

# Tomorrow's aquaculture...

Frode Mathisen, AIW Miami December 2018



*“There are **known knowns**; there are things we know we know.  
We also know there are **known unknowns**; that is to say,  
we know there are some things we do not know.  
But there are also **unknown unknowns** –  
the ones we don’t know we don’t know...”*

*Donald Rumsfeld*

News briefing on February 12, 2002 about the lack of evidence linking the government of Iraq with the supply of weapons of mass destruction to terrorist groups...

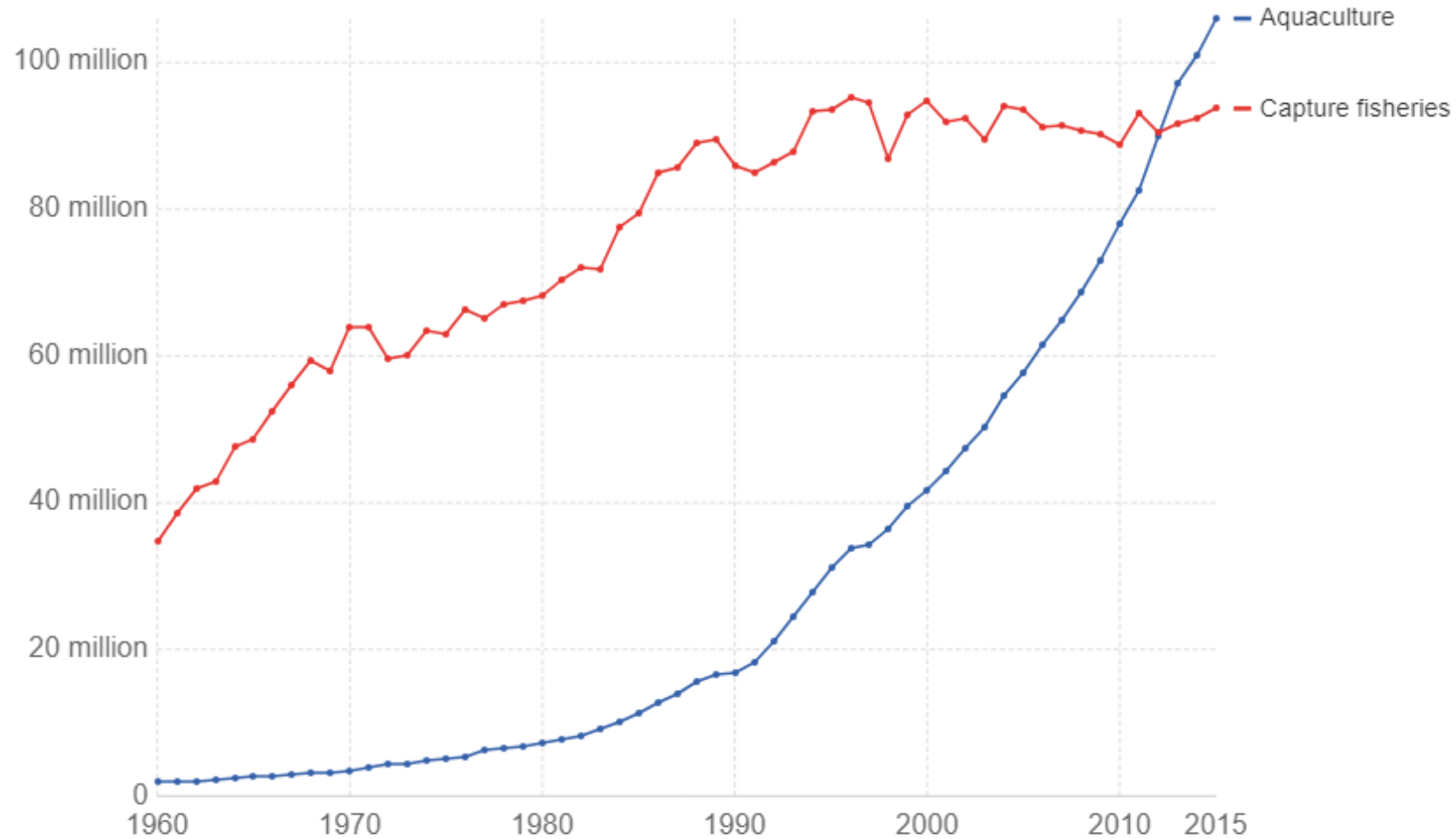
	FOOD	IMPACT (GHG emissions per gram of protein)	COST (Retail price per gram of protein)
LOW	Wheat	<div><div></div></div>	\$
	Corn	<div><div></div></div>	\$
	Beans, chickpeas, lentils	<div><div></div></div>	\$
	Rice	<div><div></div></div>	\$
	Fish	<div><div></div></div>	\$\$\$
	Soy	<div><div></div></div>	\$
	Nuts	<div><div></div></div>	\$\$\$
	Eggs	<div><div></div></div>	\$\$
MEDIUM	Poultry	<div><div></div></div>	\$\$
	Pork	<div><div></div></div>	\$\$
	Dairy (milk, cheese)	<div><div></div></div>	\$\$
HIGH	Beef	<div><div></div></div>	\$\$\$
	Lamb & goat	<div><div></div></div>	\$\$\$



## Capture fisheries vs. aquaculture (farmed fish) production, World

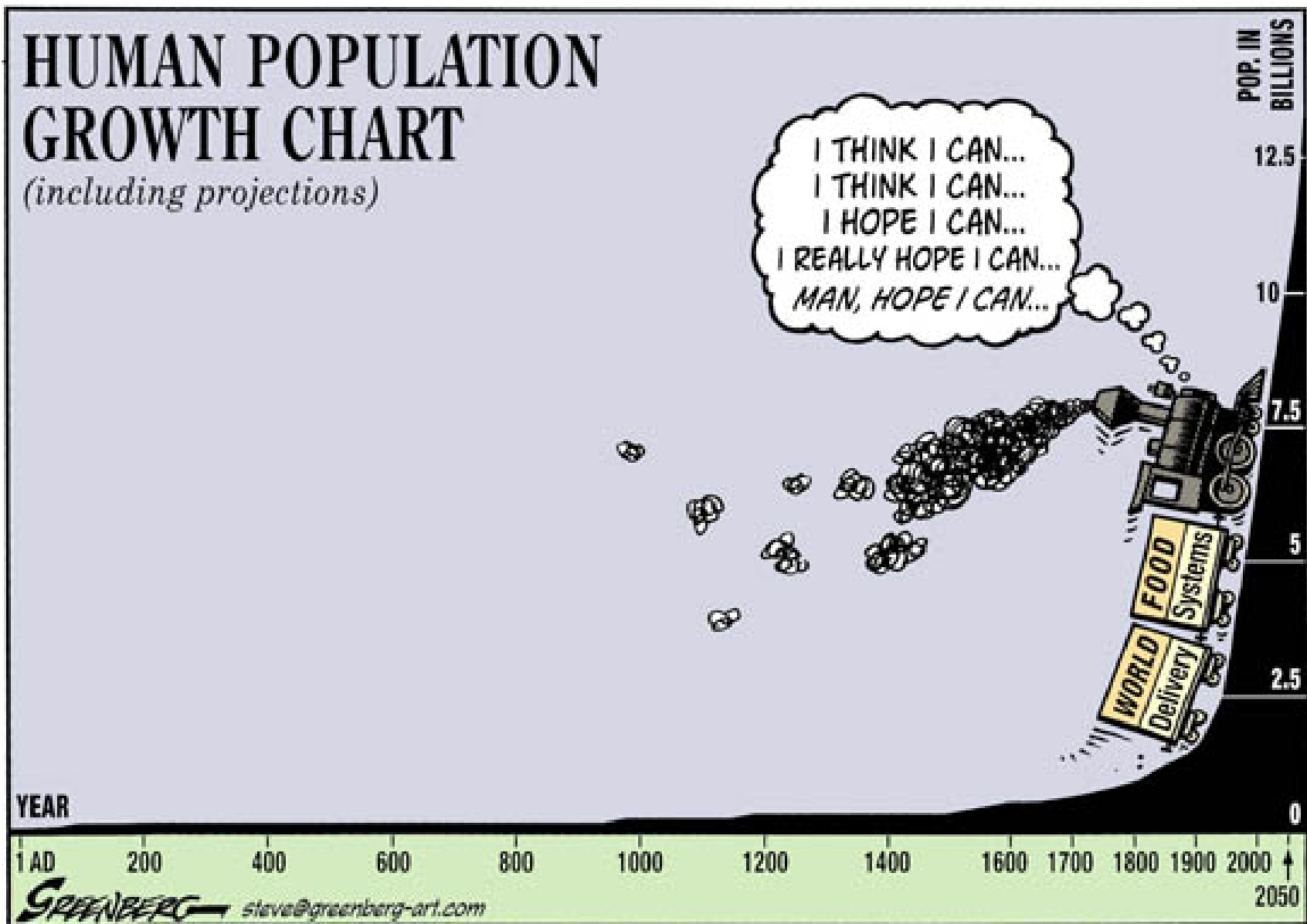


Annual production of seafood from wild-catch fisheries and aquaculture (farmed seafood) practices, measured in metric tonnes per year. Data is inclusive of all aquatic species, including aquatic animals and plants.



Source: World Bank- World Development Indicators

[OurWorldInData.org/meat-and-seafood-production-consumption/](https://ourworldindata.org/meat-and-seafood-production-consumption/) • CC BY-SA

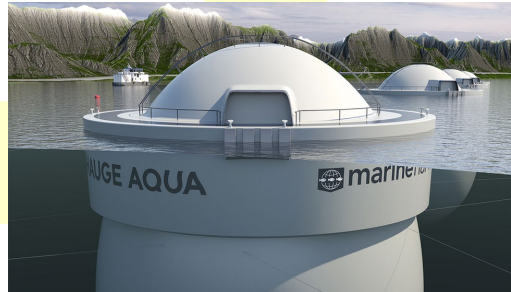




“Closed”



“CAPEX”



**ORIGINAL**





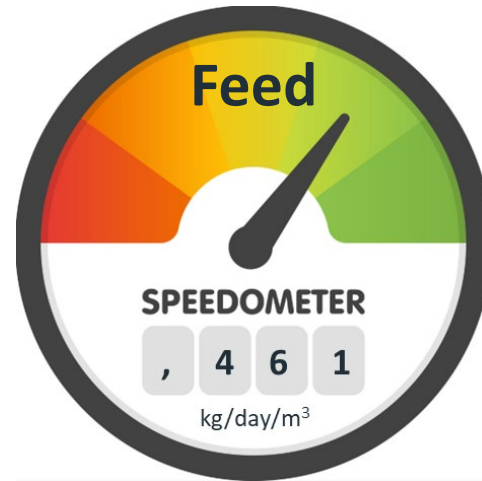
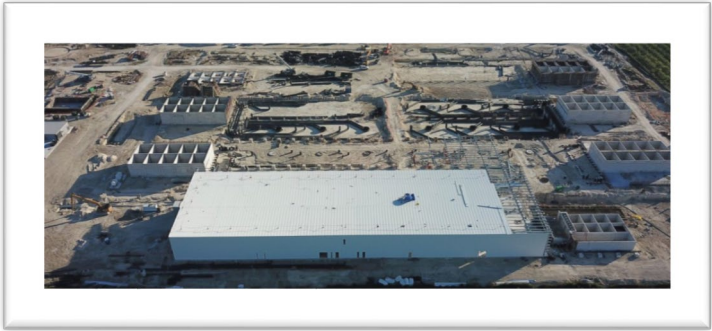


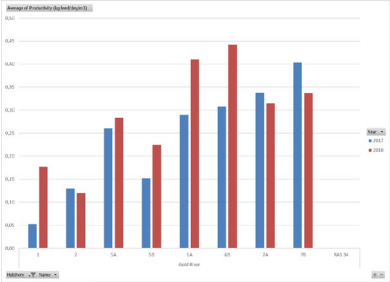
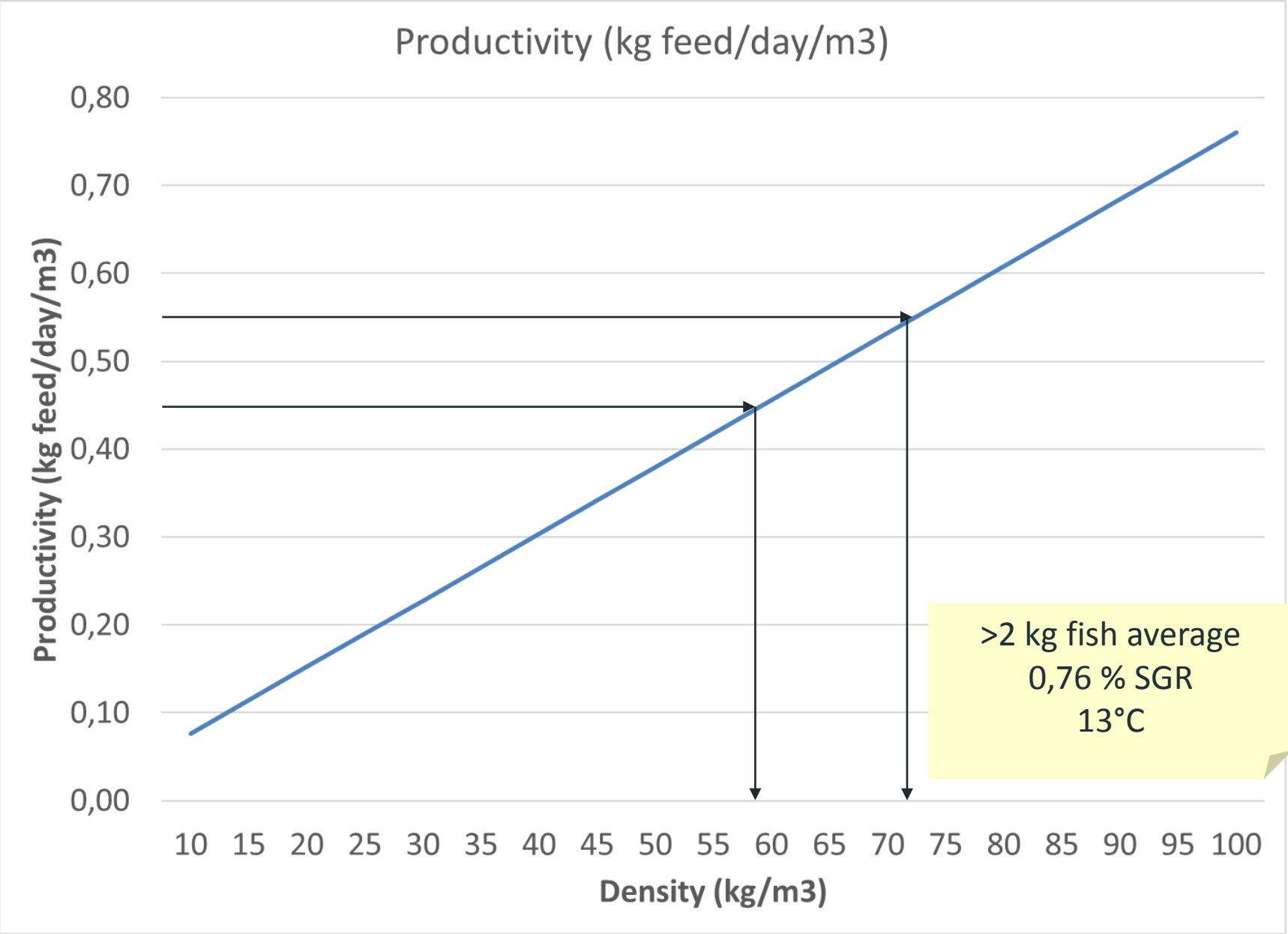
Our findings show that two-thirds of these companies – 60% – are either not managing critical risks or are failing to disclose basic information.

In general, aquaculture companies lead the animal proteins sector in the quality of their reporting of critical sustainability issues. Europe-based aquaculture producers – Marine Harvest, Lerøy Seafood and Bakkafrøst – display management best practice and disclosure across all eight scored risk factors. In the terrestrial animal protein sector, Fonterra, Cranswick and Charoen Pokphand Foods achieve the highest scores for their disclosure and management.



Largest global companies		9 risk factors	22 KPIs
Environmental, social and governance issues			
1	Greenhouse gas emissions	Disproportionate amount of GHGs generated by livestock makes companies engaged in factory farming vulnerable to regulatory and social pressures to reduce emissions	13
2	Deforestation and biodiversity loss	Global movements tracking forest loss target factory farming companies and can lead to shareholder divestment and / or weaken customer loyalty	14
3	Water scarcity and water use	Beef, pork, dairy, and poultry companies consume large quantities of water both directly and indirectly via their purchase of animal feed	15
4	Antibiotics	Drug-resistant infections are a serious public health threat which will likely impact productivity on a national scale	3
5	Waste and water pollution	Companies are facing greater scrutiny about the impact of waste on surrounding communities and the environment, meaning potential fines and regulation	6
6	Working conditions	Operational risks, which can involve worker injuries and reputational risk, as well as food product contaminated by sick workers	8
7	Food safety	A series of high profile food safety incidents across the globe have focused consumer concerns on threat of food contamination and foodborne illnesses	2
8	Sustainable proteins	Company's reliance on animal protein sources and strategy for protein diversification	3
9	Animal welfare	Poor animal welfare presents operational and reputational risks for companies	12



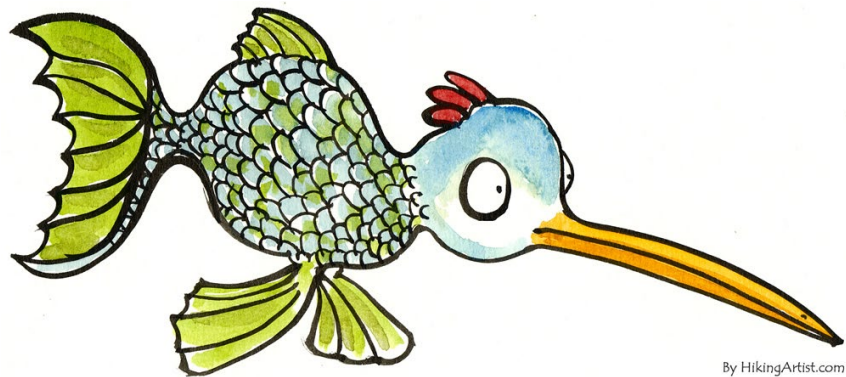
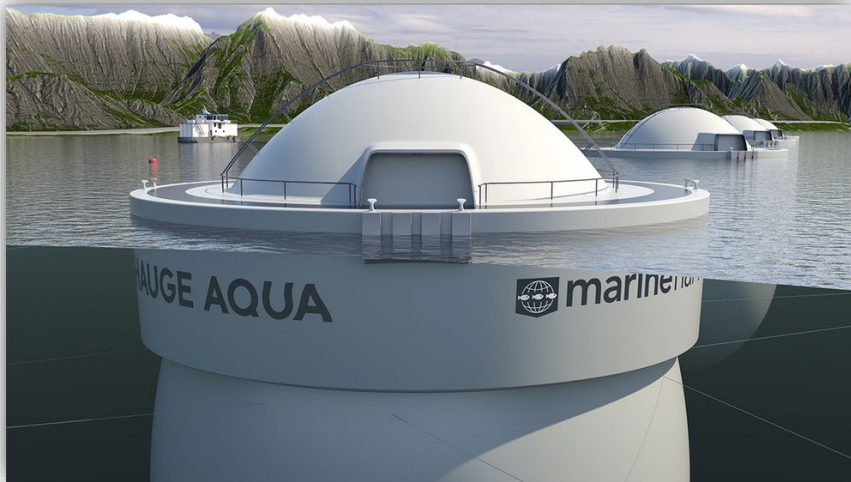


# Land based is not governed by nature...



«We used years on site selection. I don't see any comparative advantages for Norway. We will not consider to start land based aquaculture in Norway – neither in Chile...»

*Johan E. Andreassen to* **iLaks.no**



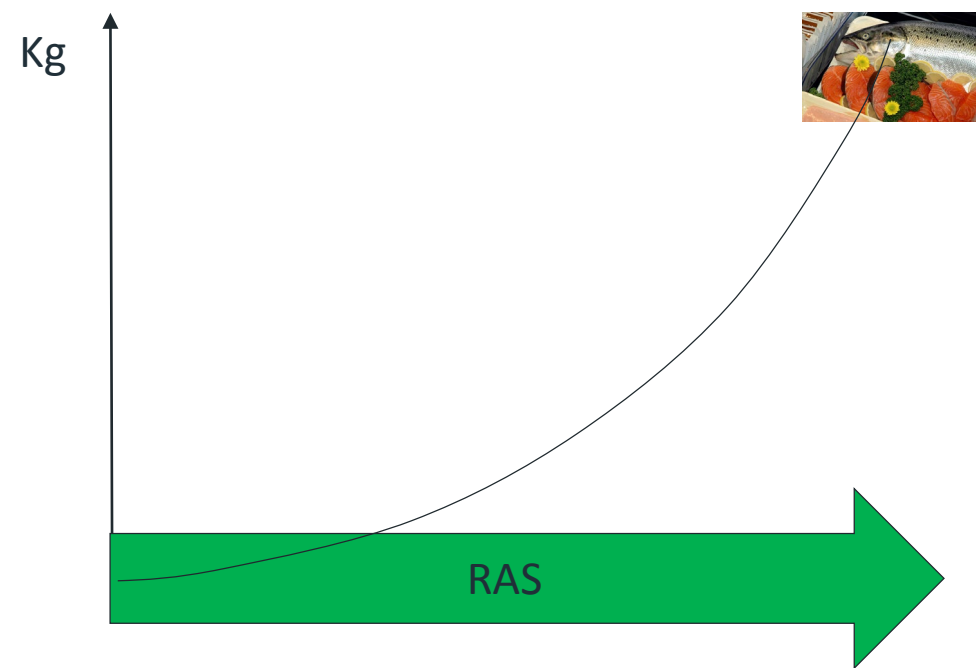
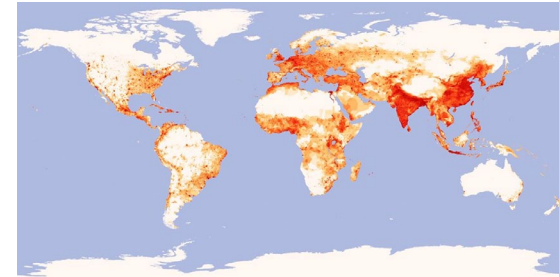
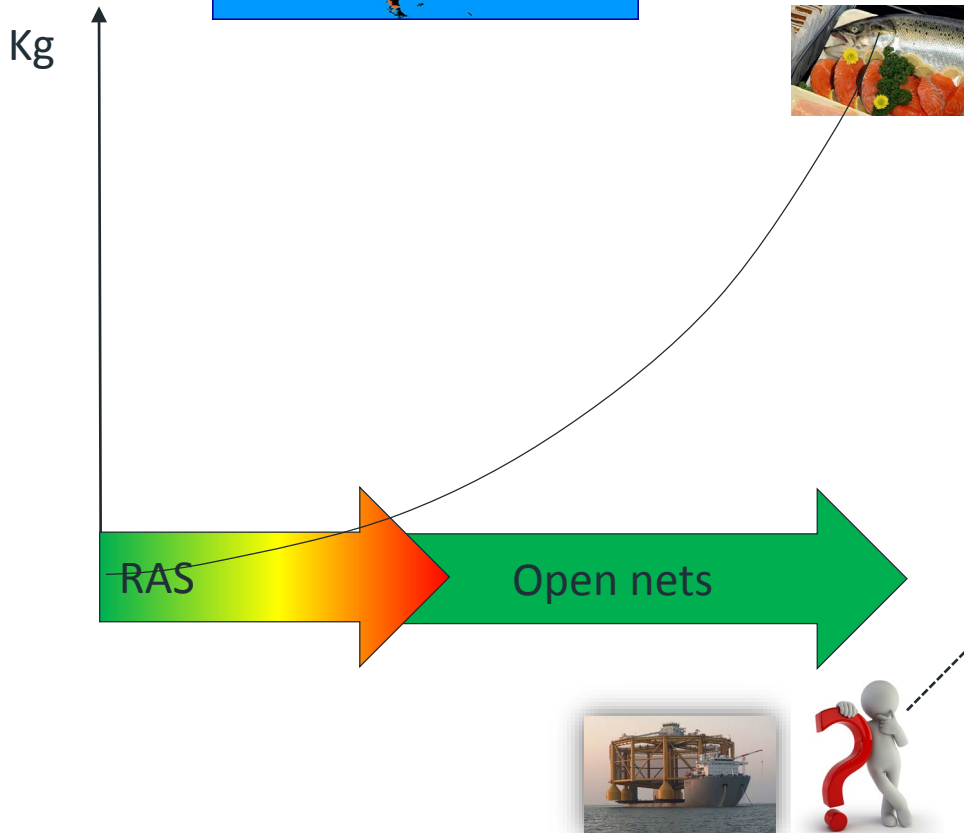
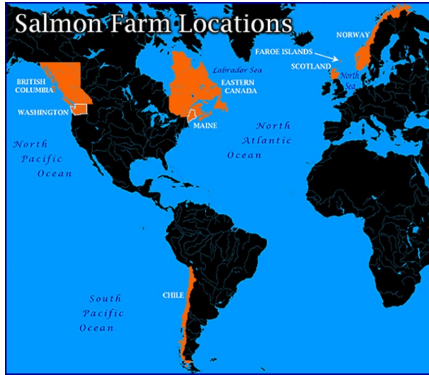
By HikingArtist.com

### What is **Productivity**?



*Productivity is expressed or measured as a mathematical division of following parameters (functions).*

$$\text{Output} / \text{Input} = \text{Productivity}$$



# **When will the “open net guys” challenge Atlantic Sapphire, Nordic Aquafarms and others?**



# Free range...



Made by Frode Mathisen



Grieg Seafood



No one knows where  
the hare leaps...

# Oslo considers base-rate tax for entire industry

News by SalmonBusiness - 30 April 2018

**Norway's government has said it wants to study and eventually recommend a base-rate tax for aquaculture instead of the per-kilogram "salmon royalty" proposed weeks ago by a party not in the ruling coalition.**

A levy on exported whole fish had also proposed, but like the others, the government felt it would make investments and production unprofitable. Instead, a base-rate tax on concessions — both existing and the new growth allotments being auctioned — would, the government said, best serve the commons.

The government said it was already working on the new tax, which also affects trout concessions, and it hopes to have it in place by 2020. The new tax, it said, was being modelled on the Norwegian tax regime in place for small-scale hydro-power plant owners.





Land-based sprawl: a computer-generated image of Nordic Aquaculture's site in Belfast, Maine

Photo: courtesy Nordic Aquafarms

## Nordic Aquafarms release discharge estimates for indoor mega salmon farm at heated meeting

News by Owen Evans - 8 October 2018

## Opponents to Maine Nordic Aquafarms project seek to win political seats

News by Owen Evans - 4 October 2018

Effort to derail indoor mega-farm project.



**20,679 Physicians**  
say **LUCKIES** are  
*less irritating*

**I too prefer LUCKIES**  
because...

Toasting removes dangerous irritants that cause throat irritation and coughing

**"It's toasted"**  
Your Throat Protection—  
against irritation—against cough.



—and it's  
*ABC*  
for keeps—

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*B. BETTER TASTING*  
*C. COOLER SMOKING*

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**MORE DOCTORS SMOKE CAMELS**  
THAN ANY OTHER CIGARETTE

DOCTORS in every branch of medicine—113,397 in all—were queried in this nationwide study of cigarette preference. These leading research organizations made the survey. The gist of the query was—What cigarette do you smoke, Doctor?

The brand named most was Camel!

The rich, full flavor and cool mildness of Camel's superb blend of choice tobacco seems to have the same appeal to the smoking tastes of doctors as to millions of other smokers. If you are a Camel smoker, this preference among doctors will hardly surprise you. If you're not—well, try Camels now.

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T for Taste...  
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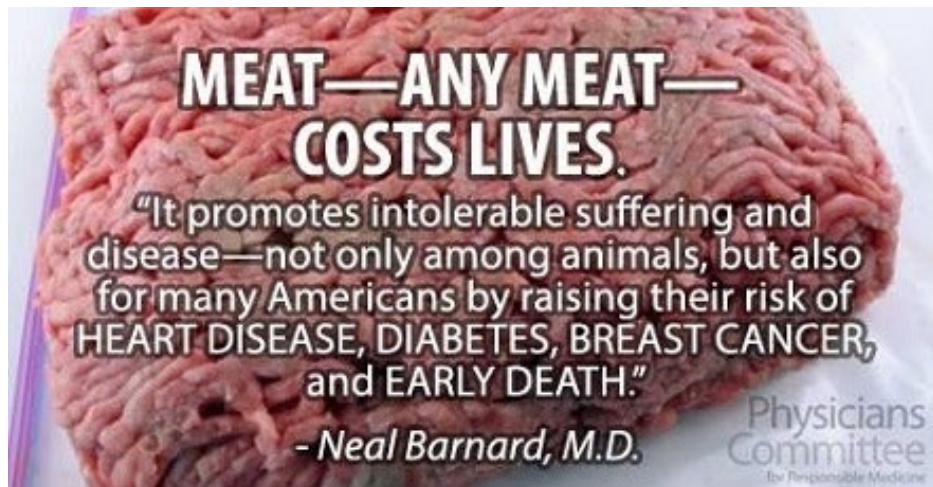
**WARNING:** Cigarettes  
cause fatal lung disease.



**WARNING:**  
Smoking can kill you.



**WARNING:**  
Cigarettes cause cancer.



Christiana Figueres: the woman tasked  
with saving the world from global warming



