SusAquaBrazil

Marine aquaculture as a sustainable green industry in Brazil

The project is supported by:

The Research Counsil of Norway, The Latin-America Programme

This seminar is supported by: NorLARNet and The Research Counsil, (Havbruk)

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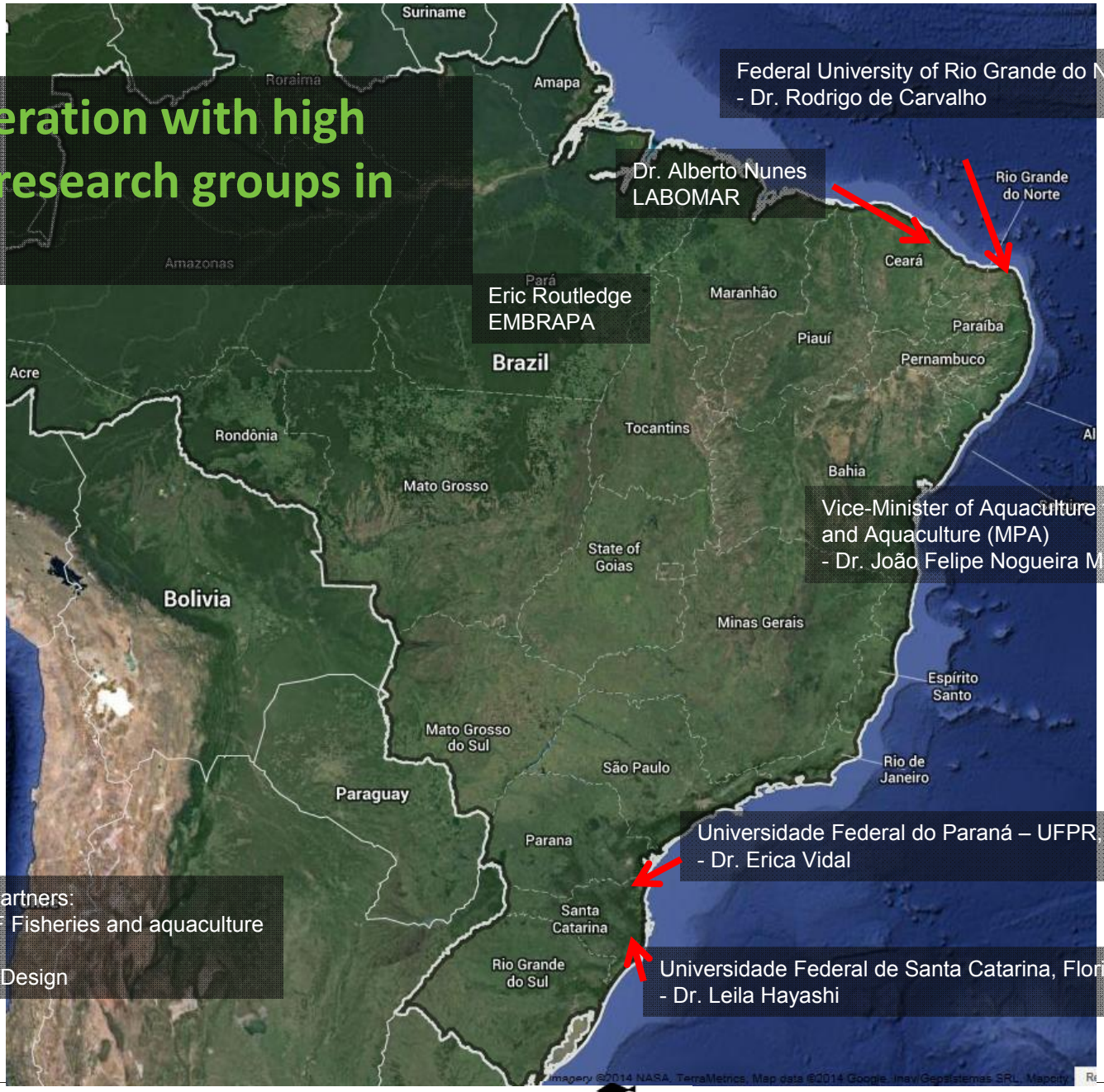
Marine aquaculture as a sustainable green industry in Brazil

- The project period: 2014-2017
- Partners in Norway:
  - Professor Kjell Inge Reitan, NTNU (WP 1)
  - Gunvor Øie, SINTEF (project leader, WP 2)
  - Pål Myhre, Marine Design (WP 3)
  - Senior adviser Roger Richardsen, SINTEF (WP 4)

Cooperation with high level research groups in Brazil



Federal University of Rio Grande do Norte, Natal
- Dr. Rodrigo de Carvalho

Dr. Alberto Nunes
LABOMAR

Eric Routledge
EMBRAPA

Vice-Minister of Aquaculture from Ministry of Fisheries and Aquaculture (MPA)
- Dr. João Felipe Nogueira Matias

Universidade Federal do Paraná – UFPR, Pontal do Paraná
- Dr. Erica Vidal

Universidade Federal de Santa Catarina, Florianópolis
- Dr. Leila Hayashi

Norwegian partners:
- SINTEF Fisheries and aquaculture
- NTNU
- Marine Design

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Marine aquaculture as a sustainable green industry in Brazil

The overall objective of the project is:
To study and characterise technologies for large scale macroalgae and marine aquaculture that can be applied as a sustainable industry at the Brazilian coast

Sub-goals of the project (Work-Packages):

1. Strategies for large scale cultivation of macroalgae in Brazil and Western Europe
2. Describe the feasibility of marine aquaculture sector in Brazil
3. Evaluate the market and techno-economic performance of marine aquaculture
4. Describe the adaptive capacity of developing marine aquaculture in Brazil

Results: Study tour to Brasil, November 2014

- **Florianópolis**
  - We did visit the Univeridae Federal de Santa Catarina, Florianópolis - Dr. Leila Hayashi
  - We had meetings om Seaweed cultivation and IMTA (Integrated Multitrophic Aquaculture)
  - We did participate a workshop about biofloc (water treatment for aquaculture)

- **Fotaleza**
  - We did participate a big aquaculture conference (FENACAM). The main focus was shrimp aquaculture.
  - Roger Richardsen was invited speaker in this conference. He talked about Norwegian aquaculture.
  - We did visit LABOMAR, a research institute with both education of Master students and contracts with the industry.
  - We did also visit one of the largest shrimp hatcheries in Brazil.

WP 1: Strategies for large scale cultivation of macroalgae in Brazil and Western Europe

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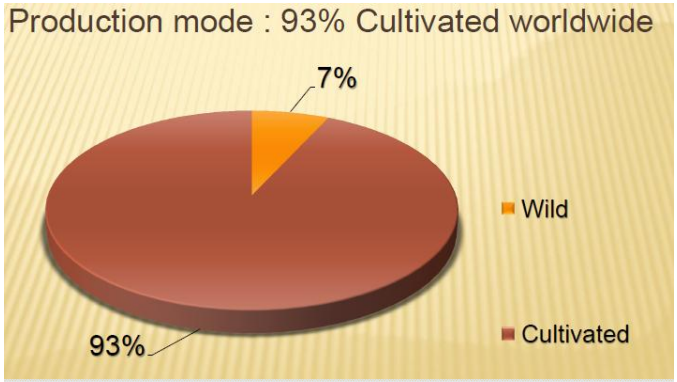
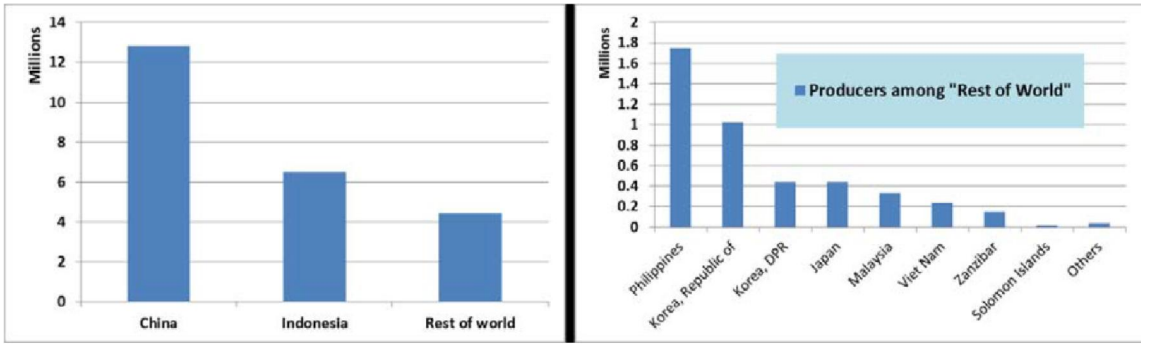
Seaweed activity in Norway and rest of the world

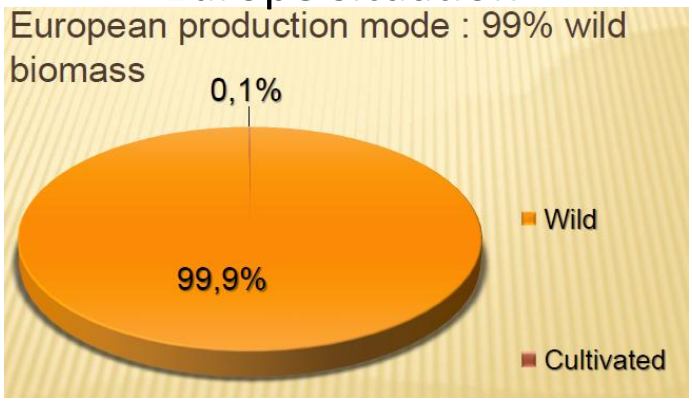
Global situation



2010: Cultivation: 19 mill ton
Harvest: 0.8 mill ton



Europe situation



Norway

Species	Harvesting (tons wet weight per year)	Region	Usage	Company
Laminaria hyperborea	130 000 – 180 000	Rogaland – Sør Trøndelag	Alginate (7000 tons)	FMC Biopolymer
Ascophyllum nodosum	10 000 – 20 000	Midt-Norge - Troms	Seaweed meal, extracts (7000 tons)	Algea

Seaweed cultivation in SINTEF/NTNU

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Universidade Federal de Santa Catarina, Florianópolis

-Visit to Dr. Leila Hayashi
-Cultivation of different macroalgae
-Plans for reseach cooperation in Brazil in 2016 (IMTA)
-Workshop in Brazil in 2016

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Seaweed workshop: program:

Workshop on macroalgae aquaculture: Synergies between Brazil and Norway

The global cultivation of aquatic plants is around 27 mill tons. While Norway only harvest from wild populations and has no commercial cultivation of macroalgae, Brazil cultivates about 700 tons per year. It is expected an increased need for sustainable macroalgea biomass in near future, suggesting that innovative cultivation methods and technology must be developed. Scientists and industry working with macroalgae cultivation in Brazil and Norway are invited to exchange knowledge and strengthen the synergies between the countries.

Program

09.00-09.05: Welcome - Prof. Kjell Inge Reitan, NTNU
09.05-09.20: The SUSAQUA-Project - Research Director Gunvor Øie, SINTEF
09.20-09.50: Macroalgae cultivation and processing in Brazil - Dr. Leila Hayashi, UFSC
09.50-10.10: Seedling production- Researcher Silje Forbord, SINTEF
10.10-10.30: Coffee break
10.30-10.50: Seaweed modelling - Dr. Ole Jacob Broch, SINTEF
10.50-11.10: Integrated Multi-Trophic Aquaculture - Dr. Aleksander Handå, SINTEF
11.10-11.30: Seaweed Energy Solutions - Hatchery manager Kaia Kjølbo Rød, SES
11.30-11.50: Processing of cultivated macroalgae- Prof. Turid Rustad, NTNU
11.50-12.00: Summary and closing - Prof. Kjell Inge Reitan, NTNU
12.00-13.00: Lunch

Registration before August 10th to:
Kjell Inge Reitan (kjell.i.reitan@ntnu.no)
or
Silje Forbord (silje.forbord@sintef.no)

When: August 20th 2015, 9.00-13.00 (incl. lunch)
Place: SINTEF Sealab, Brattørkaia 17C

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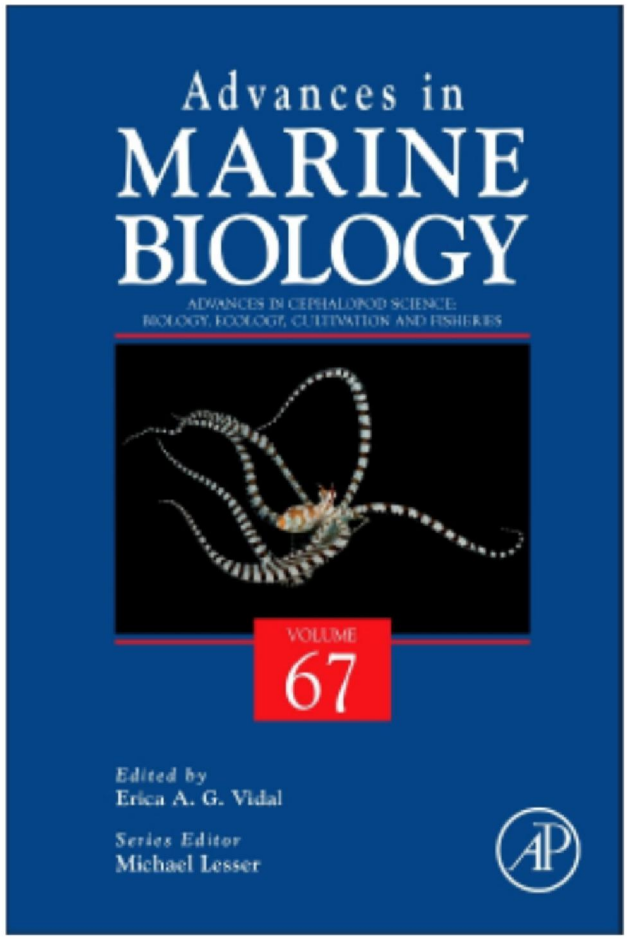
WP 2: Marine aquaculture in Brazil



Universidade Federal do Paraná – UFPR, Pontal do Paraná
Dr. Erica Vidal

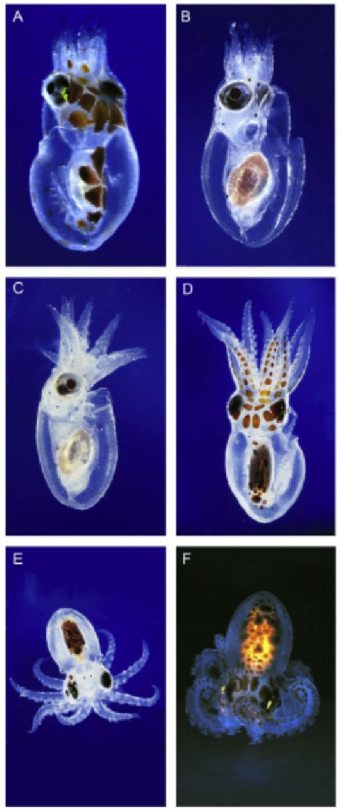


Figure 1.11 *Octopus vulgaris*. Individuals from hatching to settlement obtained from rearing experiments described in Villanueva (1995). Age (days, d) and mantle length

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Juvenile and plankton technology in SINTEF/NTNU

Research area at SINTEF/NTNU:

- Firstfeeding of marine fishlarvae
- Plankton technology
- Microalgae production
- Development of new technology

Plan in the WP 2:
First feeding experiment by using copepods to octopus

WP3: Evaluate the market and techno-economic performance of marine aquaculture in Brazil.

1	Evaluate the market situation for this bio-marine production	December 2016
2	Develop overall techno-economic analysis for different marine aquaculture strategies	March 2017
3	Overall economic considerations for industrial marine aquaculture in Brazil	June 2017

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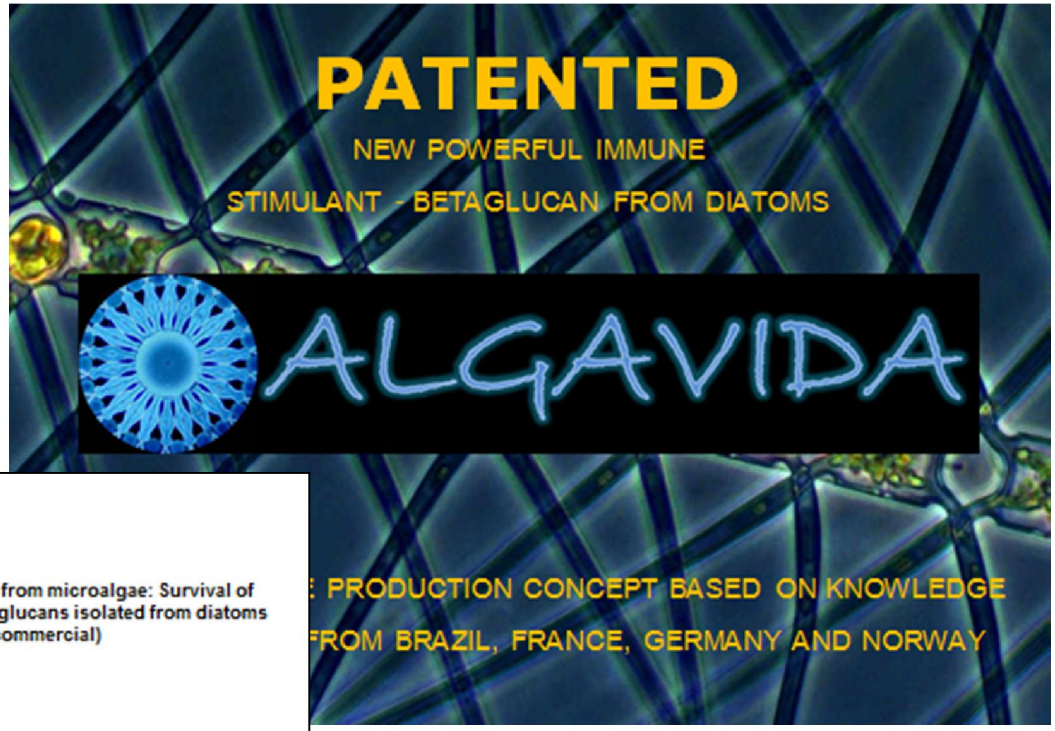
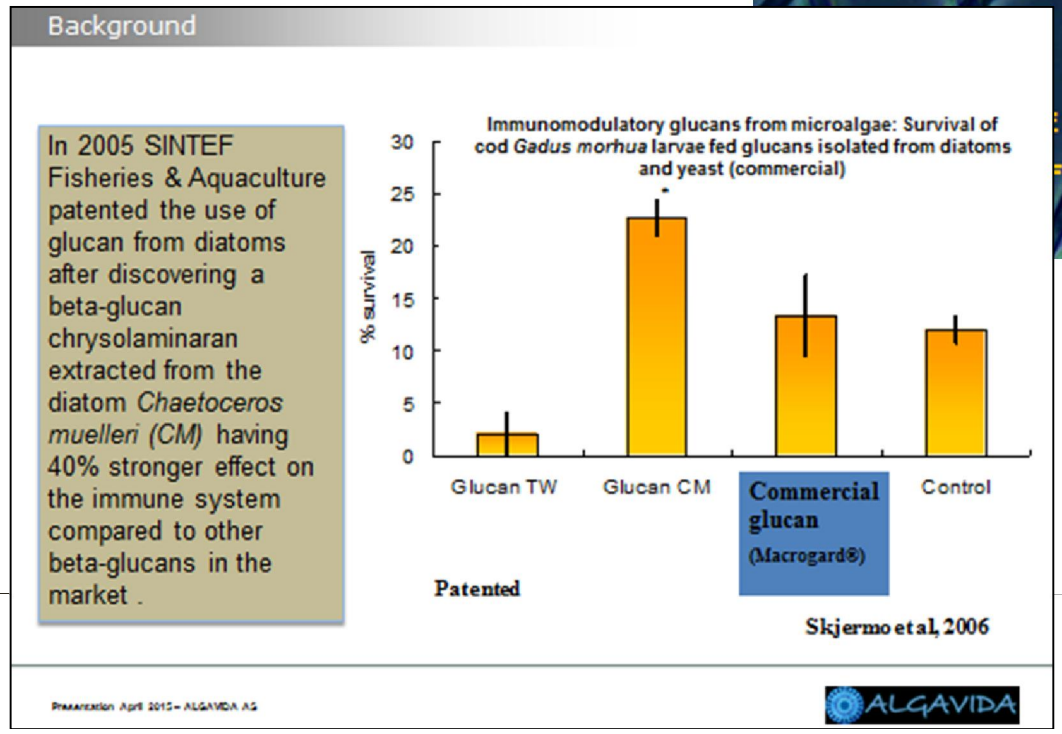
WP 3. Evaluate the market and techno-economic performance of marine aquaculture





This work is supported by Innovation Norway

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WP 4: *Adaptive capacity of developing marine aquaculture in Brazil*

- A special emphasize will be given to evaluate and compare the potential for a *Triple helix* system of interaction between government bodies, academia and industrial players.
- Task ; *Evaluate and compare status and potential models for **innovation** in marine aquaculture and facilitate knowledge transfer between Brazil and Norway*

  Discuss and evaluate quantitative scenarios and models for marine aquaculture possibilities in Brazil.
- *Data: A) Industry B) Governmental bodies C) Academia /Research capacity*

  Workshops in Brazil and Norway

  Structured Interviews to key players in Brazil

  Identify further interest and potential for joint research and cooperation

Thank you!

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