



The Scottish opportunity: Aquafeeds



Zero Waste Scotland, 26th November 2020

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Product Manager

We are changing our feed for a future

World leaders have envisioned aquaculture must double production by 2050, without increasing pressure on wild fish and agricultural land*. A seemingly impossible task, but if there is going to be a sustainable future, aquaculture must not fail. Being producers solely of aquaculture feed, BioMar stands in partnership with you. That is why we are constantly searching for alternative nutrient sources and partnering with those whose innovations can drive us further. We will not rest.

* World Resources Report: Creating a Sustainable Food Future, World Resources Institute, December 2018



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Contents

Aquaculture – A Growth Sector

BioMar Key Figures

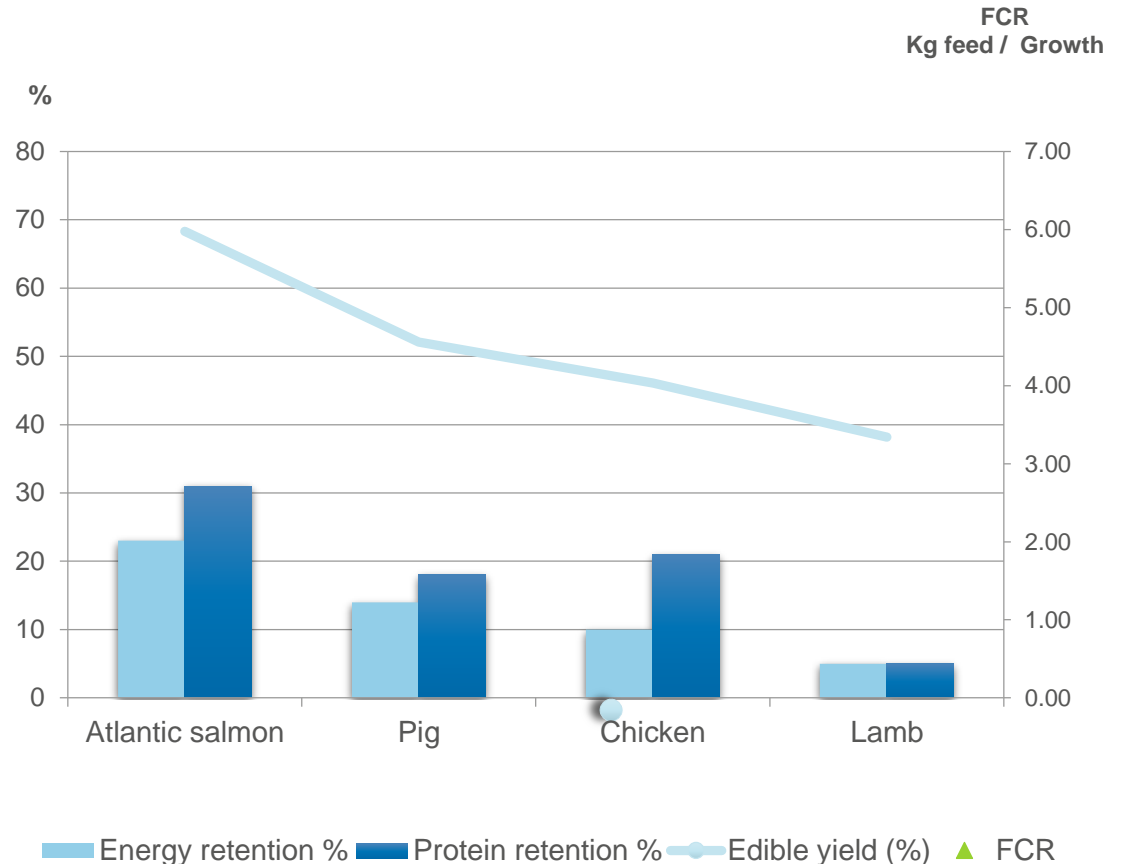
Feed & Raw Material Requirements

Moving Forward

Aquaculture is an efficient way to produce animal proteins



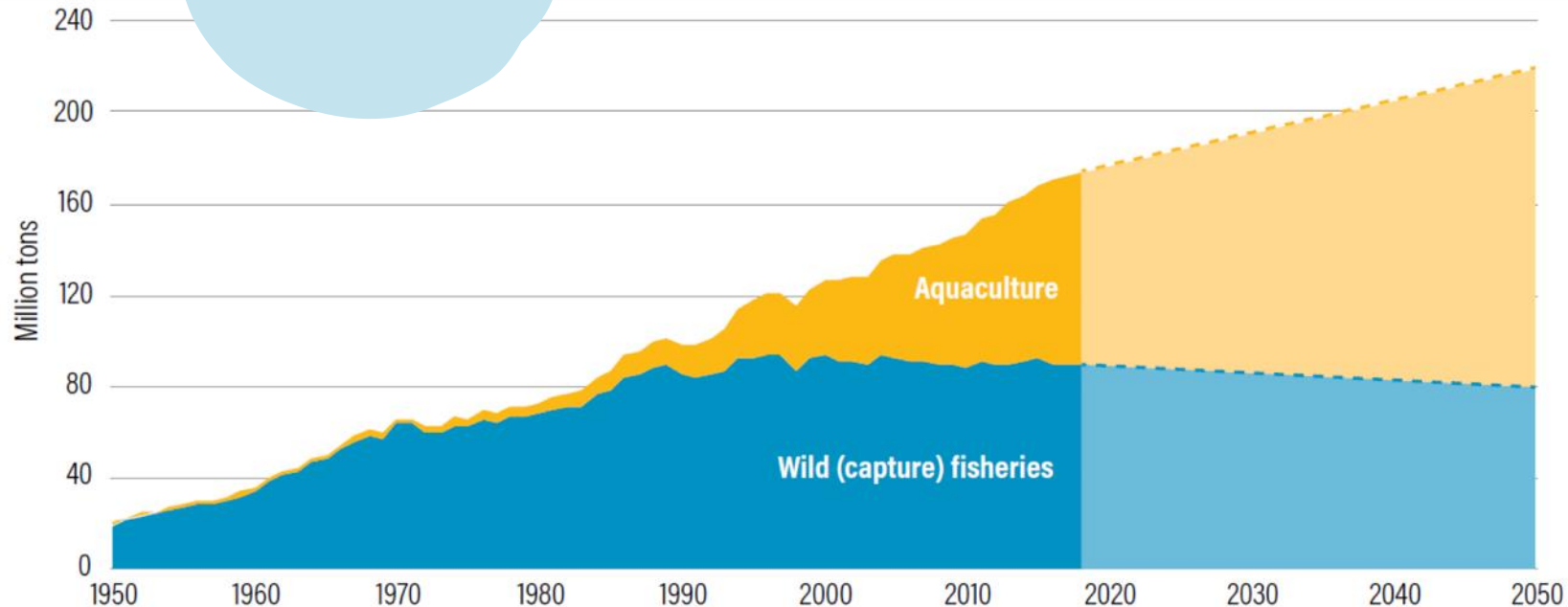
- **Fish are more energy efficient as...**
 - they do not spend energy fighting gravity to keep their balance
 - they do not spend energy on warming up their body
- **Fish has a high yield** in terms of edible meat
- **There is a low feed conversion ratio** in aquaculture



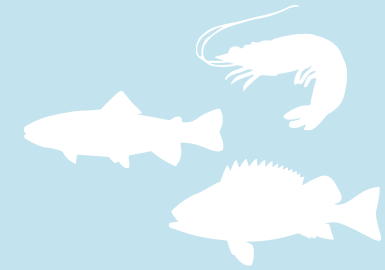
Mission for Sustainable Aquaculture



56% Growth
From 2010 - 2050



Source: Historical data, 1950–2016: FAO (2017b) and FAO (2018). Projections to 2050: Calculated at WRI; assumes 10 percent reduction in wild fish catch from 2010 levels by 2050, linear growth of aquaculture production of 2 Mt per year between 2010 and 2050.

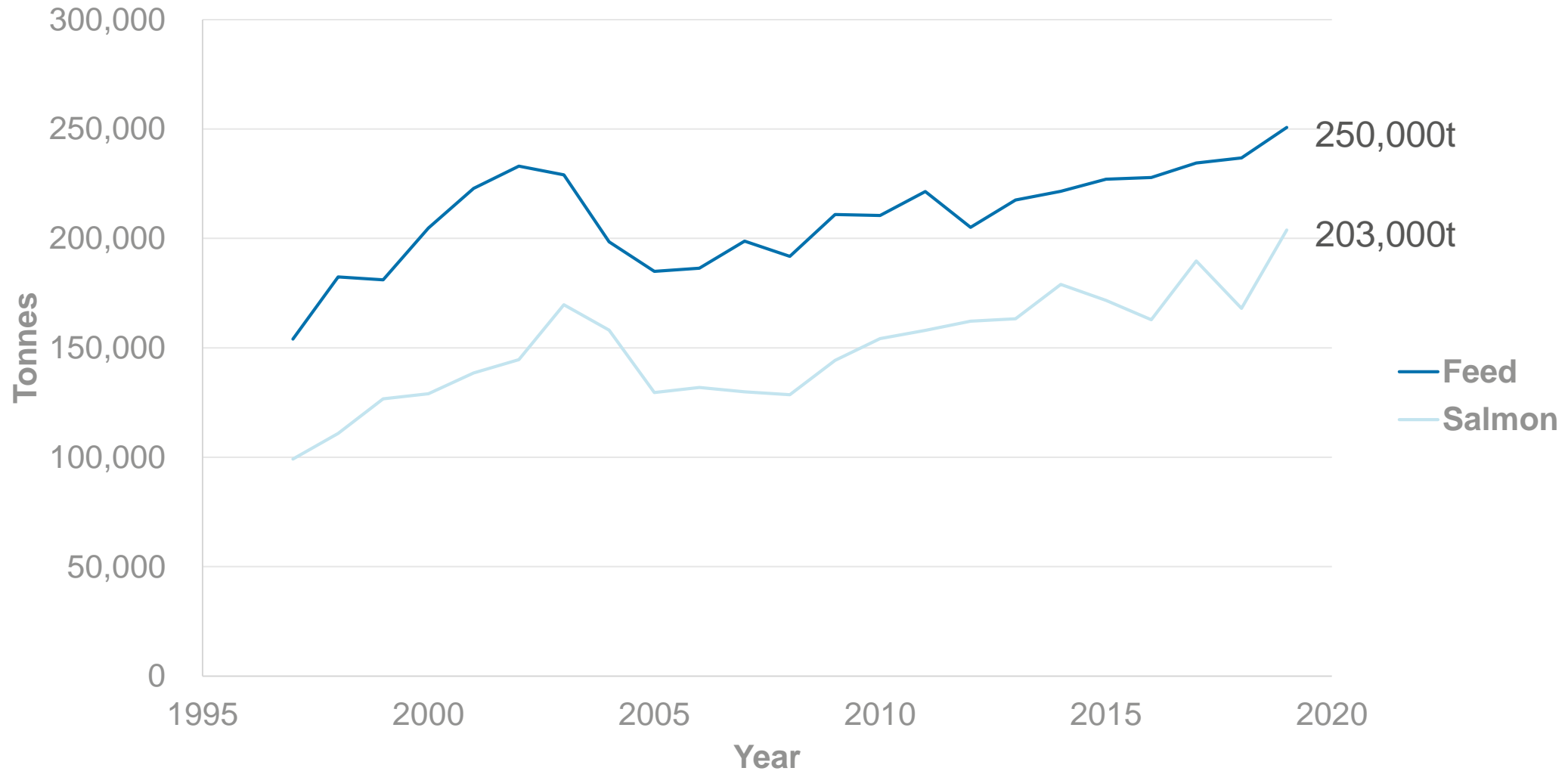


Double aquaculture production by 2050

without taking one more fish from the ocean or using any more agriculture land for crops.

Aquaculture feed is responsible for up to **80% of the environmental impact** of producing seafood.

UK salmon production and feed sales



Aquaculture Value Chain



Raw Materials

(Catch & Harvest)



Raw Materials

(Processing)



Fish Feed

(Production)



Farming



Processing

(of seafood products)



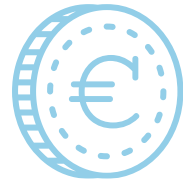
Consumer

(Sales of seafood products)

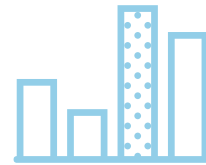
Key figures 2019



Turnover
EUR ~1.5bn



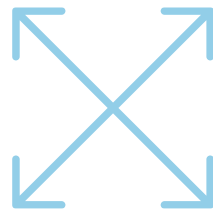
EBIT
EUR ~88m



Tonnage
~1.25m tons



Employees
~1,500



Feed for +45
different species
of fish + shrimp



Sale to more than
80 countries

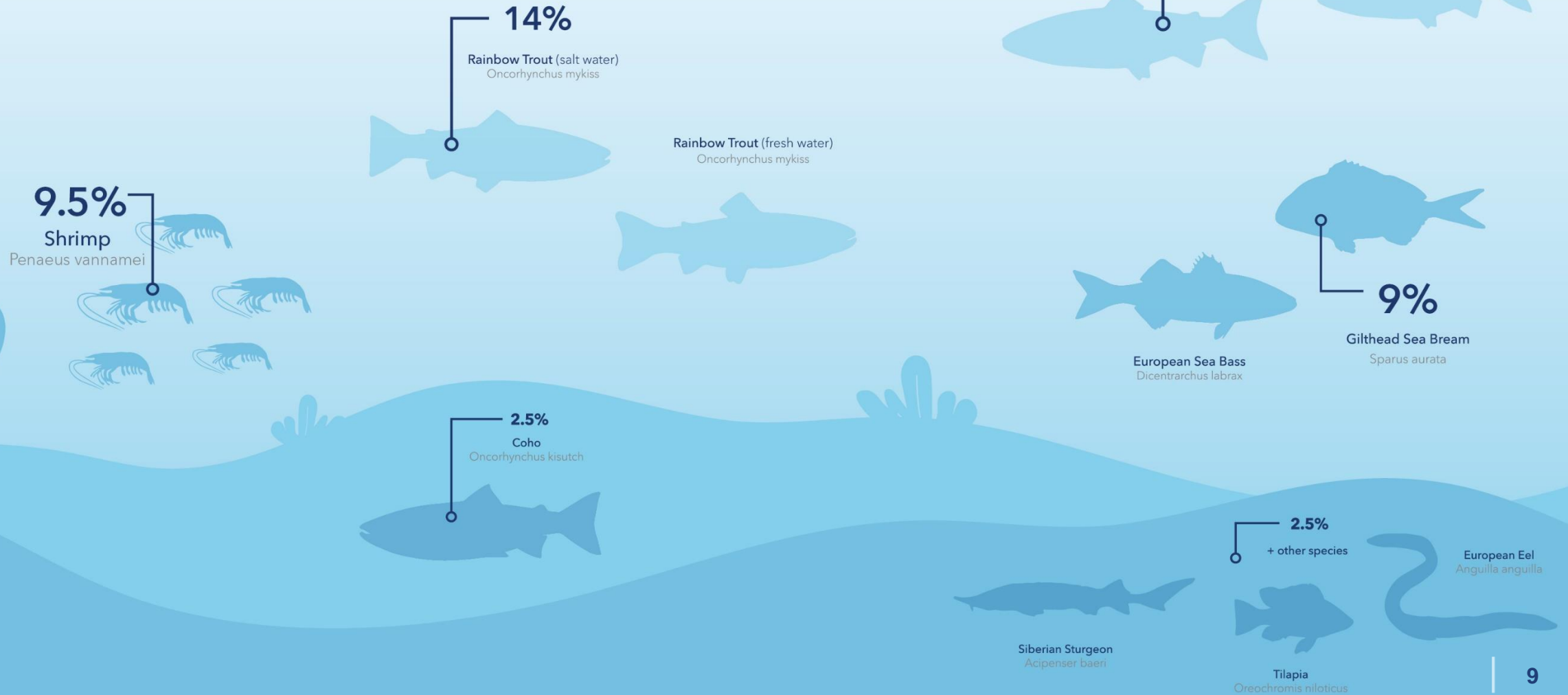


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We are innovators in high performance aquafeed dedicated to doing our part in sustainable global aquaculture.

www.biomar.com

Top Species where BioMar supplied the most feed in 2019



Salmon division - Factories North sea



Karmøy, Norway



Myre, Norway



Grangemouth, Scotland





Sustainable aquaculture is not just about the fish

We need to share our natural resources with the other inhabitants of this planet. Aquaculture should take only our share.

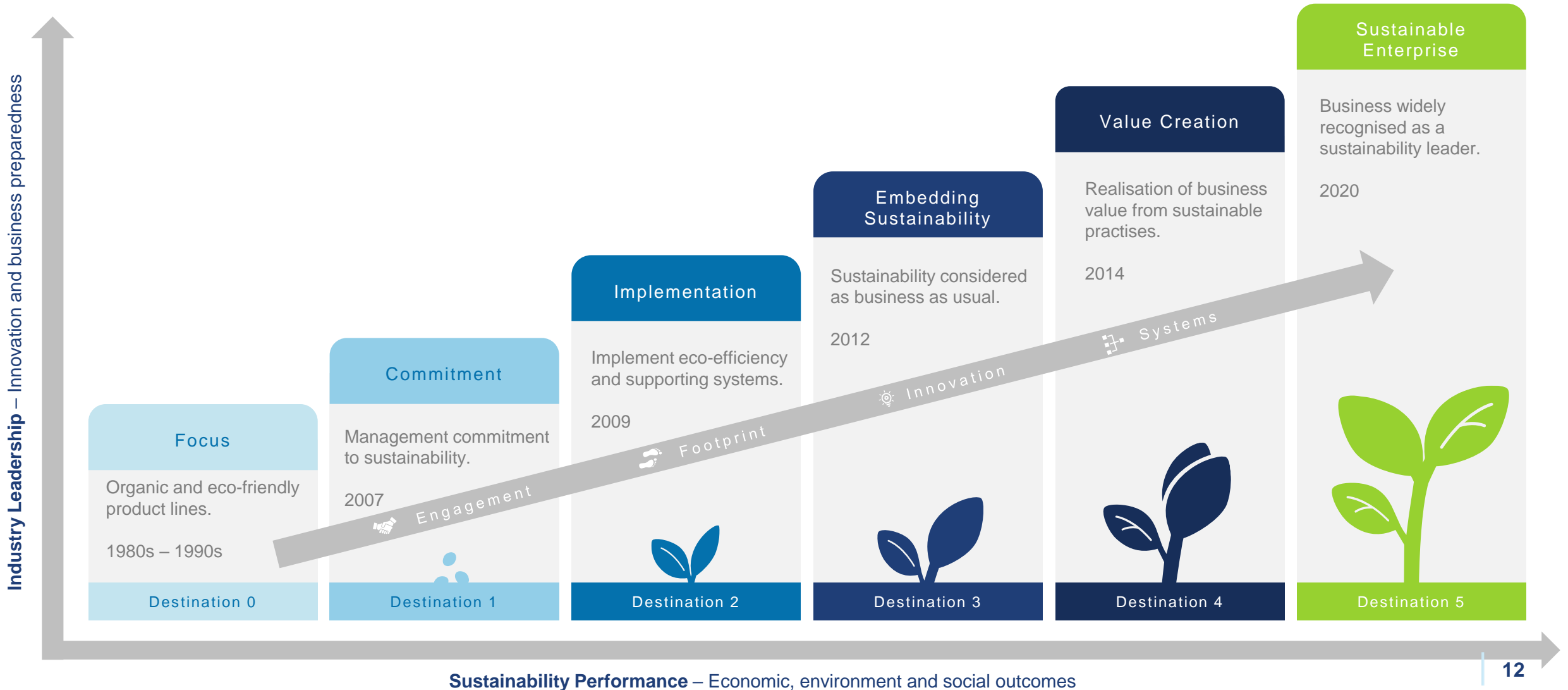
That is why we use both certified krill and wild fish. Whilst seeking alternative nutrients that don't take from the human or animal food chains.

Helping to ensure there is a tomorrow for us all.



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Our sustainability journey



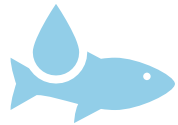
Raw material categories



Marine Raw Materials



Marine Proteins



Marine Oils



Krill Meal

Vegetable Raw Materials



Soy



Wheat



Rapeseed



Corn



Peas & Beans



Sunflower



Algae



Palm



Guar

Other Ingredients & Local Raw Materials



Vitamins & Minerals



Amino Acids

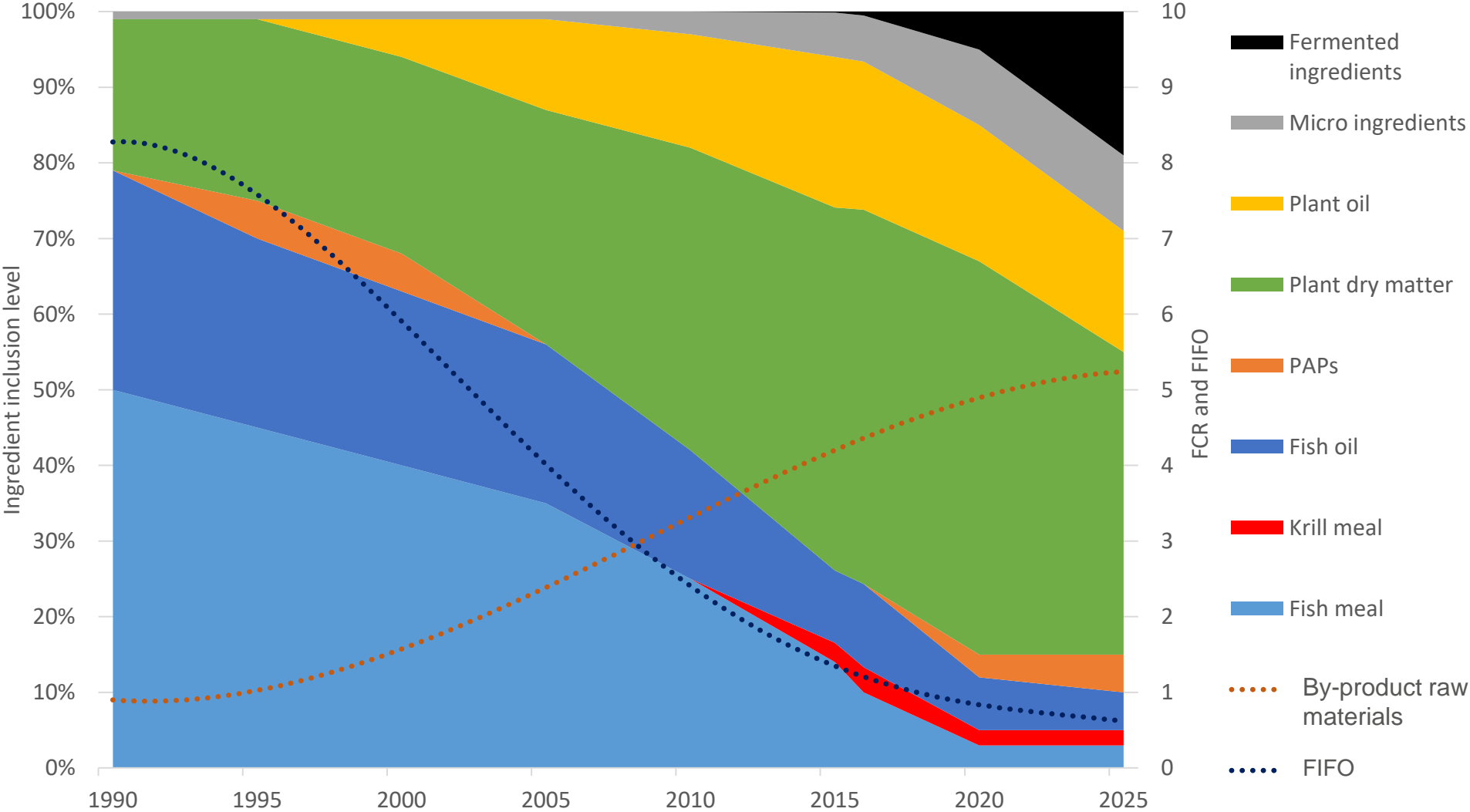


Pigment



Land Animal Proteins

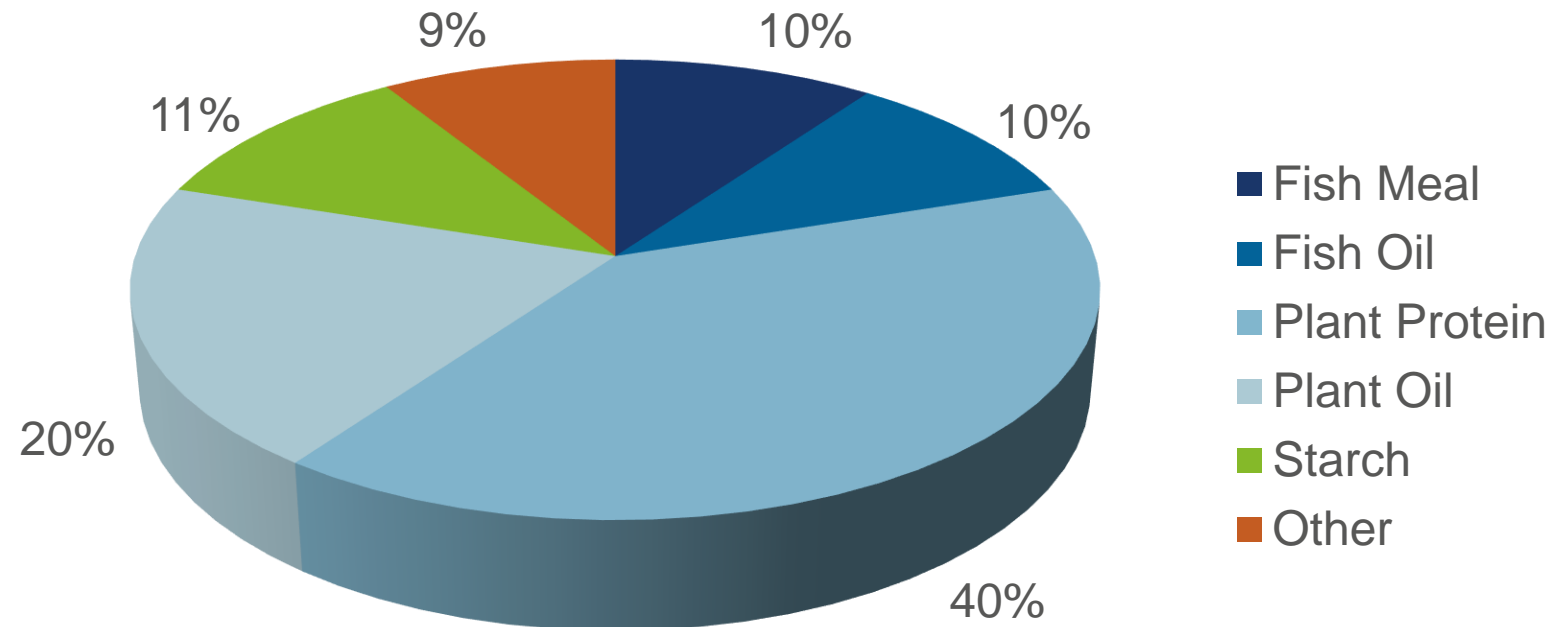
Salmon feed development



Typical salmon feed composition - UK



Standard



UK requirements for raw materials

- Need to comply with EU/UK legislation
- Additives need to be authorised for use in EU/UK
- FEMAS/GMP+/equivalent certified, requirement of UFAS (Universal Feed assurance Scheme) certification
- Non-GM, as defined by EU/UK labelling legislation
- No land animal products
- No salmonid products
- All soya products, Proterra or organic certified (Identity preserved)
- All marine products, minimum IFFO RS certified, increasing proportion MSC

New raw materials - What do we want?



1) New sustainable sources of EPA+DHA

- Current supply from fish oil: limited and fixed
- Increasing competition from human consumption market
- Genetically modified crops
- Likely to be most cost effective:
 - Camelina
 - Canola
- Algal
 - Heterophic production (without light)
 - Commercial quantities, becoming available, non-GM, costly





New raw materials - What do we want?

2) New more local supplies of non-soya protein

- Europe has a protein deficit
- European salmon feeds rely heavily on import of Brazilian produced Soya Protein Concentrate (SPC)
- Need a high protein (60%+) alternative (ideally organic too)

Alternatives are:

- Insect meal
- Microorganisms grown on methane (natural gas)
- Protein concentrates from rape seed, sunflower, and legumes
- New technologies

Need for more sustainable sources & production technologies of protein, that can cover commercial scale aquafeed needs



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