The WEFE nexus in complex water systems: Building trust and mutual understanding through stakeholders' engagement

Exercise 6

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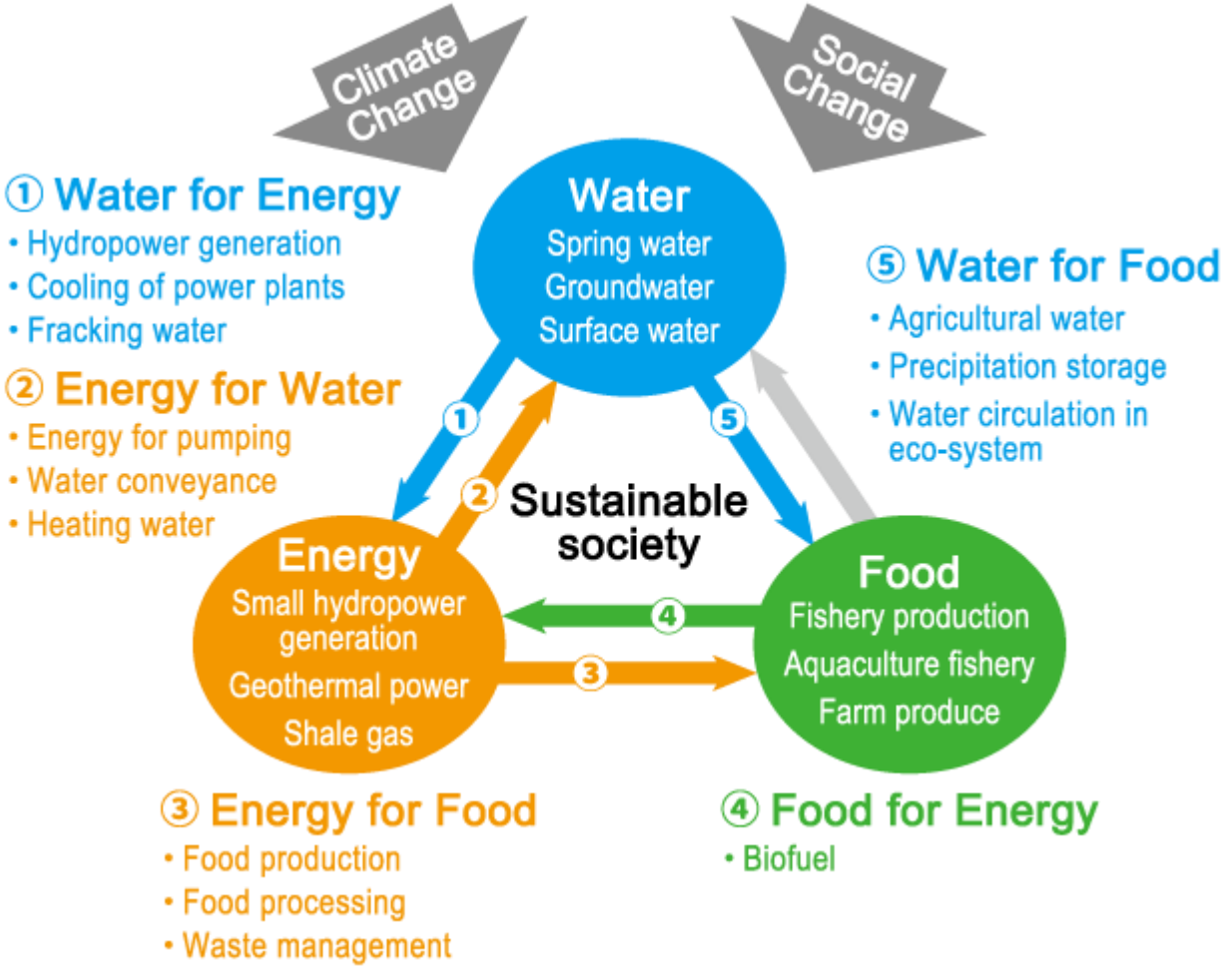
1. OBJECTIVE

How can we balance the different dimensions of the WEFE (Water-Energy-Food-Ecosystem) nexus in Lake Como catchment area, Italy?

- In a context of climate change
- Considering a scenario of hydropower prioritization
- Using a multi-stakeholder approach.

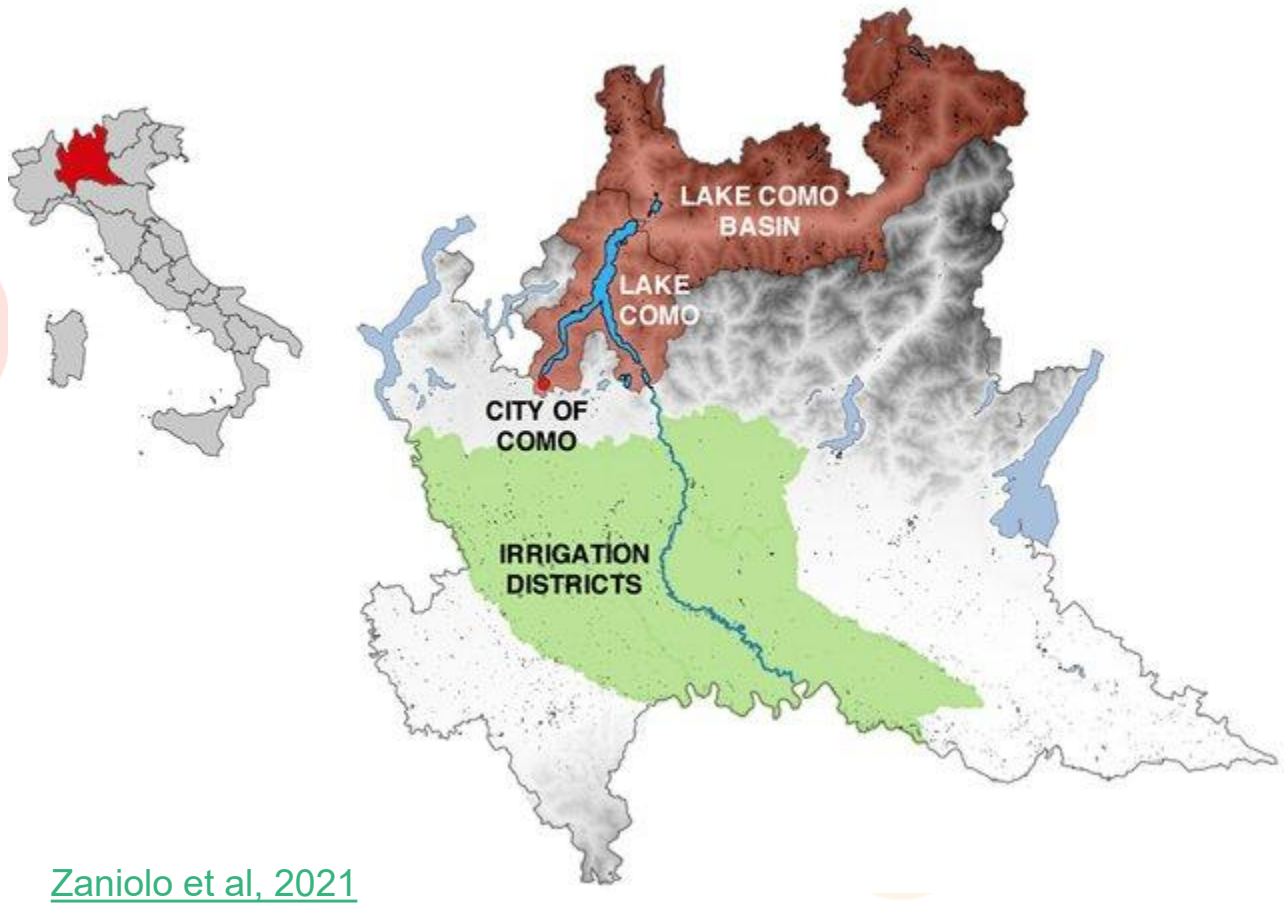
WEFE Nexus

UNEP-DHI



RIHN

The Lake Como catchment area



Zaniolo et al, 2021

Resources provided by the water of Lake Como:

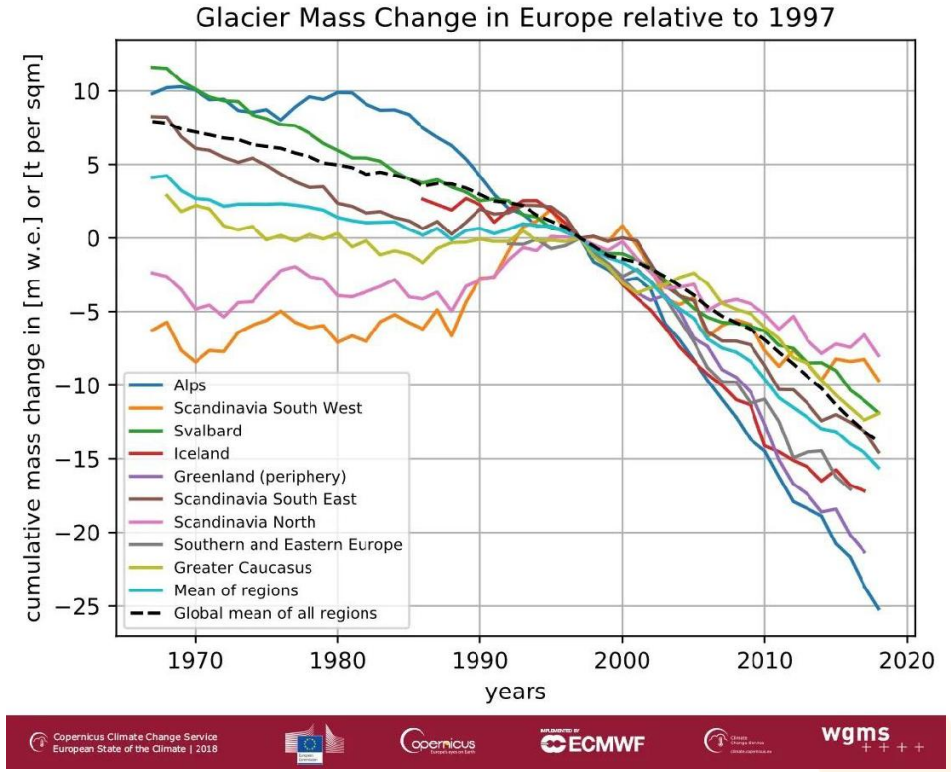
- Drinking water, tourism, agriculture, fishing, energy

Division of the area:

- Large upstream watershed, used for electricity production
- Deep glacial regulated lake in the middle
- Several water users downstream

Flood risk → flood & drought risks

Negative trend on the loss of the Alpine glacier mass



Increased winter influx – Decreased summer influx

Advancement and attenuation of the snow melt peak

Competition for water resources

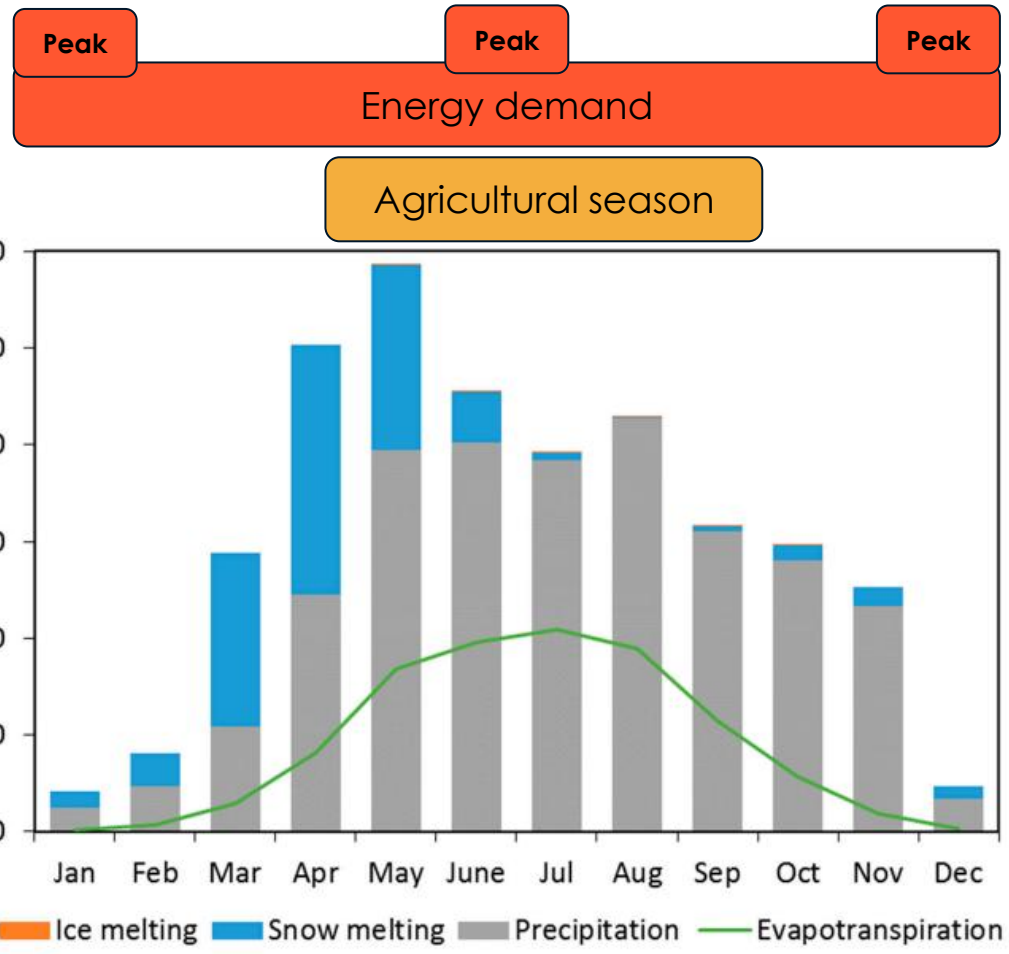


Figure 6. Monthly share of flow components in Lake Como catchment. 2002-2018

Fuso et al 2021

2. METHODOLOGY: Multi-stakeholder approach

How each:
- *Perceives impacts and risks*
- *Prioritizes actions*

And benefits and barriers to different solutions according to WEFE dimensions

Hydropower energy sector (upstream)
- Profit-oriented green energy
- Interest: retain control of when to release water or not, according to energy market prices

Lake operator (middle)
- Administrative authority
- Interest: water balance among all sectors, minimize conflict through equitable agreements

Agriculture: irrigation district (downstream)
- Profit-oriented food production
- Interest: Maximize production and increase efficiency in water usage

3. MAIN RESULTS - IMPACTS

All stakeholders mostly agree on the occurrence of impacts but the weighting of these impacts is perceived differently

Water storage: Irrigation districts would lack water
Sedimentation: Overall negative as it will hinder nutrient supply

Energy security: Beneficial for all as planning is secured
Reduction in fossil fuels: Overall positive as portfolio is diversified and climate change mitigated

Decrease in food production: mostly affects irrigation districts
Less water: Negative for all, but especially for the lake and irrigation districts

Change in water characteristics: Negative impacts for lake and irrigation district
Landscape & recreation: Overall beneficial, as more tourists might be attracted by the hydro plants.

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→ UNBALANCED IMPACTS - WHAT SOLUTIONS CAN ACCOUNT FOR ALL STAKEHOLDER CONCERNS?

3. MAIN RESULTS - Prioritizing actions

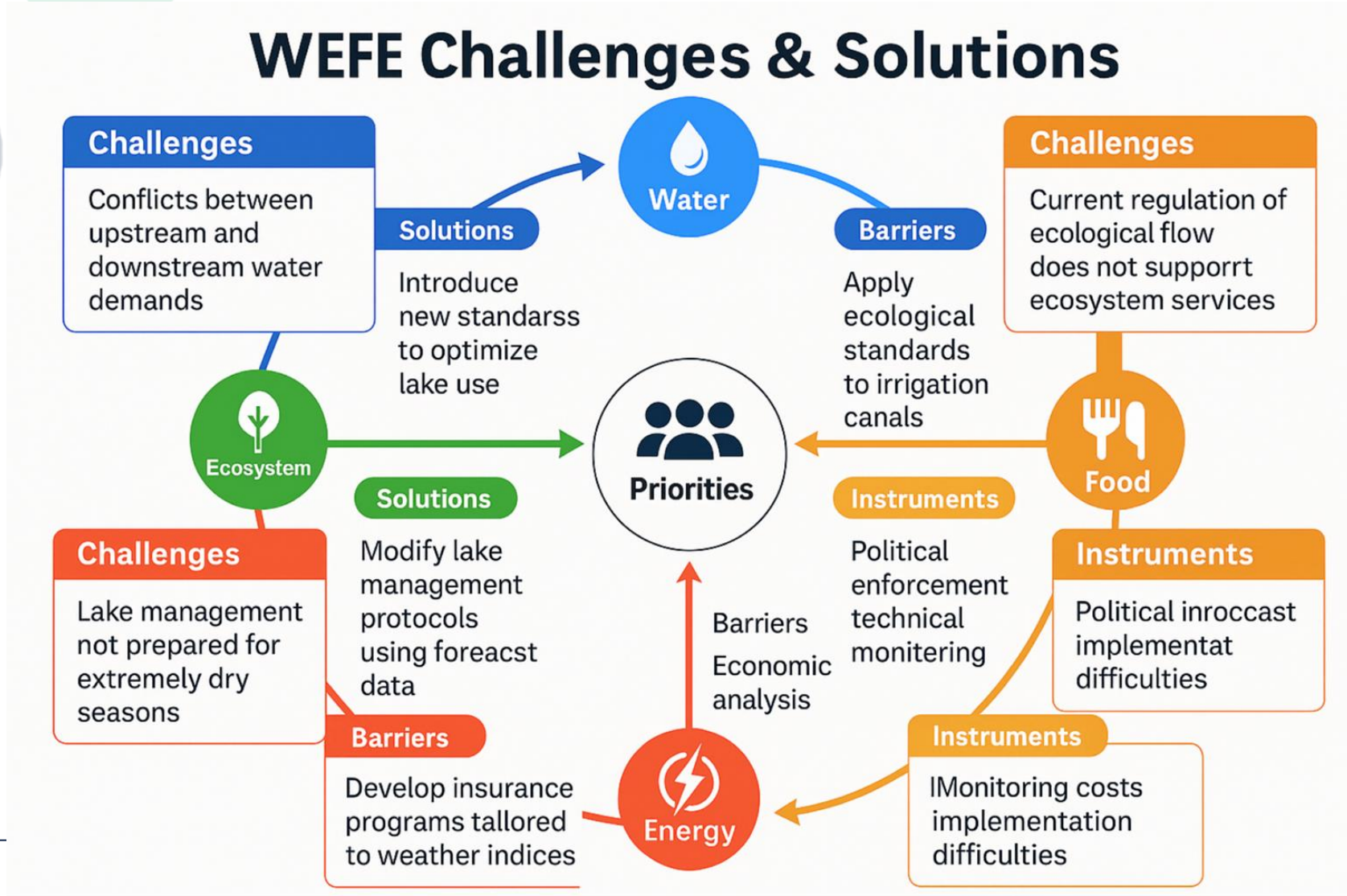
Most agreement high priority: restrict private navigation on Lake Como to hybrid/electric

Least agreement on priority: energy sector to establish sustainable fish production program

Hydropower energy
Lake operator
Irrigation districts
1 - lowest priority
5 - highest priority

Actions to implement	1	2	3	4	5
The government promotes **financial instruments** for transferring agricultural land to **solar panel** production		X X	X		
Proliferation of mini hydropower plants to ensure **energy self-production downstream** (mainly for irrigation demand) and reduce upstream energy dependency		X		X	x
The **competitive reassignment process of the hydropower concessions** open to foreign and Italian operators, increasing risk of losing national sovereignty	x	X	x		
Private navigation on Lake Como is restricted to hybrid or full **electric transportation**, which improves water quality and biodiversity				x x	X
The energy sector establishes a **sustainable fish production program** for the Lake Como system, including a specific program for activities led by the Fiumelatte fish nursery	x		x		X

3. MAIN RESULTS



LESSONS LEARNED

FutureMed
TRANSDISCIPLINARY NETWORK

Water

- Forecast data & adaptive protoocols
- Equitable distribution across sectors

Energy

- Insurance risk-sharing tools
- Balance demand & ecosystems

Food

- Efficient irrigation incentives
- Financial literacy & resilience

Ecosystem

- Blodiversity protection
- Monitoring & enforcement

Cross-cutting: Trust – Cooperation – Shared Responsibility – Adaptive

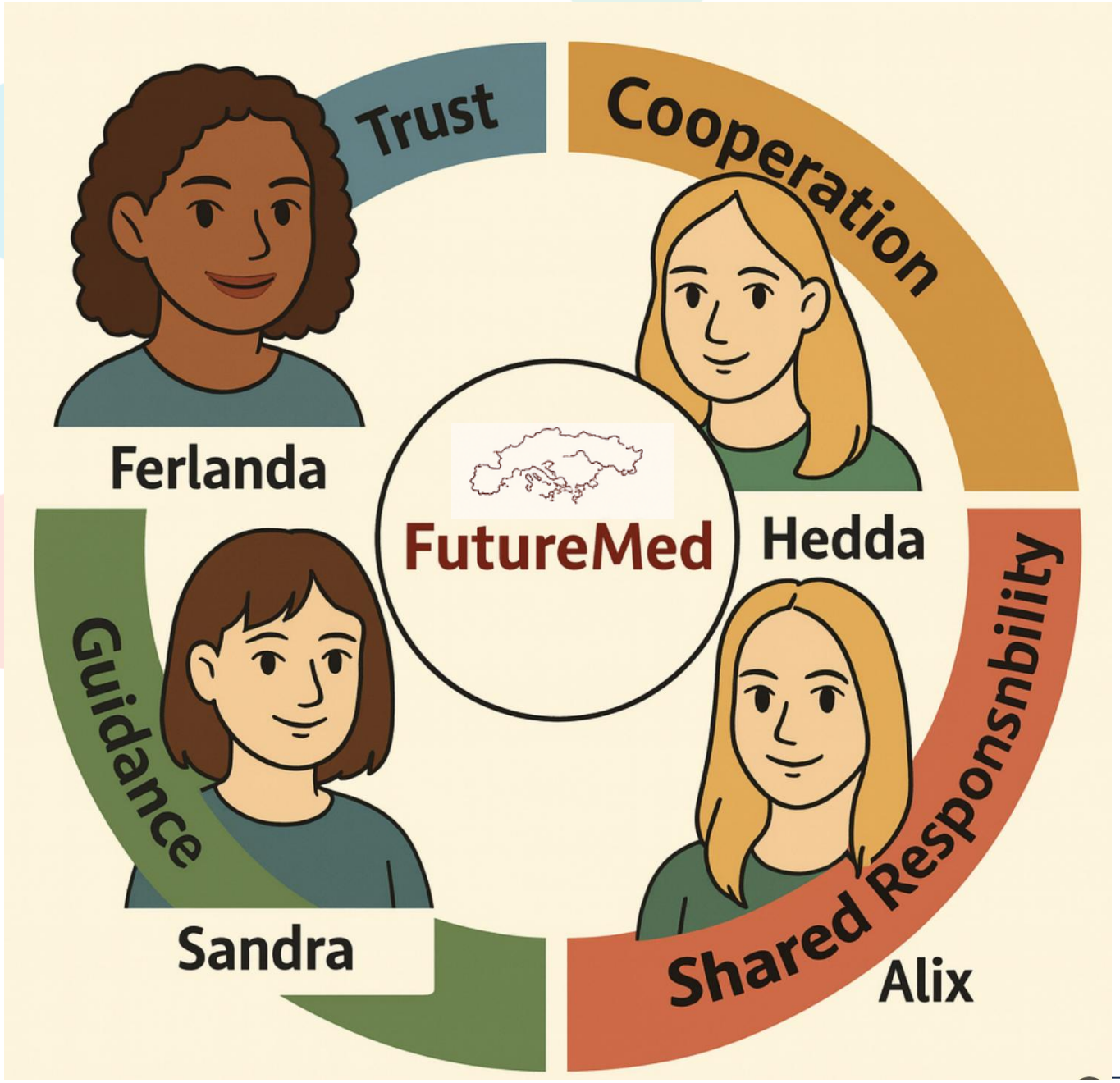
Hedda Bonatz	Ferlanda Luna	Alix Pahaut
Irrigation district	Lake operator	Hydropower company

4. FINDINGS

- Diverse impacts on the WEFE dimension that not equally impacts the stakeholders
- With the multi-stakeholder approach we could identify the needs and concerns of the different stakeholders
- Together we explored different solutions on their benefits and challenges
- Policy and economic incentives (e.g., insurances, forecasting data) seem to be promising in accounting for all stakeholder needs

4. REFLECTION

- Good exercise to highlight different interests and constraints
- Good exercise to learn to take different perspectives, rather than see the broader picture as a researcher
- Learned about tools we can use in participatory research processes and to understand stakeholder drivers
- Challenging to evaluate many different possible actions considering the complex situation and different timeframes
- Nice to hear about the real life project experience compared to our ideas
- Thank you for the guidance!


Trust
Cooperation
Ferlanda
FutureMed
Hedda
Guidance
Shared Responsnbility
Sandra
Alix

THANK YOU!