

molo®

molofeed.no



Innovation, sustainability, Ocean & aquaculture – what is in the horizon of our industry?

Marcell Boaventura
Group CEO - Molofeed



Who we are

- New and patented Microencapsulation technology
- Access to novel ingredients within our ecosystem
- We offer the next generation of marine larval nutrition



molo[®]



AquaSpark
> Investing in the Future of Aquaculture

FARVATN
venture

GLASTAD

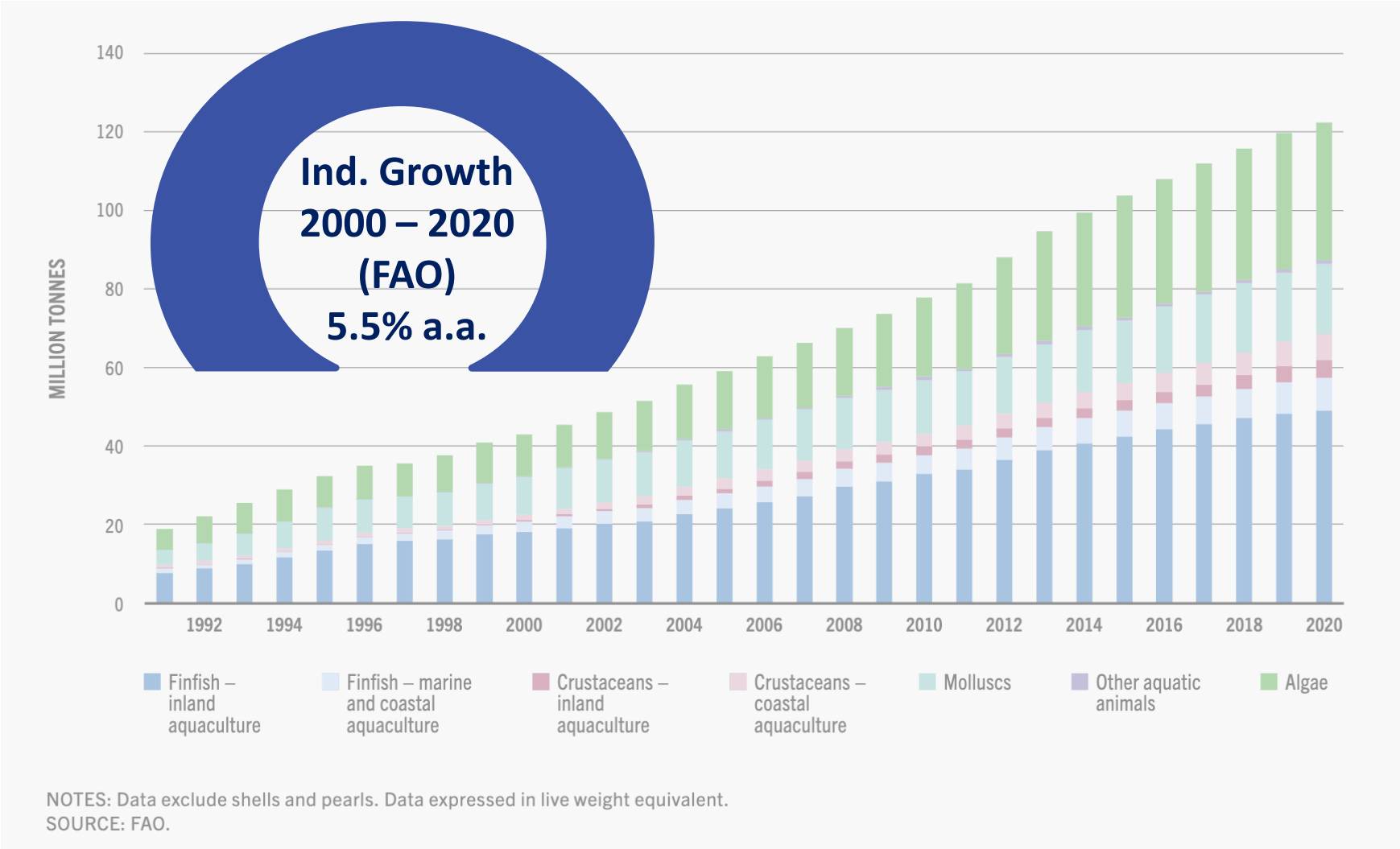
momentum[®]



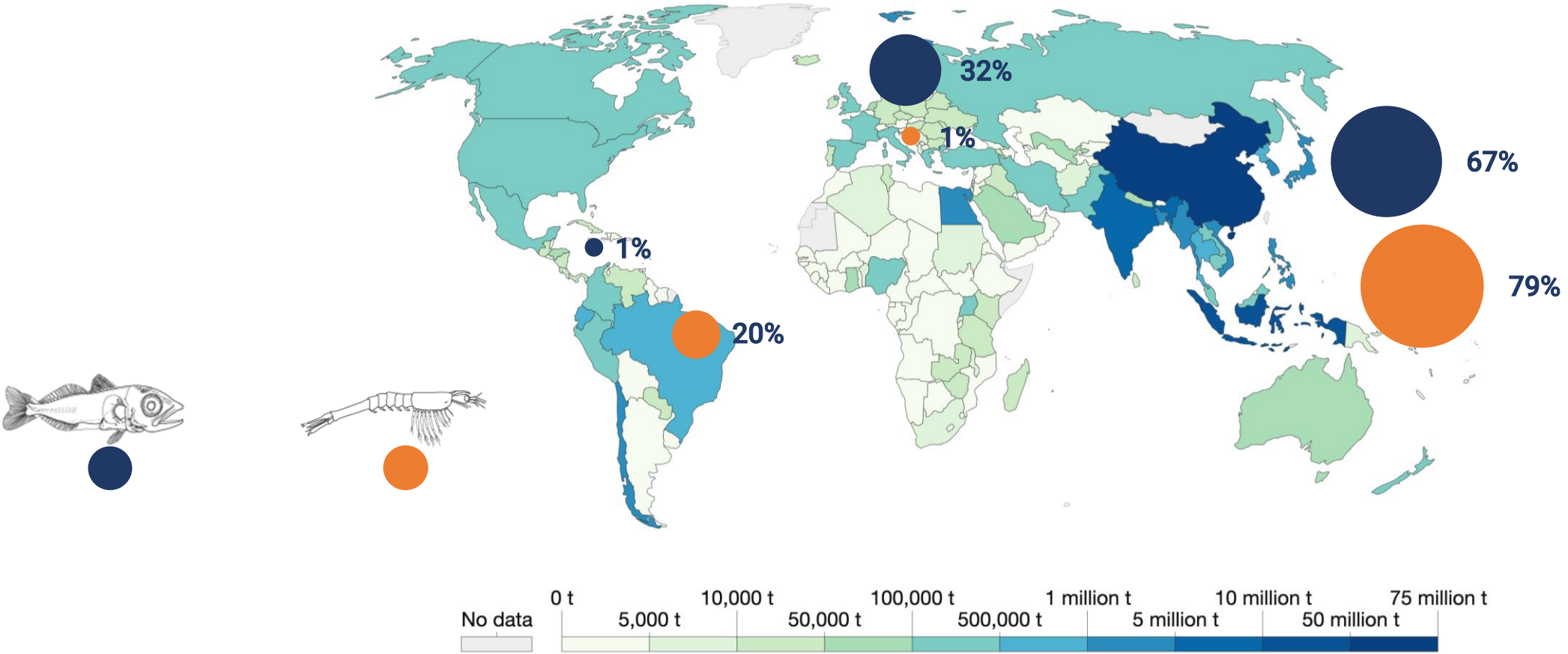
Bergen



Industry Growth - Aquaculture



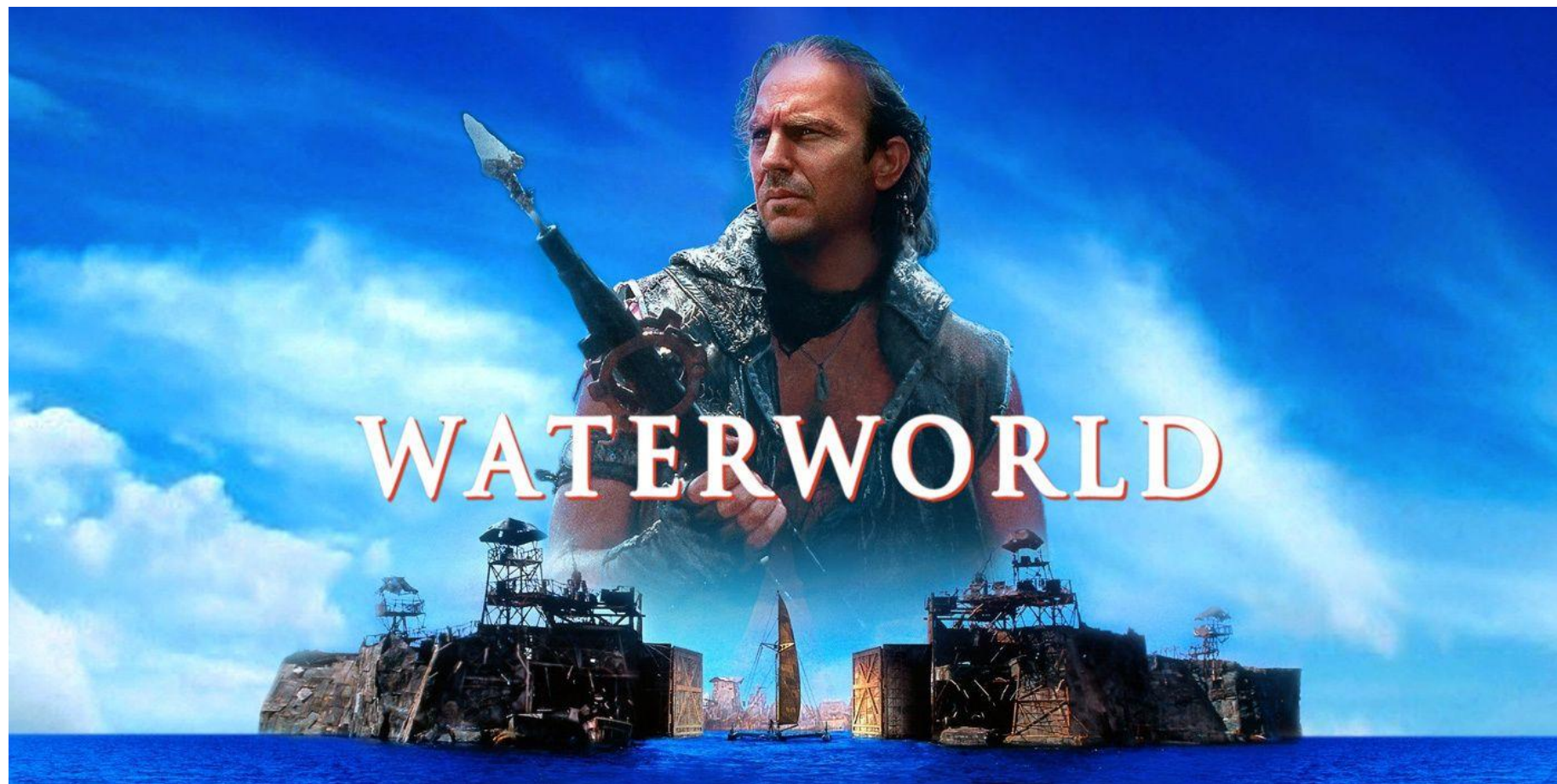
Industry Growth - Aquaculture



Source: Food and Agriculture Organization of the United Nations (via World Bank)

OurWorldInData.org/seafood-production • CC BY

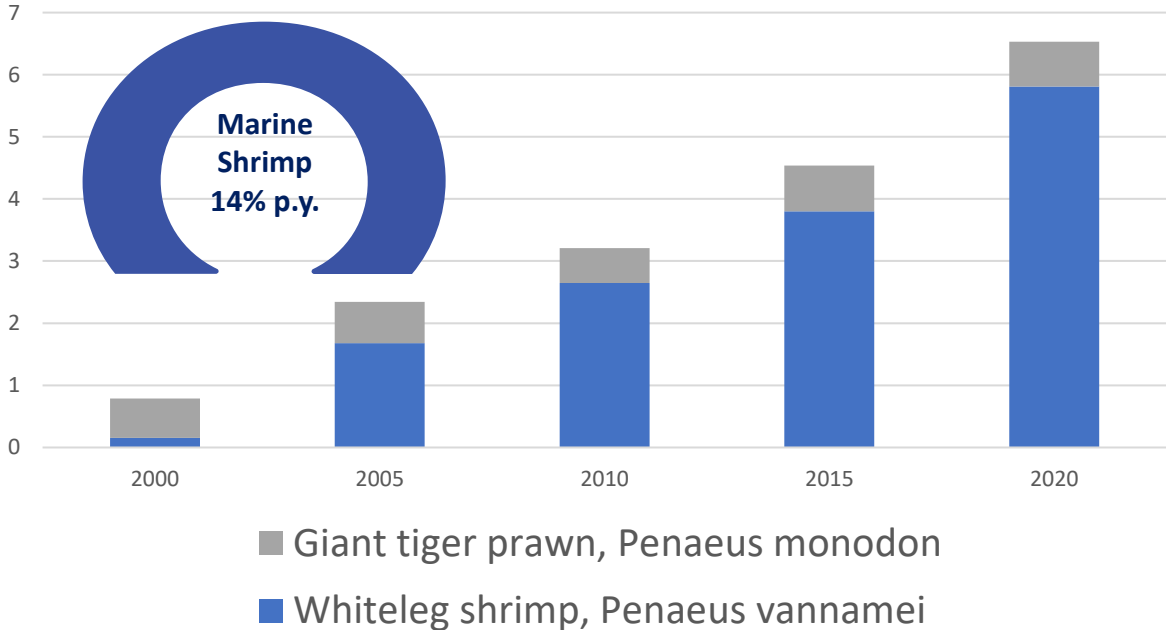
Industry Growth – How?



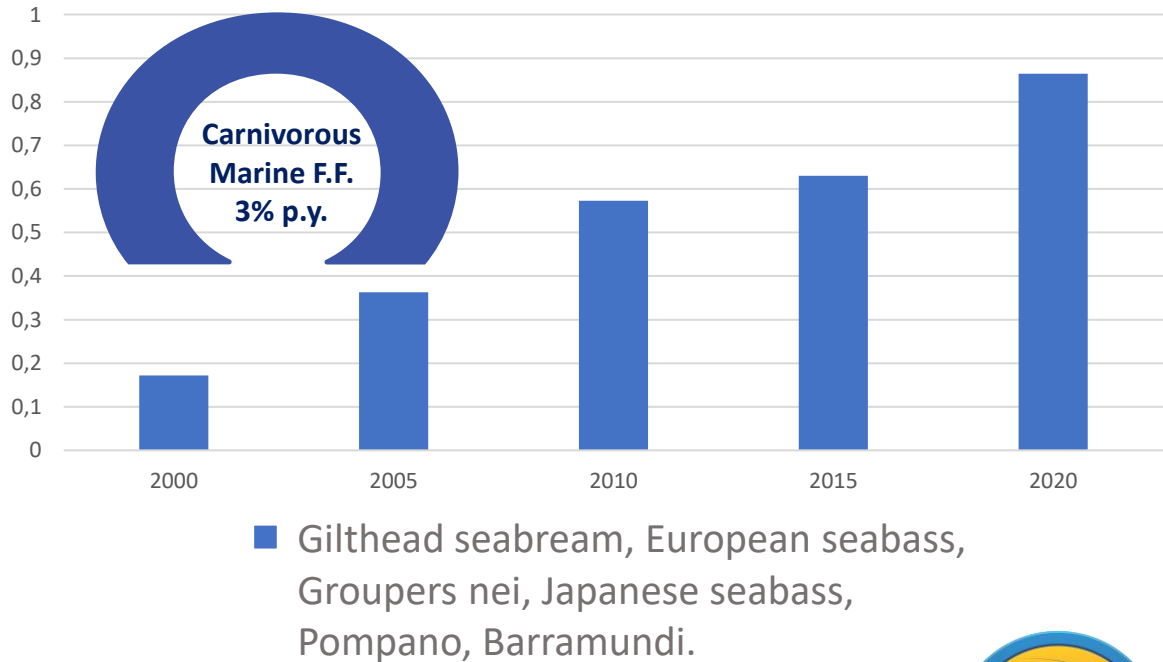
The ocean
holds
humankind
food security.

Industry Growth - Marine

World Production of Marine Shrimp – Million Tons

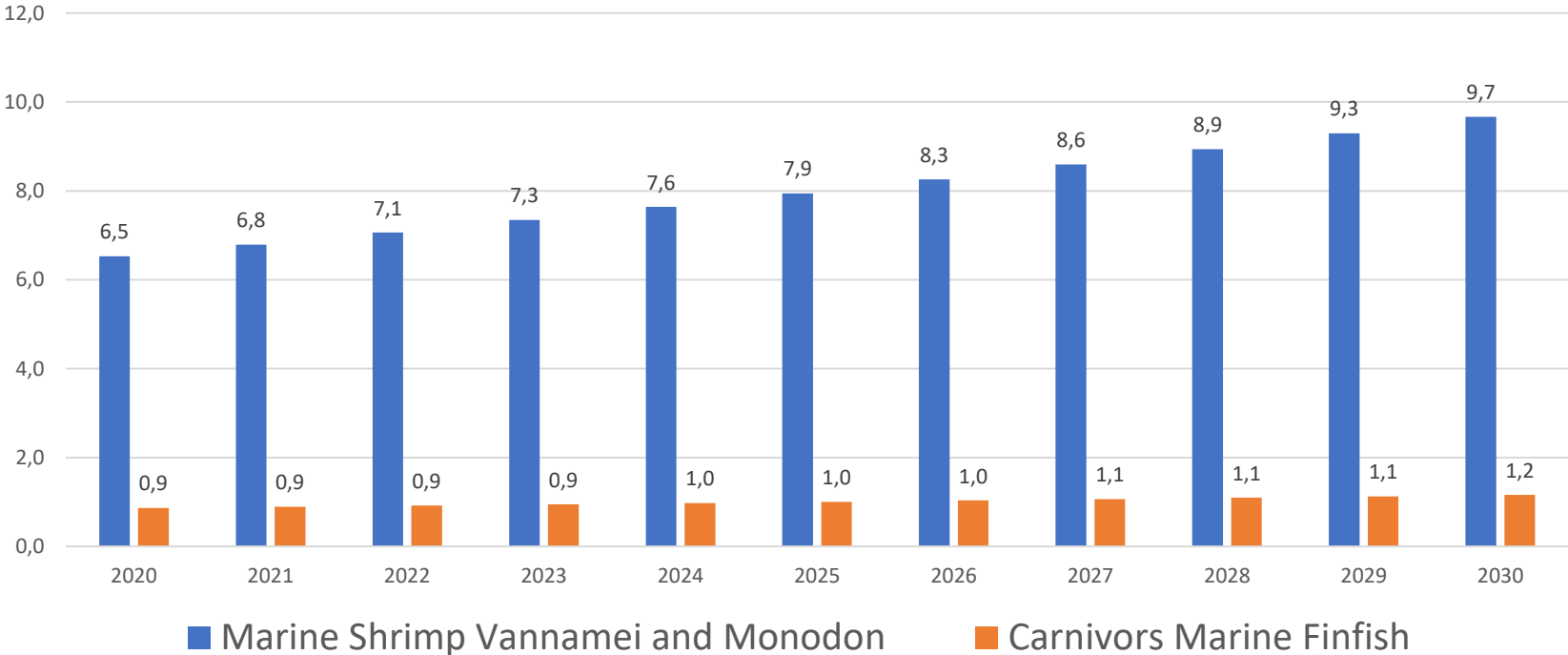


World Production of Carnivorous Marine Finfish - Million Tons



Industry Growth – Projection to 2030

World Production of Marine Shrimp and Marine Carnivorous Finfish (2030 PROJECTION) – Million Tons

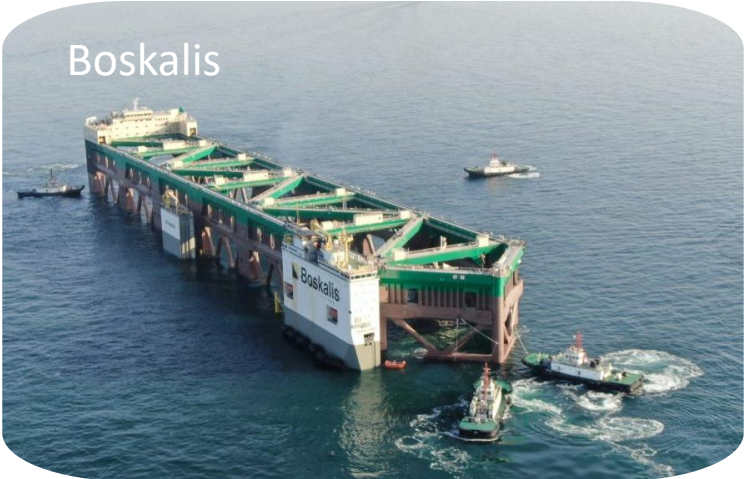


Marine Shrimp Grow 48% by 2030

Marine C. Finfish Grow 34% by 2030

Innovations to Unleash Sustainable Growth

- Offshore farming
- Inland RAS



Diseases

- AHPND caused US\$ 44 billion in losses between 2010 and 2016⁽¹⁾.
- Antibiotic use in Aquaculture to rise 33% globally by 2030⁽²⁾.



SOURCES:

1-Valente, C.D.S, Wan, A.H.L., 2021. *Vibrio* and major commercially important vibriosis diseases in decapod crustaceans. *Journal of Invertebrate Pathology* 181 (2021), 107527.

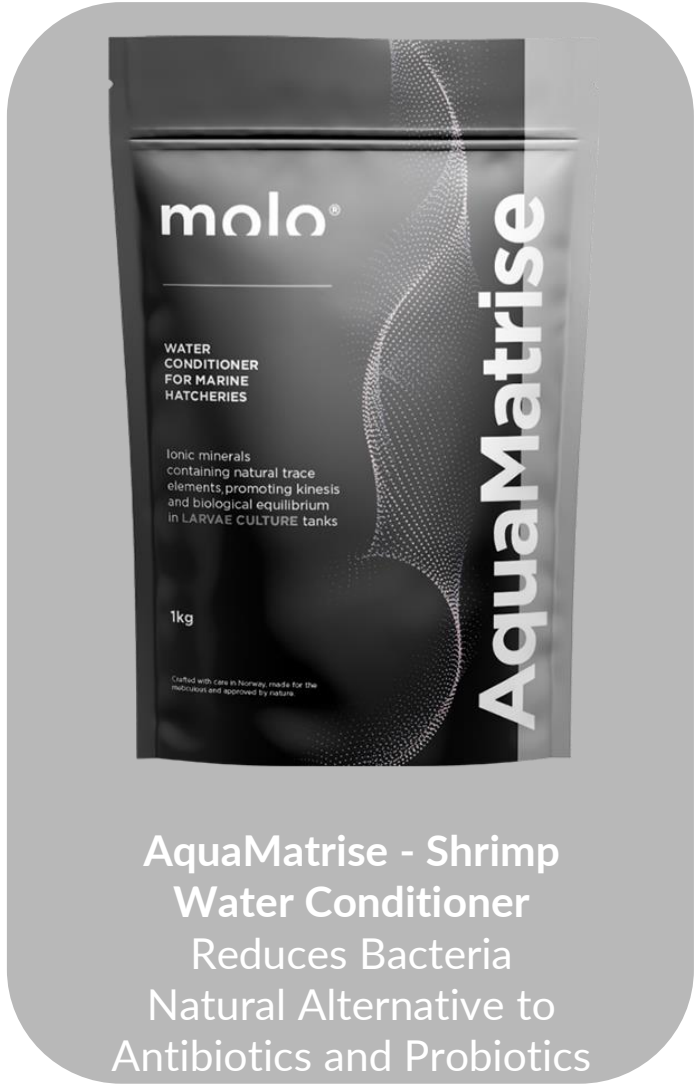
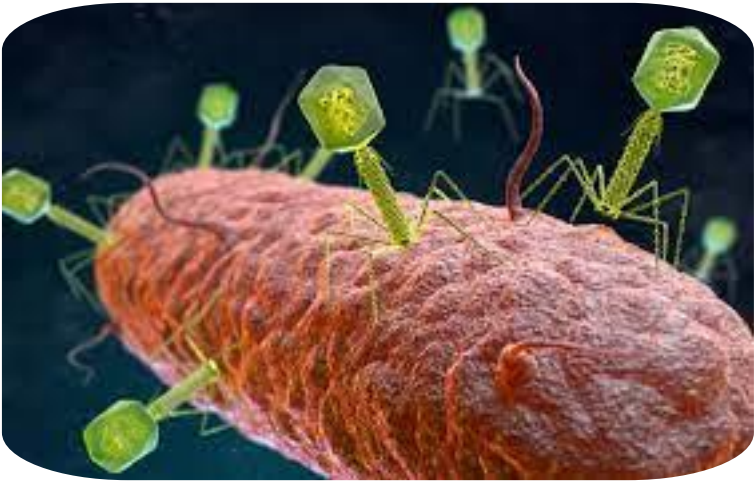
2-Schar, D., Klein, E.Y., Laxminarayan, R., Gilbert, M., Van Boeckel, T.P., 2020. Global trends in antimicrobial use in aquaculture. *Sci Rep* 10 (2020), 21878.

Innovations to De-medicate Aquaculture

- Bacteriophage
- Vaccines
- Alternatives to antibiotics



Proteon 
Pharmaceuticals



AquaMatrise - Shrimp
Water Conditioner
Reduces Bacteria
Natural Alternative to
Antibiotics and Probiotics



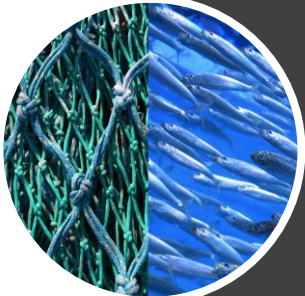
But products do not substitute best practices & nutrition!



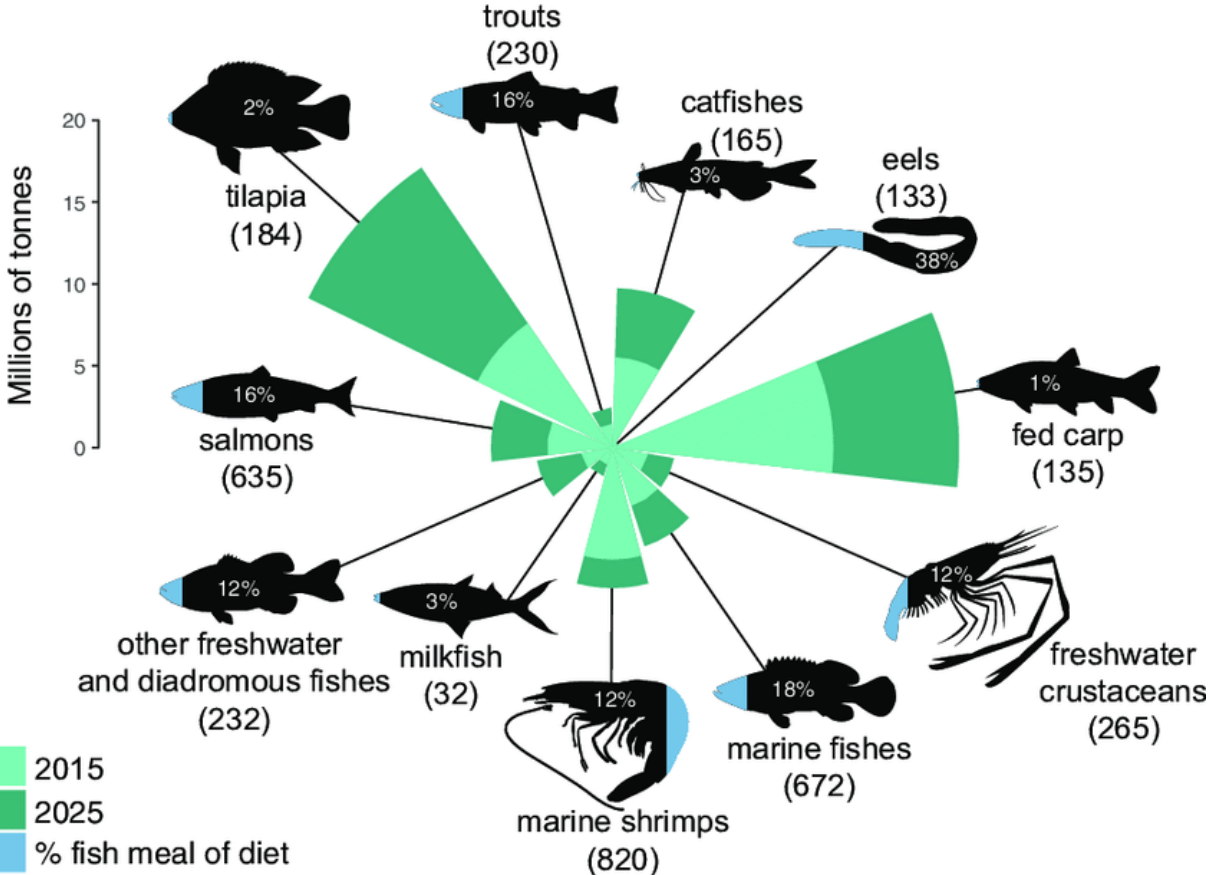
Ingredients



Global population will grow to 9.7 and a 70% increase in protein demand is expected by 2050.



Aquaculture can't expand while dependent on the usual and limited natural resources.



2015
2025
% fish meal of diet

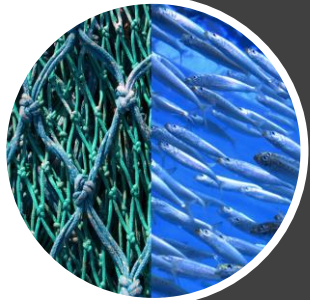
SOURCE: Hua, Katheline & Cobcroft, Jennifer & Cole, Andrew & Condon, Kelly & Jerry, Dean & Mangott, Arnold & Praeger, Christina & Vucko, Matthew & Zeng, Chaoshu & Zenger, Kyall & Strugnell, J.M.. (2019). The Future of Aquatic Protein: Implications for Protein Sources in Aquaculture Diets. One Earth. 1. 316-329. 10.1016/j.oneear.2019.10.018.



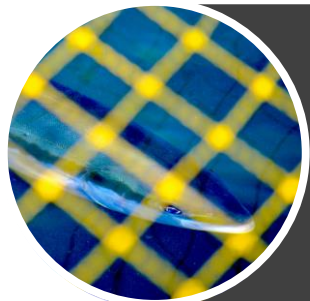
Ingredients



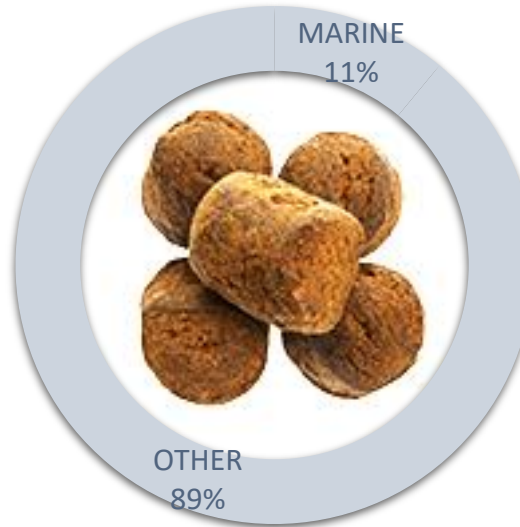
Global population will grow to 9.7 and a 70% increase in protein demand is expected by 2050.



Aquaculture can't expand while dependent on the usual and limited natural resources.



Straight substitution reduces ecological efficiency through animal welfare and diseases, impacts profitability, increase the need for antibiotics...



Aquafeeds⁽¹⁾:

2015: 35.5 million Tons

2020: 41 million Tons

FM and FO production^(2,3)

1997: 7 million Tons

2015: 5 million Tons

2020: 5 million Tons

SOURCES:

1-Alltech (2016) 'Alltech Global Feed Survey 2016'. Available at: <https://cdn2.hubspot.net>

2-Shepherd, C. and Jackson, A. (2013) J. Fish Biol., 83(4), pp. 1046-1066; Hunter, M. et al. (2017) BioScience, 67(4), pp. 386-391; Hua, K. et al. (2019) One Earth 1(3), pp. 316-329

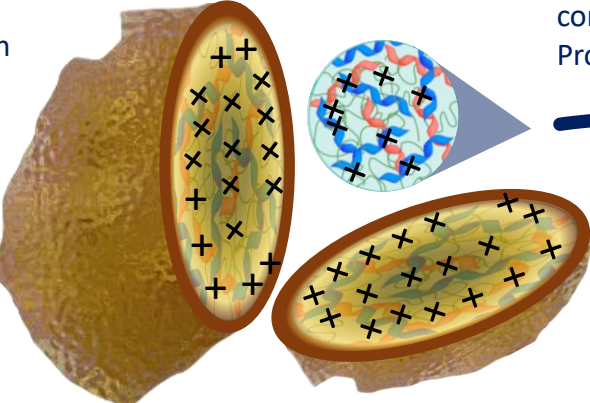
3-SEAFISH (2016) 'Fish Meal and fish oil facts and figures'. Available at: <https://www.seafish.org>

Ingredient Innovation

- Single-cell proteins
- Nutritional Programming



MOLOFEED
Microencapsulation
technology allows
inclusion



Larval diets
containing our Nut-
Pro stimuli (+)

Broodstock diets containing
Nut-Pro stimuli (+)

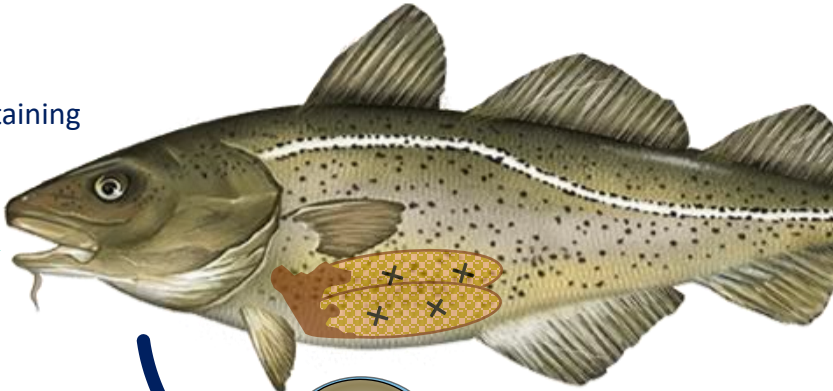
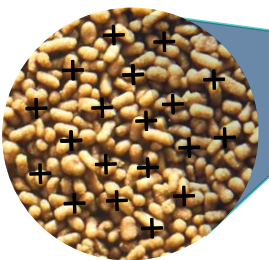
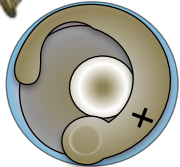


Image Credit: FishWatch.gov



Offspring gene
expression

Larval gene
expression

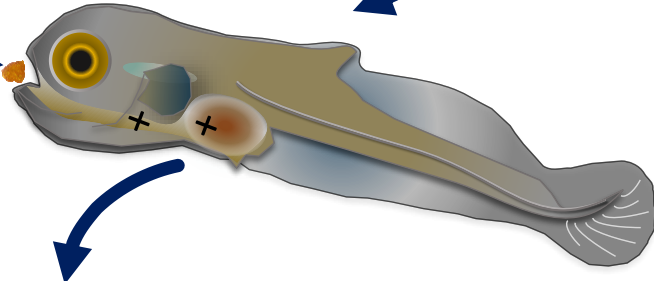


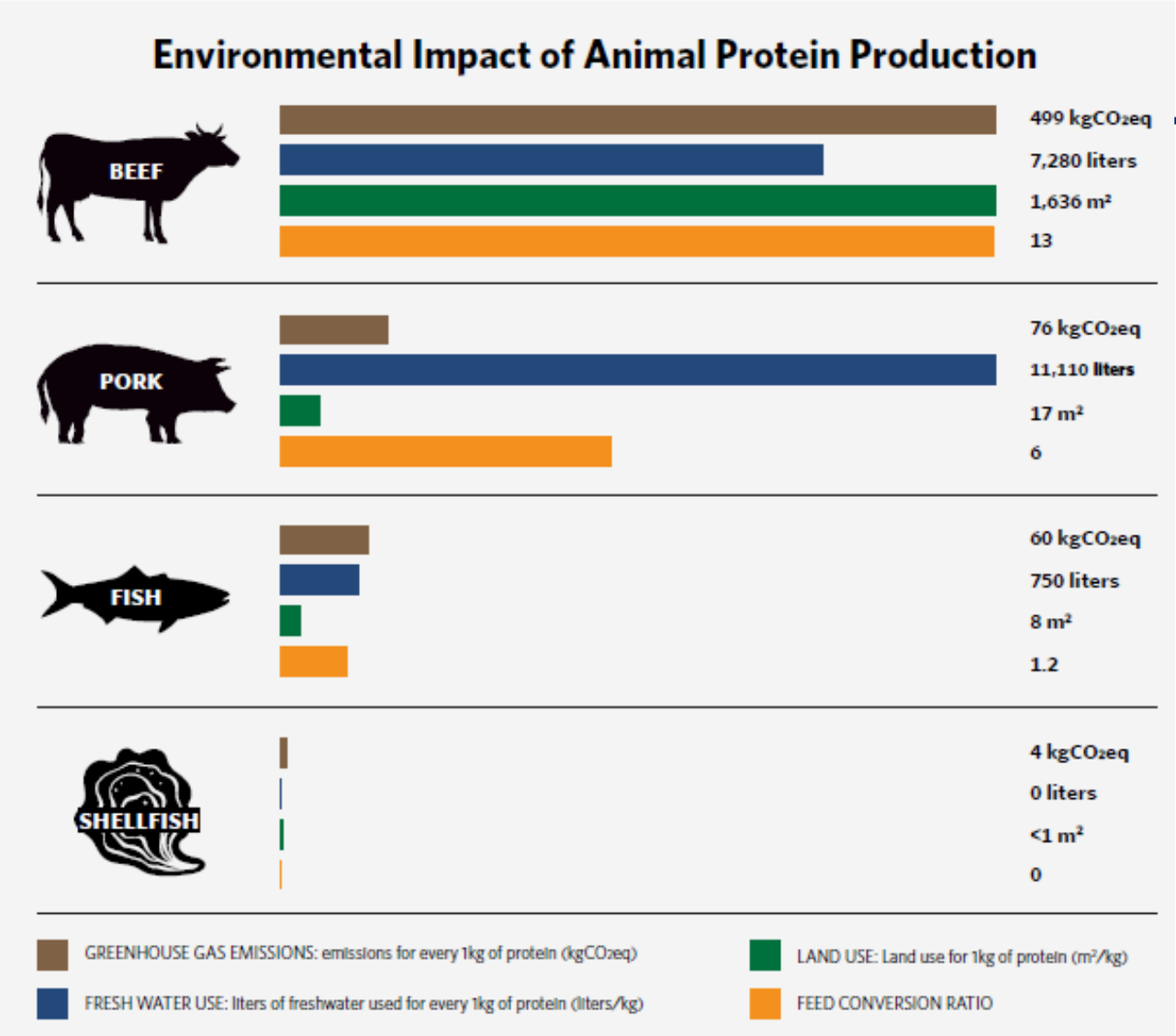
Image Credit: Paulo Oliveira

Diets stimuli (+) enable long lasting digestive and metabolic enhancements and resilience to ingredients



Sustainability

- Greenhouse gasses (60Kg of CO₂eq/Kg)
- Fresh water use (750 Liters/kg)
- Land use (8 M²/kg)
- FCR (1.2 Kg/Kg)



→ Equivalent to 600 km driving (a full tank consumption).

SOURCES: Reef Resilience Network & CO2 Everything

Sustainability Innovation



A New Kind of Fish.

Using state-of-the-art cultivation processes that are sustainable and scalable, Avant brings you only the finest of authentic and nutritious fish products.

[Find out more](#)



Take Home

- Aquaculture will continue to grow
- The grow is likely to happen in the open ocean or in Inland RAS
- Diseases will continue to challenge the industry
- In fighting diseases, no innovation will substitute best practices and nutrition
- Marine ingredients are limited, we must work together to reduce FIFO and create efficient application
- New ingredients and technologies are emerging
- Despite the challenges, aquaculture remains among the most efficient protein production
- Can it be more sustainable? Cultivated cell seafood...

Obrigado!



molo®

Advancing hatcheries
to their full potential for
the best of aquaculture

molo®

