

Mads van Deurs - Nordshell



Background

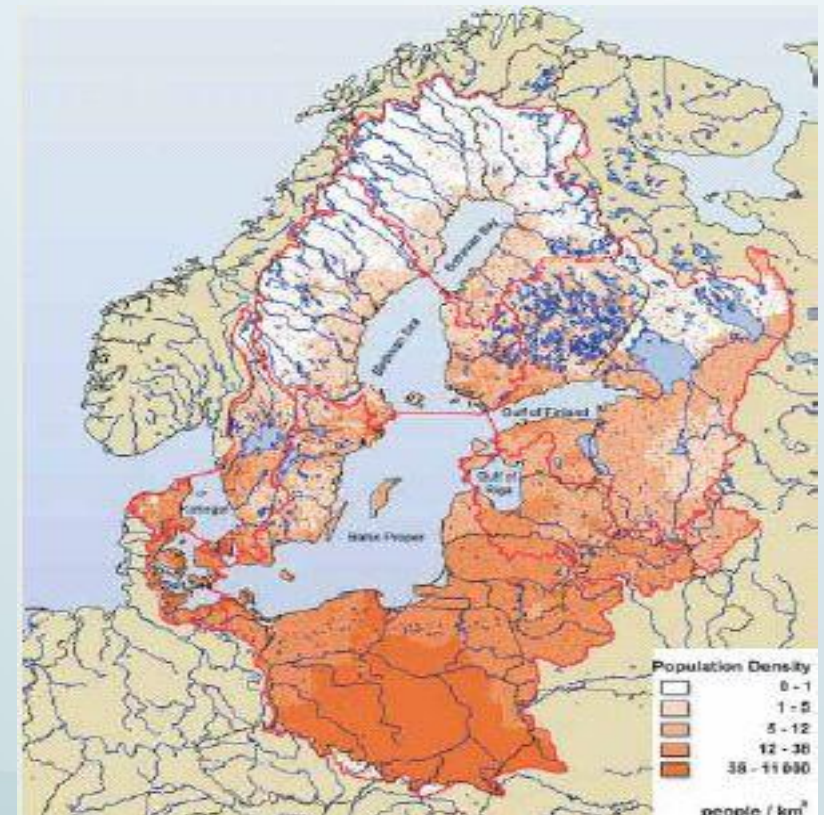
- Commercial ships
- Teacher in biology
- Mussel farmer, 6 years
- Nordshell - aquaculture consultancy
- SmartFarm- sales and development



How do we identify farming model for a permanent production and not only time limited projects?

Challenges in Baltic Sea

- Low growth (salinity)
- Ice during winter
- High labour cost
- Market situation
- **Advantage: Nutrients for free!**



Challenges from nature

- Eider duck
- Starfish
- Barnacles
- Tunicates
- Ice



Requirements to mussel farming system

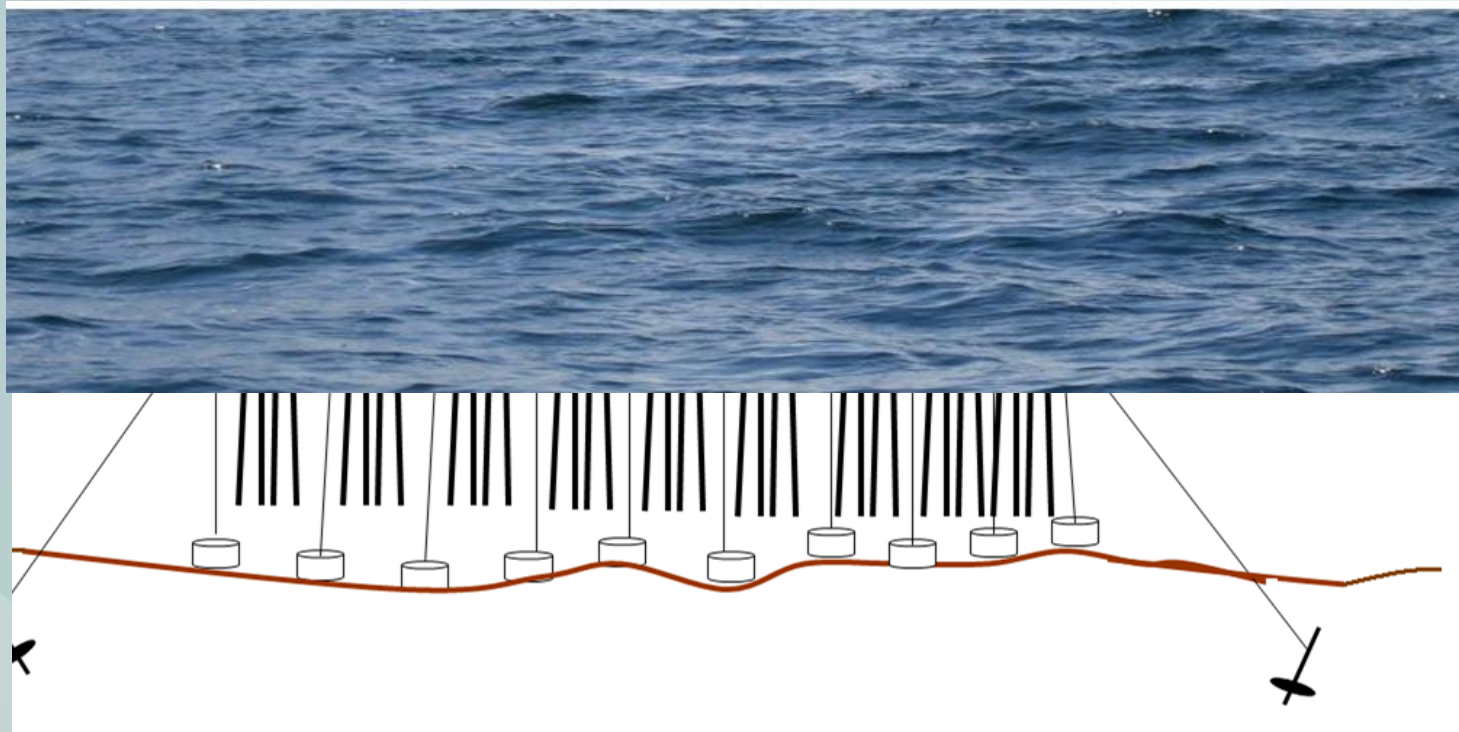


- Must be able to up-scale
- Must have low labour input
- Must have a low production cost on the mussels
- Must be suitable for Baltic Sea conditions
- Must show positive result from existing business



Longlines

- Simple system
- Well tested and developed during decades
- Can produce very fine mussels
- Can be submerged

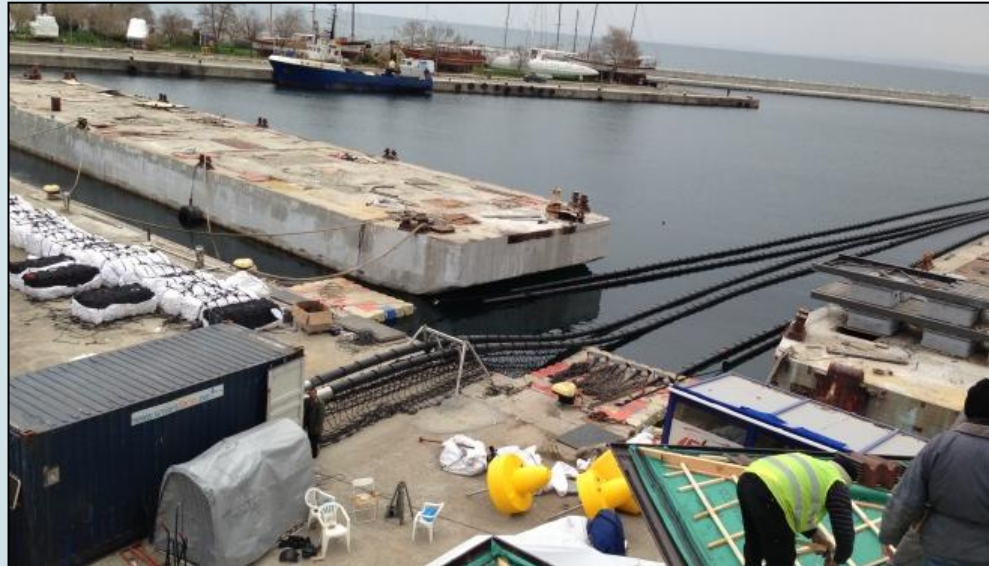


SmartFarm system - patented

- High quality - continuously improved
- Long lifetime. Prototfarm from 2000 is still in the sea
- Low operating cost
- All operation done under water
- Installed in the following extremes:
 - ice covered fjords
 - in strong tidal sites (4 knots / 200 cm/sec. current)
 - Open waters with 7 meters significant high waves



- The Smartunits are assembled on land and launched at sea
- the Smartunits are towed to the farm site
- Mooring and installation is done under supervision

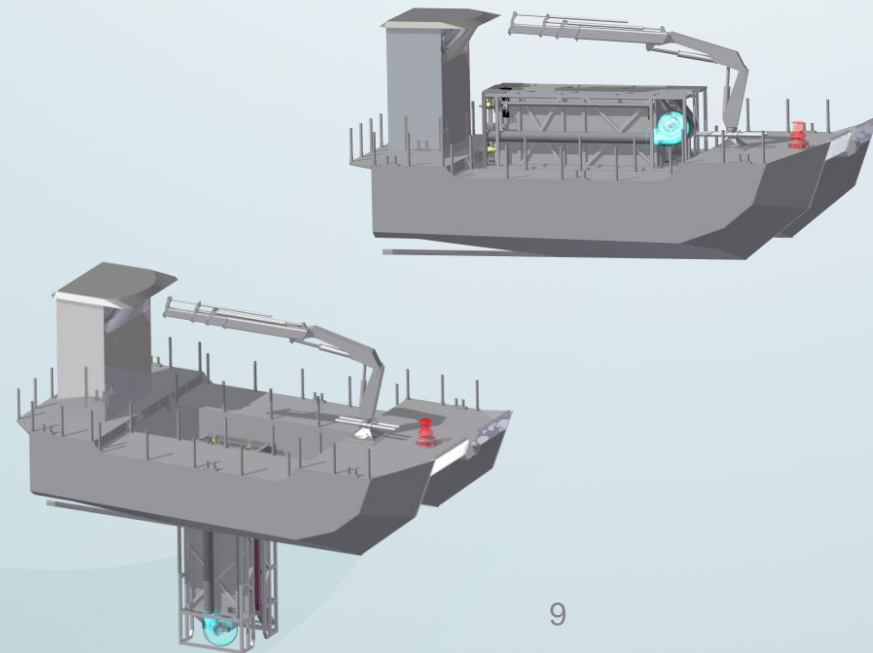
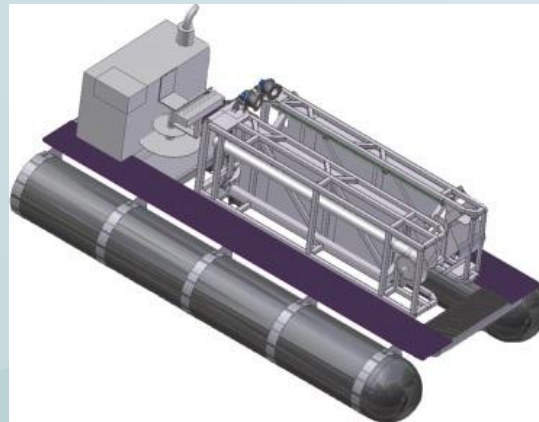
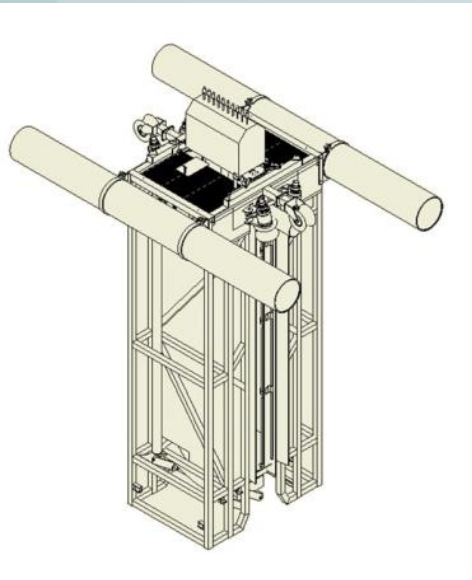


- Mussels settle and grow on the net
- Predator removal, thinning and harvesting is done by machine
- The Smartunits can be submerged during ice cover



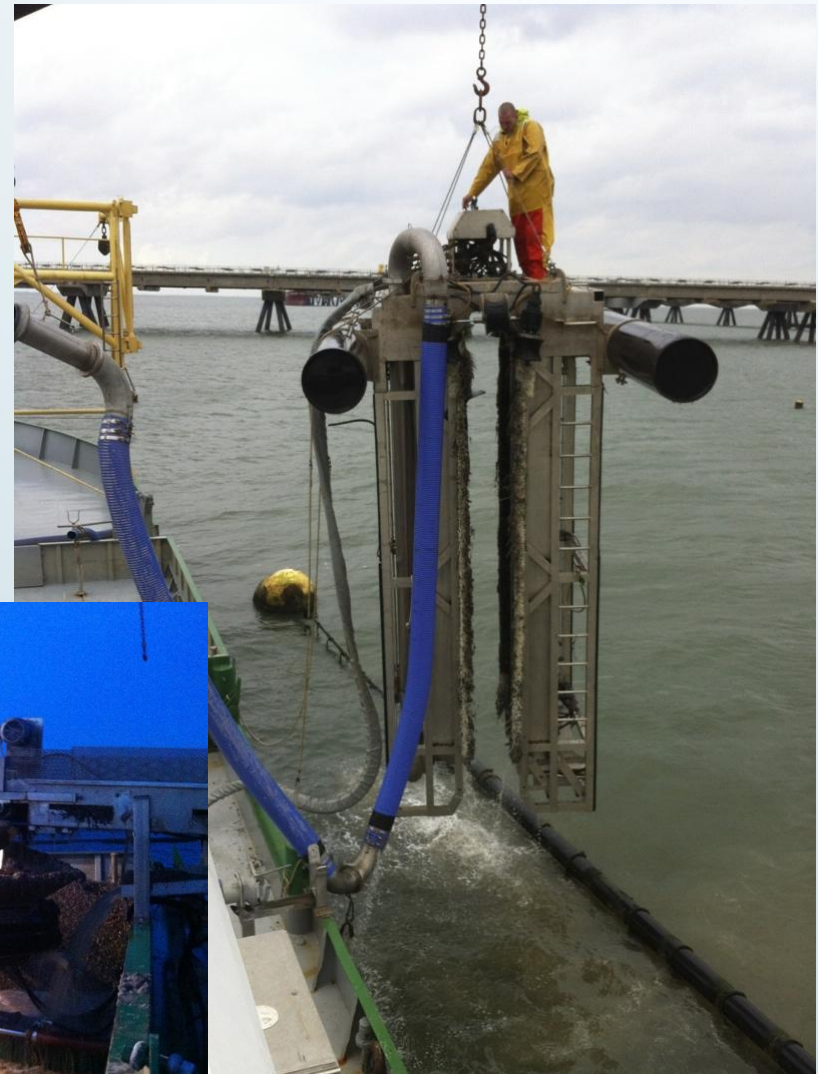
Specialised machines

- Basic for the harvesting machine:
- Cleaning nets before settlement of mussels
- Starfish and barnacle removal
- Thinning
- Harvesting
- Depending on scale of production and infrastructure, the machine can be custom designed into the following units:
- Harvesting machine to be operated from boat
- Scooterversion. Selfpowered with limited carrying capacity
- Catamaran with increased capacity and logistic



Harvesting

- The machine is lowered over the unit
- Mussels are pumped on board



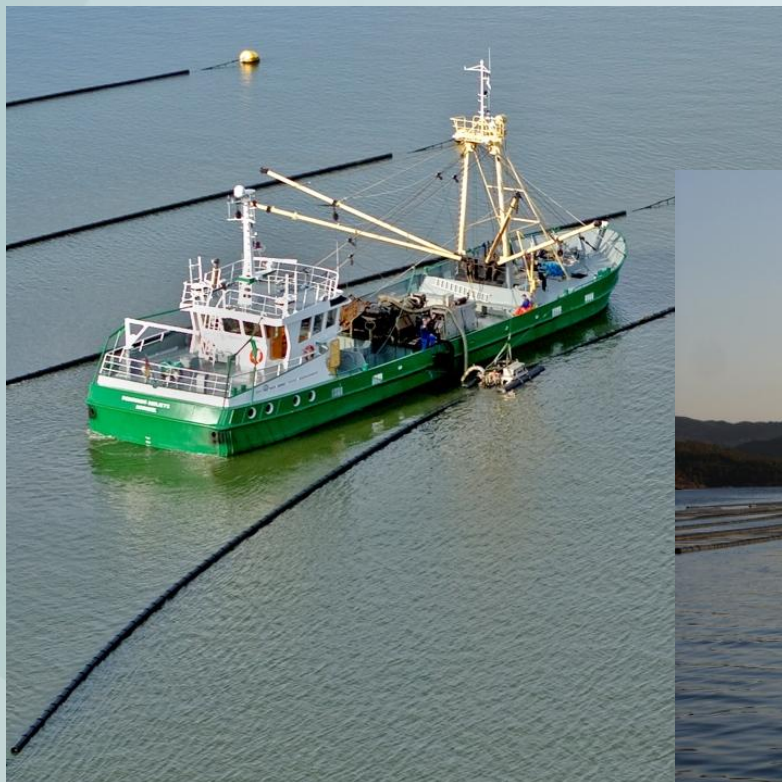
Capacity

- 30 tons per hour
- Depending on time shifting to the next unit
- Depending on efficient handling of the mussels onboard
- All operations are adjusted by operator
- Result: Low cost per ton



Example from Germany

- Production from May to October
- First harvest in August (50%)
- Second harvest in October (50%)
- 236 Smartunits
- 4.000 tons per year



Complete solution

- Consultancy during planning
- Tailor made smartunits for optimised growth
- Husbandry- and harvesting machine
- Complete mooring systems
- Navigational markers
- Fence against eider duck
- Continuously service and follow up





Mussels

Valuable protein from the
Baltic Sea



Feasibility

- The investment / write off has to be covered by profit from the production
- The production price has to be higher than the market price
- There must be a demand for the mussels
- Fixed expenses are the same for small and big farm (boat, analyses, administration etc.)
- There can be a financial compensation for the N/P removal

Thank you

