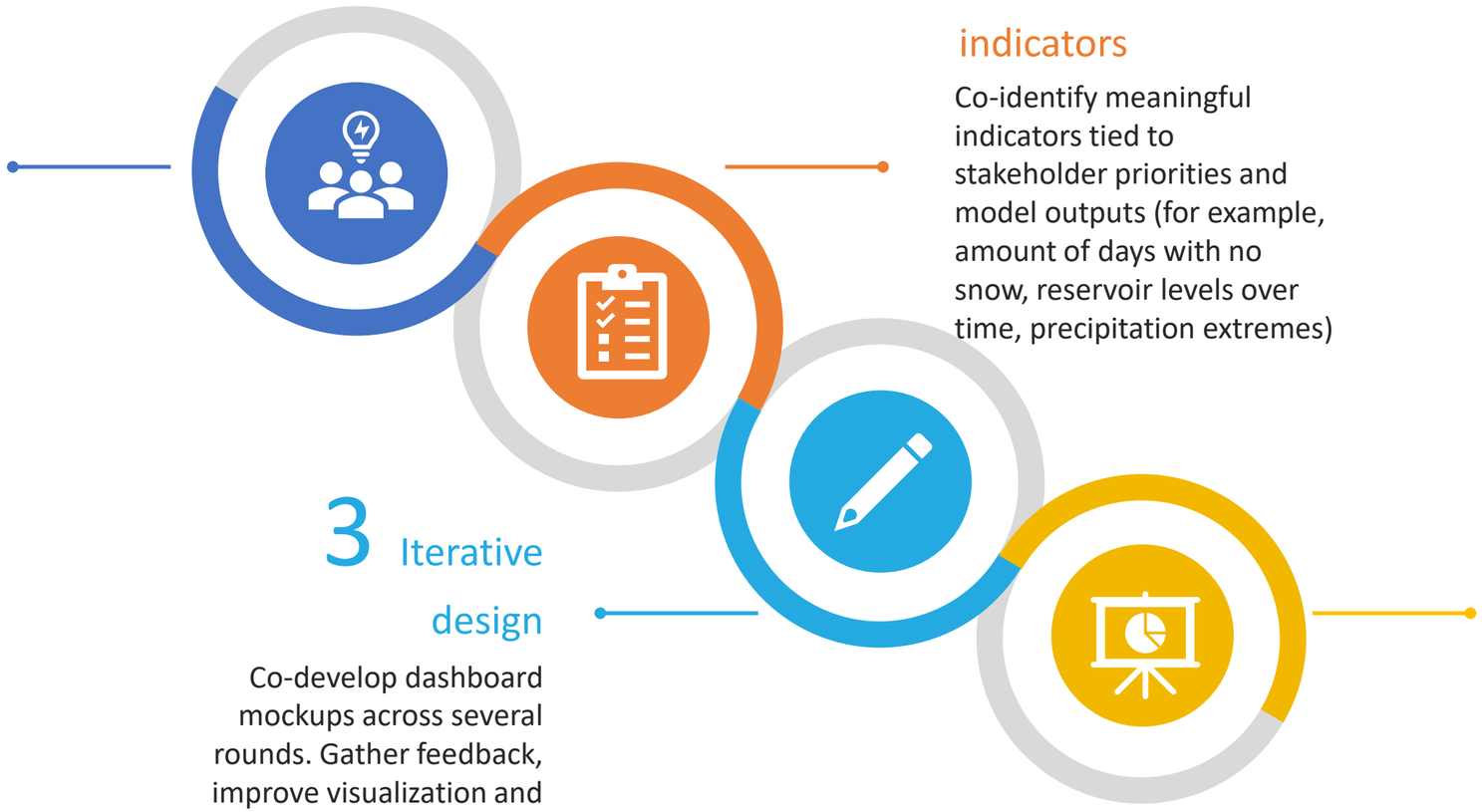


Co-Creation process

1

Understand the system

Work with stakeholders to develop a shared understanding of the local water system, challenges, and context. Start aligning science with real-world planning needs



2 Define indicators

Co-identify meaningful indicators tied to stakeholder priorities and model outputs (for example, amount of days with no snow, reservoir levels over time, precipitation extremes)

3 Iterative design

Co-develop dashboard mockups across several rounds. Gather feedback, improve visualization and interaction, validate relevance

4 Refine and deliver

Use the dashboard to present results back to stakeholders. Discuss, adjust, and deliver a tool that is locally owned and usable for decisions and planning.

Stakeholder engagement is not a side activity, it’s at the core of the entire process!

Workshop 1: Drammen River Basin

Stakeholder participation

- Participants included:
  → hydropower producers
  → dam operators
  → municipal planners
  → water suppliers

- Stakeholders engaged in:
  1. Defining **use cases** and **indicators**
  2. Exploring existing dashboards for **look & feel**
  3. Sketching dashboards with **preferred** features and functions

Workshop 1: Drammen River Basin

Use case statement to indicators

"As a **< role >**
I would like to know **< specific information need >**
in order to **< specific action based on the information >**

As a	*I would like to*	*So that I can*
Hydropower producer	Know the possibility for extreme weather events in the Drammenvasdraget	Asses the risk for overflow/low reservoir level. Think about concecutive dry/wet years

- Reservoir storage
- Consecutive dry years
- Hydropower potential

Workshop 1: Drammen River Basin

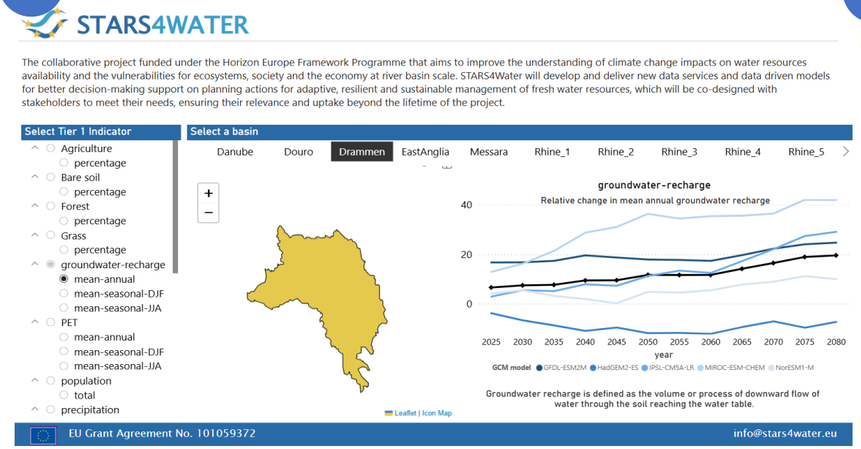
Look and feel

Examples of dashboards

1. STARS4Water Tier 1 Dashboard
2. Flood Impact Assessments (USA)
3. Nexus Water Food Energy (Greece)
4. Water security and irrigation (Egypt)

Demo

1



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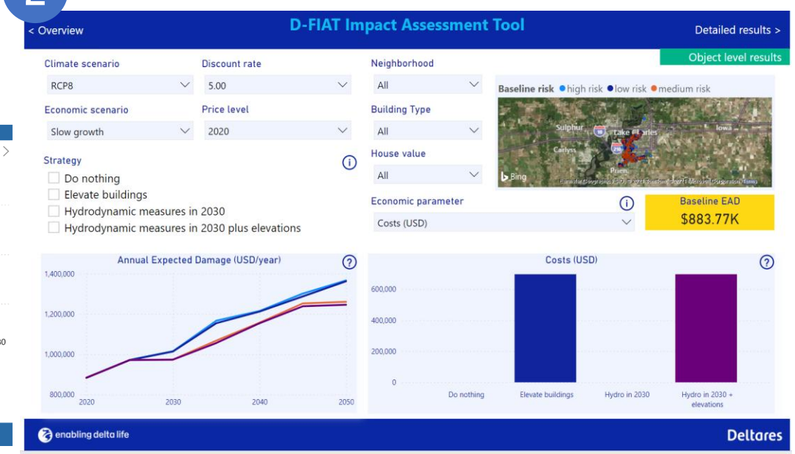

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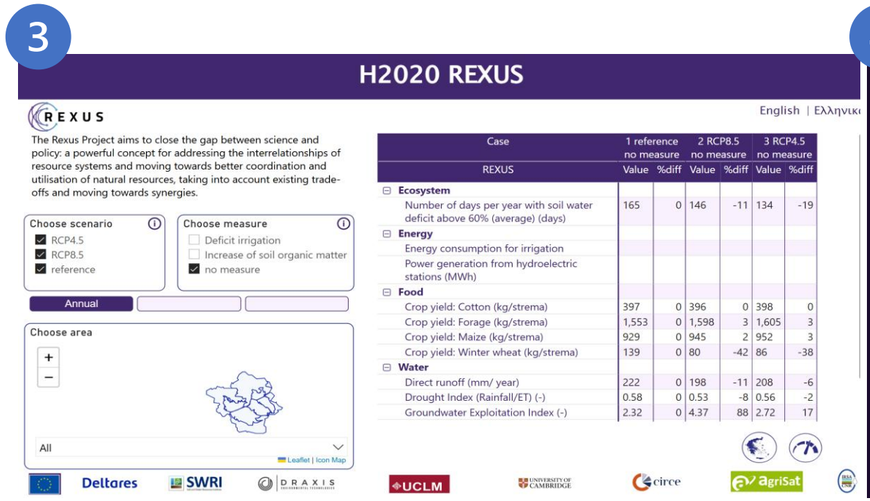

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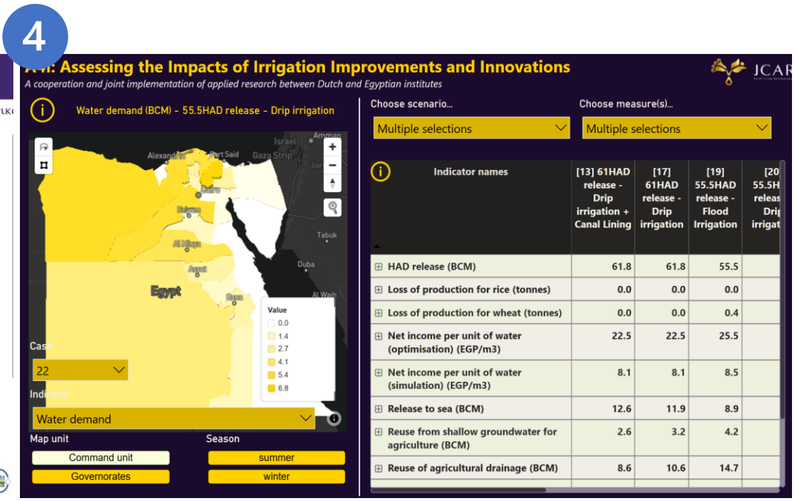


Workshop 1: Drammen River Basin

Sketching dashboard

Scenario: SSP2 - RCP4.5 | SSP3 - RCP7.0

2015 — 2070 — 2100

Season 1 | Season 2 | Season 3 | Season 4

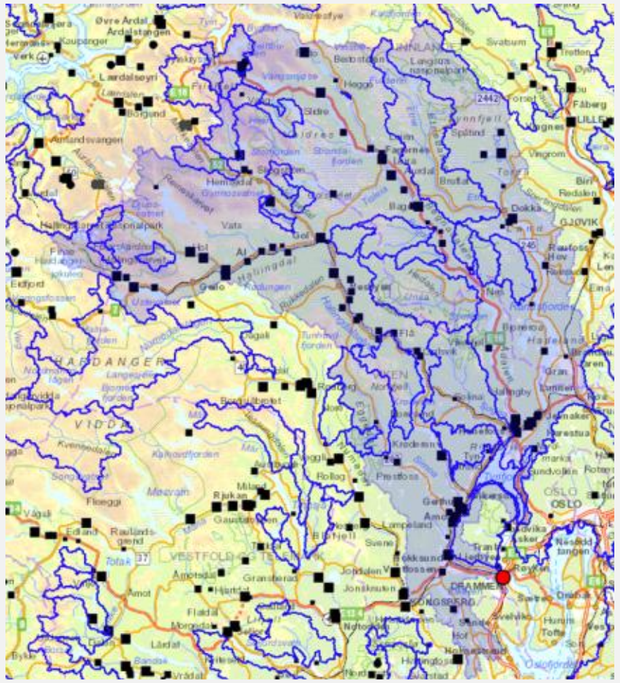
Impacts				
Case		**Baseline**	**Scenario**	**Measures**
Year		*2015*	*2070*	*2100*
Water supply	**Unit**			
		++	-	--
Rainfall				
Energy				
Energy production				
Environmental				
Minimum flow	people	10	7	5

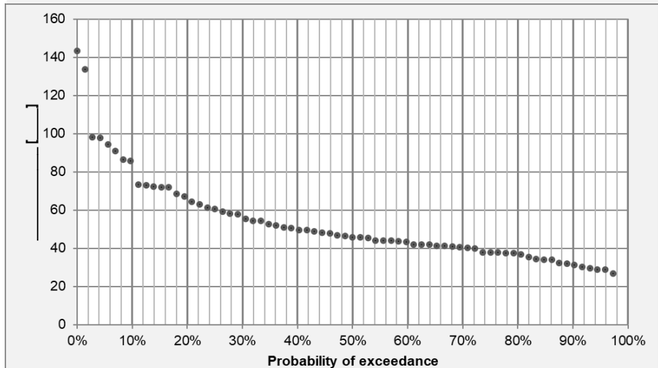
Bad — **Good**

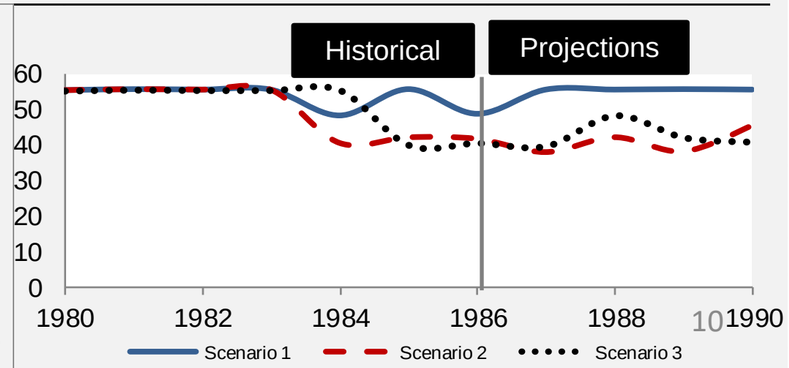
Area affected

low
moderate
high
very high

Drammen







From models to indicators

Challenges

- Multiple models used: **HBV, Lisflood, EOPS**
- Each model outputs data in **different formats**, often as daily values on spatial grids
- Raw outputs are **not dashboard-ready**

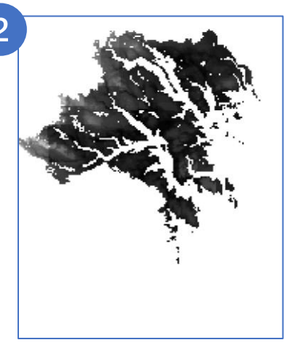
Following approach

- Developing a **template script** to:
  - Organize and harmonize model outputs
  - Transform data into dashboard indicators
- Designed for **reusability and maintainability**

Snow area (km²)

1. Reading	• **HBV**, xxx.nc, **param SWE**, 1kmx1km, daily for 30 years
2. Masking	• Masking files DEM **> 800** m
3. Applying threshold	• **>10 mm**
4. Spatial aggregating	• Raster → **sub basin** • Aggregation type = **summation**
5. Temporal aggregating	• Daily → **monthly** • Aggregation type = **average**

2



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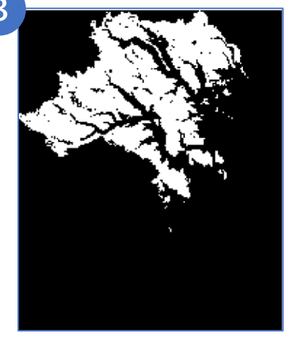

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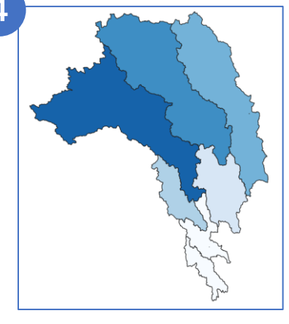

Conclusion and outlook

- Co-creation works, it helps align dashboard design with real stakeholder needs
- Stakeholders shaped use cases, selected indicators, and sketched key features
- Dashboard development now supported by a structured data pipeline
- Technical template is reusable and transparent, supports future updates
- Collaboration can ensure long-term maintenance beyond project lifetime
- Goal: a living, decision-support tool for climate adaptation and water planning

<u>Next steps:</u>

- Create the first dashboard draft
- Interviews and gather feedback (workshop 2)

Thank you

Questions?

More information

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- https://bit.ly/stars4water-tier1

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