Interreg
Baltic Sea Region

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

Baltic Blue Growth

Baltic Blue Growth – Initiating full scale mussel farming in the Baltic Sea

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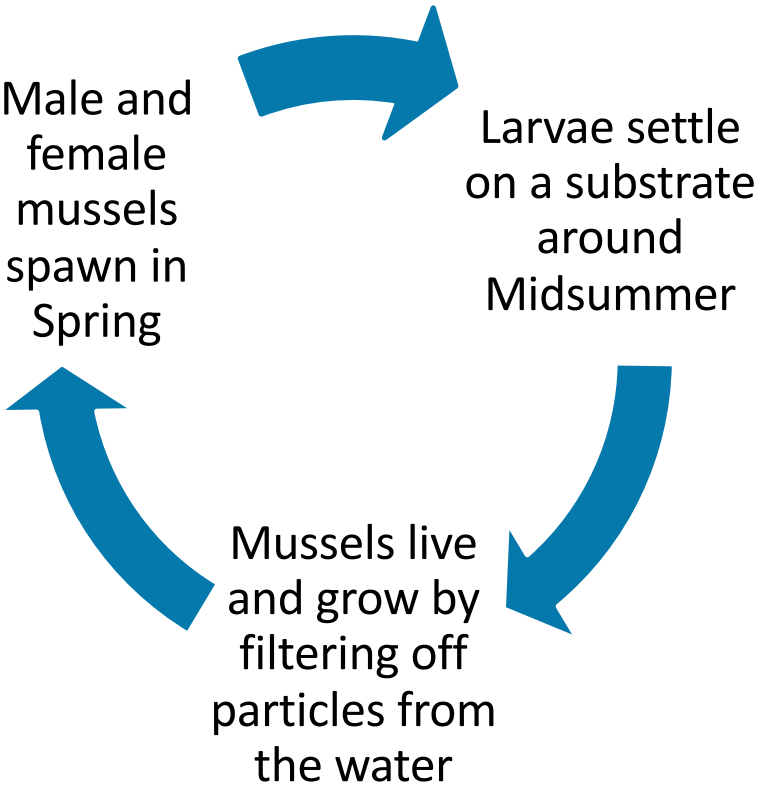
Basic facts

- Duration: May 2016 – March 2019
- Total budget: € 4.7 million
- Co-financed by Interreg Baltic Sea Region
- Lead Partner: Region Östergötland, Sweden
- 18 project partners + 20 associated organisations
- Flagship under Policy Area ”Nutri” of the EU Strategy for the Baltic Sea Region
- A SUBMARINER Network project

Blue mussel farming in the Baltic Sea



- To “farm mussels” means to offer the substrate, typically ropes or nets
- Size and growth rate depend on factors like salinity, temperature and food supply
- Blue mussels in the Baltic Sea are usually harvested 1,5 – 3 years after they settle

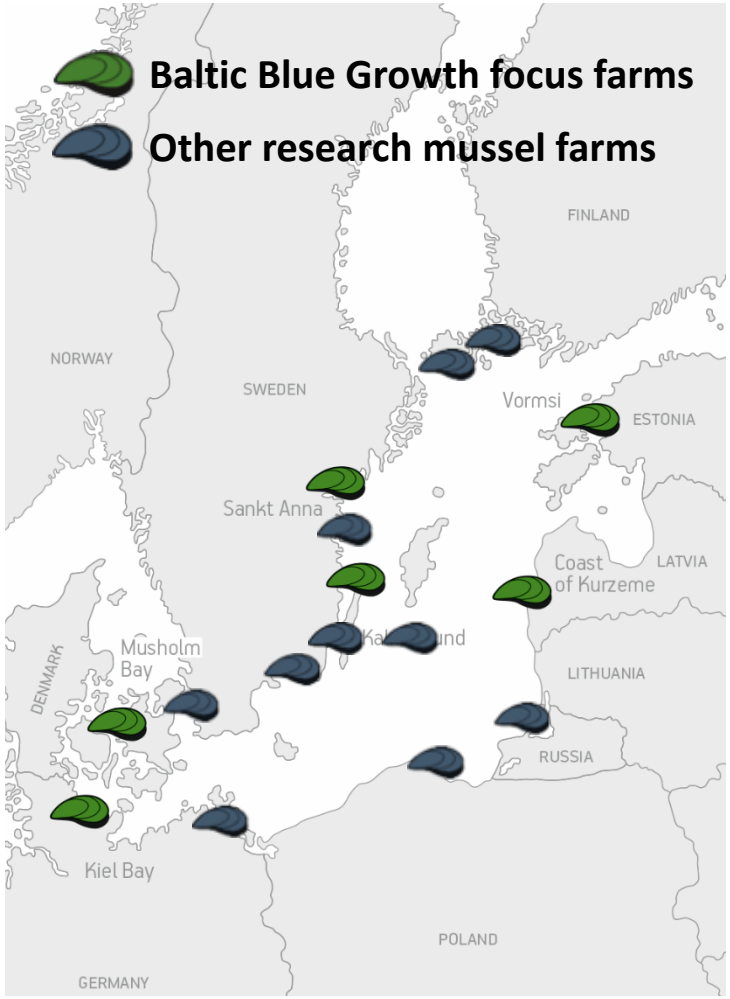
Mussel farming experience in the Baltic Sea

- Research projects assessing mussel farming in the Baltic Sea:

Baltic 2020	2009 – 2012
Submariner project	2010 – 2013
Aquabest	2011 – 2014
Baltic Ecomussel	2012 – 2014
Bucefalos	2012 – 2015
BONUS OPTIMUS	2017 – 2020
MuMiPro	2017 – 2020

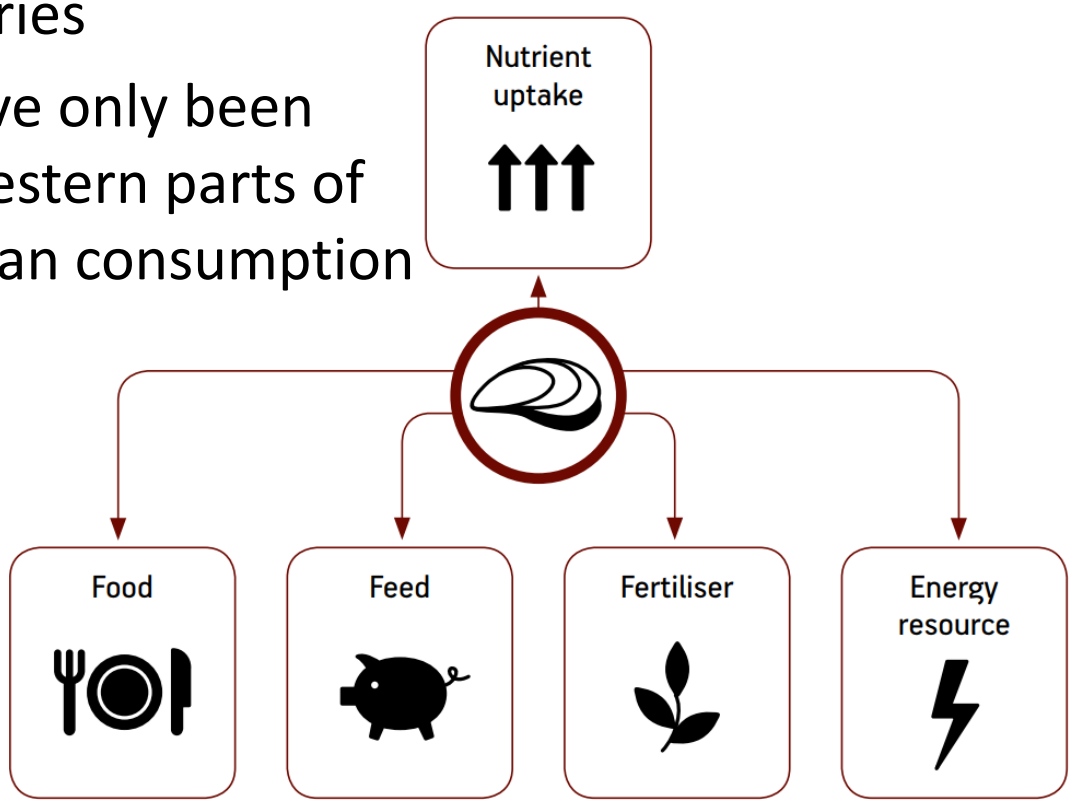
  Several other projects with focus on aquaculture or spatial planning

- Baltic Blue Growth will contribute to the step from research to full scale

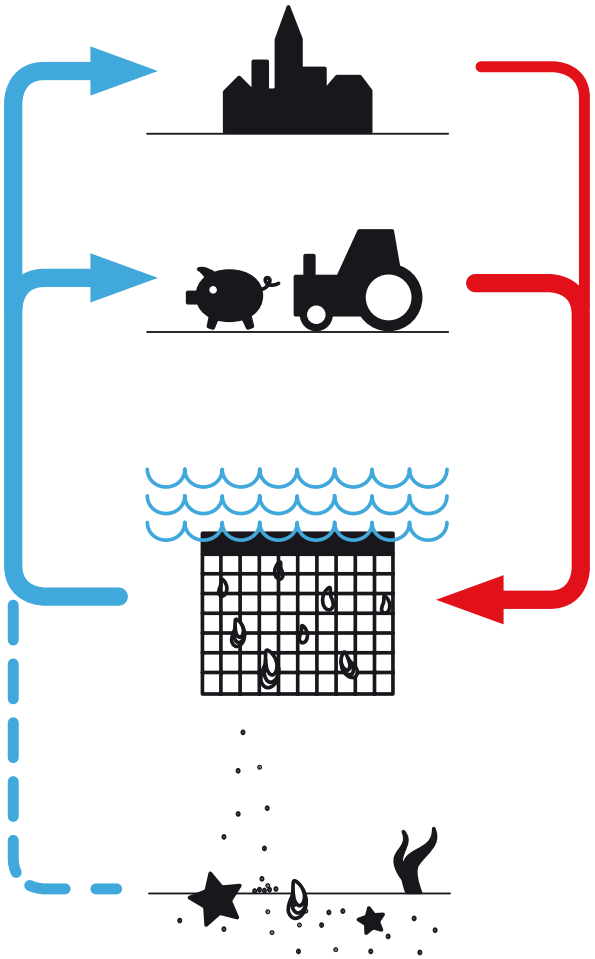


Introduction to mussel farming

- Blue mussels are farmed and enjoyed as fresh seafood in many European countries
- Until now, mussels have only been cultivated on in the western parts of the Baltic Sea for human consumption
- Farms are set up in eastern Baltic Sea to find out if mussels can be farmed for other purposes, f.ex. animal feed



Background: closing the nutrient loop



- Concept of “closing the nutrient loop” by recycling nutrients through mussel farming
- Farming mussels can improve the Baltic Sea water quality by reducing eutrophication

Background: nutrient reduction efforts

- Baltic Sea Action Plan (BSAP) targets from 2007:
  - good ecological status of the Baltic marine environment by 2021, Baltic Sea unaffected by eutrophication
- Achieving the targets can create **benefits worth up to 3,800 million € per year** from individuals' willingness-to-pay for a healthier sea
- Achieving the targets can result in **costs as low as 1,400 million € per year**, provided a cost-effective mix of reduction measures is implemented, if not, costs can go up to **more than 10,000 million € / year**

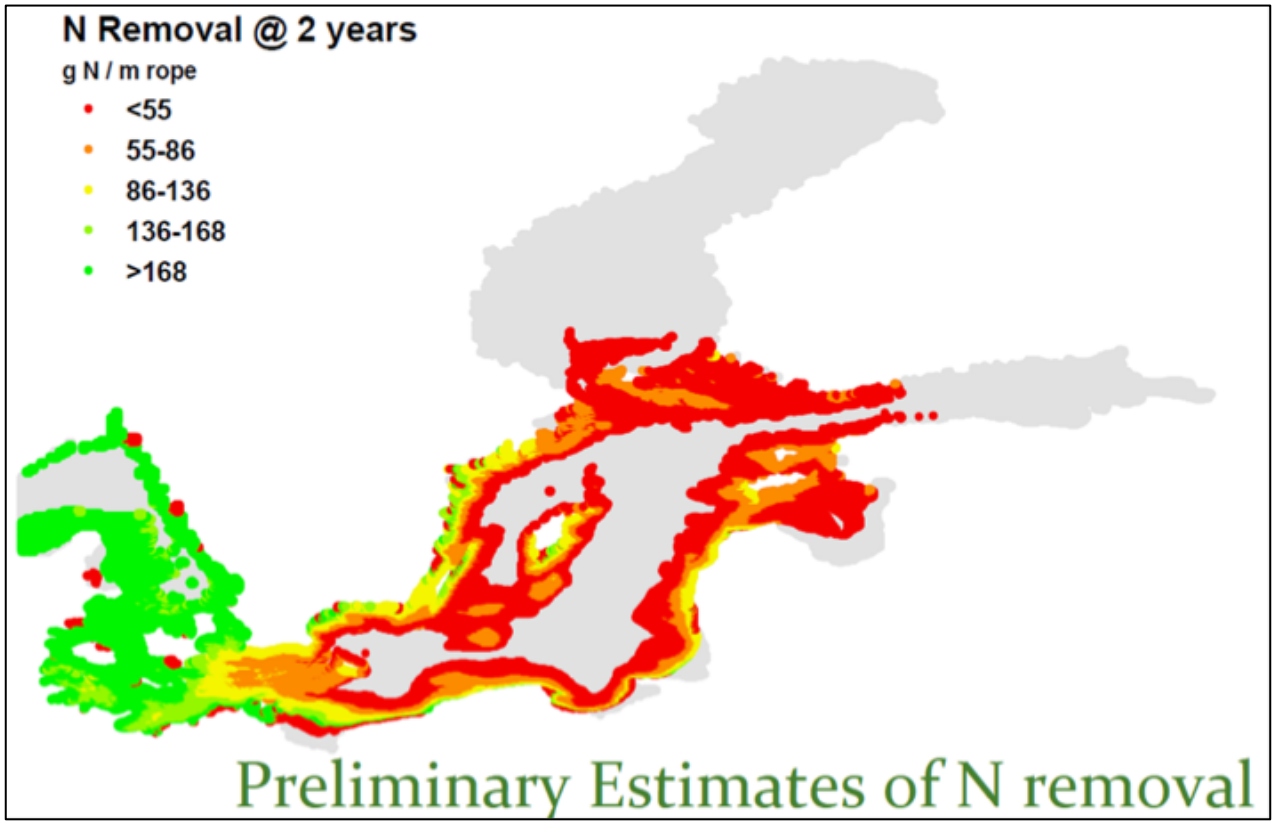
Background: finding a cost-effective mix of nutrient reduction measures

- Most cheapest and easiest measures (low-hanging fruits) have already been implemented
- Hence, costs for tradition measures to achieve more reduction will increase dramatically
- Including mussel farming in the mix could decrease the total cost by up to 11%

Measure in the Baltic Sea Region	Reported N removal costs in €/kg N	Reported P removal costs in €/kg N
Mussel farming without sales	10 – 64	150 – 900
Agricultural measures	0 – 150	0 – 10200
Livestock reductions	6 – 842	112 - 5895
Wastewater treatment upgrades	11 – 136	39 – 600
Wetlands	2 – 93	396 – 1518

Background: modelled nutrient removal by farmed mussels

- Mussel farming in the Baltic Sea can remove significant amounts of nitrogen and also phosphorus
- Mussel farming could account for 2-3% of the Swedish nutrient reduction



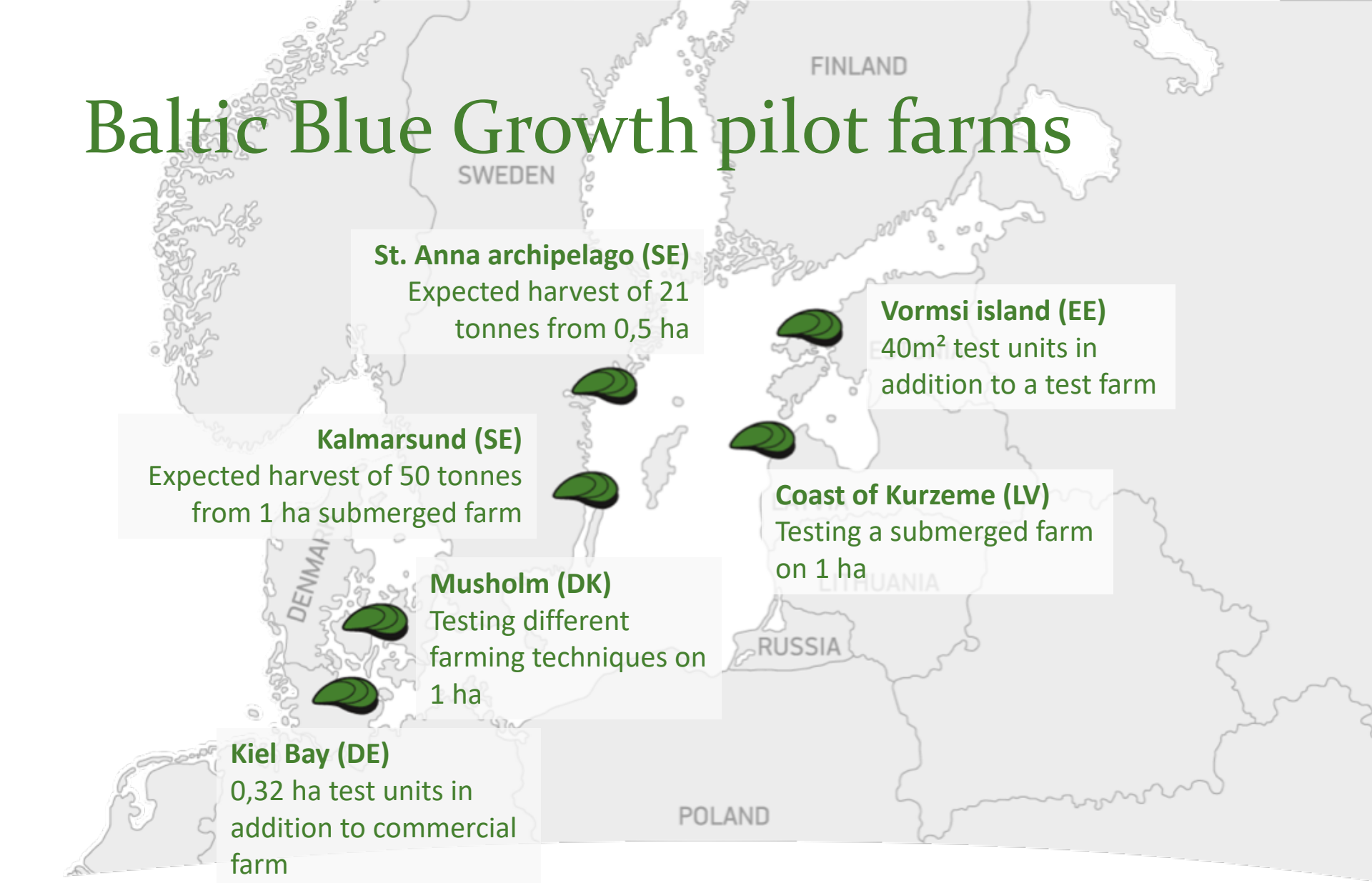
Background: new blue growth opportunities for the feed industry?

- Baltic mussels often too small and fragile for human consumption
- Successful trials of producing mussel meal as animal feed
- New possibilities: mussels as organic substrate for insects larvae as protein source in animal feed

Objective

Advance mussel farming in the Baltic Sea from experimental to full scale to improve the water quality and create blue growth in the feed industry

Baltic Blue Growth pilot farms



St. Anna archipelago (SE)
Expected harvest of 21 tonnes from 0,5 ha

Vormsi island (EE)
40m² test units in addition to a test farm

Kalmarsund (SE)
Expected harvest of 50 tonnes from 1 ha submerged farm

Coast of Kurzeme (LV)
Testing a submerged farm on 1 ha

Musholm (DK)
Testing different farming techniques on 1 ha

Kiel Bay (DE)
0,32 ha test units in addition to commercial farm

Produced outputs and current status

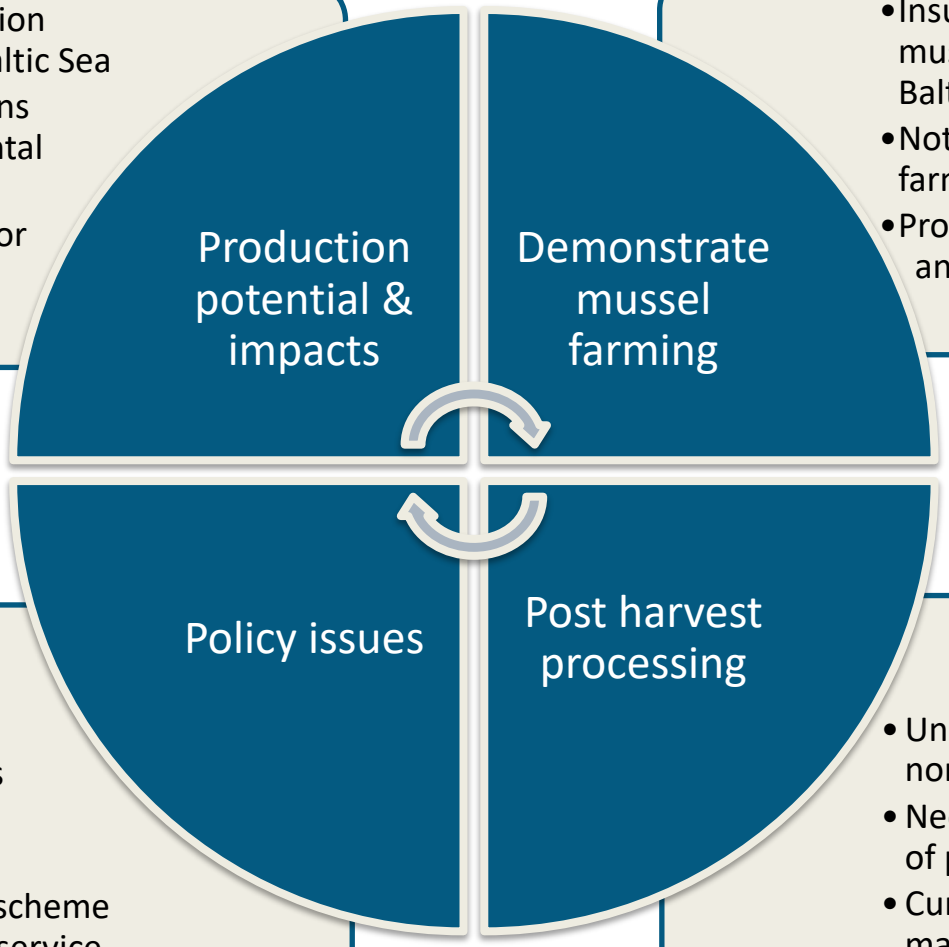
Finished tasks:

- Pilot version of an Operational Decision Support System (ODSS) available
- Review of available mussel production equipment
- All focus mussel-farms in the Baltic Sea established

Ongoing tasks:

- Optimization of mussel production
- Development of systems for submerged mussel farms
- Monitoring of the effects of mussel farming on water quality
- Development of technology for postharvest processing
- Assessment of the value of mussel and larvae meal as animal feed
- Development of relevant business models
- Promotion of business opportunities
- Studies on relevant policies

Mussel farming challenges



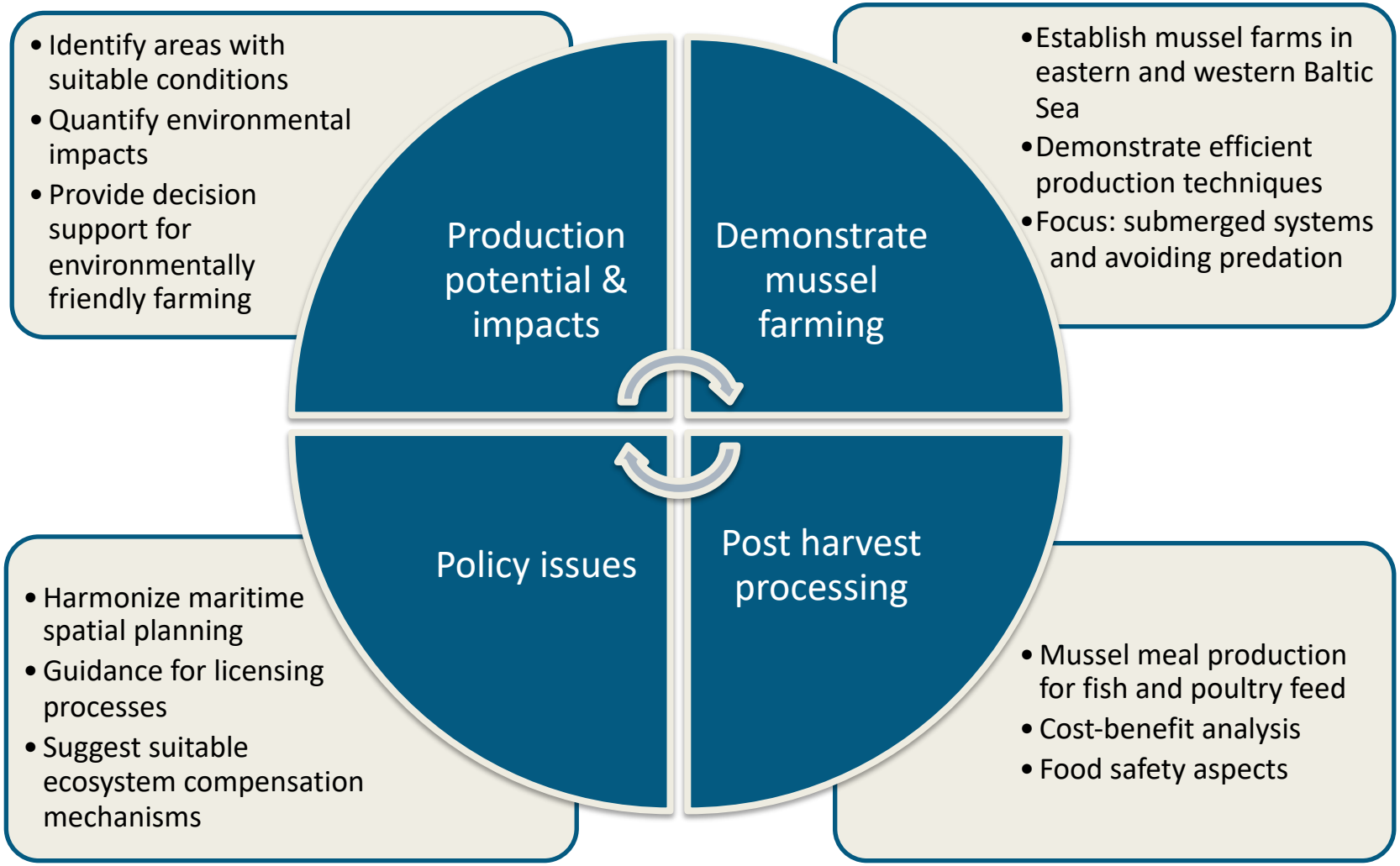
- Unknown production potential in the Baltic Sea
- Ongoing discussions about environmental impacts
- Lack of guidance for environmental friendly farming

- Insufficient technology mussel farming in the Baltic Sea
- Not enough data about farming techniques
- Problems with ice cover and predation

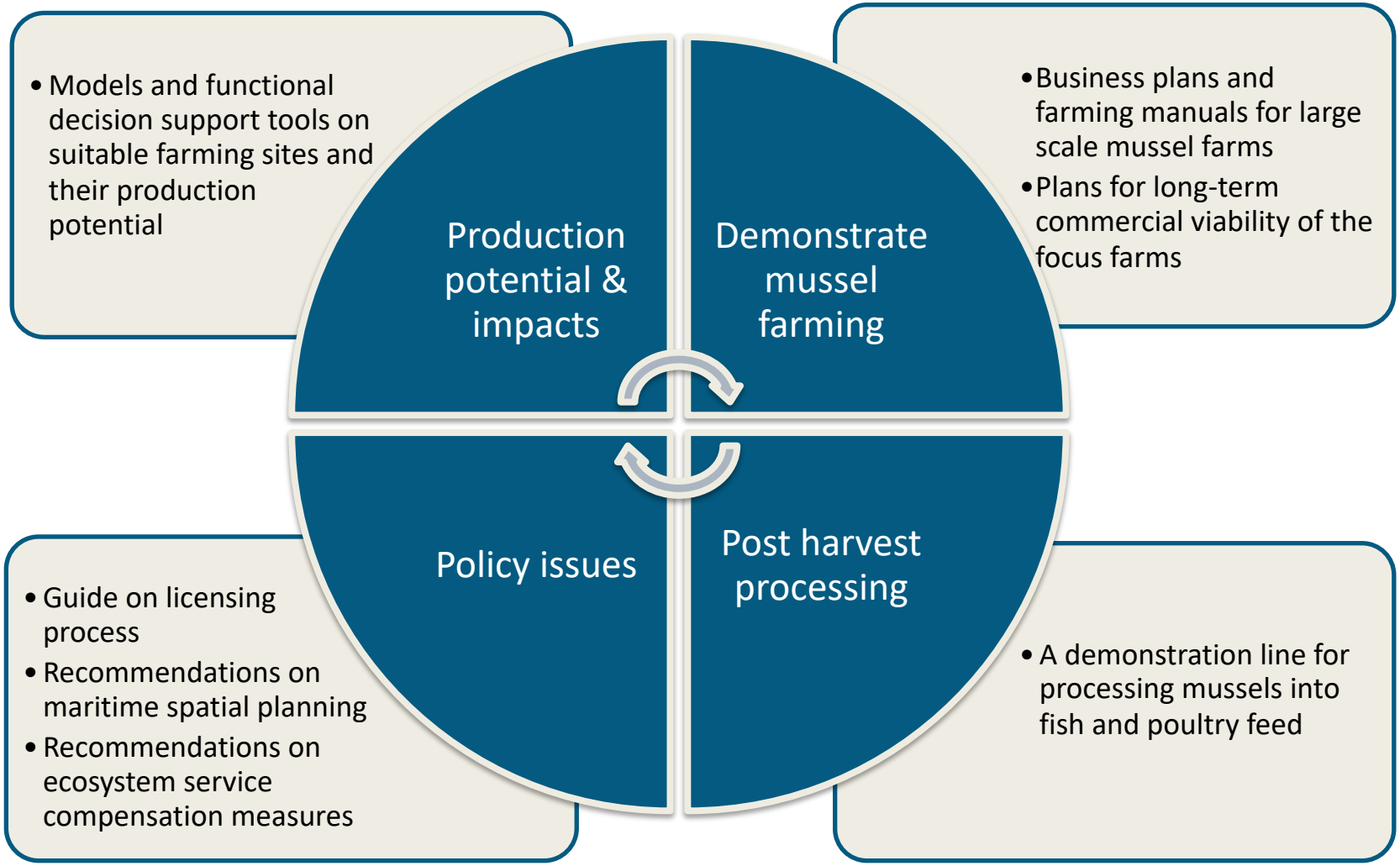
- Not addressed in Marine Spatial Planning strategies
- Unclear licensing processes
- No compensation scheme for the ecosystem service

- Unclear use of produced non-food mussel
- Need for demonstration of possible processing
- Currently no existing markets for feed from mussels

Project structure and activities



Expected outputs



Expected outputs

Baltic Blue Growth partners

Mussel producers, public authorities, policy makers, research institutions and interest groupings from six Baltic Sea Region countries:

Region Östergötland

Länsstyrelsen Kalmar län

VCO Vattenbrukscentrum Ost

Kalmar kommun WWW.KALMAR.SE

KURZEMES PLĀNOŠANAS REĢIONS

LATVIJAS HIDROEKOLOĢIJAS INSTITŪTS

MARITIME INSTITUTE IN GDAŃSK

SH Schleswig-Holstein Ministerium für Energiewende, Landwirtschaft, Umwelt und ländliche Räume

Borgholms kommun

SUB MARINER NETWORK

SLU

LÄNSSTYRELSEN ÖSTERGÖTLAND

TARTU ÜLIKOOL UNIVERSITAS TARTUENSIS 1632

CRM Coastal Research & Management

ORBICON

MUSHOLM

EUCC-D

RI.SE Research Institutes of Sweden

+ 20 associated organisations

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