

# OIL BOOM IN NEBRASKA

INNOVATIONS IN SUSTAINABLE INGREDIENTS



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September 2018

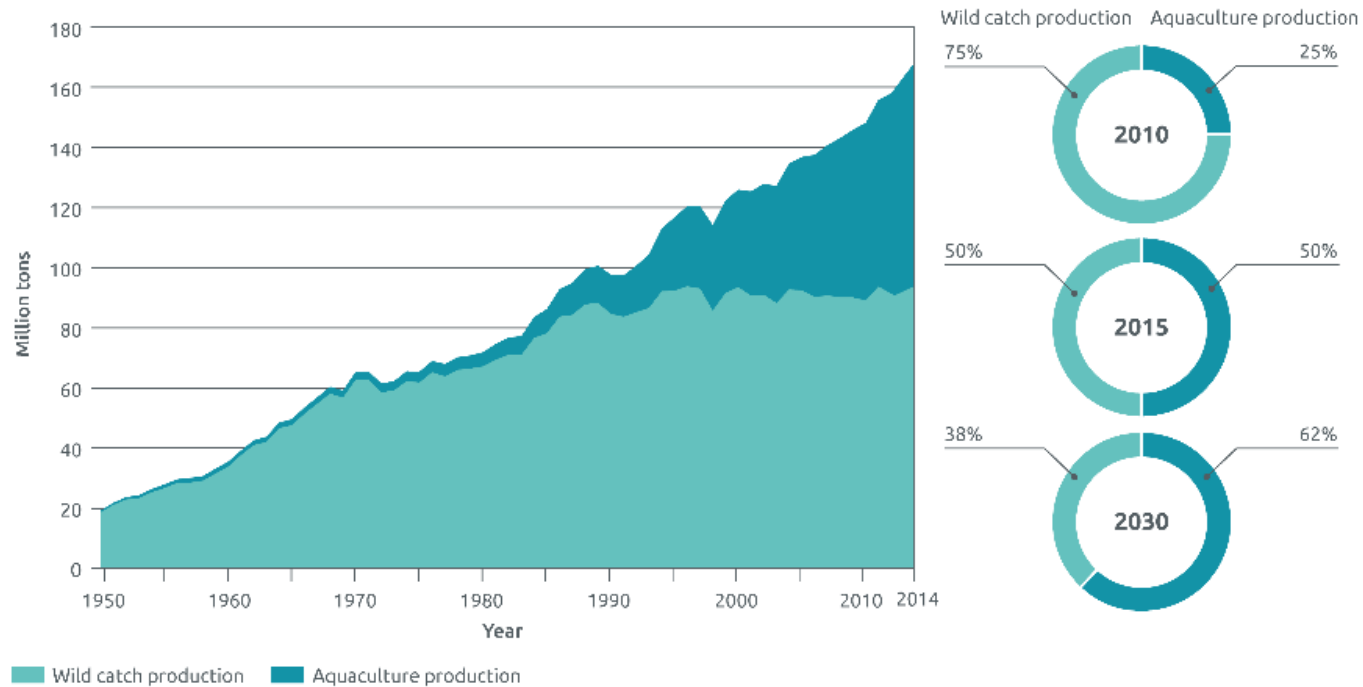
Blair, Nebraska population over 8000.  
Distance from the sea >1000 miles



# Why is aquaculture so important ?

Fastest growing food sector soon to overtake capture fisheries.

## Global wild catch and aquaculture production



Intensive aquaculture farming  
Is growing at a CAGR of 6%  
(Rabobank 2018).

Source: FAO (2017)



# Why is salmon important ?

**BUILDING  
STRONGER  
HEARTS AND  
MINDS**



Every adult needs at least 250 mg of Omega-3 EPA and DHA daily to maintain heart, brain and eye health

Image source: [http://fitlife.tv/things-you-can-do-to-help-your-own-health\\_original/](http://fitlife.tv/things-you-can-do-to-help-your-own-health_original/)



# Is the continued aquaculture growth sustainable ?

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# Quantity of fish stocks required to produce fish oil & fishmeal for aquaculture ?



Anchovy



Menhaden



Sprat



Blue Whiting



Herring



Sand eel

## 16,000,000 TONS WILD FISH



~17% of global wild catch is consumed for the production of fish oil and fishmeal



~ 5 million tons fishmeal

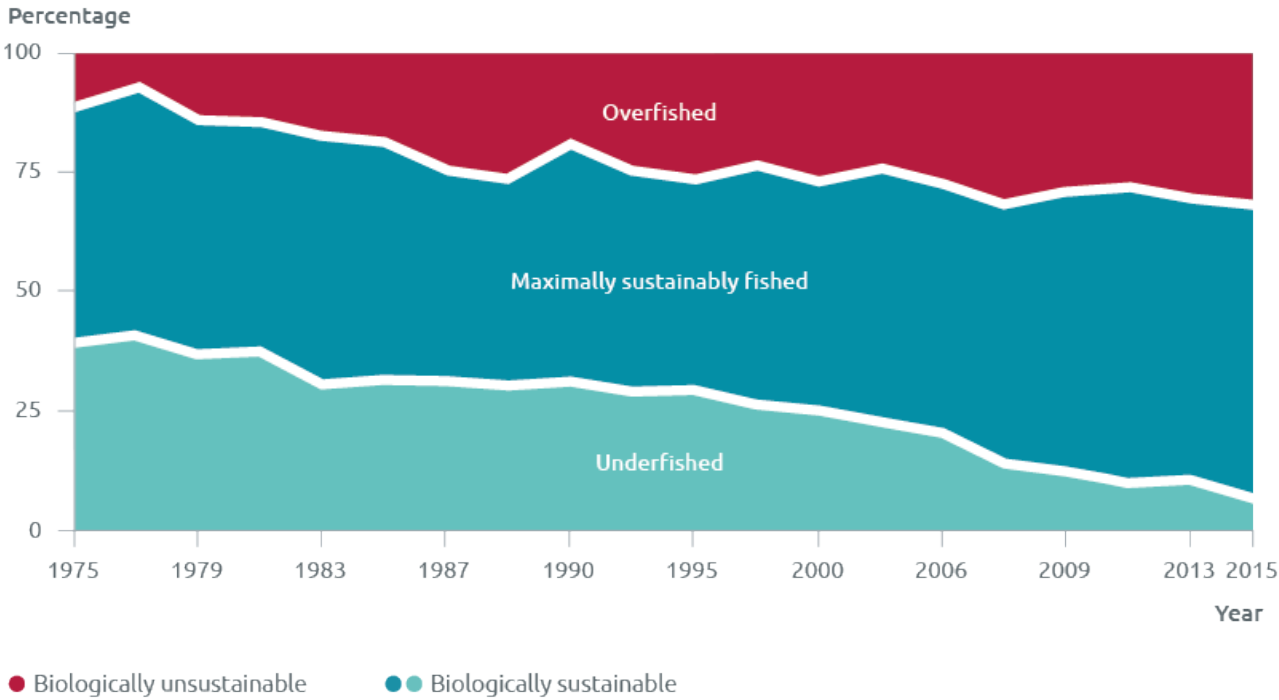


~ 1 million tons fish oil

# What does the FAO data show ?

## 30% of fish stocks are overfished, 58% are fully fished & is of limited supply.

### Global trends in the state of world marine fish stocks, 1975 – 2015



- FAO data is only based on landed fish.
- Illegal fishing is not accounted.
- MSY ignores ecosystem interactions.
- FAO relies on data from members.
- Wild fish stock levels have plateaued.

Source: FAO (2018)

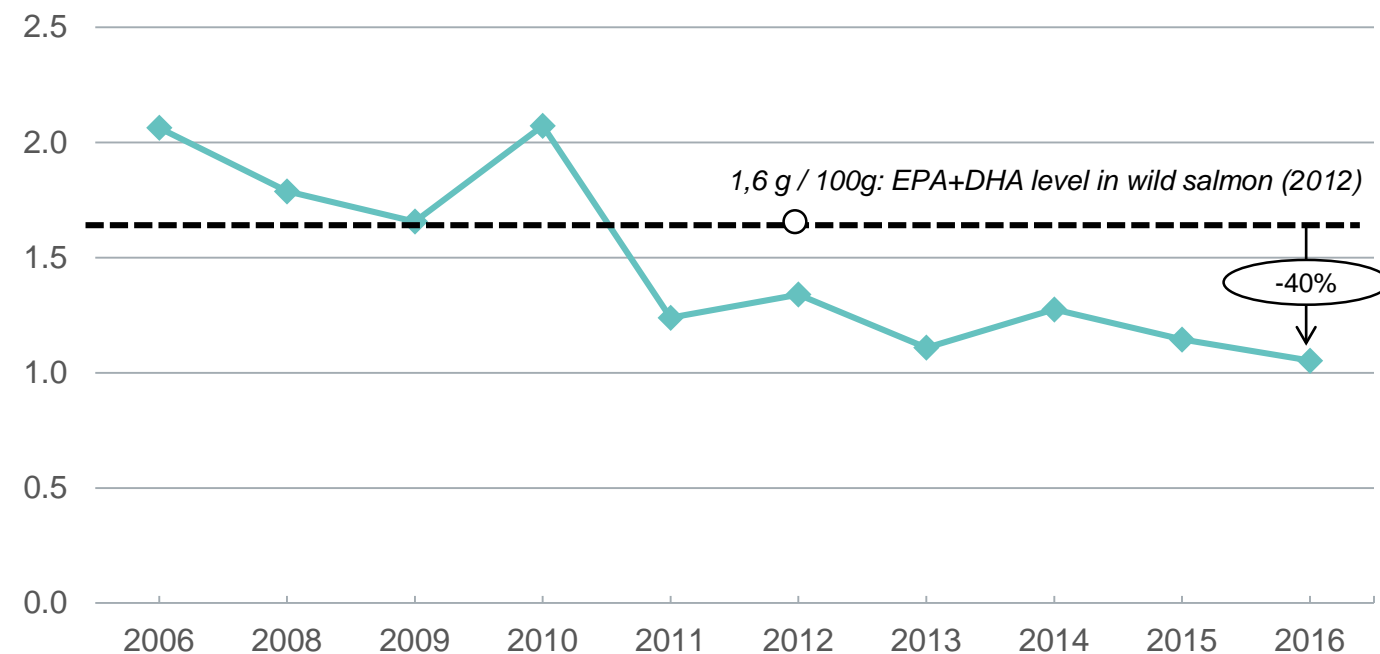




# A reaction: Omega-3 levels in farmed salmon halved during the last decade

## Levels of EPA + DHA in farmed Norwegian Atlantic salmon between 2006 and 2016

Unit: g / 100g



If nothing was done the level of the beneficial omega-3 can only really go down.

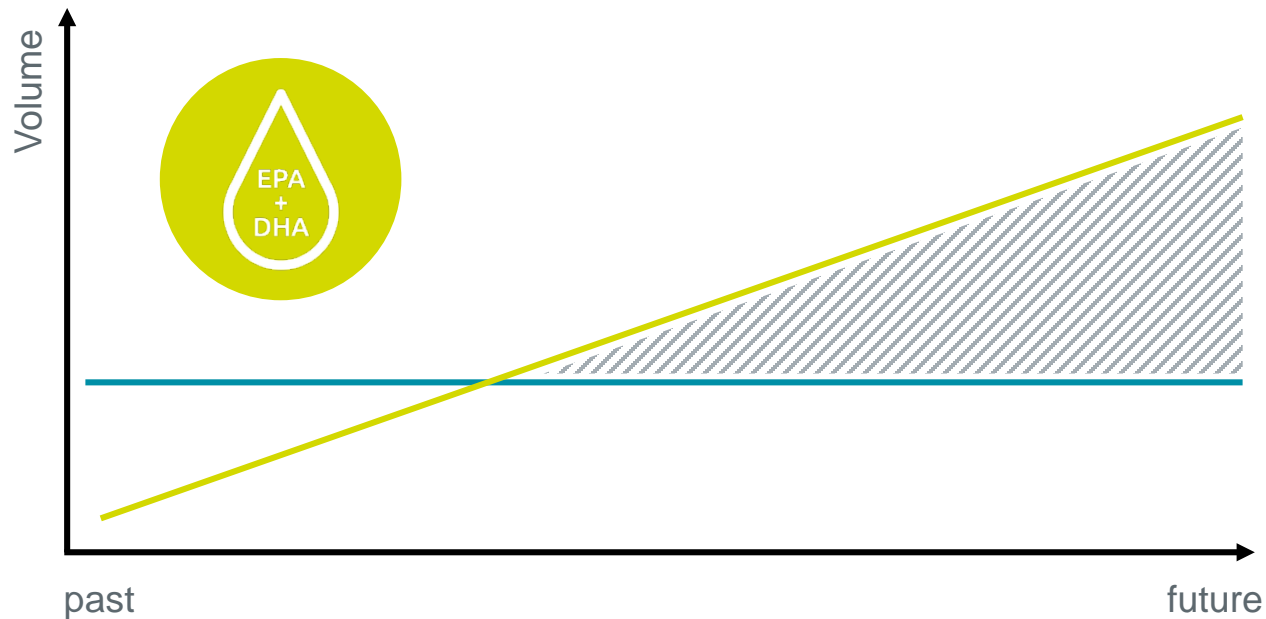
Prof Douglas Tocher  
Stirling University

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# The challenge : supply of omega-3 from fish oil will limit growth of aquaculture industry & availability of EPA+DHA for human consumption

## Emerging gap between supply and demand for omega-3



### Increasing demand for EPA+DHA

- Aquaculture growth & biological requirement
- Consumer demand for healthy nutrition

### Supply-Demand-Gap

- will emerge in the near future

### Limited supply of fish oil as source of EPA+DHA

- <1 million tons of FO per year
- <90KT EPA+DHA

Meeting the demand for omega-3 fatty acids solely from fish oil is not sustainable.

A photograph of an astronaut in a white spacesuit standing on the moon's surface. The astronaut's helmet visor reflects the lunar landscape. A large yellow circle is overlaid on the left side of the image, containing the text 'MISSION IMPOSSIBLE?'. A yellow horizontal line is at the top right. Several white crosshair markers are scattered across the moon's surface.

**MISSION  
IMPOSSIBLE?**

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**Luckily not!**

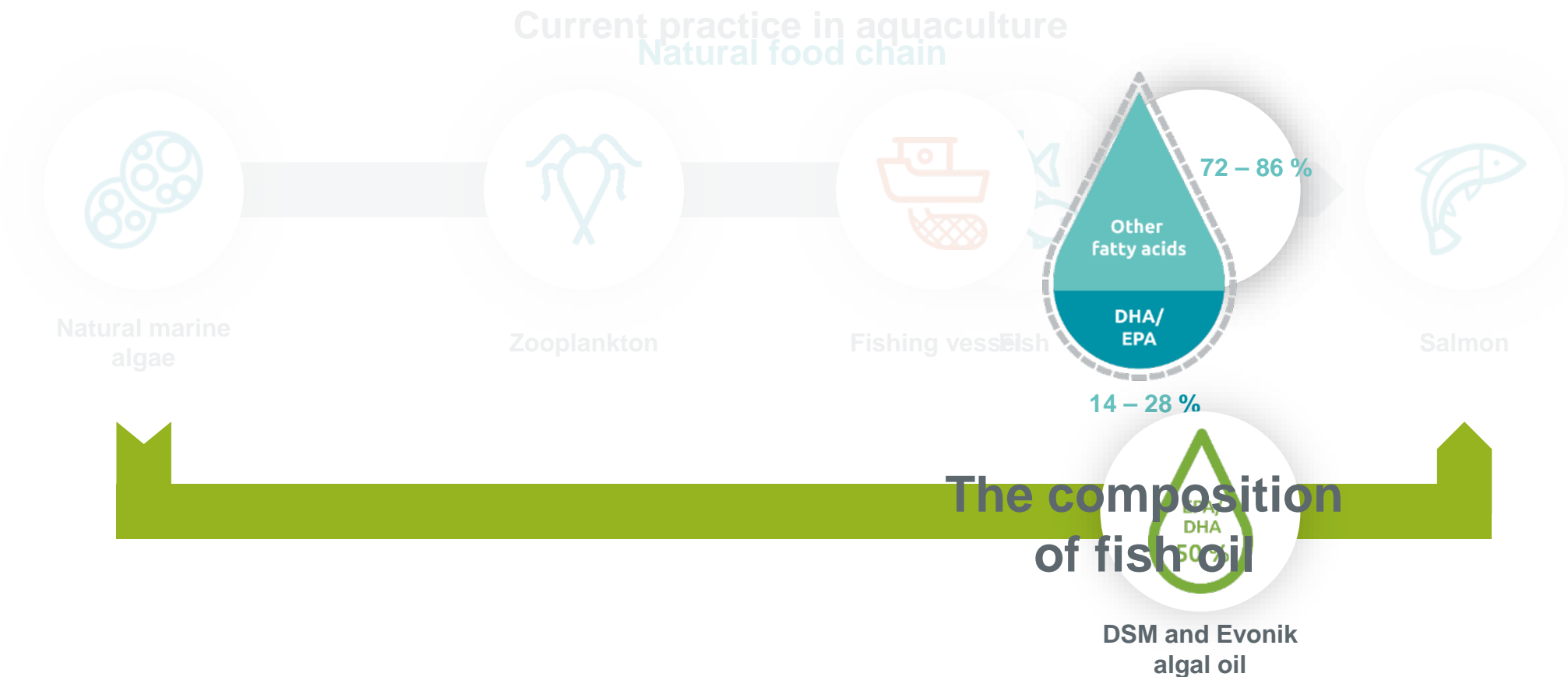
**Natural marine algae is just another  
step for mankind !**

# Oil boom in Nebraska



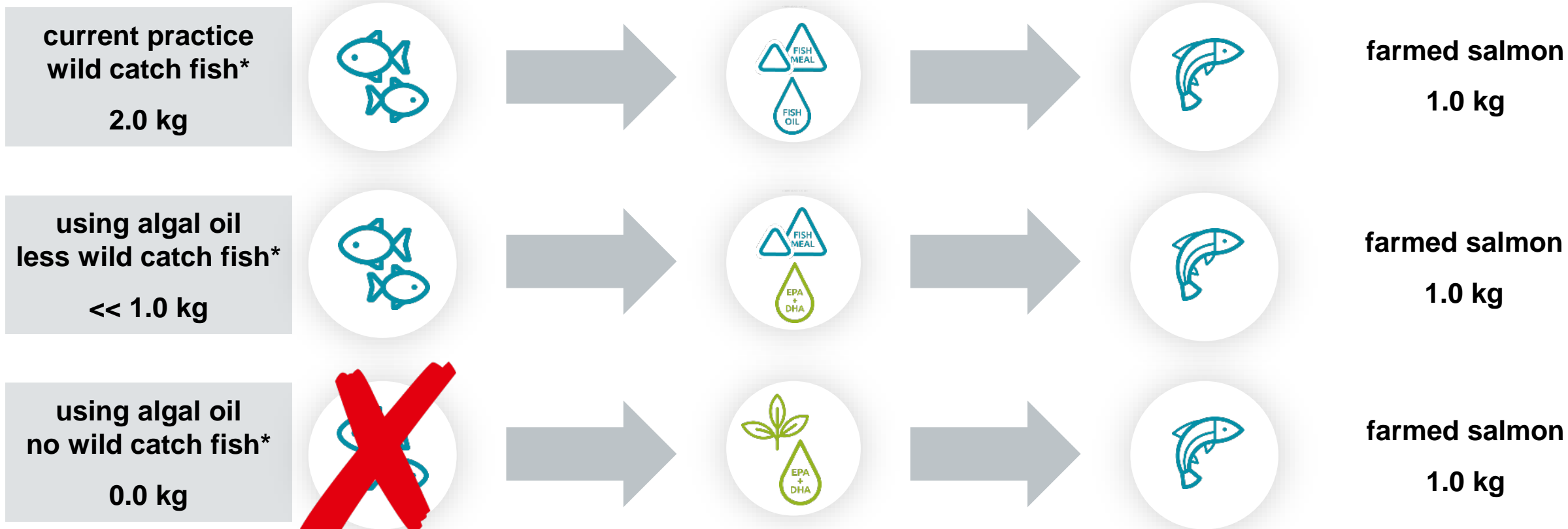


# What is all the fuss about ?



**DSM and Evonik breakthrough – shortening the natural food chain**

# The result is a net fish producer.

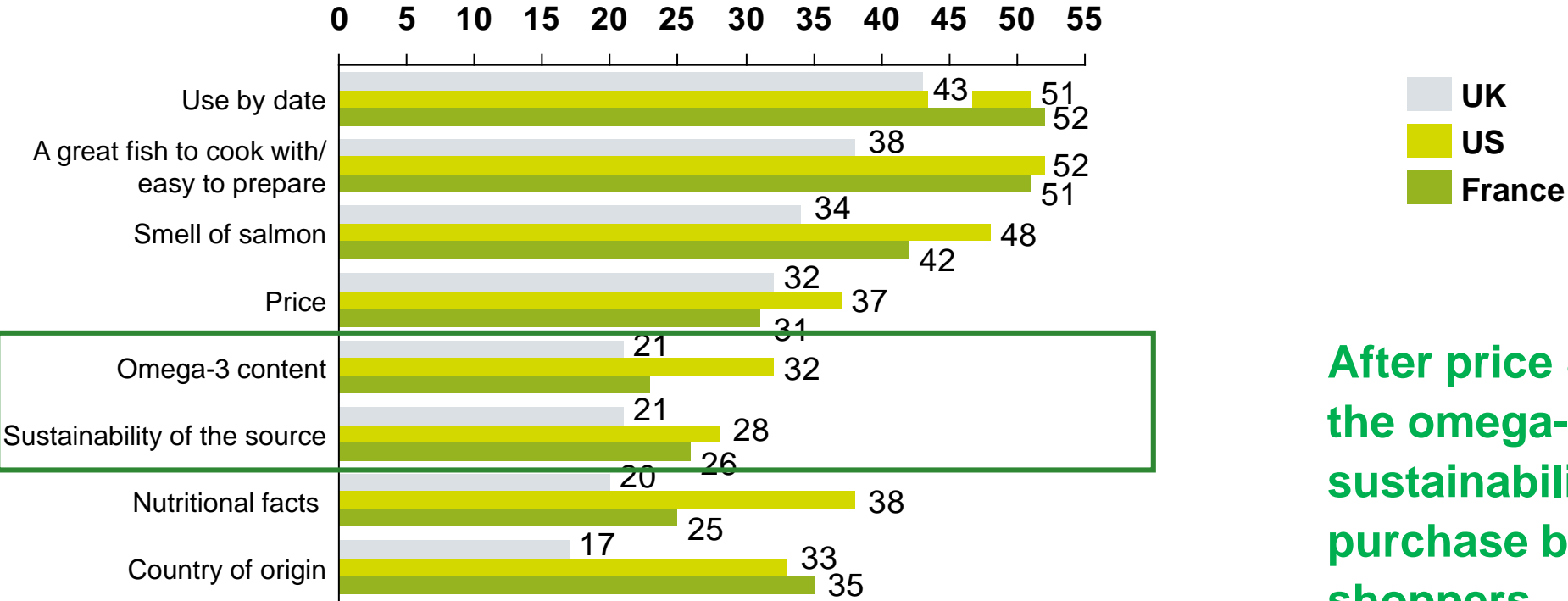


Algal oil from natural marine algae

\* Forage Fish Dependency Ratio (FFDR) | trimmings excluded

# Compelling reasons consumers choose salmon

% of salmon consumers indicating this is a key reasons for the final salmon product they purchase (top box – “extremely important”)



After price & country of origin, the omega-3 content and sustainability are a driving purchase behavior for salmon shoppers.

14 Question: How important each of the statements are with regards to the final salmon product you will purchase - The salmon is pre-packed/select portion size/country of origin, wild sourced, farmed sourced, price, nutritional information, smell, appearance, use by date, sustainability, information on methods, Omega-3 content, DHA+EPA content, Brand name, store display  
 Notes:  
 Source: Veramaris Value Chain Studies 2016







# Making informed choices



**Salmon, a tasty way to stay healthier**

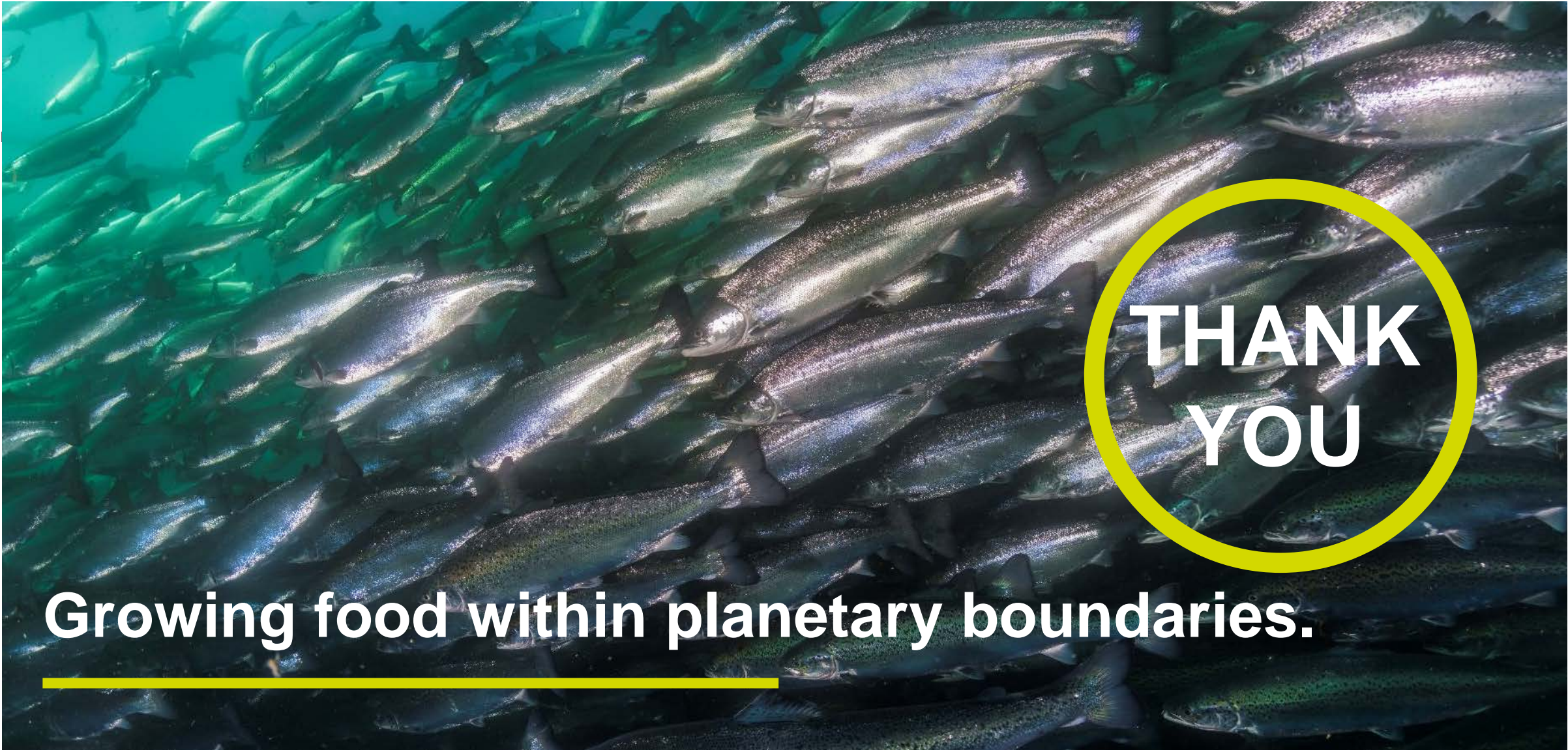
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**Every adult needs at least 250 mg of Omega-3 EPA and DHA daily to maintain heart, brain and eye health**

MAXIMUM  
NUTRITION  
MINIMAL  
IMPACT







**Growing food within planetary boundaries.**

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