Systems Approach Framework
Issue Identification

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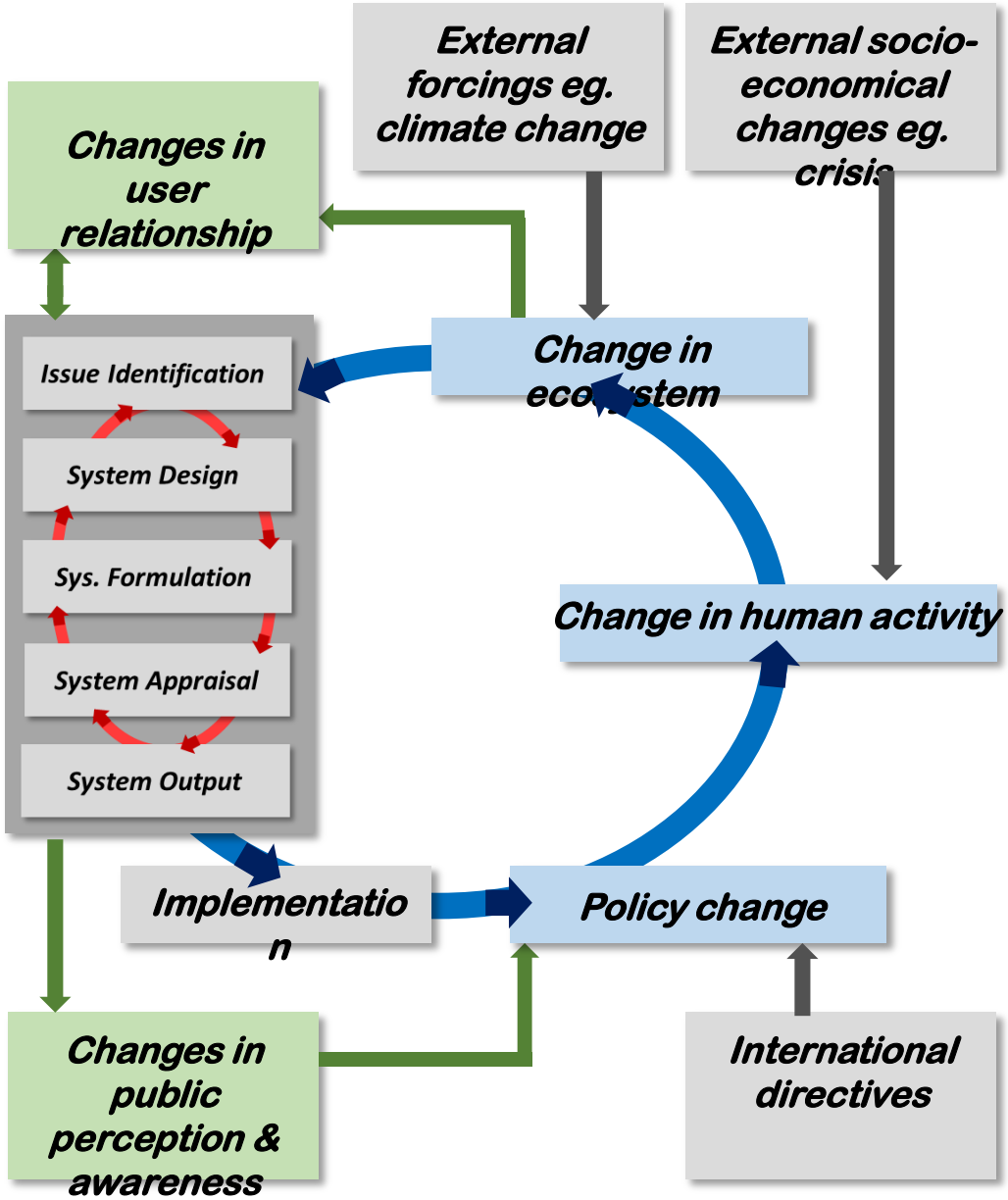
A SYSTEM APPROACH FRAMEWORK FOR
COASTAL RESEARCH & MANAGEMENT

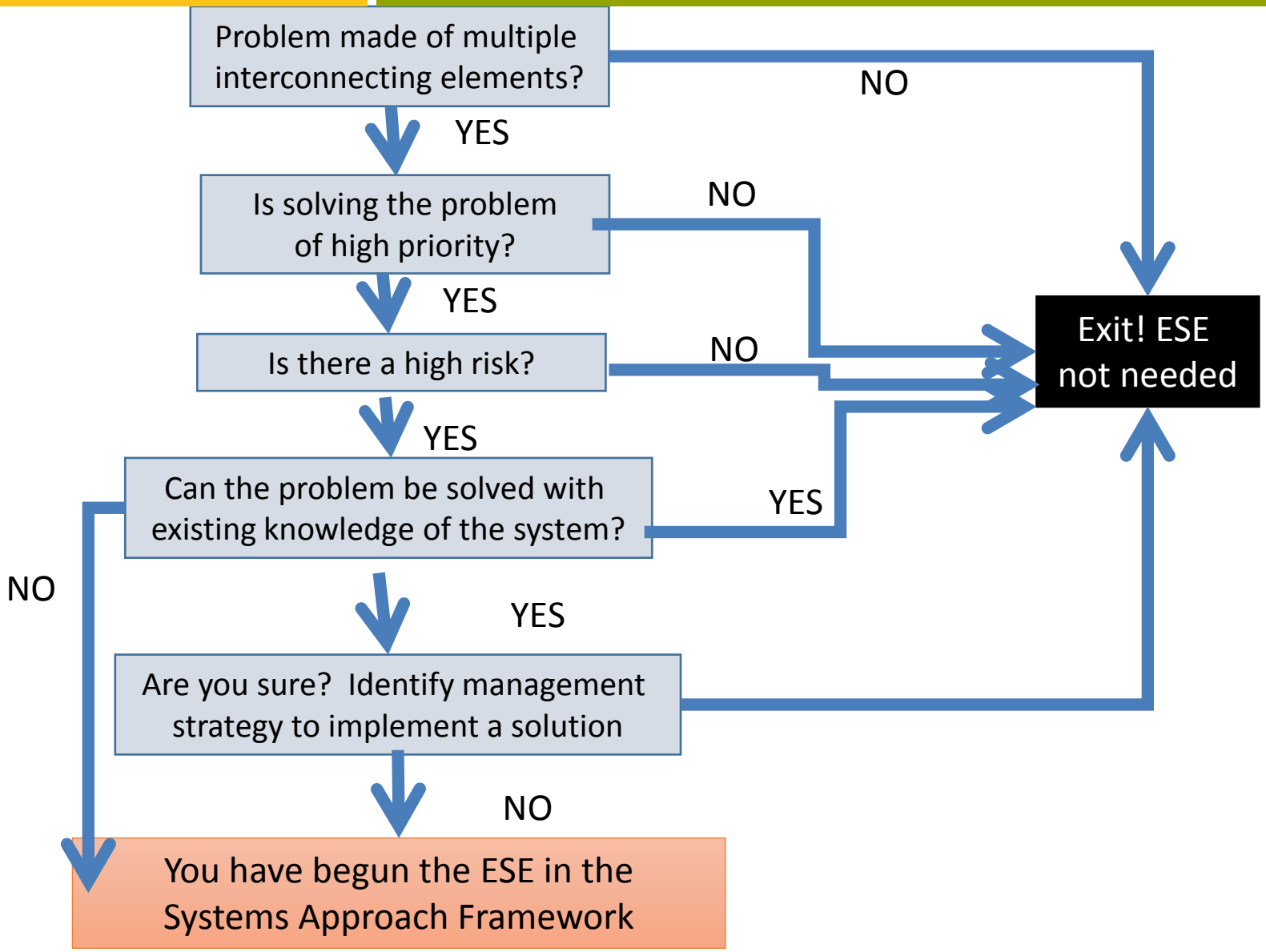
BONUS-BaltCoast received funding from BONUS (Art 185), funded jointly by the EU and Baltic Sea national funding institutions

Systems Approach Framework

Systems Approach Framework (SAF)



Do we need to run an ESE assessment?



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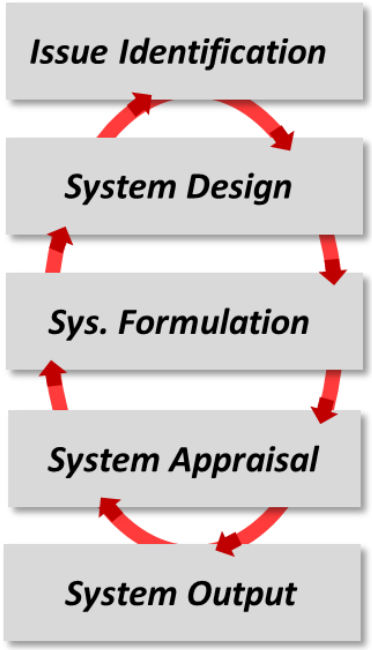
ISSUE Identification



- What is the problem?

With the problem: you have the core matter and the area.

Start with:

- List Human Activities (Preliminary actions) – take a broader perspective – you may narrow in later in the process.

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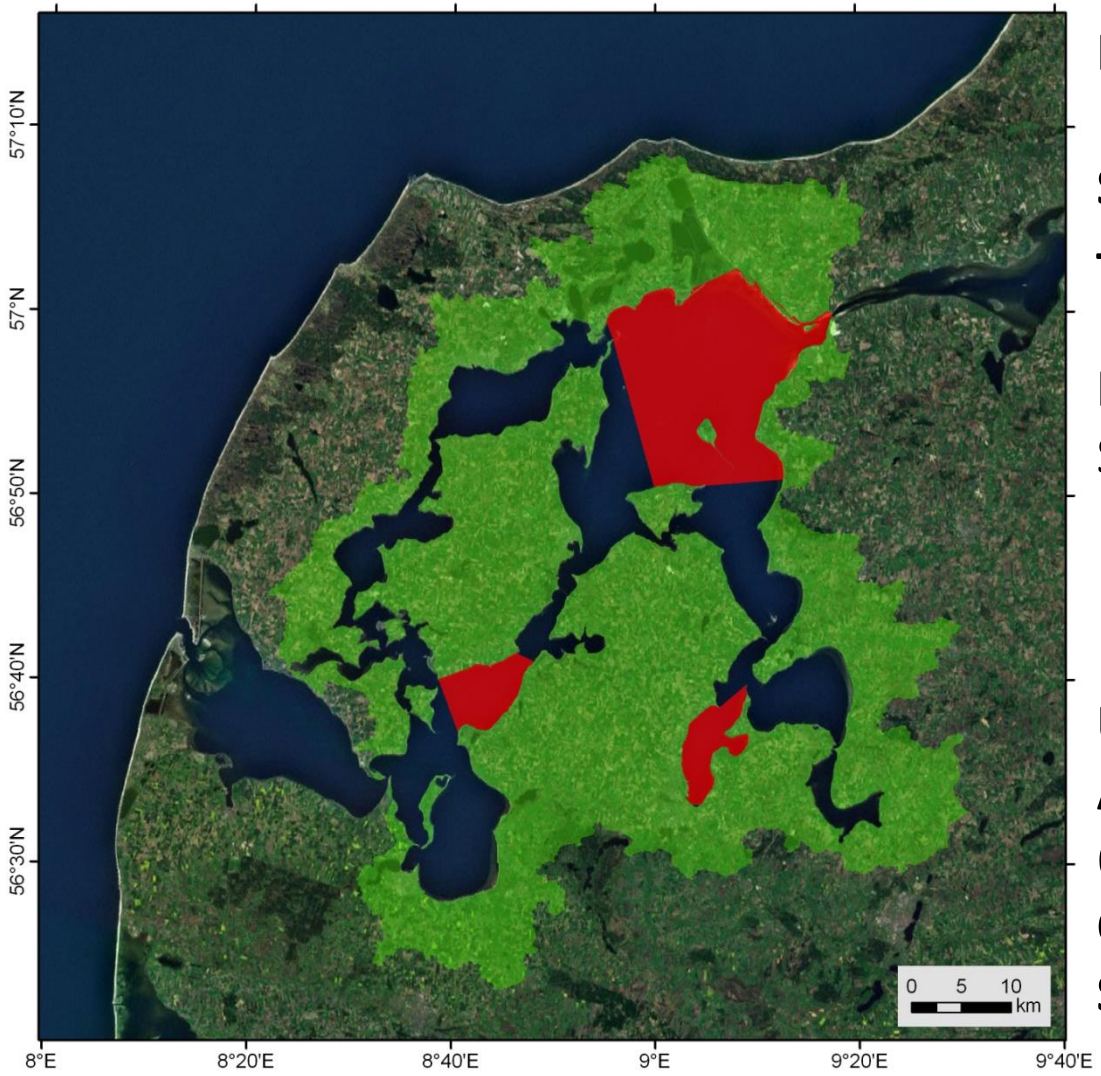

HUMAN ACTIVITIES

SPICOSA DK case study – the Limfjord (SSA5)

Focus area:
Skive Fjord, Kås Bredning, Løgstør Bredning

Upland: 7.528 km^2
Area use, land:
62% agriculture
Coastline: ~1.000 km
Sea area: ~1.500 km^2

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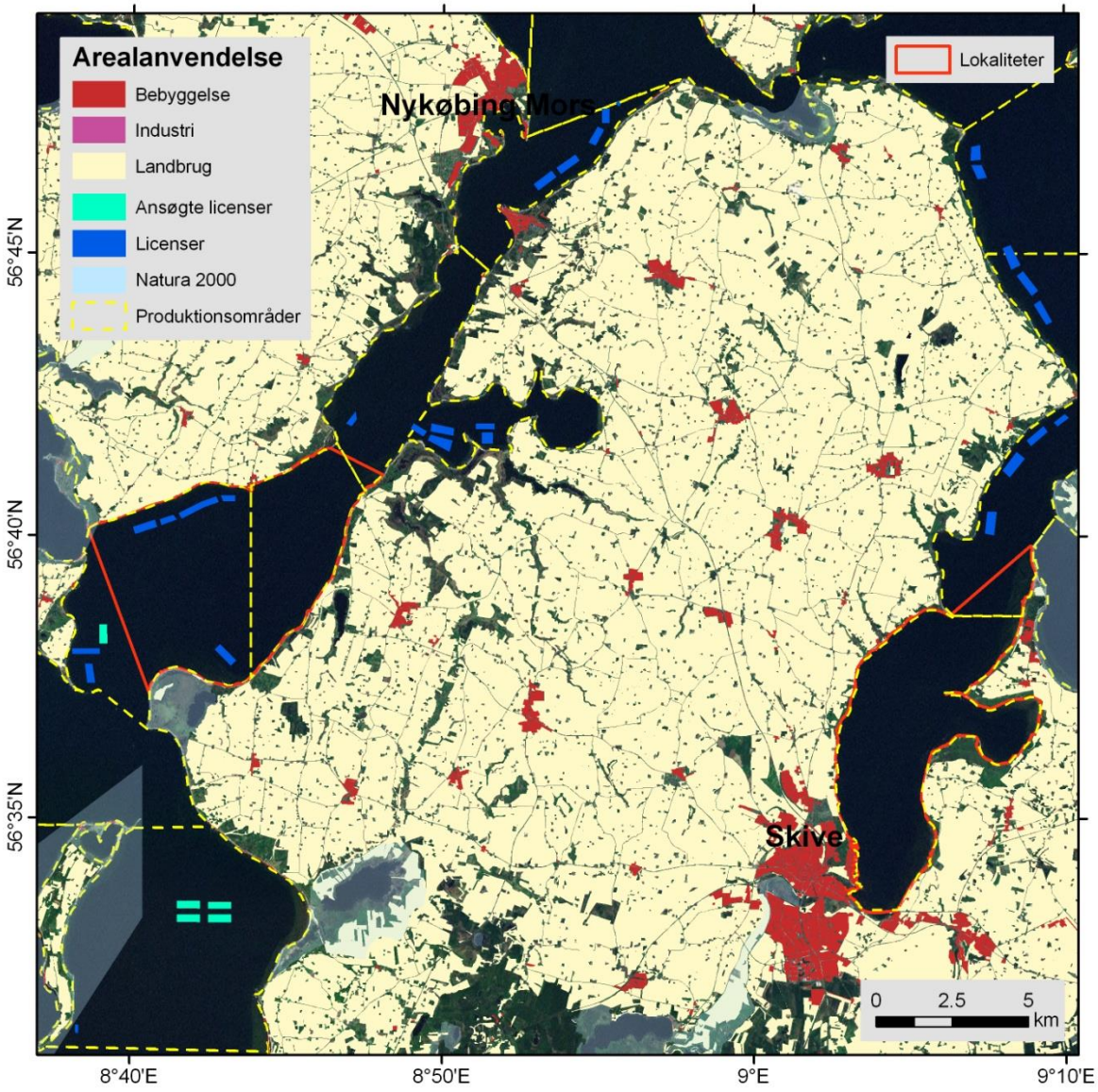

HUMAN ACTIVITIES

Area use - sea:

Mussel Production areas
Licenses (aqua culture)
Recreational fishery
Natura 2000 areas
Recreational activities
Shipping
Military training

Area use - land:

Agriculture
Summerhouses
Tourism

WFD regulations

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ISSUE Identification

- **Institutional Mapping**

Explore institutional links (McFadden et al. 2010):

- Identify important features; here, the organisations who are players.
- show the relationships between those organisations – location with respect to each other, social relationships, rules, power.
- Functional and geographical boundaries for each institution.

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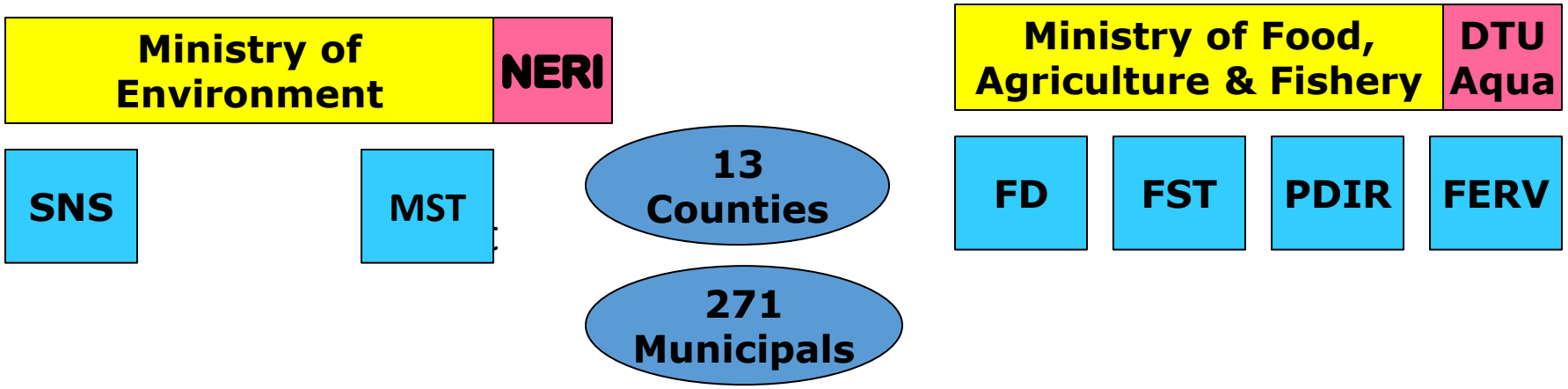
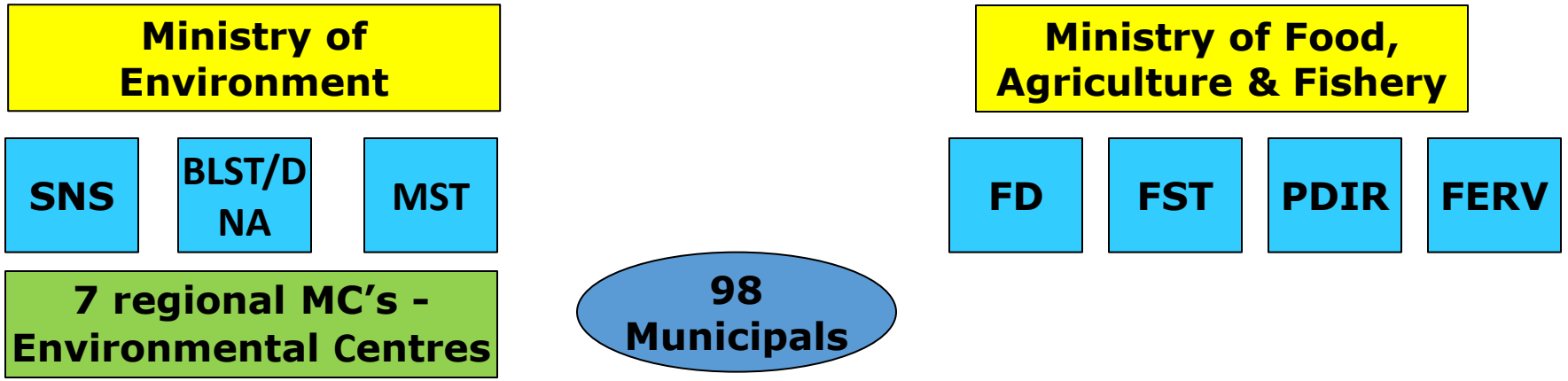
Governmental structure **Before 2007**



After January 2007



ISSUE Identification

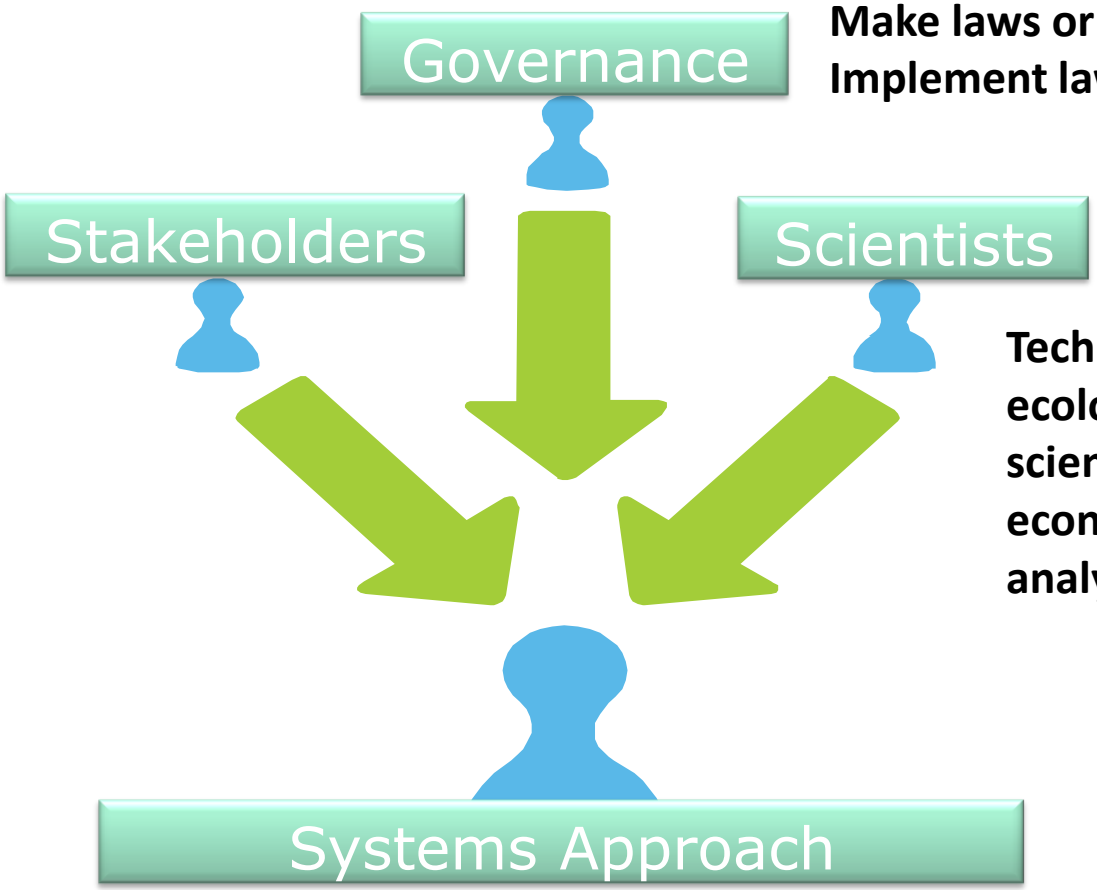
- Stakeholder Mapping

Who are the stakeholders?

What are the interactions between the governance and other stakeholders – i.e. power structure?

Who takes part in the SAF process?

Cause of problem
Affected by problem
Affected by solution
Affected by doing nothing



Make laws or policy
Implement laws or policy

Technical experts: ecologists, social scientists, economists, system analysts, modellers.

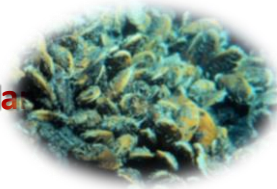
Systems Approach Framework

Nature Conservation:

- **Reduce hypoxia & N/P loadings**
- **Secure shallow water mussels as food for birds**
- **Close mussel fishery by dredging and increase mussel farming**

Nature Managers:

- **Management according to regulations , e.g. implementation of the WFD in DK waters (initial pla out on 15th January 2010)**



Mussel fishermen:

- **Maintain income from mussel fishery**
- **Reduce hypoxia & secure mussel recruitment**

Mussel farmers:

- **Develop profitable mussel farming for food (& other means)**
- **Avoid filter-feeding competitors (on artificial reefs) & hypoxia**

Fishery Managers:

- **Management and development of mussel & fish fishery according to regulations**

Recreational fishermen:

- **Fish back into the Limfjord system**

Systems Approach Framework

Commercial fishermen:

- Have lost interest in the area as fishing there is not longer viable.

Agriculture farmers:

- Have no interest in participating. Rely on strong governmental influence - lobby.

Tourist assoc.:

- Are interested in a fjord with a better water quality, but more interested in improving access to water.

Science team: Environmental scientists, economists, social scientist, modeller.

Starting the process with stakeholders

Initial stakeholder meeting

Allow all to voice their main concerns

Allow participants to rank these in order of importance

Identify the core issue and agree

Generally after the first meeting a smaller Core Stakeholder group forms who are the Reference group relative to Issue.

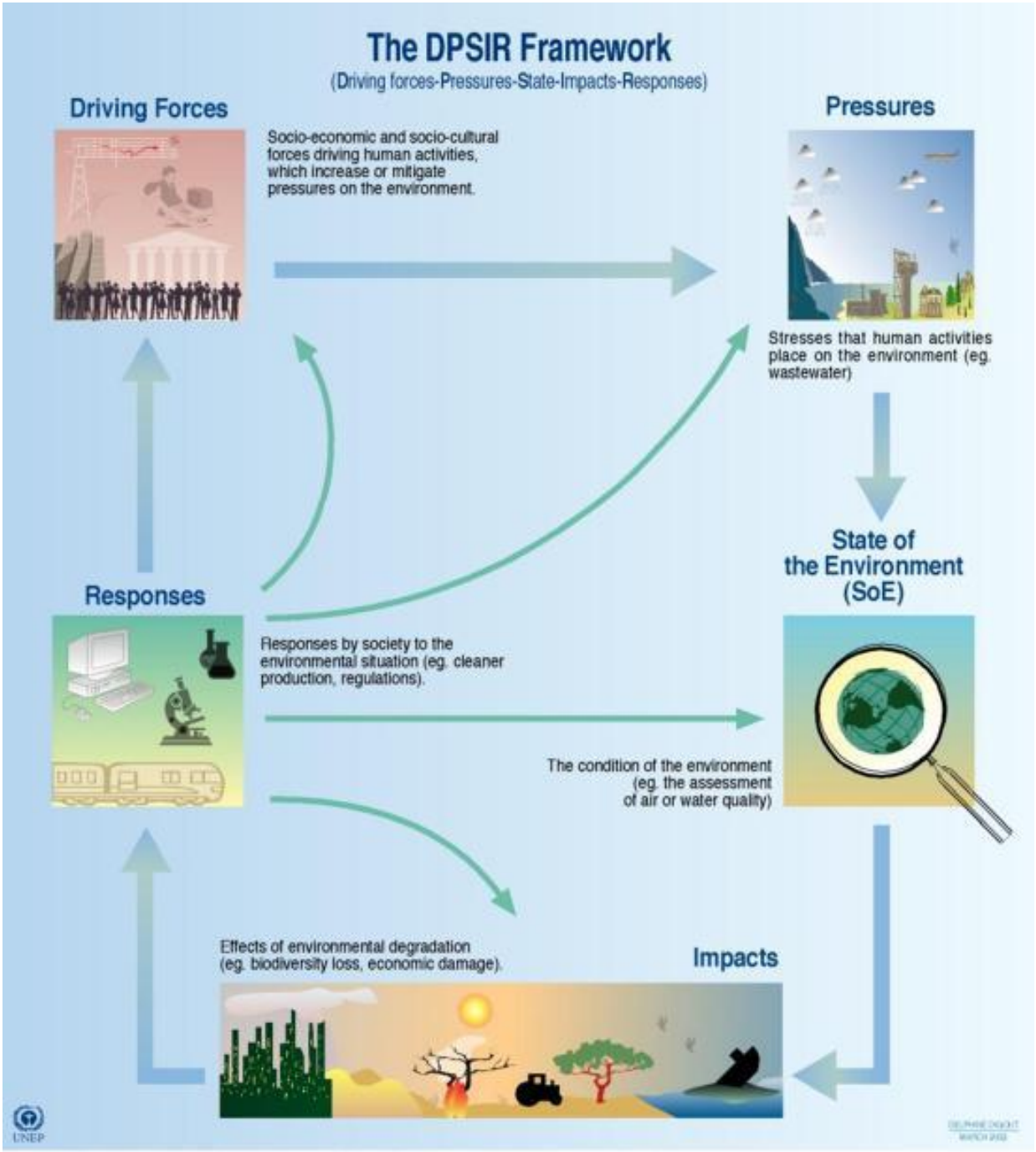
About stakeholder involvement this afternoon.



Systems Approach Framework

ISSUE Identification

- ✓List Human Activities (Preliminary actions)
- ✓Institutional Mapping (Preliminary actions)
- ✓Stakeholder Mapping
- ✓Form Stakeholder group (Reference group)
- ✓Agree Issue and rank importance with Stakeholder group*
- •DPSIR + CATWOE (examples)



Source : Global International Water Assessment (GIWA), 2001; European Environment Agency (EEA), Copenhagen.

Systems Approach Framework

DPSIR
Driver: Needs of human society (**food,** water, fuel, shelter, etc.) This often relates to a HA (food= agriculture) *giving rise to.....*
Pressure: HA that stress the environment (increasing loading with nutrients), *resulting in a shift in the …..*
State: The situation at a specific time and the forced rate of change in the ecosystem (increasing nutrients, phytoplankton, primary production, shift from fish to mussels, change of makro vegetation –regime shifts) *which may be diagnosed as an …..*
Impact: the 'undesirable disturbance' (e.g. harmful algal blooms, water quality/clarity). End results of a cause-effect chain *causing a …..*
Response: response of society to losses of Ecosystem services - measures to mitigate the Driver and Pressure eg. WFD targets for nutrient reductions= often leading to a Policy change.

Systems Approach Framework

CATWOE

- **Customers, beneficiaries/victims:**
- **Actors:**
- **Transformation:**
- **Worldview:**
- **Owners:**
- **Environment:**

Systems Approach Framework

CATWOE

Customers, beneficiaries/victims:

- Who is on the receiving end?
- What problem do they have now?
- How will they react to new management options?
- Who are the winners and losers?

SPICOSA DK case study: Fin fish fishers, mussel fishery & farming owners and staff, farmers sustainable production, agriculture/farm workers, recreational fishers, boat owners, summerhouse owners, tourist, wind farm companies, shipping companies, environmental NGO's, etz.

Systems Approach Framework

CATWOE

Actors:

- Who are affected directly?

SPICOSA DK case study: Mussel fishers, mussel farmers, mussel industry owners and workers, boat and fishing gear suppliers, agricultural farm owners and staff.

Systems Approach Framework

CATWOE

Transformation:

- What are the inputs and where do they come from?
- What are the outputs and where do they go to?
- What are the steps in between?

SPICOSA DK case study:

Public demand for water clarity, demand for high quality mussels.

Less nutrient loading.

Maintain or increase in mussel production.

Systems Approach Framework

ISSUE Identification

- Institutional Mapping (Preliminary actions)

Systems Approach Framework

- **CATWOE**

Worldview:

- What is the bigger picture into which the situation fits (may differ among stakeholders)
- What is the real problem for each stakeholder
- What is the wider impact of any solution?

SPICOSA DK case study:

- Mussel production is an important income source in the area.
- Mussel dredging is harmful to the environment impoverishing the fjord.
- Solution: healthy ecosystem.

Systems Approach Framework

CATWOE

Owners:

- Who can help or stop you?
- What will cause them to get in your way?
- What will lead them to help?

SPICOSA DK case study: The EU, Danish Ministry of Environment, Danish Ministry of Food, Agriculture & Fisheries (incl. regional), national municipals.

Systems Approach Framework

CATWOE

Environment:

What are the external constraints and limitations affecting the success of the solution?

What are the ethical limits, laws, financial constraints, limited resources, regulations?

How might these constrain your solutions?

How might you get around them?

SPICOSA DK case study: Agriculture technology, regulating laws, improved land-use in catchment, upland assimilation, marshland/wetlands, mussel dredging impacts, mussel harvest and culture technology.

Systems Approach Framework

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- ✓Form Stakeholder group (Reference group)
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- ✓DPSIR + CATWOE (examples)

- **Identify Social and Economic components relevant for the Issue.**
- **List the main Ecosystem Goods and Services and Economic drivers relevant for the Issue.**

Systems Approach Framework

ECOSYSTEM GOODS AND SERVICES

- **Provisioning:** Food provision
- **Regulation:** Disturbance prevention; Bioremediation of waste.
- **Cultural:** Cultural heritage & identity; Cognitive benefits; Feel-good
- **Option-use value:** Future unknown & speculative benefits.
- **Supporting:** Primary production; Habitat provision; Nutrient cycling; Soil formation & retention; Resilience & resistance

(Wiethüchter 2007).

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Questions?

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BONUS
SCIENCE FOR A BETTER FUTURE OF THE BALTIC SEA REGION