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IFFO TECHNICAL DIRECTOR



A S.W.O.T. Analysis of Marine Ingredient Use in Aquaculture

Protein Sustainability Workshop – Sorrento, ITALY 5th June 2022

Strengths – Weaknesses – Opportunities - Threats



STRENGTHS

- Nutritional qualities of marine ingredients remain the benchmark in feed qualities.
- Most fisheries (in developed nations) in the world are now seen as the benchmark of sustainability.
- Recent price stability has surpassed that of other raw materials.

OPPORTUNITIES

- Marine ingredients can be easily value-added.
- Potential for circularity in feed resource production is HUGE.
- LCA footprinting characteristics of marine ingredients are among the best of all resources.

WEAKNESSES

- Public and eNGO perception is that fisheries are unsustainable.
- Capacity to increase production is low to zero.

THREATS

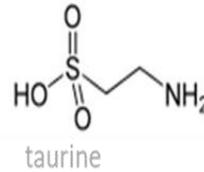
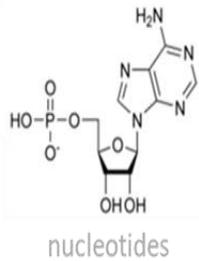
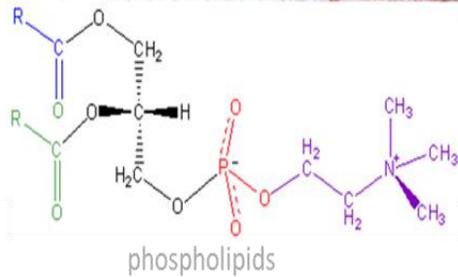
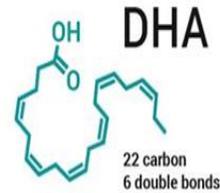
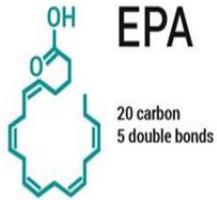
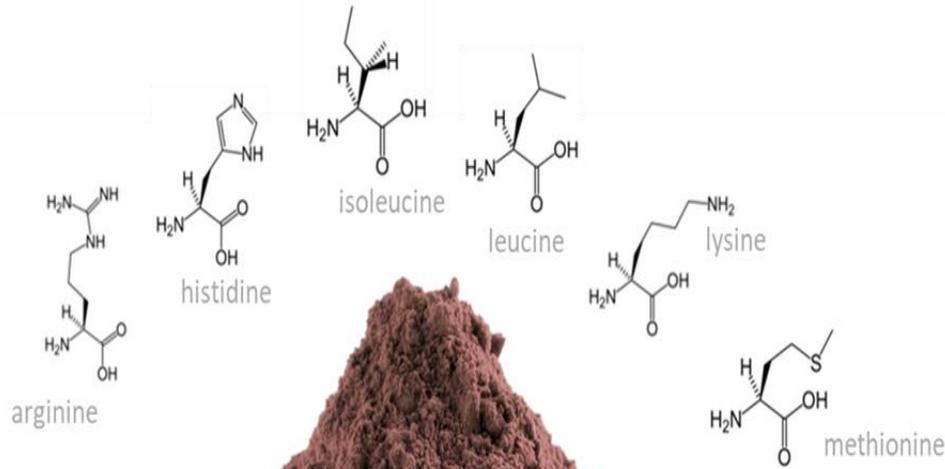
- Fisheries around the world are exposed to climate change threats.
- Political instability threatens agreed stock sharing arrangements.



Strengths

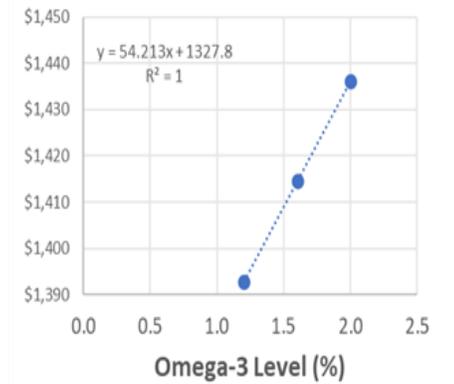
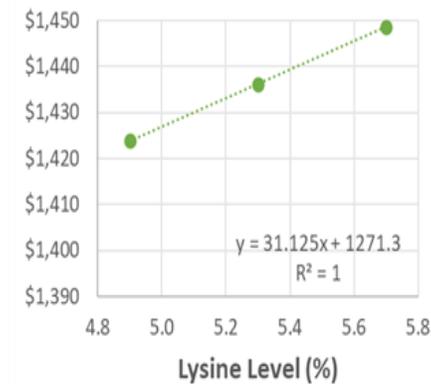


Still the Benchmark Ingredient



- Still considered the benchmark ingredient for use in aquafeeds.
- High nutrient density + key essential nutrients + palatability = formulation flexibility.
- Value drivers not always obvious.

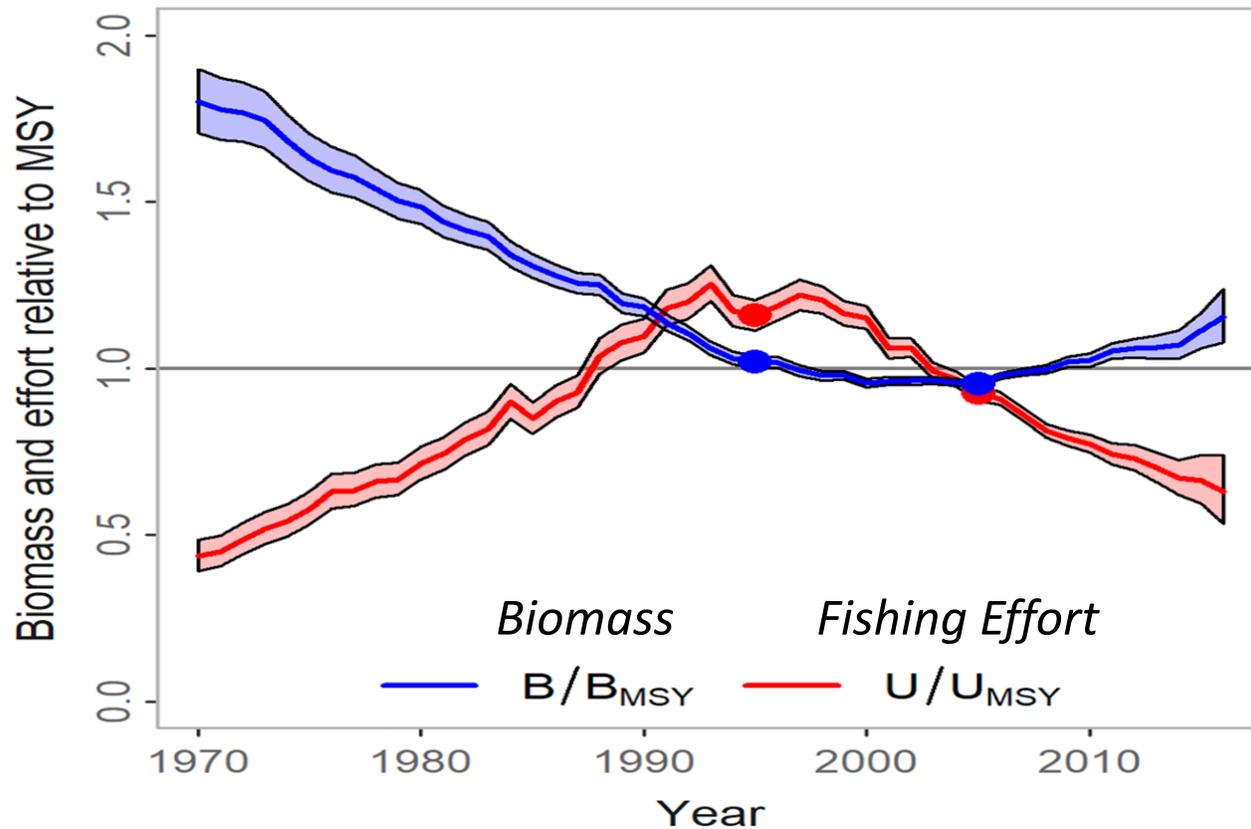
Shadow Costing Impact (Salmon Feed) of Nutrient Change



Content in Fishmeal

Well Managed Fisheries are Rebuilding

Trend in abundance and harvest rate



Effective fisheries management instrumental in improving fish stock status

Ray Hilborn^{a,1}, Ricardo Oscar Amoroso^a, Christopher M. Anderson^a, Julia K. Baum^b, Trevor A. Branch^a, Christopher Costello^c, Carryn L. de Moor^d, Abdelmalek Faraj^e, Daniel Hively^a, Olaf P. Jensen^f, Hiroyuki Kurota^g, L. Richard Little^h, Pamela Maceⁱ, Tim McClanahan^j, Michael C. Melnychuk^a, C  il  n Minto^k, Giacomo Chato Osio^{l,m}, Ana M. Parmaⁿ, Maite Pons^a, Susana Segurado^o, Cody S. Szuwalski^f, Jono R. Wilson^{c,p}, and Yimin Ye^q

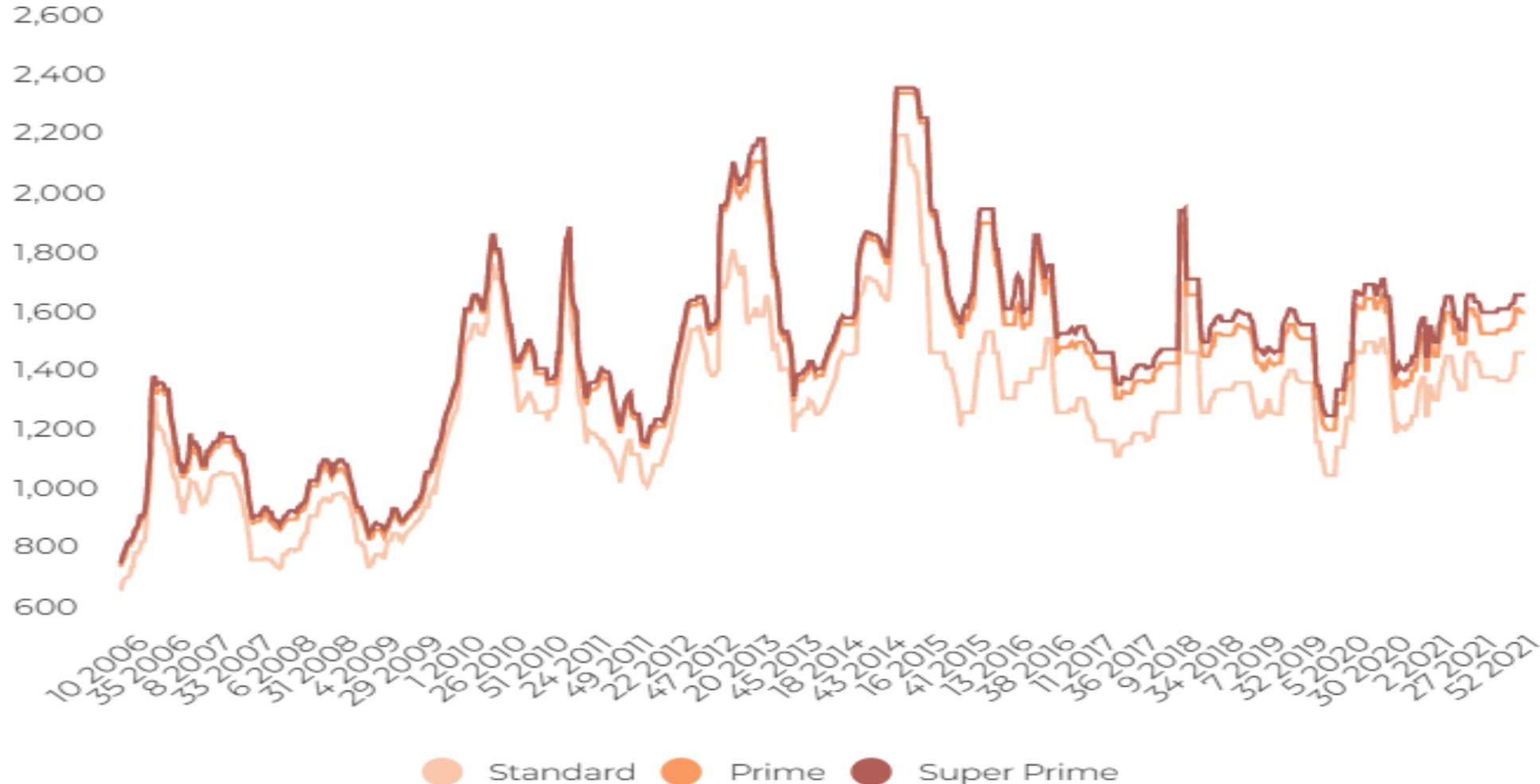
2218–2224 | PNAS | January 28, 2020 | vol. 117 | no. 4

www.pnas.org/cgi/doi/10.1073/pnas.1909726116

Recent Historical Price Stability

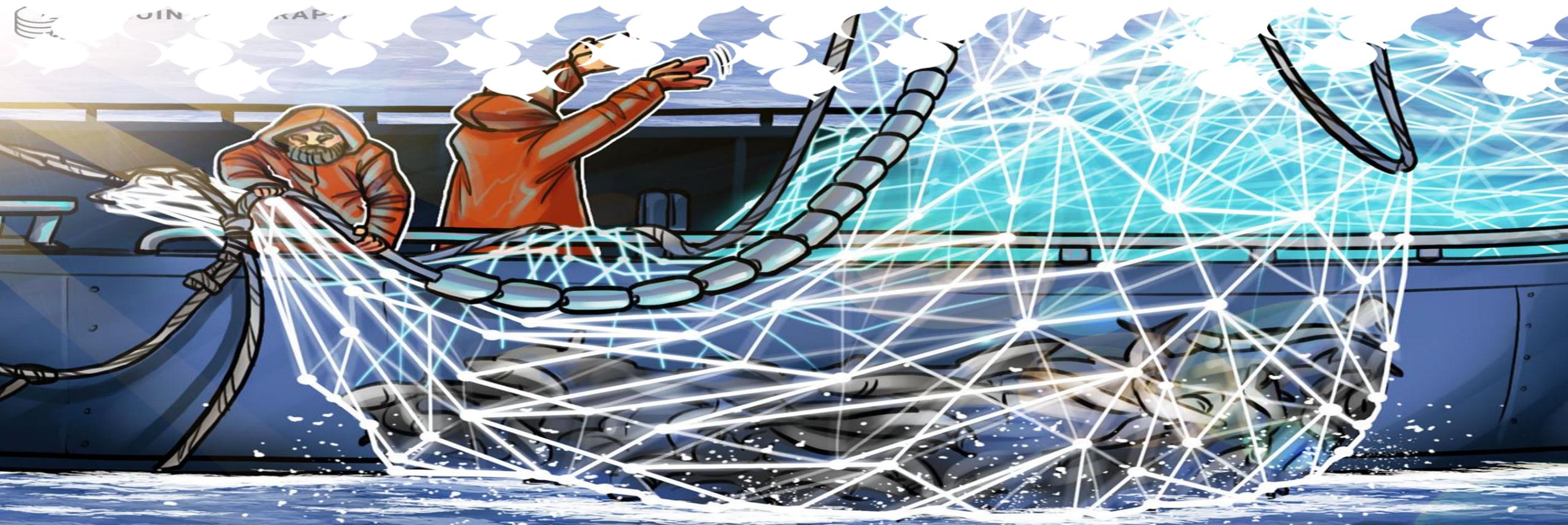
FOB PERUVIAN PRICES*
(US\$/metric tonne)

Historical - FishMeal





Weaknesses



Perceptions Can Be Misleading



FEEDING AQUACULTURE

EVERY YEAR, SMALL PELAGIC FISH, ARE TAKEN OUT OF THE OCEAN OFF THE COAST OF WEST AFRICA **500,000+ TONNES**

Round Sardinella (Sardinella Aurita)
Flat Sardinella (Sardinella Maderensis)
Bonga (Ethmalosa Fimbriata)

AND GROUND DOWN INTO FISHMEAL AND FISH OIL BY THE REDUCTION INDUSTRIES

MOST OF THE FISHMEAL AND FISH OIL produced in West Africa ends up in Europe and Asia to **FEED ANIMALS**

GREENPEACE



FEEDBACK

GREENPEACE

A WASTE OF FISH

Food security under threat from the fishmeal and fish oil industry in West Africa

JUNE 2019

GREENPEACE

Investing in troubled waters

The material risks of fish mortality and the use of wild-caught fish in feed for the aquaculture sector

Fishing for Catastrophe:

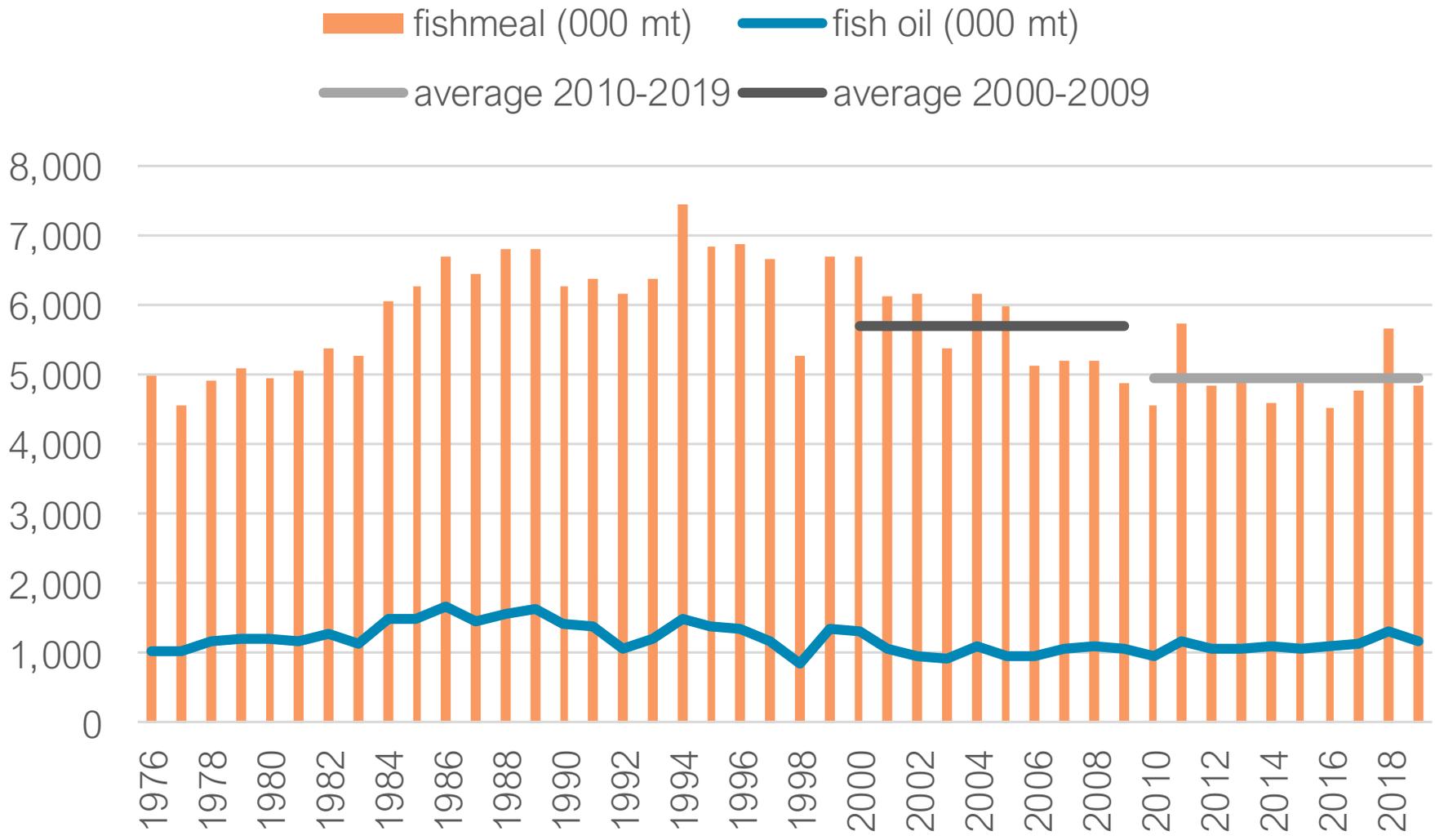
How global aquaculture supply chains are leading to the destruction of wild fish stocks and depriving people of food in India, Vietnam and The Gambia

FEEDING A MONSTER:

How European aquaculture and animal feed industries are stealing food from West African communities



Stable, But Not Increasing Supply



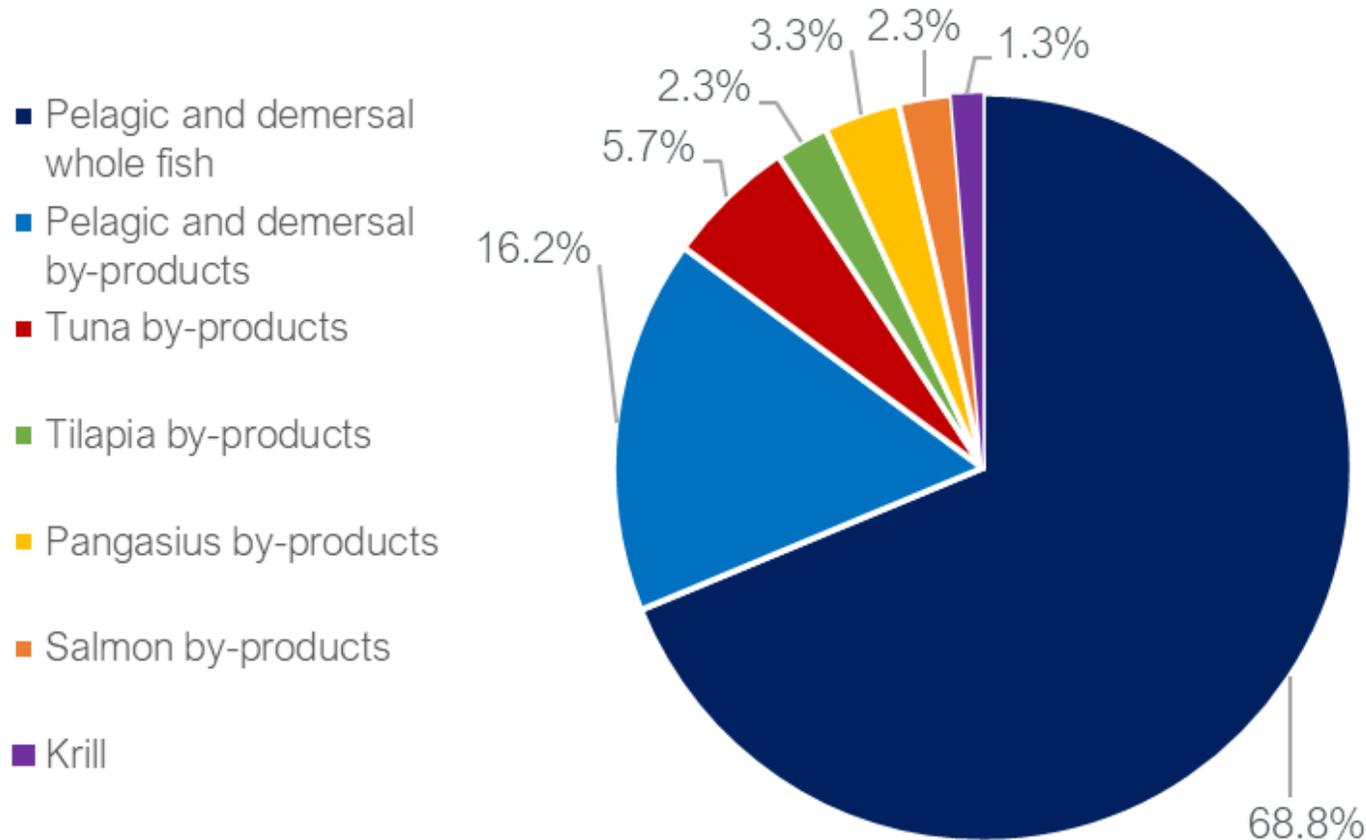


Opportunities



No Such Thing as Waste

Fishmeal in 2021

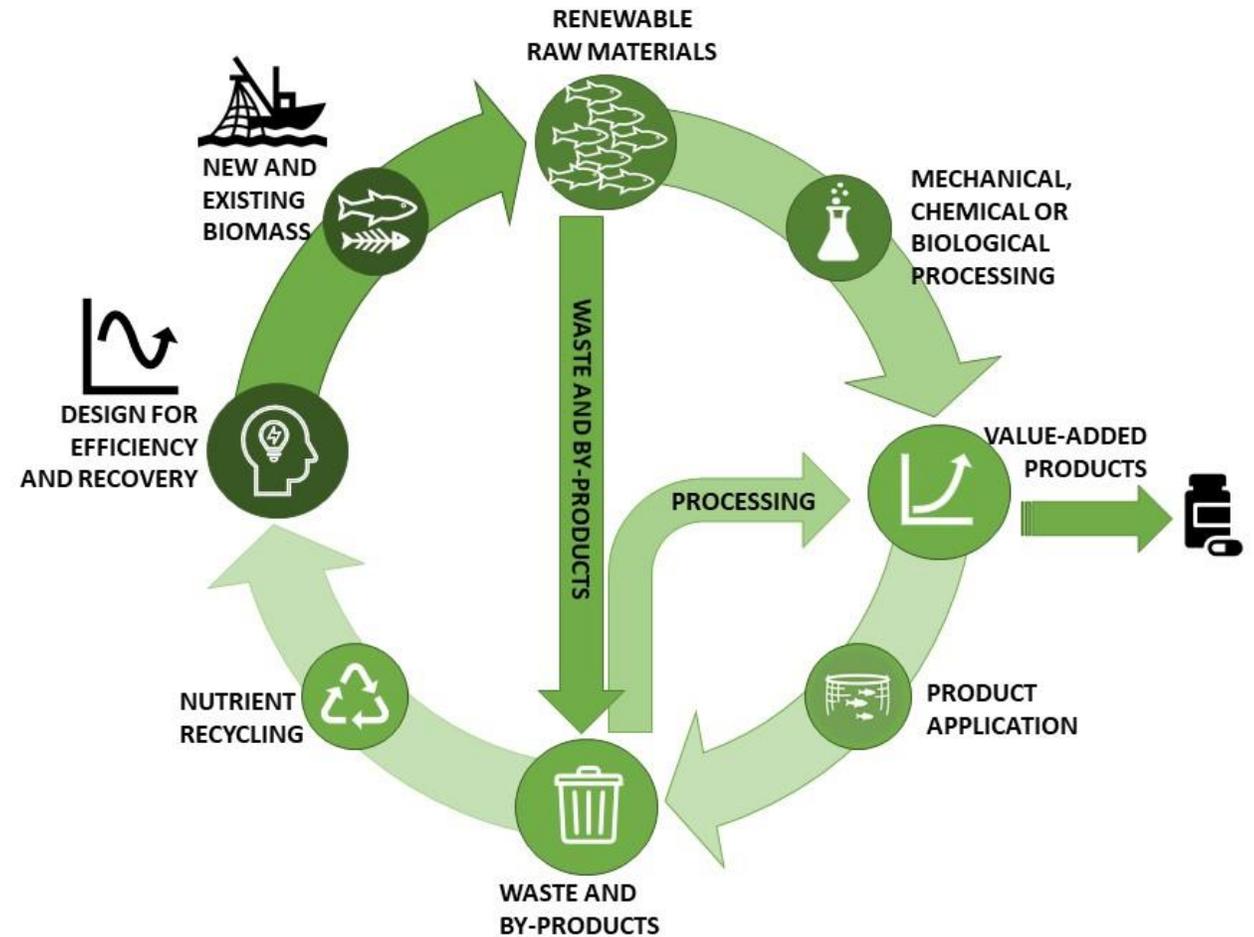
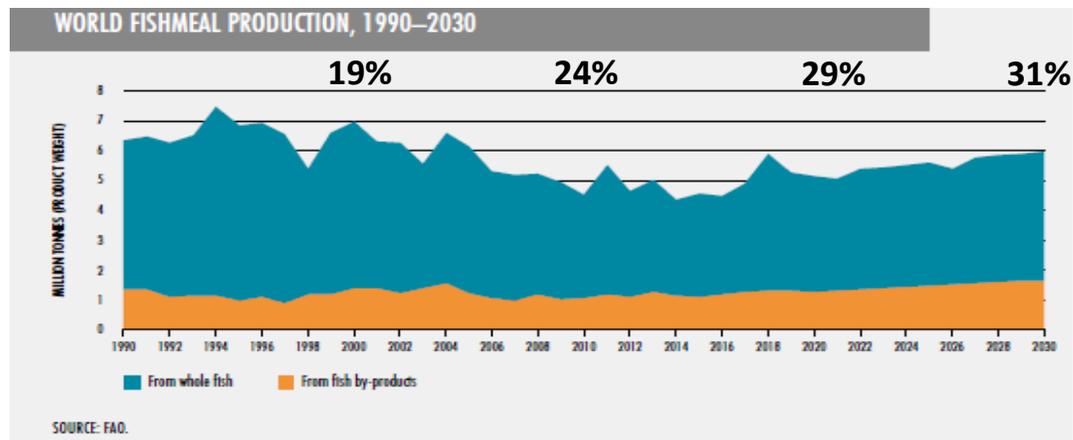


By-product resources in 2021 supplied about 30% of all fishmeal ~1.5Mtonnes produced globally.

- Aqua: 397 ktonnes
- Fishery: 1152 ktonnes

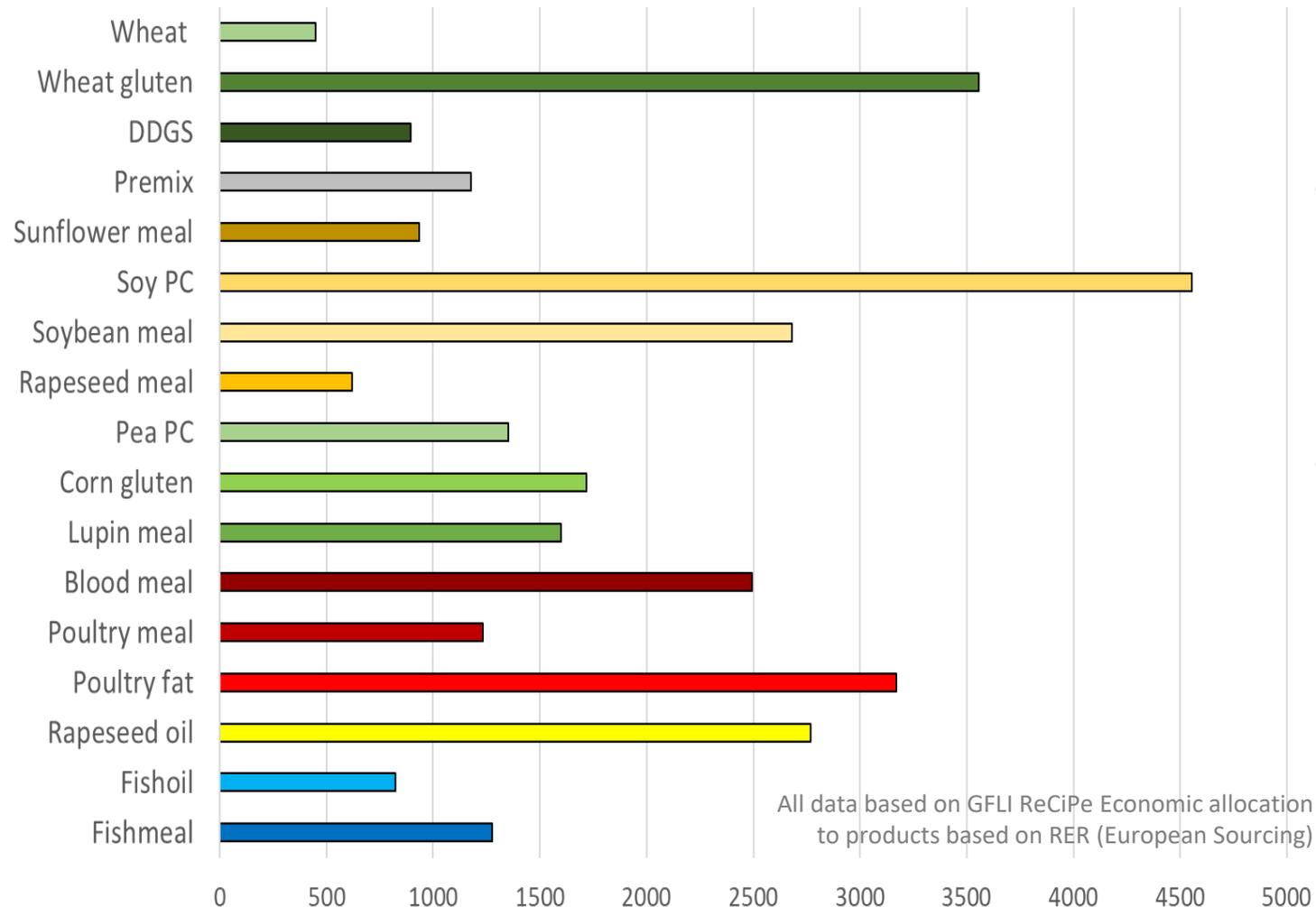
Increasing Circularity in Marine Ingredient Supply

- The majority of fish caught and farmed is for human consumption, but less than 50% of that is eaten.
- Fisheries that were once considered forage species are now being redirected to food, but still supply by-products.
- By-products are increasingly be used as the biomass in marine ingredients.



Low Carbon Footprint Ingredients

Global warming - Including LUC (kg CO₂ eq / ton product)

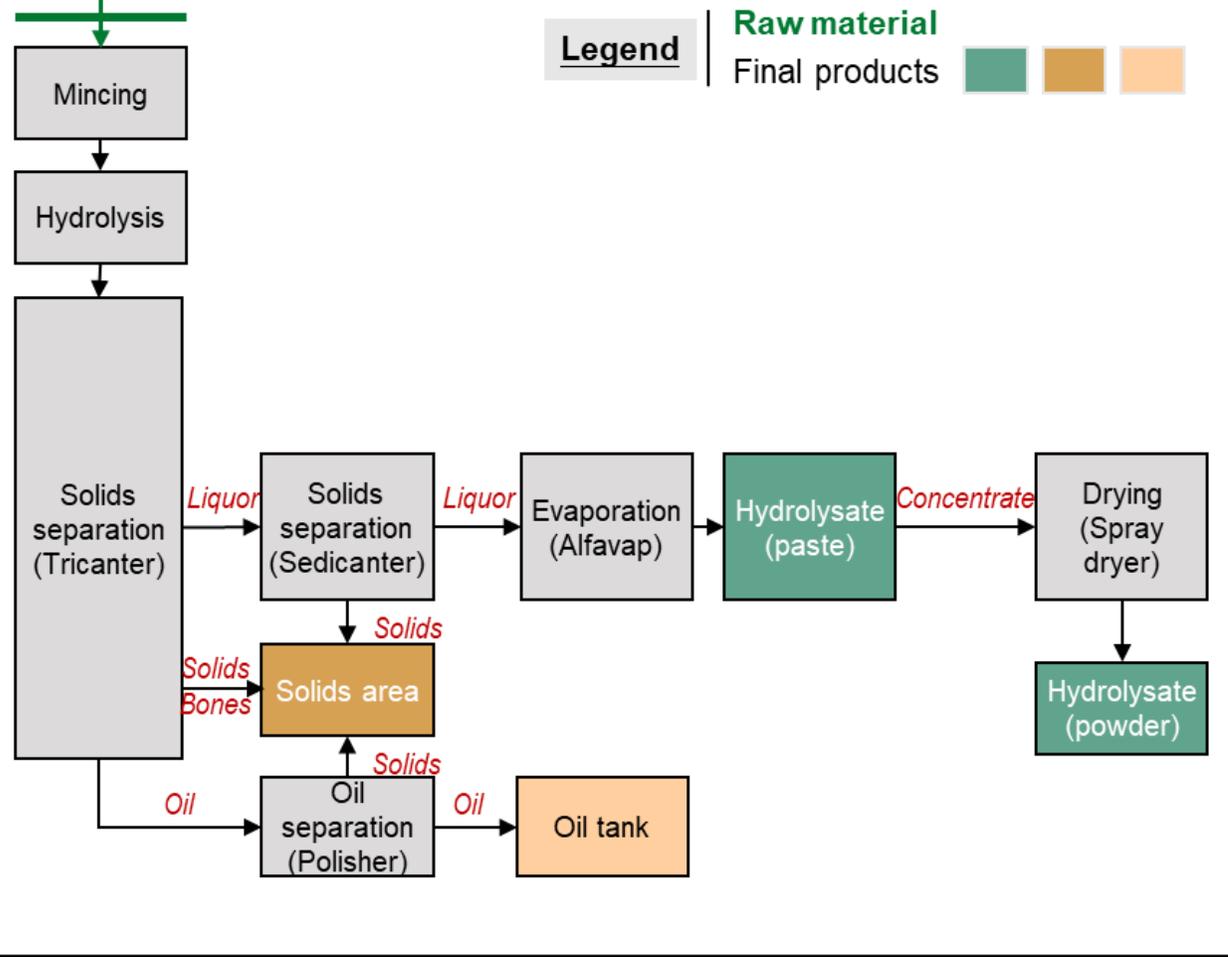


- Increasingly of importance is the environmental footprint of feed ingredients.
- The Global Feed Lifecycle-Assessment Institute (GFLI) acts as an independent database on close to 1000 ingredients.
- A simple examination of the Global Warming Potential (Carbon footprint) shows that marine ingredients compare very favourably.

Products Can Be Easily Value Added

PROCESS CASE EXAMPLE

Raw material:
whole anchovy



Fish Soluble



Fish Protein Hydrolysate



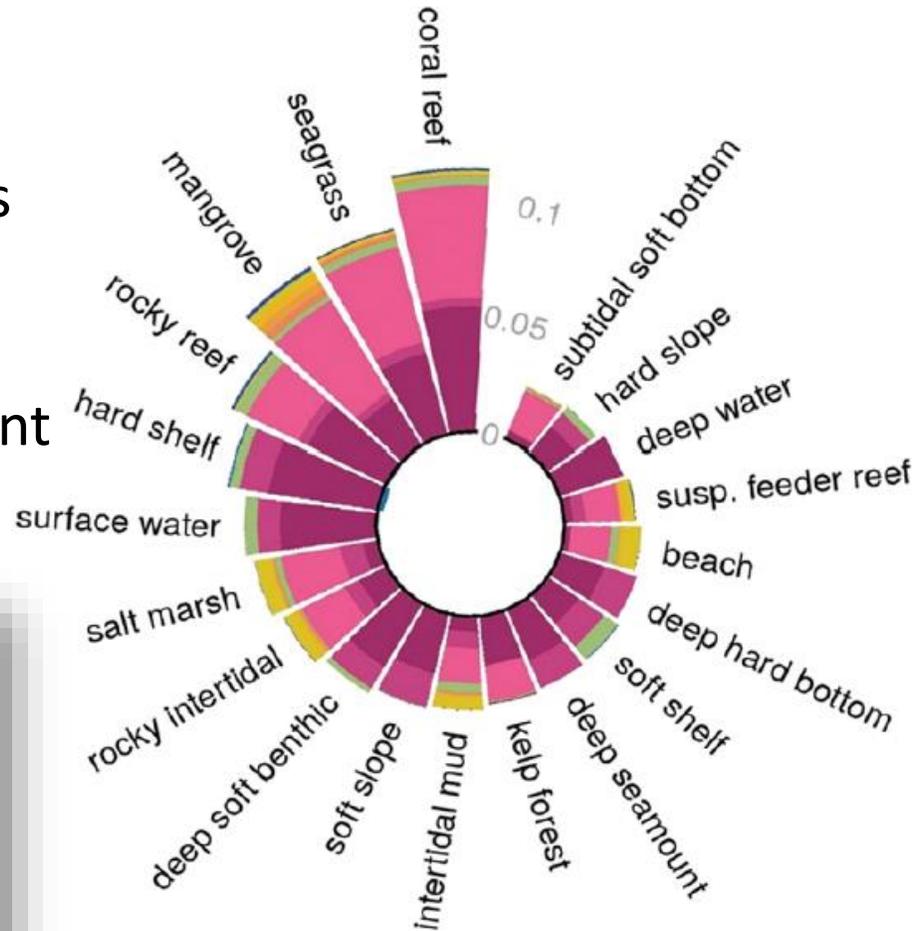


Threats

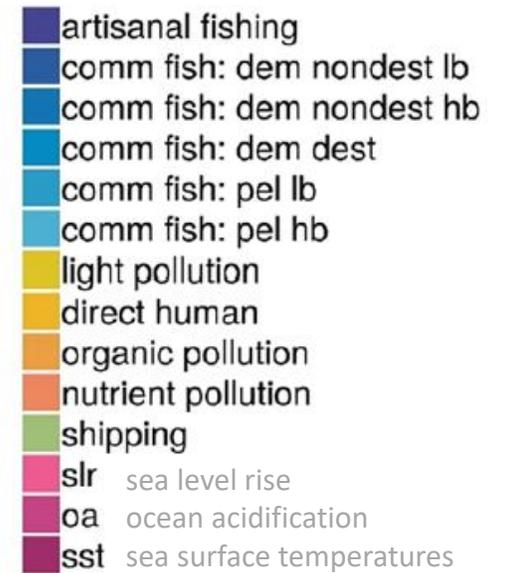


Climate Change is Our Greatest Threat

- Recent evidence has clearly demonstrated that the greatest threat to all marine ecosystems is climate change.
- Impact of fishing activities on ecosystem change is almost absent by comparison.



Annual change



www.nature.com/scientificreports

**SCIENTIFIC
REPORTS**

natureresearch

OPEN Recent pace of change in human impact on the world's ocean

Benjamin S. Halpern^{1,2}, Melanie Frazier¹, Jamie Afferbach¹, Julia S. Lowndes¹, Fiorenza Micheli^{3,4}, Casey O'Hara², Courtney Scarborough¹ & Kimberly A. Selkoe^{1,2}

Humans interact with the oceans in diverse and profound ways. The scope, magnitude, footprint and ultimate cumulative impacts of human activities can threaten ocean ecosystems and have changed over time, resulting in new challenges and threats to marine ecosystems. A fundamental gap in understanding how humanity is affecting the oceans is our limited knowledge about the pace of change

Received: 18 February 2019

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Published online: 12 August 2019

Political Instability



All Atlanto-Scandian herring and blue whiting fisheries to lose MSC status

The suspension affects eight certificates covering fisheries from the European Union, Norway, Iceland, Russia, the Faroe Islands, Greenland, and the United Kingdom.

2022 quotas set for Northeast Atlantic pelagic fisheries, but no agreement on shares

By Jason Holland
October 28, 2021

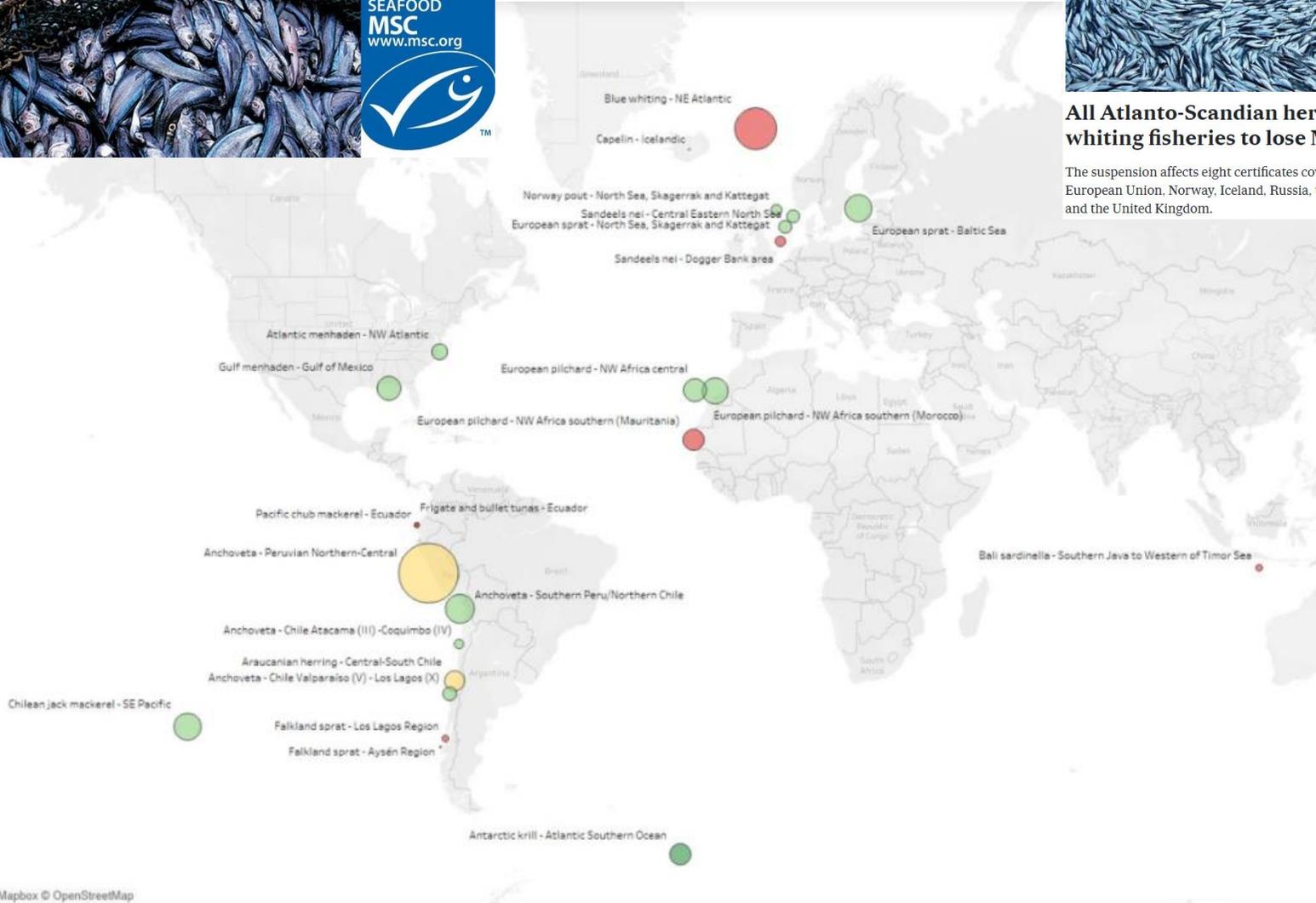
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Northeast Atlantic coastal states have reached agreements on the total 2022 catches for mackerel, herring, and blue whiting that follow the advice given by the International Council for the Exploration of the Sea (ICES). However, there is still no accord on how these quotas should be divided up between the fishing nations.

In a statement issued on 28 October 2021, the Norwegian Ministry of Fisheries and Maritime Affairs confirmed that alongside the European Union, the Faroe Islands, Greenland, Iceland, and the United Kingdom, it had signed an agreement on a total quota of 794,920 metric tons (MT) of mackerel for 2022. This is in line with ICES recommendation and entails a

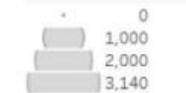
reduction from the quota for 2021, which was 852,284 MT, it said.



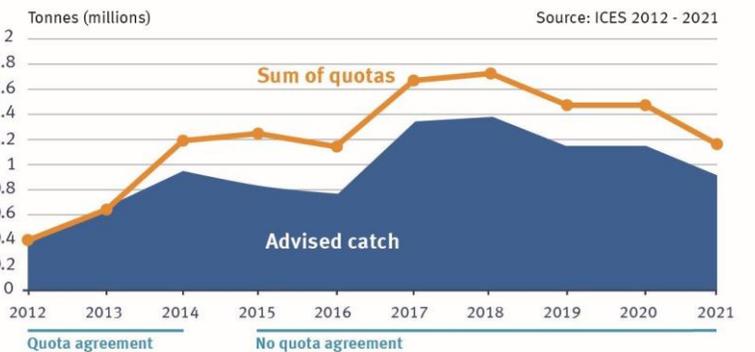
Sustainability category



Latest catch ('000 t)



Blue whiting



Summary

■ Strengths

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■ Weaknesses

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- Capacity to increase production is low to zero.

■ Opportunities

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■ Threats

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- Political instability threatens agreed stock sharing arrangements.



THANK YOU

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THE MARINE INGREDIENTS ORGANISATION

Global Fisheries Catch Status- Reported vs Actual?

Data from: Pauly & Zeller 2016. Nature Communications: DOI 10.1038/ncomms10244.

