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Interreg Baltic Sea Region

EUROPEAN UNION

EUROPEAN REGIONAL DEVELOPMENT FUND

Blue Platform

InnoAquaTech project products: possibilities of development of RAS and aquaponics in BSR

Blue Platform Workshop, November 17th 2020

BIOECONOMY HOTSPOT GULDBORGSUND

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Reasons to go: InnoAquaTech

The State of World Fisheries and Aquaculture

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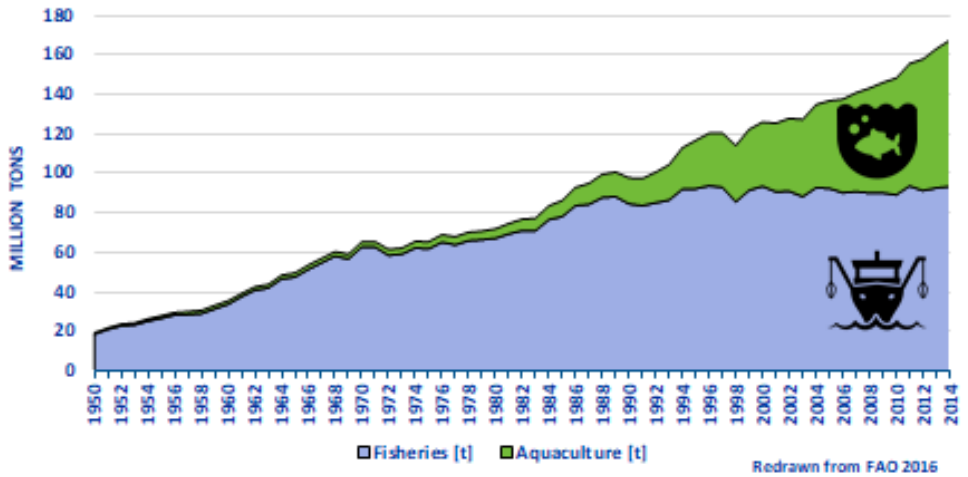

Redrawn from FAO 2016

Aquaculture is still a fast growing sector!

Where do we find the South Baltic Region (SBR)?

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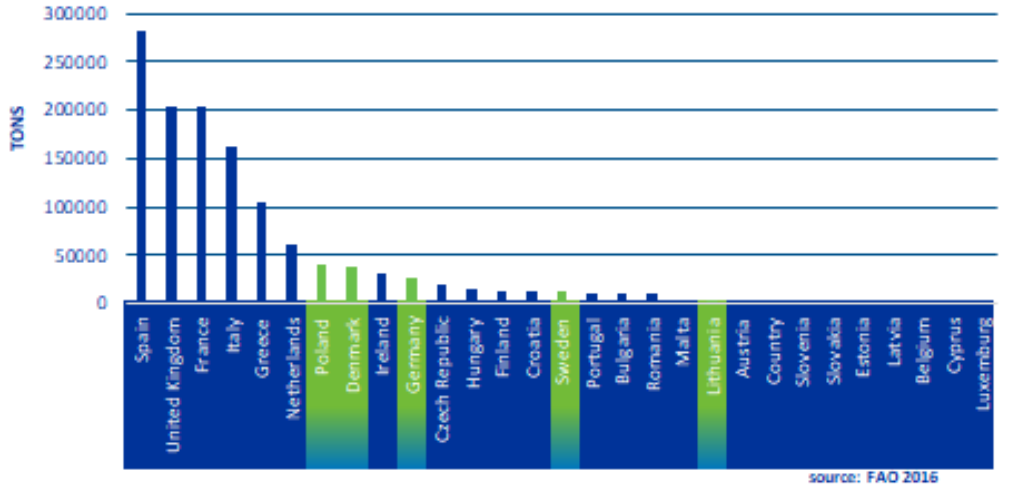

source: FAO 2016

The SBR does not play a big role in EU's aquaculture sector. Net cage aquaculture is still the most prominent technology.

An aquaculture boost for the South Baltic

Aquaculture forecast

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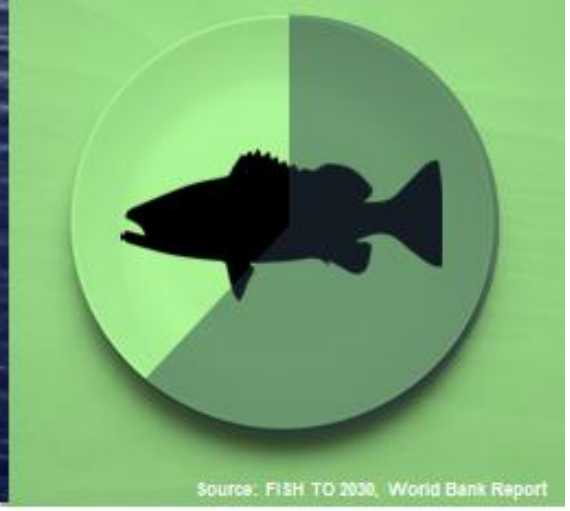
62%

of food fish will come from AQUACULTURE by 2030

There is still time for the SBR to play a role in this game!



Source: FISH TO 2030, World Bank Report

InnoAquaTech Overview II
Key Elements

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Production:
Access to state-of-the-art technology, know-how, expertise, lifecycle analysis and financing models for SMEs

Investment:
Decision support (tool) for potential investors and establishment of a strong aquaculture economy in the SBR

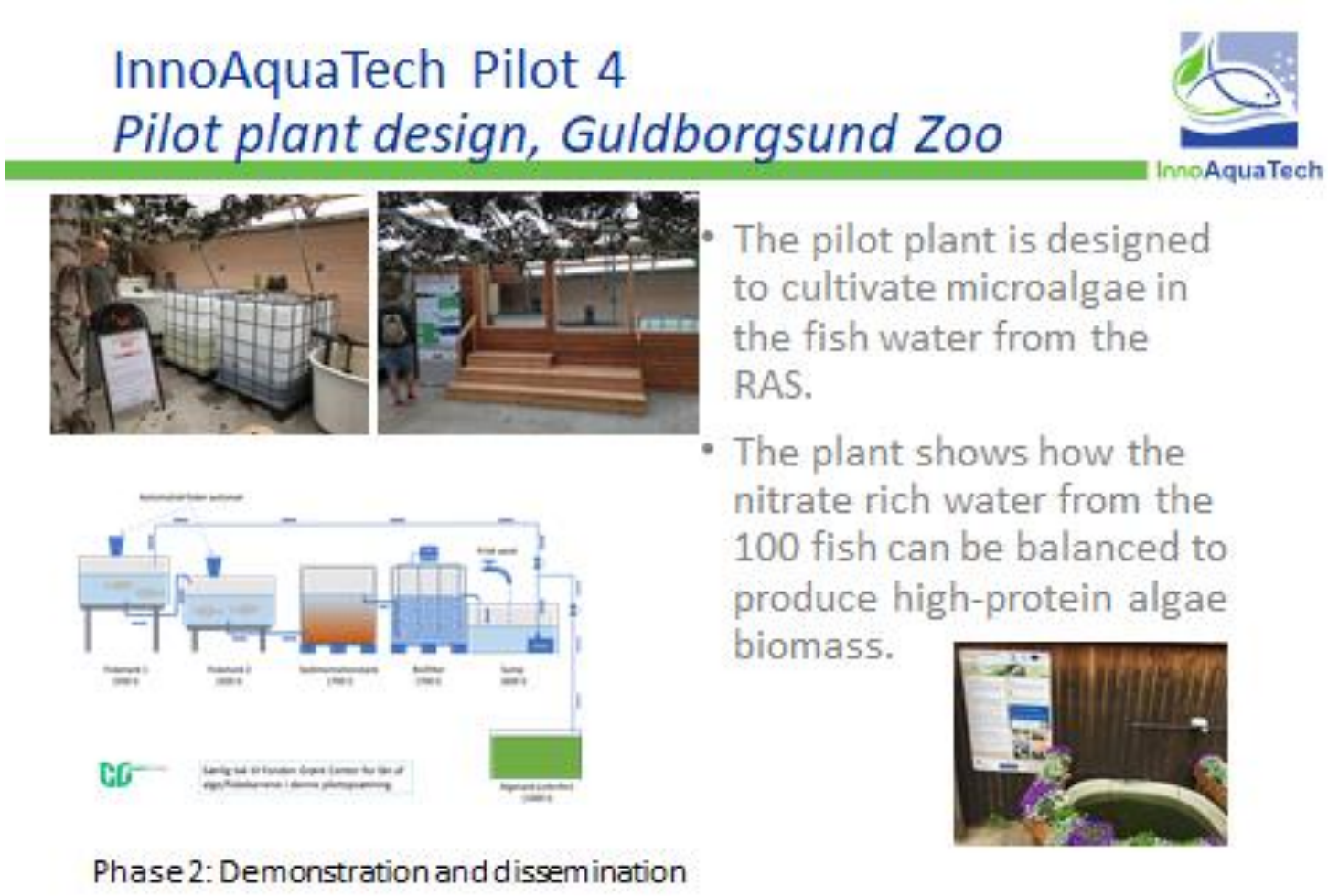
Scientific knowledge (4 pilots):
Evaluation of sustainability and development of innovative and integrated recirculating aquaculture systems - RAS

InnoAquaTech – further work

- **Innovative Aquaponics System Production**
  Hilary Karlson, Bioeconomy Hotspot , Guldborgsund Municipality, Denmark
- **The InnoAquaTech Decision Support Tool for Recirculating Aquaculture Systems**
  Introduction and demonstration of the tool - Adrian Bischoff-Lang, Rostock University, Germany
- **Potential of Crustacean Production in RAS in Pomerania** Halina Kendzierska, University of Gdańsk, Poland
- **Geothermal Potential in Whiteleg Shrimp Recirculating Aquaculture Technology**
  Nerijus Nika, Klaipeda University, Lithuania

Danish Aquaculture facilities/farms, EPA report 2016

Innovative aquaponic system production – basis info



- DTI/UROS worked together on investigating the potentials of culturing green microalgae biomass on untreated fish effluent water
- Vermifiltration (proof of concept) showed significant BOD, COD and solids reductions in sediment treatment
- Positive outputs: nutrient uptake, high-protein microalgae biomass, worm protein, biologically enriched compost

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Innovative Aquaponics System Production – status quo

- What has happened in Denmark since the end of 2019?
- Where are the biggest hurdles?
  - Demonstration and proof of concept
  - Information to Producers – Consumers - Education
  - Species diversity – BAT / BEP – animal welfare concerns
  - Lack of funding - risk capital
- Policy – clear , long term vision please!
- Danish strategy for sustainable development of the aquaculture sector 2014-2020 has the vision of increasing technology-based fish farming - but so far no funding solutions – risk capital solutions
- Bill of law 22nd October 2020: Pressure on the Danish aquaculture producers to adopt innovative technologies in order to reduce nutrient emissions – combined biotechnologies for nutrient uptake should therefore be communicated clearly – not as compensatory cultivation but at innovative aquaponic solutions.

Agri-
Aqua Innovation Denmark

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The good news! Local level developments

- Agri-Aqua Innovation Denmark partnership (DA,DTI,AU,DLS,BLF,GBS)
- Building on the DK/DE InnoAquaTech pilot set-up: AquaDemo - technical playroom, demonstration and proof of concept, fish production for product development - collaboration with colleges
- Collaboration with Rostock Uni – Study tours - learning from each other – exchange of biomass
- Fish feed trials – residual biomass – bioconversion with insects and worms – microalgae
- Professional College Absalon trials – basis for new cultures – preparing the consumer for African Catfish!
- Semi-RAS /model farms are experimenting with wood chips in the retention ponds to bind N
- SmartFarm systems are being developed to mitigate visual and ice challenges (SUBMUSSEL project – Danish Green Development and Demonstration Program)
- INProFeed (GUDP) industrialised production of mussels (10.000t)in Venø Sund for food and feed
- Mussels and seaweed as marine nutrient uptake tools

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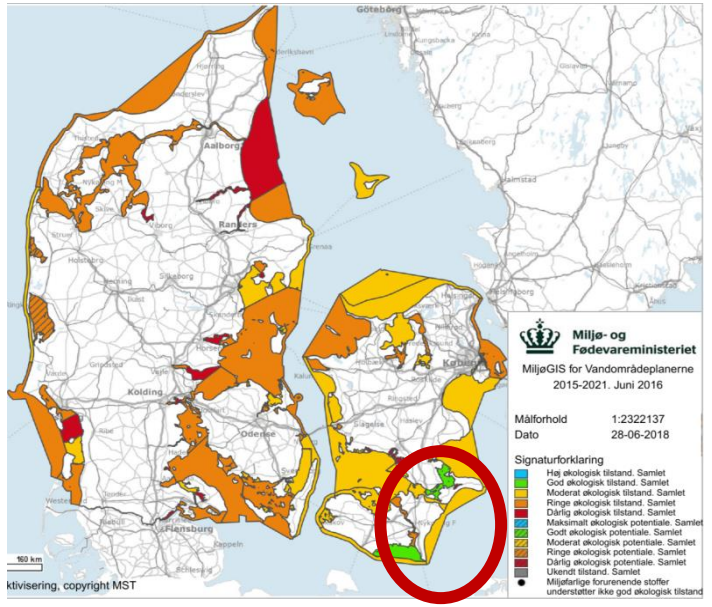
A front-line Municipality

- Rural municipality bordered by Baltic
- Richest soil – plant breeding expertise
- Good transport infrastructure
- Commitment to green transition through circular bio-economy
- 328 km coastline



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PILOT TEST SITE

Agri-Aqua Innovation Denmark

Focus on BLUE BIOECONOMY

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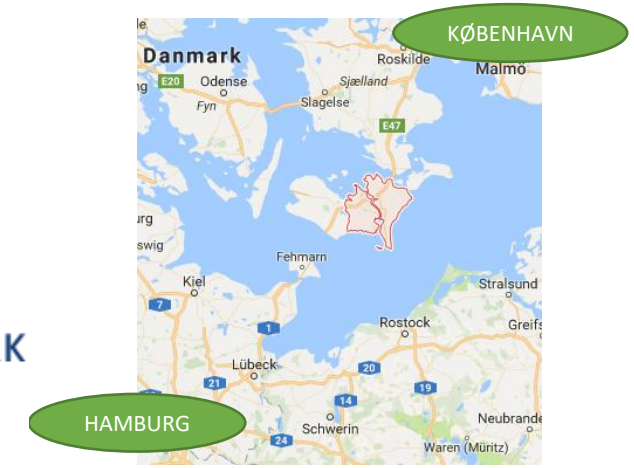
ALLIANCE

SUBMARINER NETWORK



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Value from local beach cast?

Black Soldier Fly larvae bred on residue biomass – New sustainable protein source for fish?





Feed-screening and dietary experiments:

- Larval and frass production,
- Substrate reduction
- Feed conversion rate,
- Larval weight and survival rate (%)

Analysis of larvae and frass: protein, carbohydrate, lipid and ash (+Larvae: amino acids profile and chitin concentration. +Frass: NPK and sugar profile)

LCA

Business model

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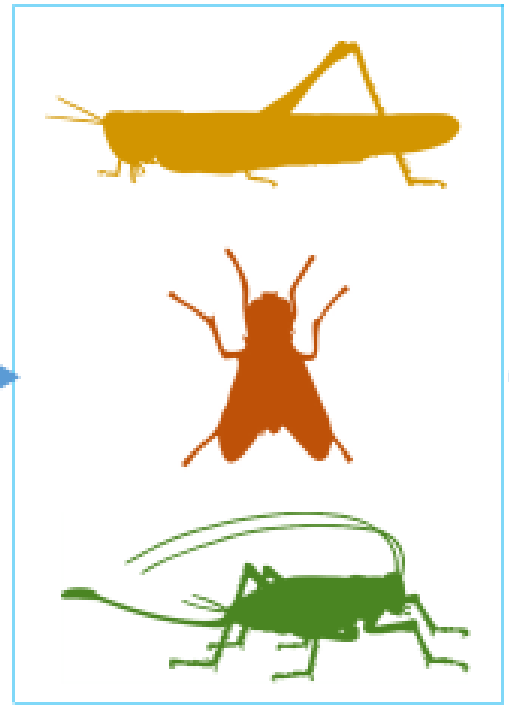
Insects: EU regulatory overview – feed (generic)

[Seven species defined by EU as farmed animals for feed use]

- ✓ Vegetal substrates
- ✓ Former food - Dairy and eggs
- ✗ Former food - Meat and fish
- ✗ Catering waste
- ✗ Slaughterhouse products
- ✗ Animal manure



Currently legal US/CA – EU expected in 2019

Currently not legal EU or US/CA – EU expected in 2020+

Bioconversion of beach cast with black soldier fly larvae (BSFL)

- Beach cast (primarily eel grass) was used as feed for BSF larvae in mixes with
  a) source-separated organic household waste (25- 75%)
  b) brewers mash (25-75%)

  Conclusion: Up to 25% beach cast (primarily eel-grass) can be added to larvae feed with out loss of growth.

- **The Danish Food Administration currently does not approve that larvae fed with beach cast are used for food or feed for production animals (zoo and pets excepted).**

Læs rapporten: bioguldborgsund/Viden/Lokale analyser og rapporter

Fractions and feed trials

- The BSFL larvae were extruded into fractions – protein powder and fat emulsion
- GBS delivered these fractions to Rostock University
- Rostock University will soon use these fractions (together with other ingredients, e.g. worms and microalgae) and work on feed formulae and trials
- What goes in must come out… it will be exciting to learn whether these ingredients have an effect on the nutrient excretion levels and their profiles!

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THANK YOU !

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ALLIANCE

Agri-Aqua Innovation Denmark

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Agrovi Den bedste løsning på jorden

provinsje fryslân provincie fryslân

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FRISIAN DESIGN FACTORY

GHENT UNIVERSITY

Hanzehogeschool Groningen University of Applied Sciences

Heidekreis Mitten in Niedersachsen – mitten im Leben.

CARL VON OSSIETZKY universität OLDENBURG

Rinagro smart farming

SDU

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