



## FHF dialogmøte Klima og Havbruk.

5. mai 2026

# OCCAM EU Project: Operationalising Climate Change Adaptation and Mitigation for aquaculture

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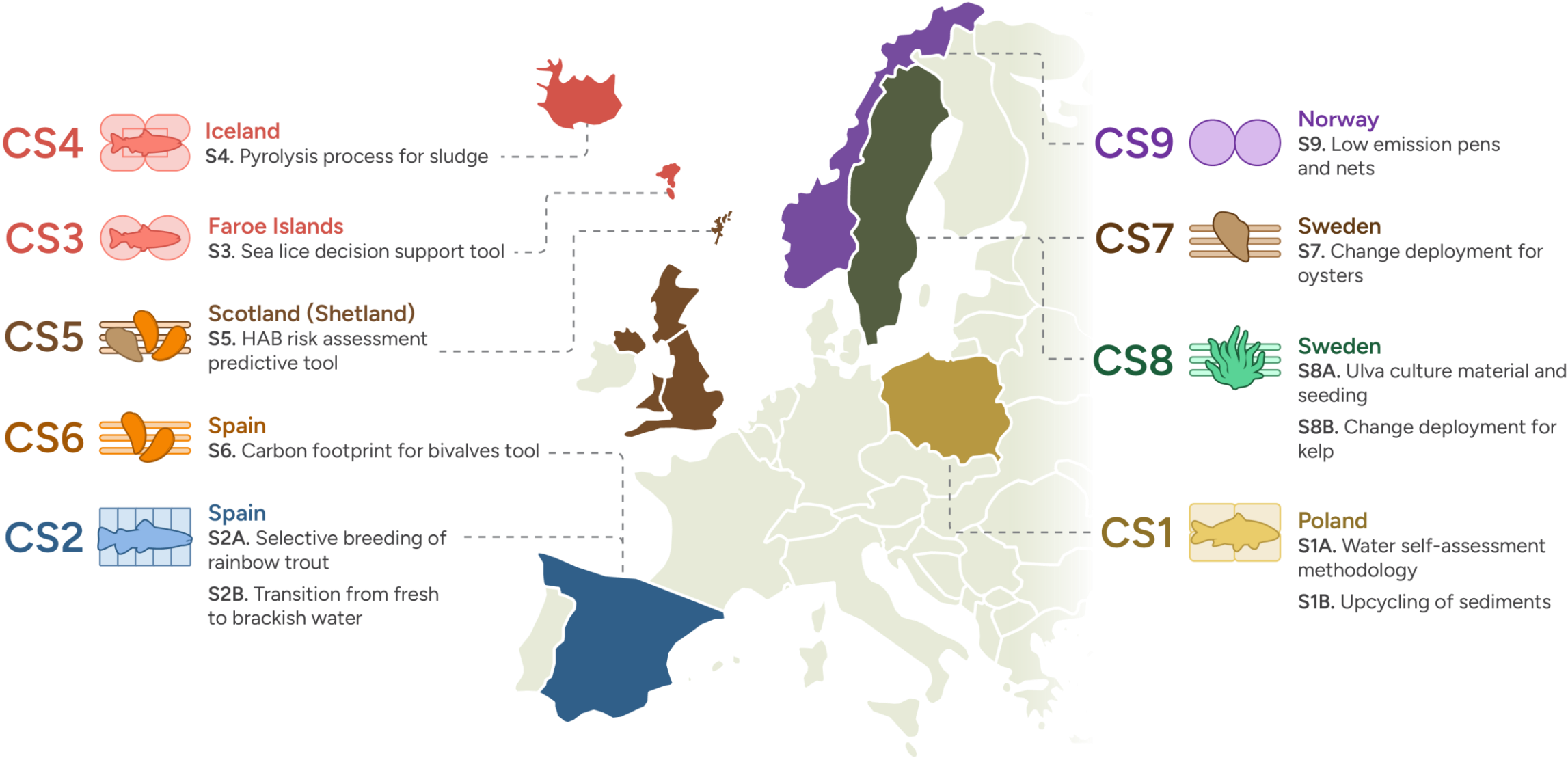
OCCAM will develop, deploy, test, and evaluate innovative **solutions for climate change adaptation and mitigation in the aquaculture sector**, and deliver recommendations and **scalable, exploitable, and replicable solutions** ready for use or further refinement for a wide variety of aquaculture supply chains.



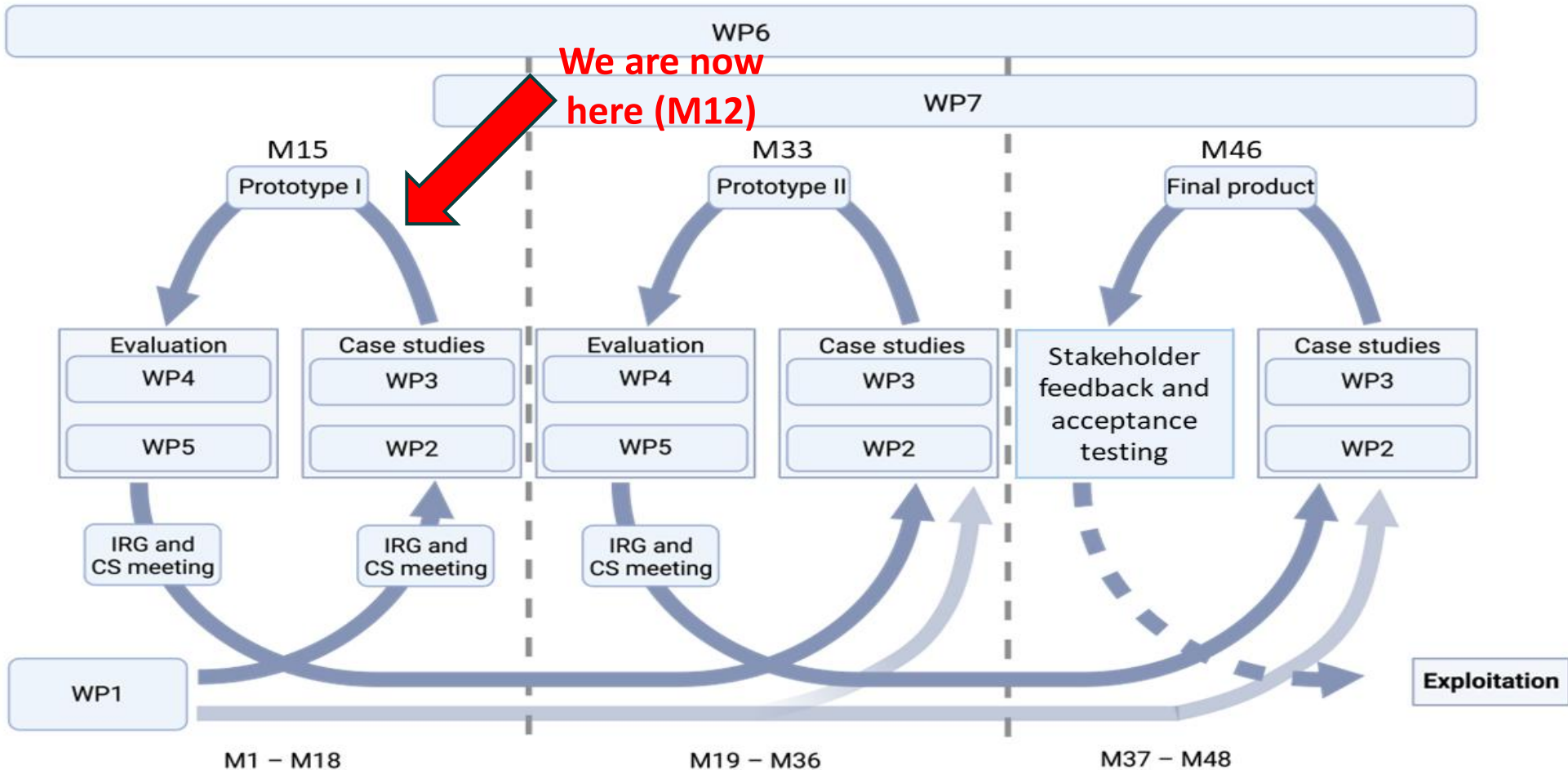
- 4-year Innovation Action (May 2025 - April 2029)
- 22 Partners
- Funding: €4,500,000
- Countries: Norway, Belgium, Denmark, Faroe Islands, Germany, Iceland, Poland, Spain, Sweden, UK



# Case Studies and Solutions



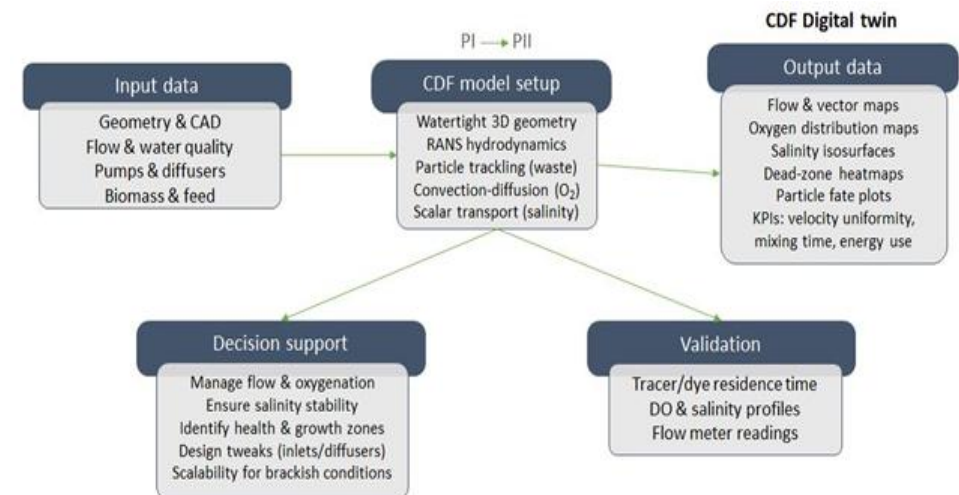
# Prototyping and iterative feedback from stakeholders



Requirement specification for Prototype I elicited from users and stakeholders at project start. Prototype I will be delivered for testing and evaluation at **M15** (August 2026), and requirements will be updated.

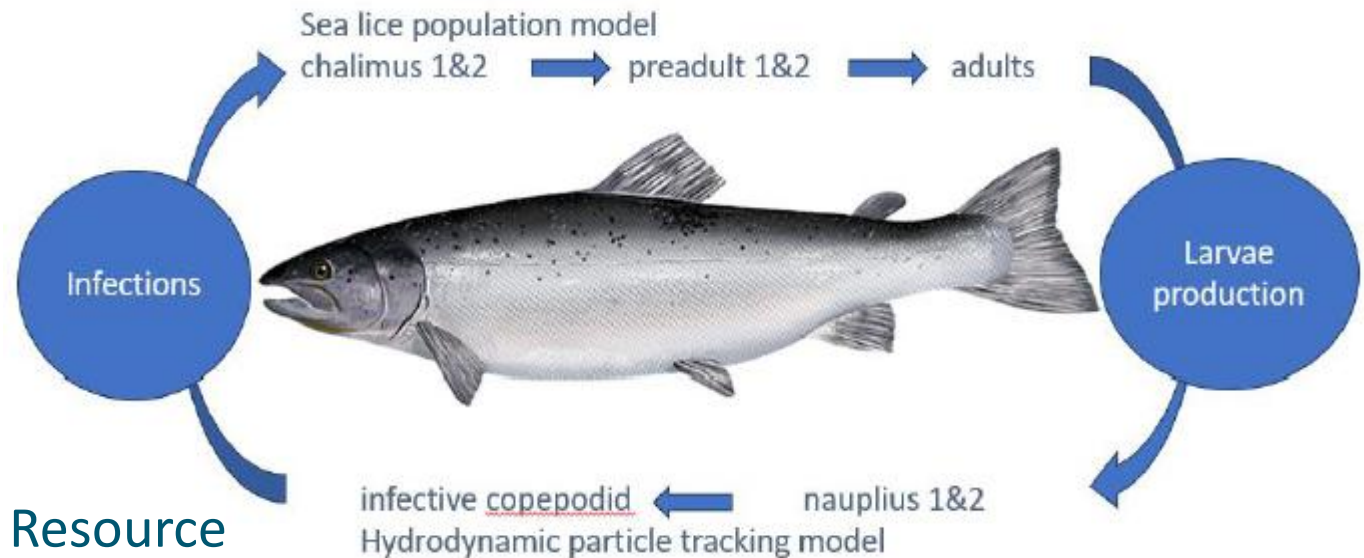
# CS2 – Flow-through aquaculture, Rainbow trout, Spain

- **S2A – Development of rainbow trout breeding lines with greater resilience to elevated water temperatures.** Families with superior survival under heat stress will be identified and used to build breeding lines adapted to warming conditions.
- **S2B – Adaptation of rainbow trout to recirculating aquaculture systems using brackish water.** Design pilot systems that stabilize water quality, flow, oxygenation, and salinity; study physiological responses; apply computational fluid dynamics modelling.
- **Industry:** Caviar Pirinea
- **Science:** Spanish National Research Council



# CS3 – Marine aquaculture, Salmon, Faroe Islands

- **S3 – Multi-generation modelling of sea lice infestations under changing climate conditions to guide potential adaptation and mitigation strategies.** Will include climate scenario modelling with the possibility to test mitigation and adaptation strategies. Some of the adaptation measures, such as changed treatment thresholds will be tested out and the mitigation effect documented, as the total reduction in carbon footprint due to reduction in treatment frequency.



- **Industry:** Hiddenfjord
- **Science:** Fiskaaling
- **Social science:** Sjókovin – Blue Resource

## CS4 – Land-based aquaculture, Salmon, Iceland

- **S4 – Demonstrate and validate production of biochar (charcoal) from sludge by pyrolysis in operational environment and its usability as soil improver and fertilizer.**
- Concrete plans to produce 150,000 tons of salmon annually in Iceland, giving 300,000 tons of fish sludge (8-10 % DM).
- Landfill is not a sustainable long-term solution, so need alternatives. Sludge transformation will also be tested for carp ponds (CS1) and trout RAS (CS2)
- **Industry:** Samherji Fiskeldi
- **Science:** Matís



«Salmon Garden»  
under construction



Biochar

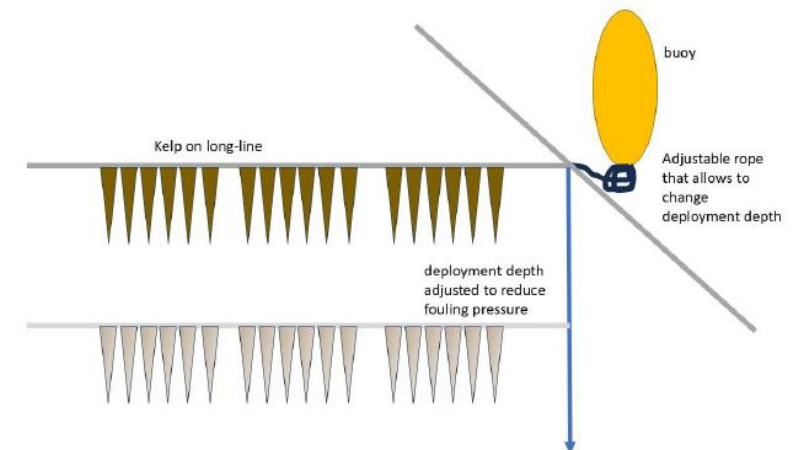
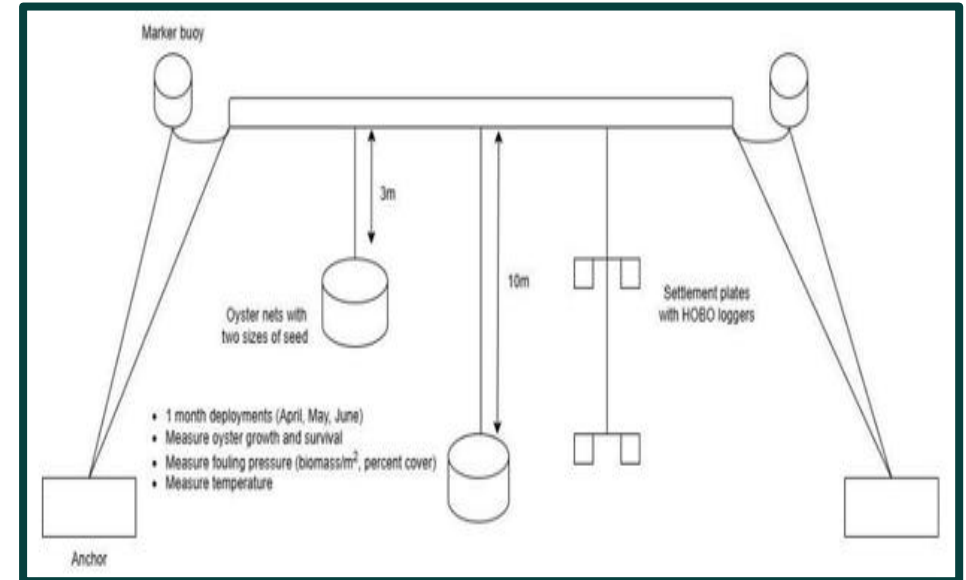
# CS5 – Marine aquaculture, Shellfish, Scotland

- **S5 – Will enhance existing, and develop new, methodologies for the early warning and risk assessment of harmful algal blooms and their biotoxins** that negatively impact shellfish aquaculture businesses and the consumers of their products.
- Will develop a prototype of an alert system for individual shellfish farms available through mobile phone and also through a R-shiny app embedded within the HAB reports.
- **Industry:** Seafood Shetland
- **Science:** Scottish Association for Marine Science



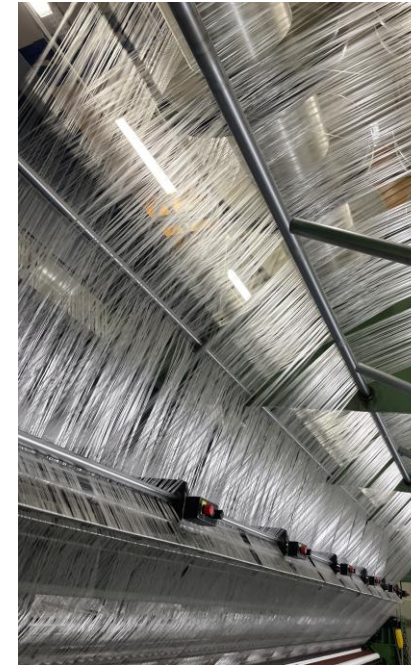
# CS7/CS8 – Marine aquaculture, Oysters/Kelp, Sweden

- **S7** – Experiments with deployment of oysters at different depths and times to reduce fouling pressure. Two sizes of oysters will be deployed at three depths and at three points in time. Temperature will be tracked throughout deployment, and growth and survival will be measured. Additionally, two types of settlement plates will be deployed at four depths at four different deployment times to measure the growth of fouling organisms.
- **S8B** – Similar experiments for deployment of kelp.
- **Industry:** Ostrea Aquaculture (CS7), Nordic Sea Farm (CS8)
- **Science:** IVL Swedish Environmental Research Institute



## CS9 – Low emission equipment, Marine, Norway

- **S9 – Improved gear design and low emission equipment initiatives that reduce use of virgin plastic and reduce GHG emissions.**
- Validate operational performance of equipment from recycled and regenerated plastics. Assess and document environmental benefits through LCA and EPDs, and economic performance. Develop market strategies and regulatory compliance for circular nets.
- Give recommendations to farmers, market and industry, and contribute to creating a market for circular products.
- **Industry:** AKVA group
- **Science:** Nofima, IVL, Matís



*Our production of regenerated nylon nets at Egersund Net in Egersund.*

Using regenerated nylon to make new nets



Recycled plastic for producing new pens



# Overarching OCCAM solutions

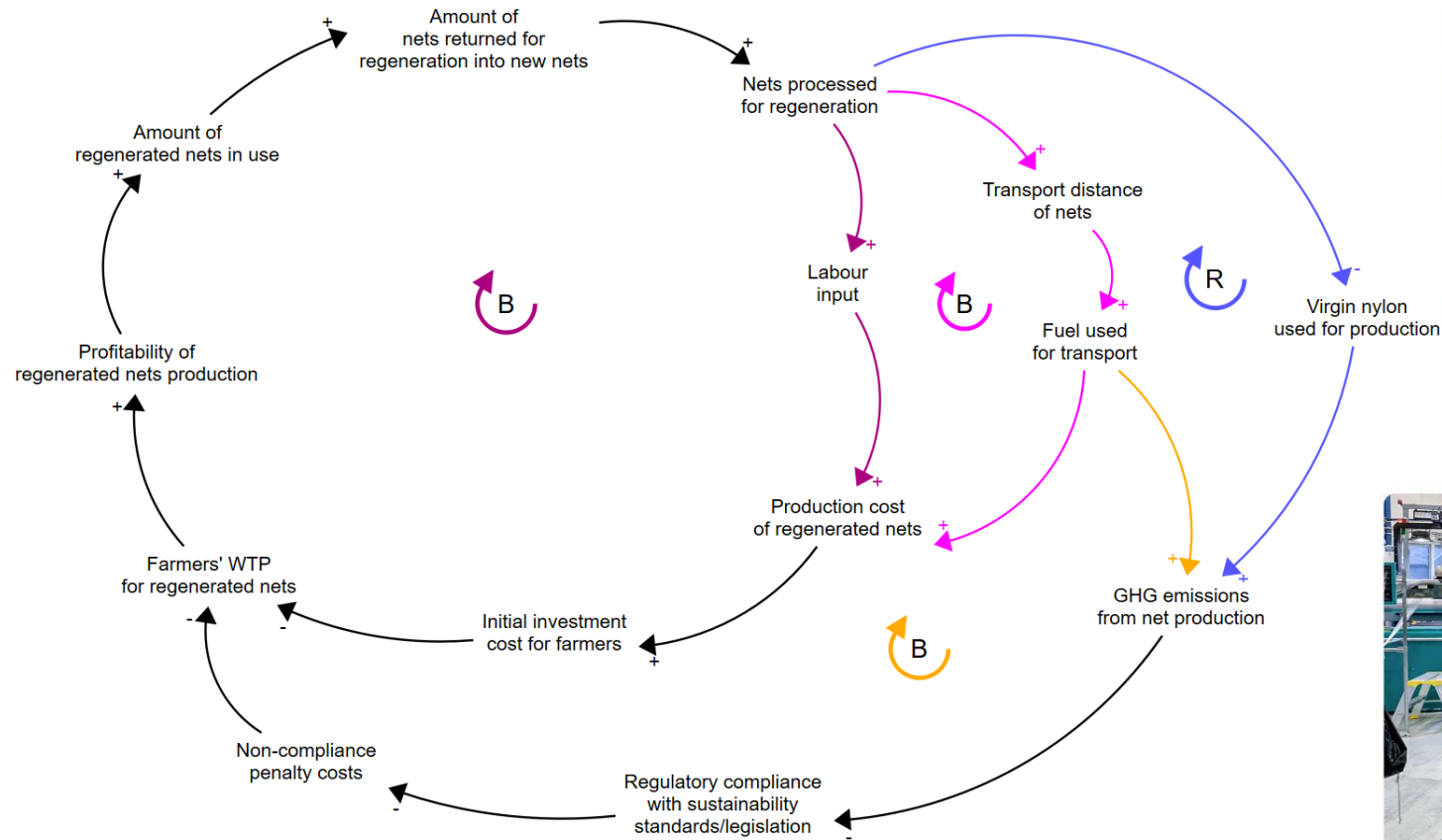
Specific needs	Expected results	Outcomes	Impacts
Limited advice-ready science and data on key issues for ICES wrt. CC impact on aquaculture	<b>Templates for requesting and providing scientific advice on CC</b>	improved ability to specify what advice is needed, improved quality of advice	Provide scientific basis and advice to support resilient aquaculture production
Measure and minimise the carbon footprint of small producers, enable self-assessment	<b>Carbon footprint self-assessment CWA</b>	Improved measurement of own emissions, ability to measure effect of improved practices	Monitor own emissions, document effect of mitigation, competitive advantage
Companies need to meet a variety of sustainability reporting requirements, and this is complicated	<b>Roadmap for how to prepare for sustainability reporting requirements</b>	Improved ability to meet sustainability reporting requirements, access to green loans	Better control, improved recording of relevant data, decision support
Risks and opportunities related to CC not sufficiently included in current policies	<b>Policy brief on climate-resilient aquaculture</b>	Improved policies and regulations, improved incorporation of CC aspects in policy	Recommendations to EU/MS on climate adaptation/mitigation planning and actions

# Industry Reference Group

- The Industry Reference Group (IRG) are industry-based representatives interested in specific OCCAM solutions.
- The IRG will test and evaluate the solutions developed in OCCAM, act as stakeholders, and participate in workshops to facilitate the multi-actor approach. The IRG participants are instrumental in ensuring that solutions developed in OCCAM are scalable and replicable with potential for application and exploitation.

**The IRG is open! If you are interested in joining, get in touch!**

# Example: Regenerated nets



**Causal Loop Diagram**  
(from OCCAM WP4, IVL)



Our production of regenerated nylon nets at Egersund Net in Egersund.



Based on results from «Circular Fish Farming Nets» with Nofir, Hampidjan, Grieg Seafood and Aquafil

# Field test of regenerated nylon

- Estimates show 39 % reduction in total CO<sub>2</sub> footprint per net\*
  - 14 tonnes CO<sub>2</sub> –eq saved per net
  - Up to 90 % lower GWP for the nylon material
  - Documented quality of the net - equivalent to virgin nylon
  - Tested in demanding, real-life aquaculture operations

*\* ) More accurate data will be available once the EPD for a net made from regenerated nylon is completed and can be compared with the existing EPD for a net made from virgin Nylon.*



# Thank you for your attention!



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