

”The successful Ocean Rainforest in the Faroe Islands“

By Urd Grandorf Bak, MSc, R&I manager, Ocean Rainforest Sp/F

Nordregio Forum 2018

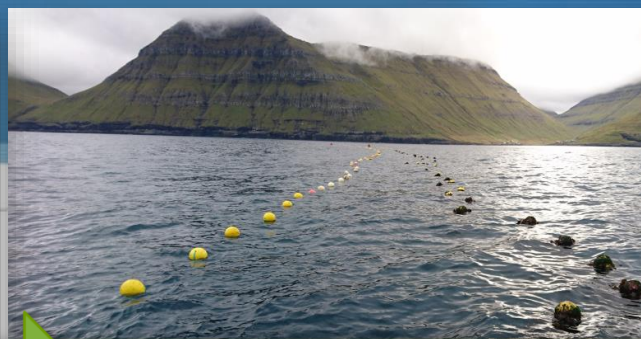
Ocean Rainforest's seaweed cultivation



Seeding



Deployment



Growth at sea, monitoring and inspection



Harvesting



Storage Stable Intermediate



Cascading Extraction



Ensilage




Frozen

Dried



B2B

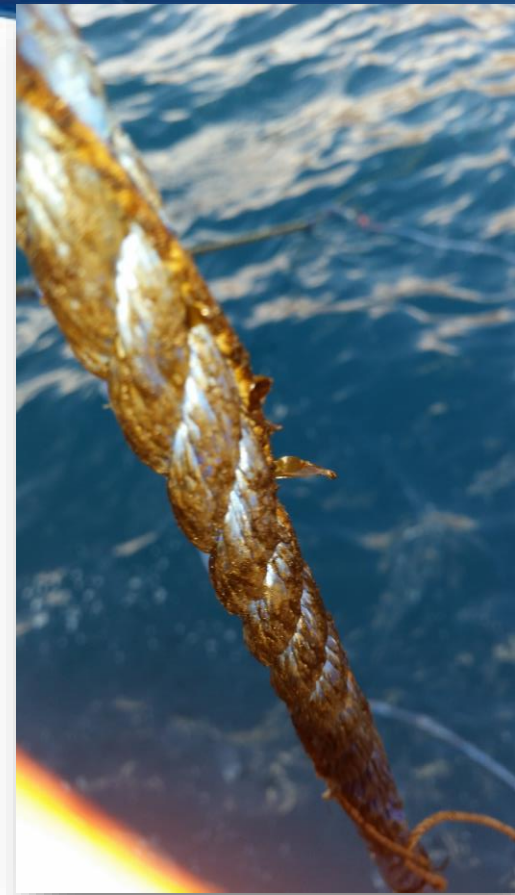




“The potential for providing large quantities of food and biomass from macroalgae mariculture is much larger than for any other group of marine organisms.”

Source: Science Advice for Policy from European Academies (SAPEA) is a consortium involving more than 100 European science academies, established to provide evidence-based advice to the European Commission on major policy issues. Its first report, “Food from the Oceans”, was published at the end of 2016.

High yield in comparison

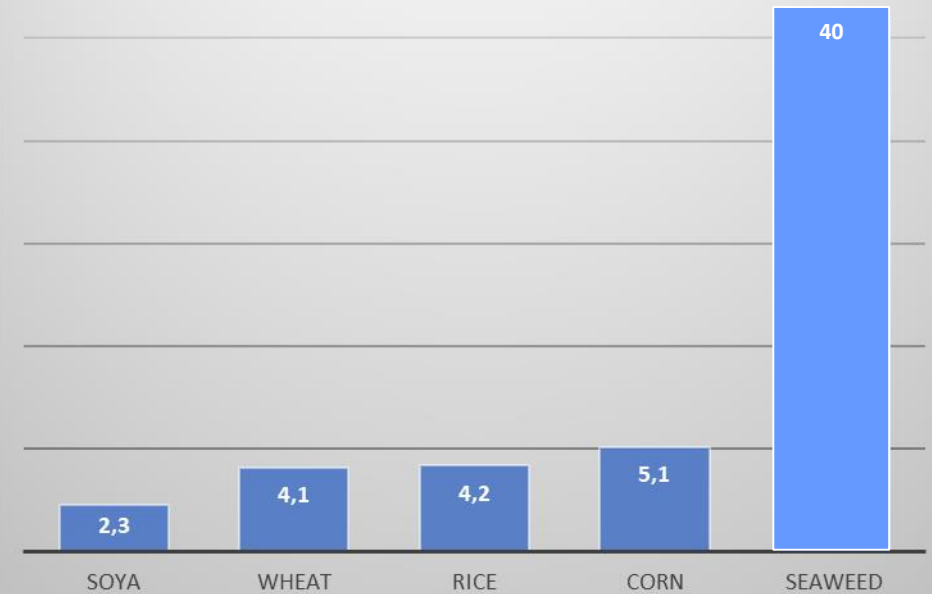


February



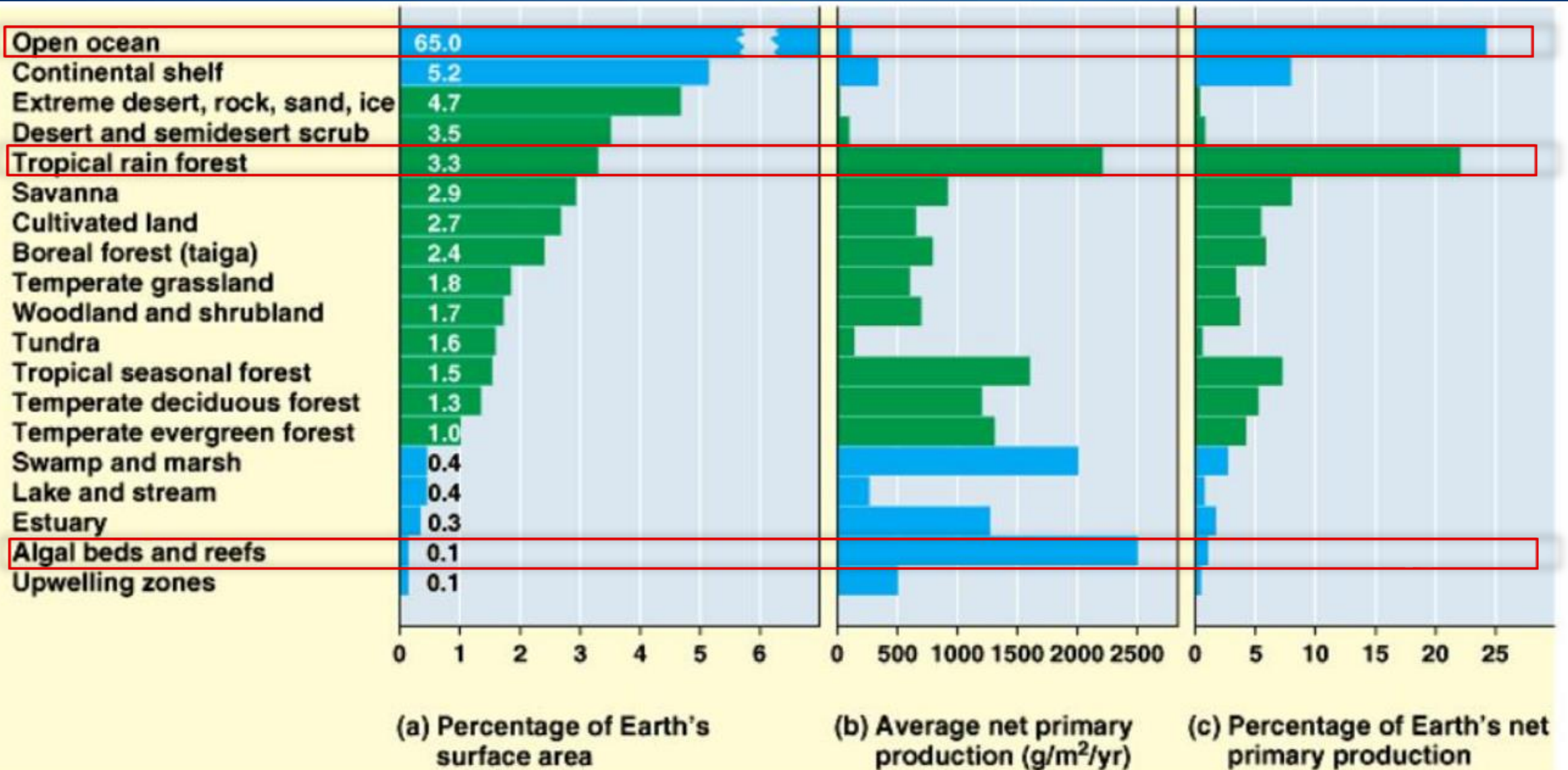
May

Output per area of various crops in tonnes/ha



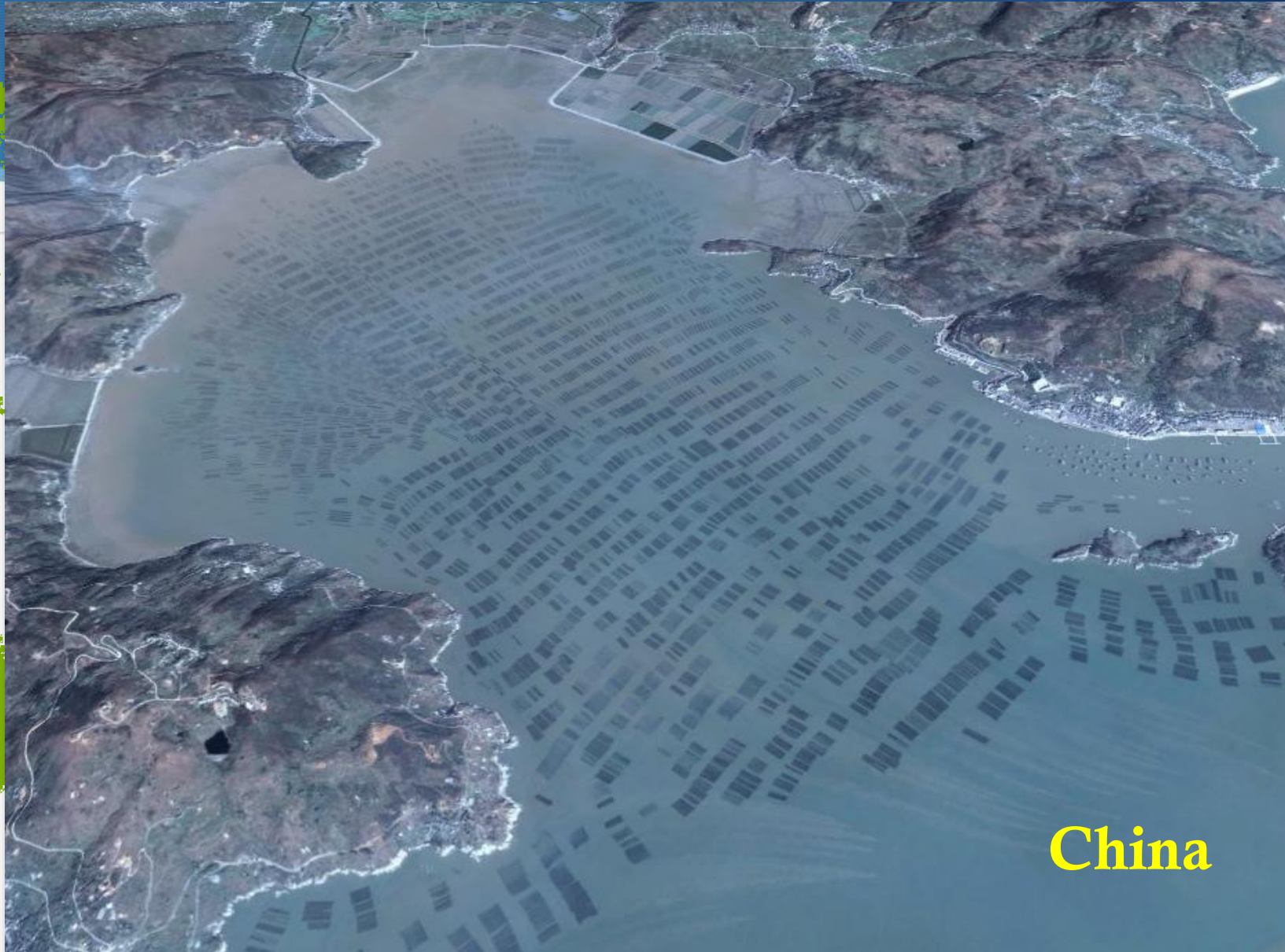
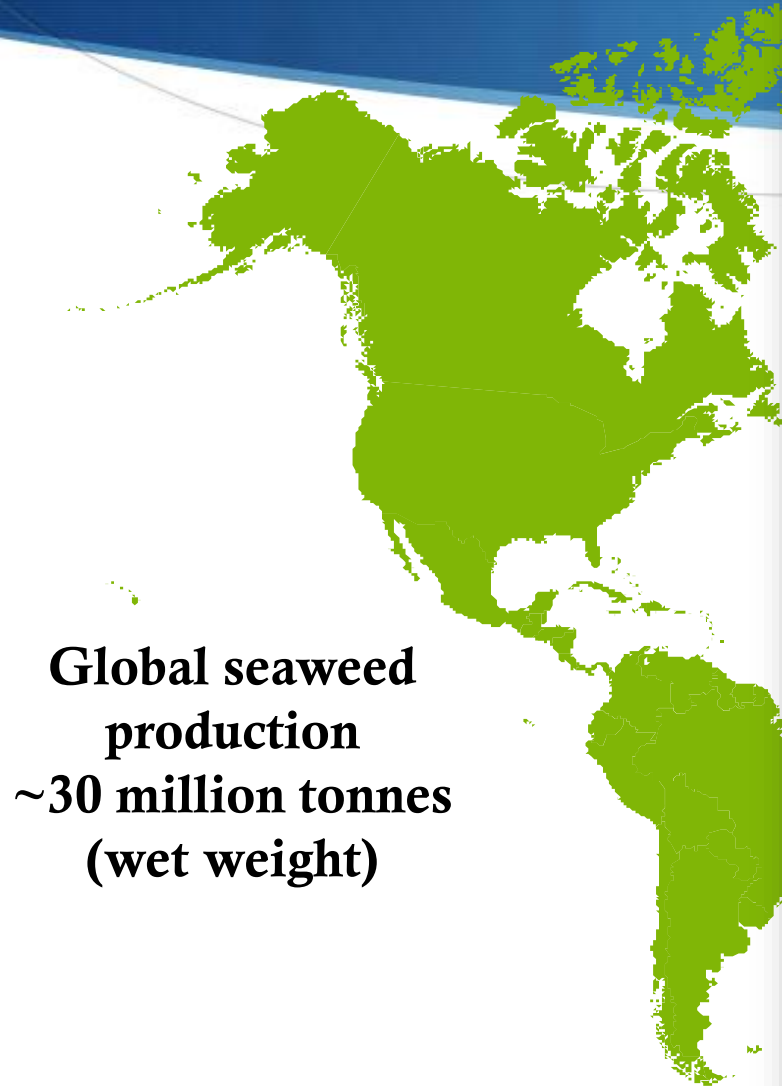
The most disruptive trends in the sector



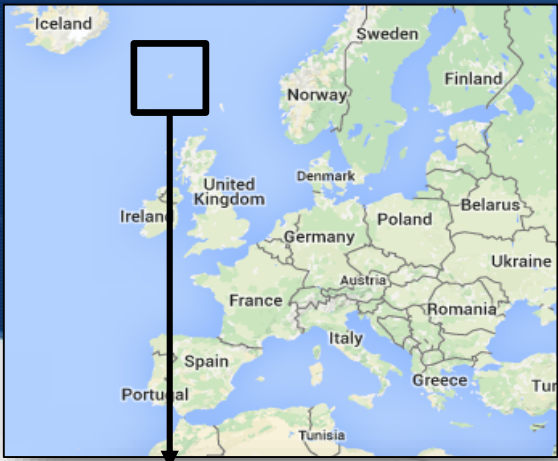


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Cultivation of seaweed is big in Asia



New Opportunities Offshore



- Water depth: 50-70 meters
- Water temperature: 7-11 °C
- Salinity: approx. 35 ‰
- Current: 1-3 knots
- Max. wave height: 8 meters
- Max. wind speeds: 62 m/s

Key issues for commercial seaweed harvesting and processing

Survivability

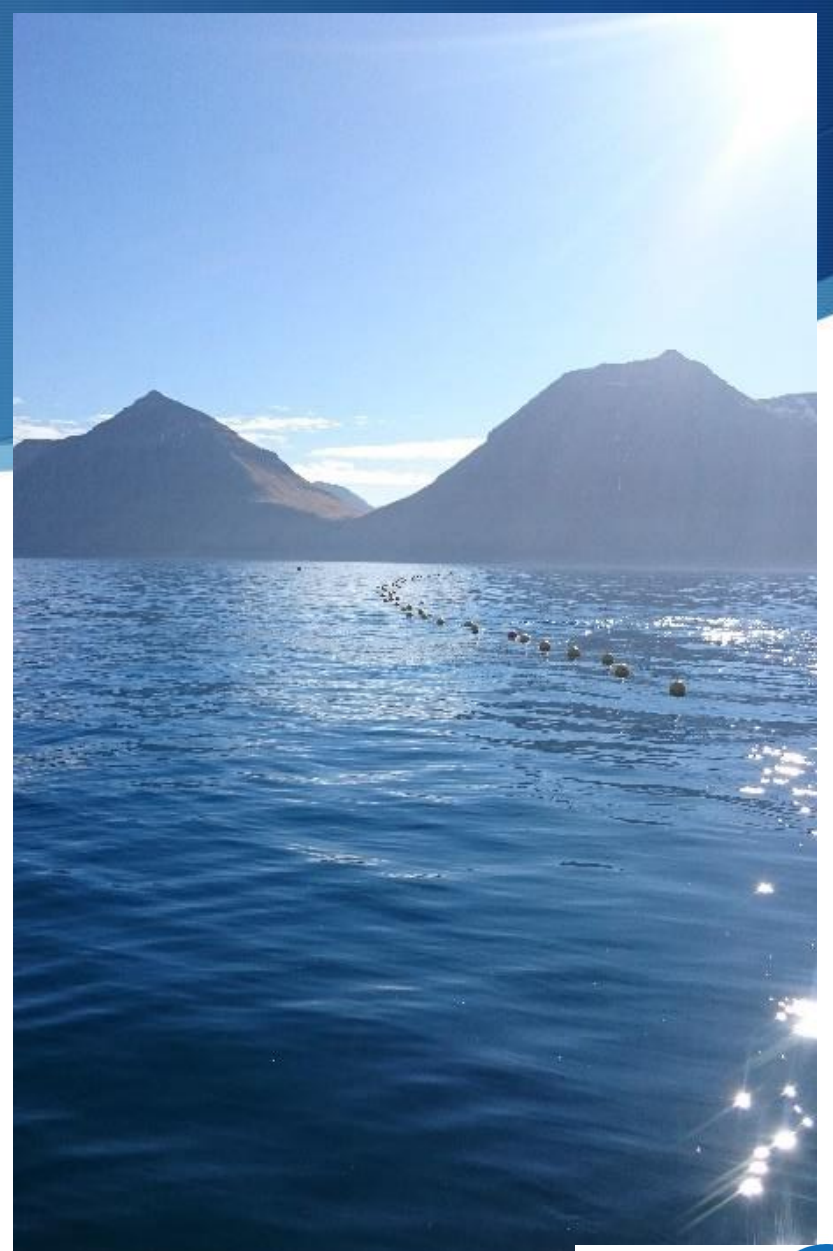
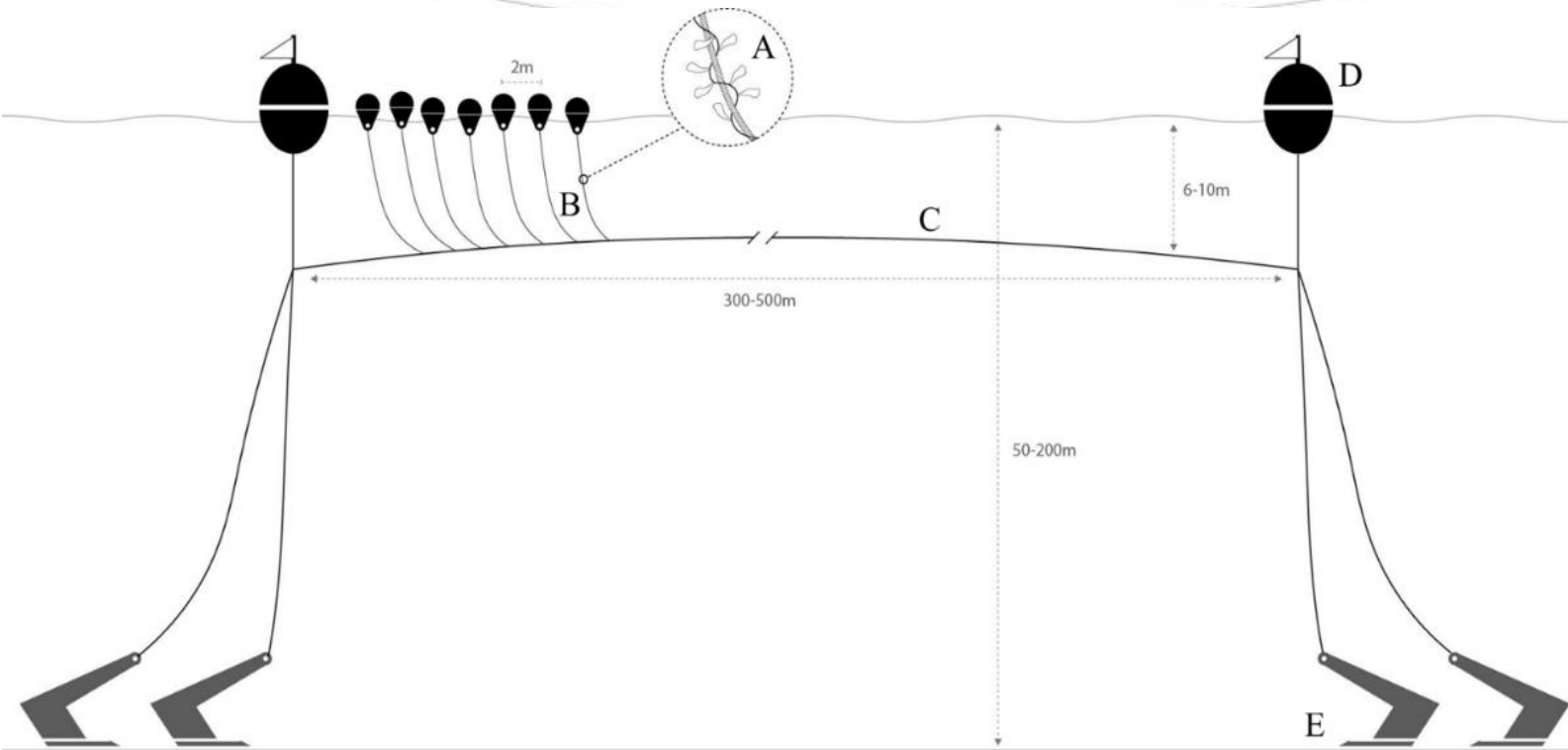
Scalability

Sustainability

Predictability

Profitability

The MacroAlgal Cultivation Rig (MACR)



Publication in Algal Research: Bak et al. (2018) “Production method and cost of commercial-scale offshore cultivation of kelp in the Faroe Islands using multiple partial harvesting”

Systems and space at sea



Scalability



CO₂ uptake



Reduces global heating and acidification of the oceans



No use of fresh water, land or fertilizers



Provides bioremediation (take up nitrogen and phosphorus)



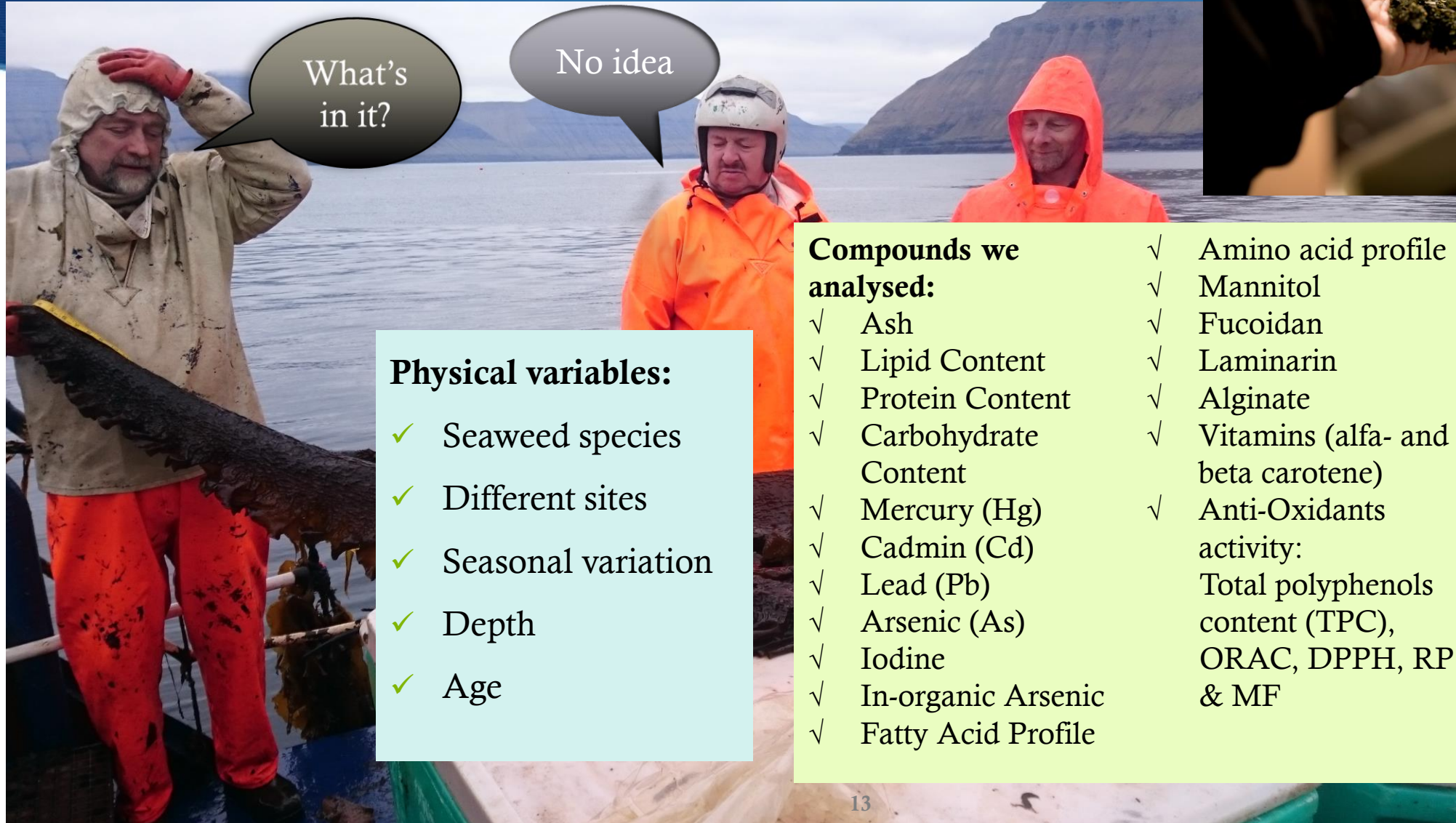
Create ecosystems



Provides habitat for fish and other marine life



Chemical composition of the seaweed



What's in it?

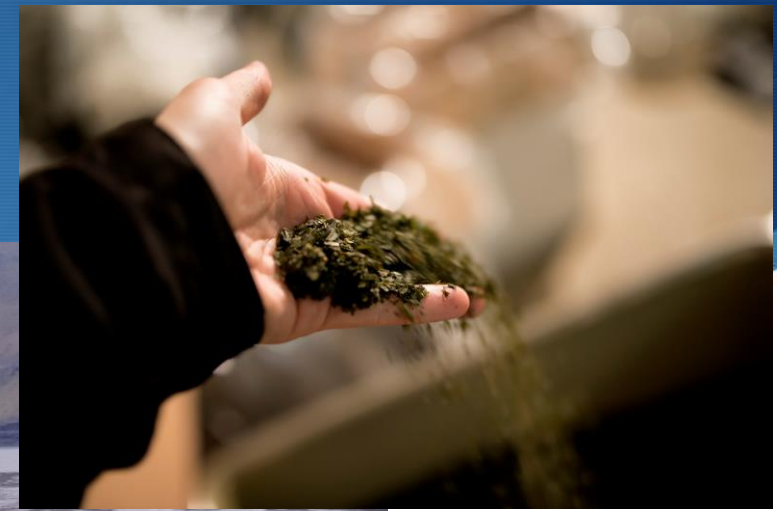
No idea

Physical variables:

- ✓ Seaweed species
- ✓ Different sites
- ✓ Seasonal variation
- ✓ Depth
- ✓ Age

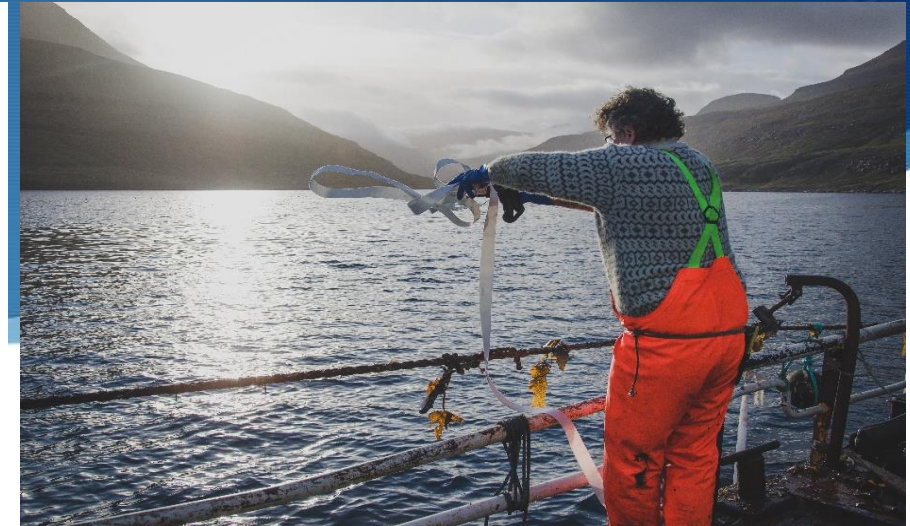
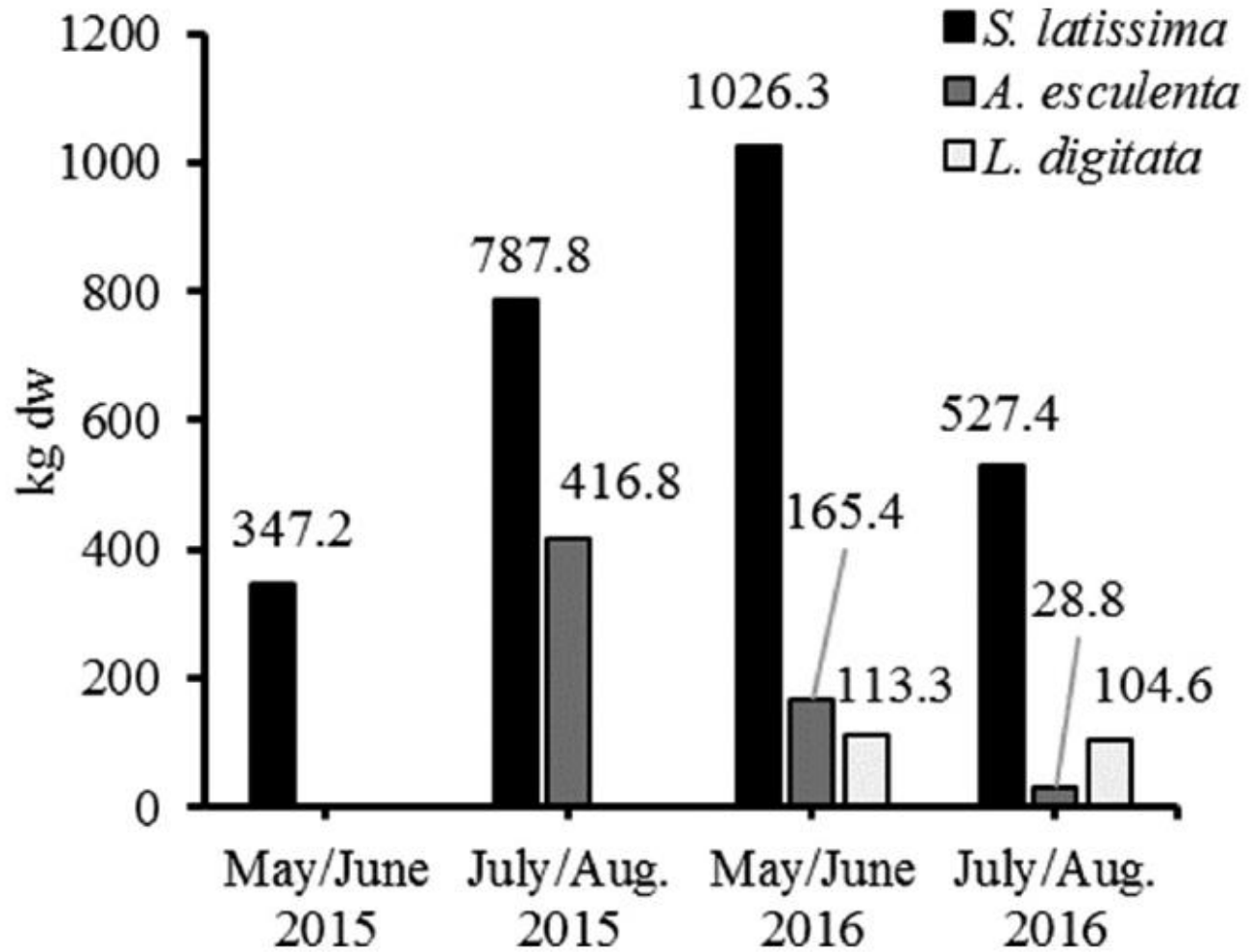
Compounds we analysed:

- ✓ Ash
- ✓ Lipid Content
- ✓ Protein Content
- ✓ Carbohydrate Content
- ✓ Mercury (Hg)
- ✓ Cadmin (Cd)
- ✓ Lead (Pb)
- ✓ Arsenic (As)
- ✓ Iodine
- ✓ In-organic Arsenic
- ✓ Fatty Acid Profile
- ✓ Amino acid profile
- ✓ Mannitol
- ✓ Fucoidan
- ✓ Laminarin
- ✓ Alginate
- ✓ Vitamins (alfa- and beta carotene)
- ✓ Anti-Oxidants activity:
Total polyphenols content (TPC),
ORAC, DPPH, RP & MF



Predictability

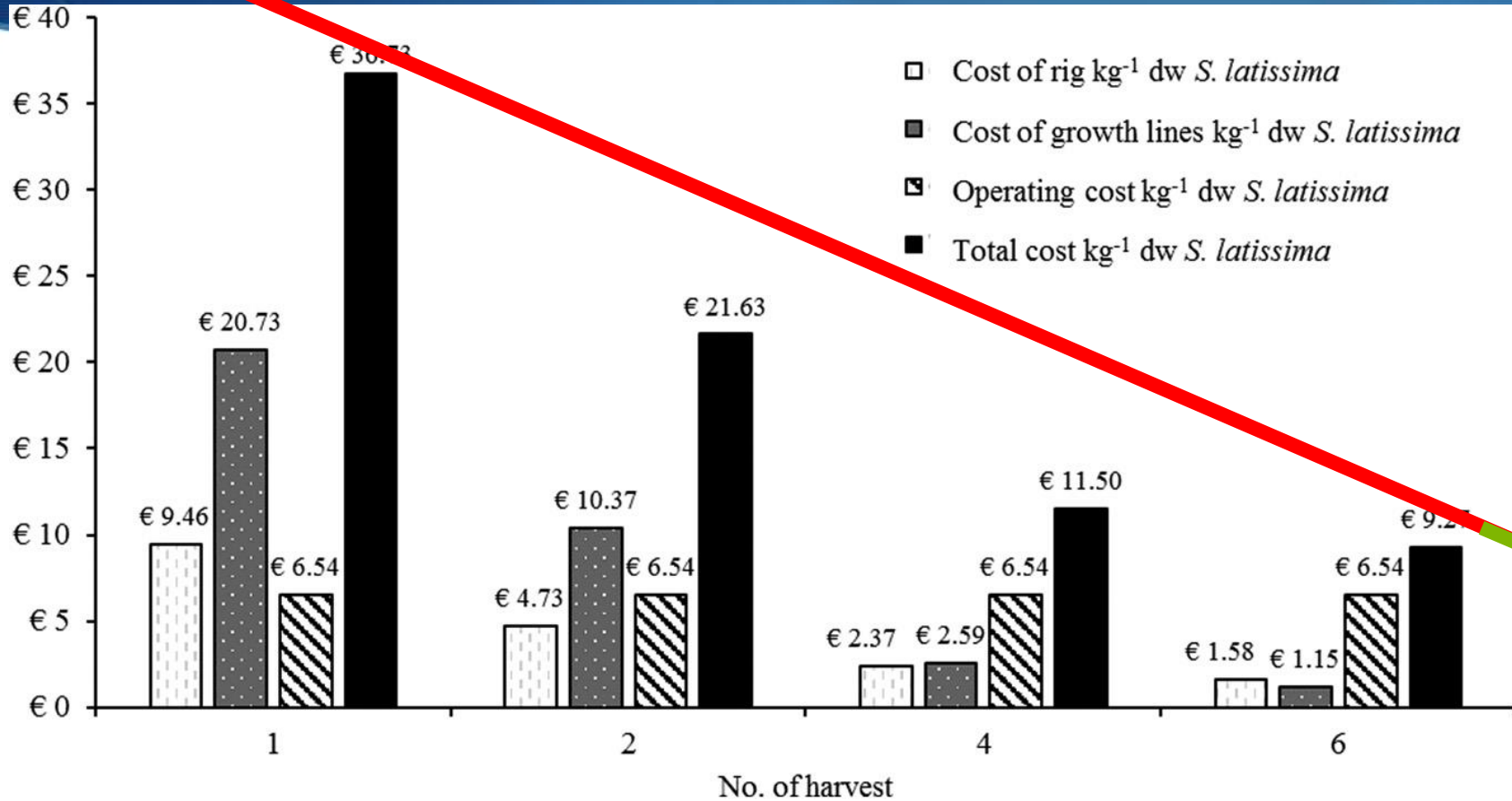




Predictability

Publication in Algal Research: Bak et al. (2018) "Production method and cost of commercial-scale offshore cultivation of kelp in the Faroe Islands using multiple partial harvesting"

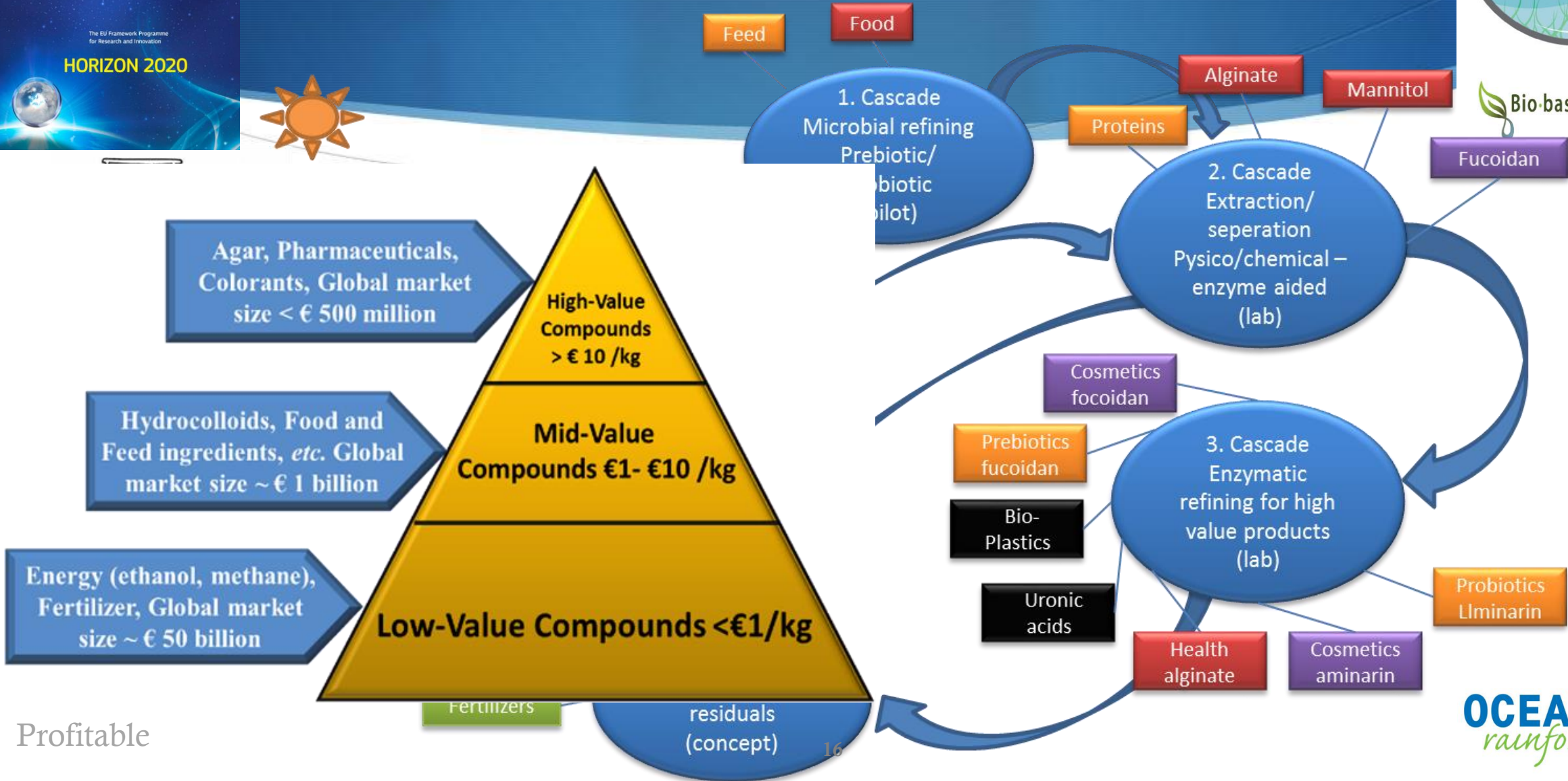
Lowering cost of production



Profitable

Publication in Algal Research: Bak et al. (2018) "Production method and cost of commercial-scale offshore cultivation of kelp in the Faroe Islands using multiple partial harvesting"

The bio-refinery approach



Profitable

LOLIWARE™

1,5-2 million tons of seaweed
50.000 tons of alginate
LOLIWARE LEAVES NOTHING BEHIND.



OUR PRODUCT

LOLIWARE started with the first and only edible disposable cup. We provided a completely new experience, 100% plastic-free, gluten-free, gelatin-free, BPA-free, non-GMO, all natural, non-toxic, safe, and FDA approved, LOLIWARE Cups and Straws. Our products are made from a biodegradable material so natural you can eat it.

LOLIWARE is made from seaweed, organic sweeteners and flavors and colors derived from fruits and vegetables. Serve room temperature, chilled, or frozen drinks and desserts.

17 LOLIWARE can be found at the Four Seasons Hotel, or through Aramark, caterers and

Exclusive Economic Zone Faroe Islands 260.996 km²





Faroese Export value in million €



Fishery



Salmon



Seaweed

Faroese Salmon production	70.000 tonnes (ww) per year
Nutrients release (per year)	3500 tonnes N 700 tonnes P
4 kg N uptake per tonne seaweed (ww)	1 mio. tonnes seaweed per year
Total emission of CO ² in the Faroes	870.000 tonnes C
25 tonnes seaweed (ww) bind 1 T CO ²	21.8 mio. tonnes (ww) seaweed
MACR: 4000 tonnes (ww)/km ²	5450 km ² or 2 % of EEZ
LOLIWARE	2 mio. T (ww) seaweed / yr ~0.2% EEZ
Average price €4400-13200/T alginate	€220-660 million

Data for year 2016 was used in all calculations
 Alginate price: Stefan Kraan / FAO

High Local Impact

- 🟢 Job creation
- 🟢 Attractive for experts in the field
- 🟢 Training and internship
- 🟢 Knowledge transfer





Hult Prize
@hultprize

Follow

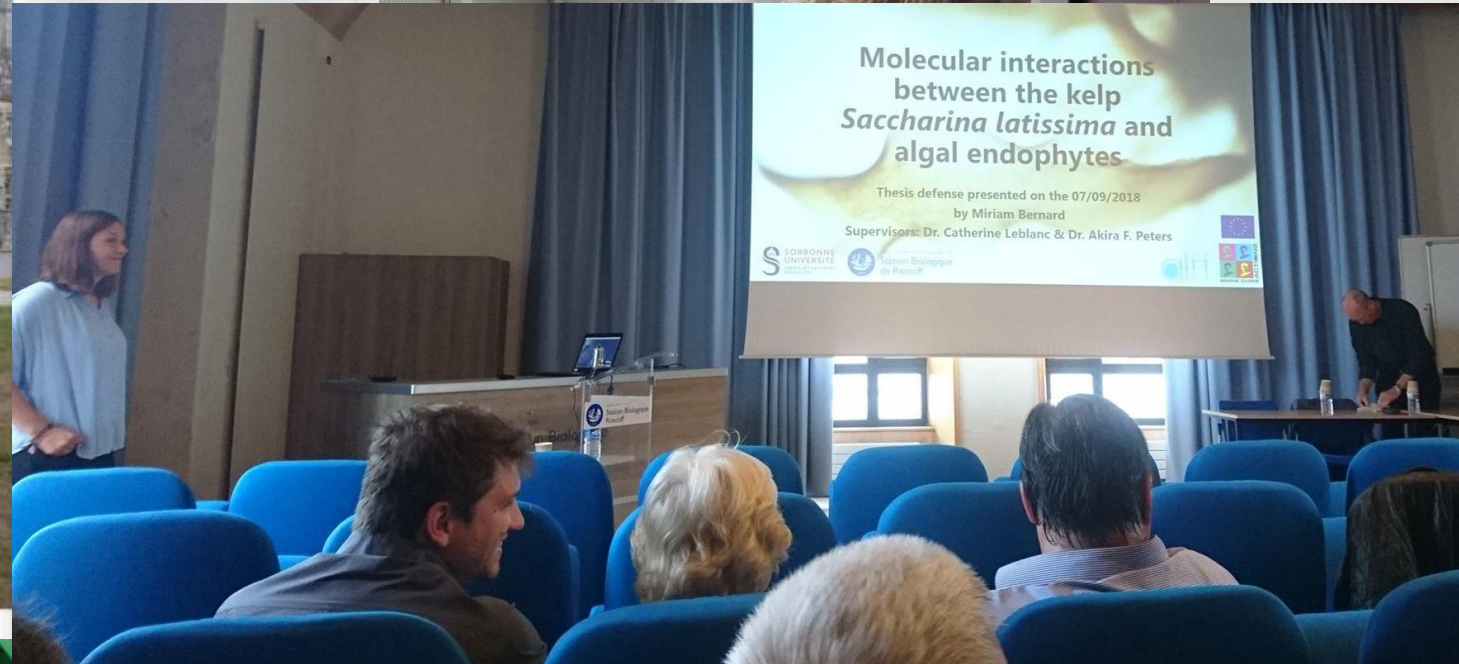
Team PHYTA from @UNC spent 6 weeks in our castle at the world's largest Accelerator Program 🏰 ✨ and today, is one of the 6 finalists out of 42 competing teams that will get to pitch their idea at the @UnitedNations for the chance to win 1 million USD.

ernship

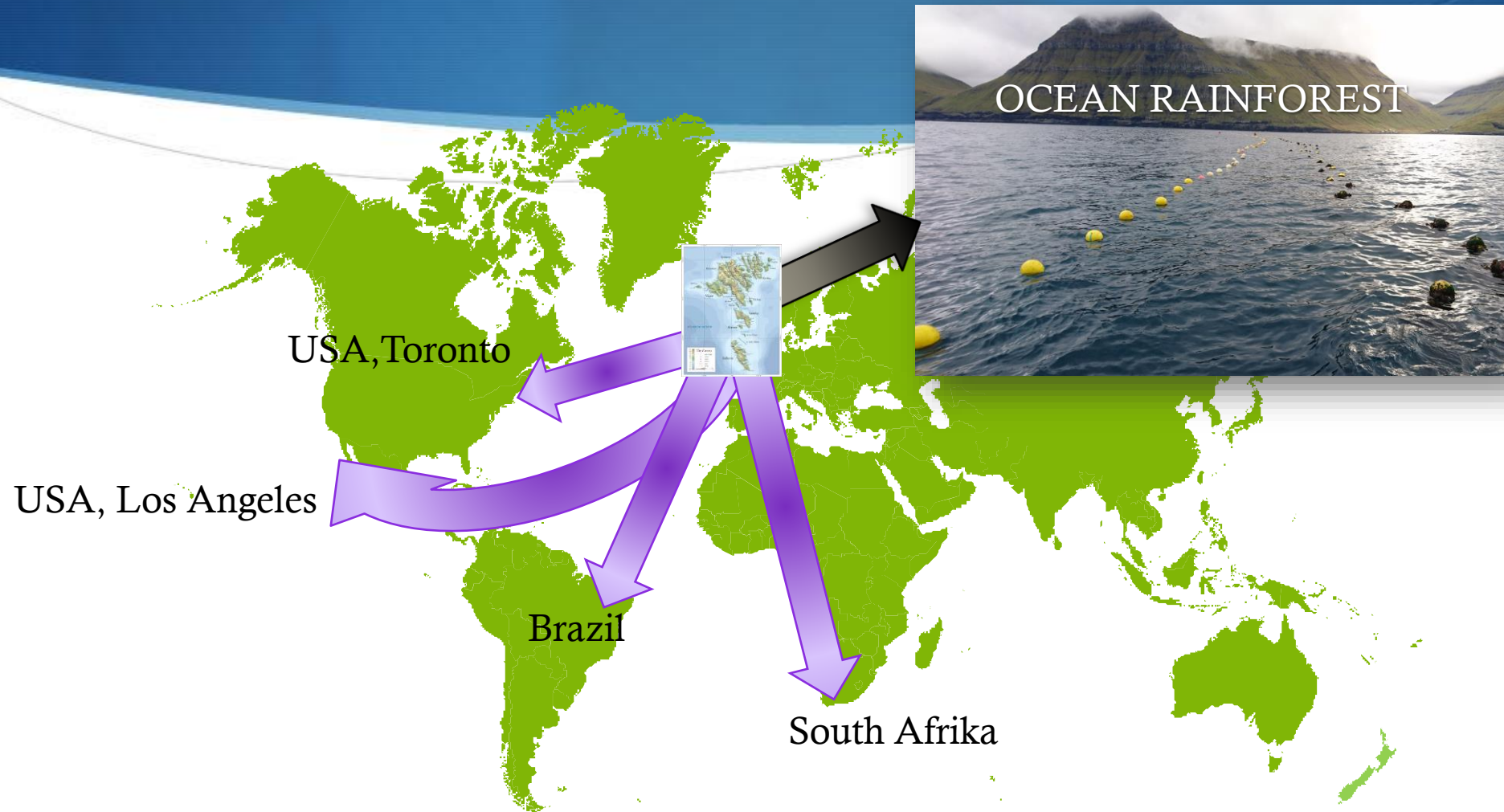
Elizia
Gilling
Scienc



ard, PhD at Station Biologique de Roscoff - CNRS



Knowledge transfer



Acknowledgement



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urd@oceanrainforest.com

Global production of macroalgae & market assessments

The global commercial seaweeds market:
 2015: >€10 billion
 2024: >€20 billion

Agar, Pharmaceuticals,
 Colorants, Global market
 size < € 500 million

Hydrocolloids, Food and
 Feed ingredients, etc. Global
 market size ~ € 1 billion

Energy (ethanol, methane),
 Fertilizer, Global market
 size ~ € 50 billion

