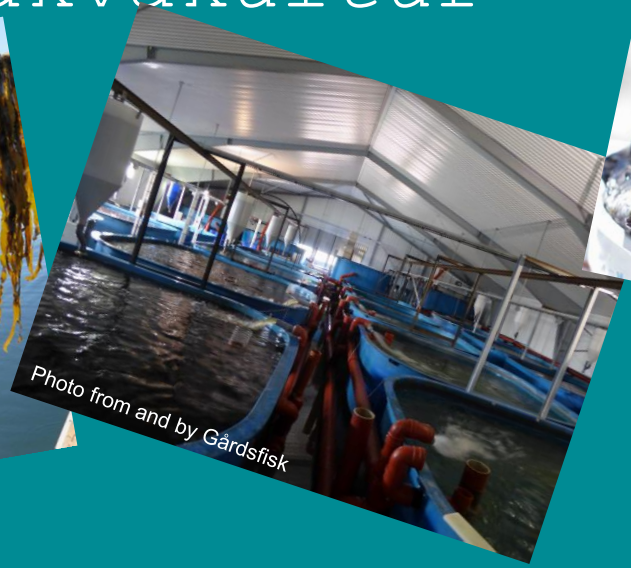
Næringsverdi og klimaaftryk for akvakultur



Friederike Ziegler, RISE Research Institutes of Sweden,
Dansk bioøkonomikonference 23 september, 2020

Interreg Baltic Sea Region

EUROPEAN UNION

EUROPEAN REGIONAL DEVELOPMENT FUND

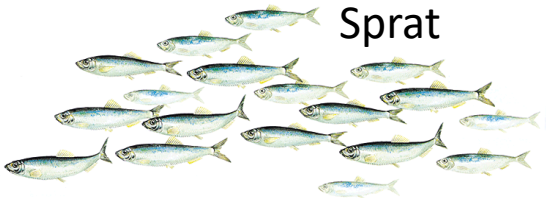
Blue Platform

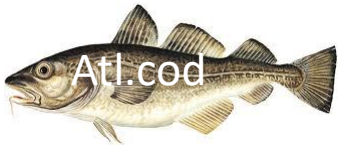
I will talk about

- Seafood, nutrition and climate impact
- Reduction opportunities
- Differences between farming systems

Question: Is farmed seafood less nutritious than wild-caught?

Nutrient density



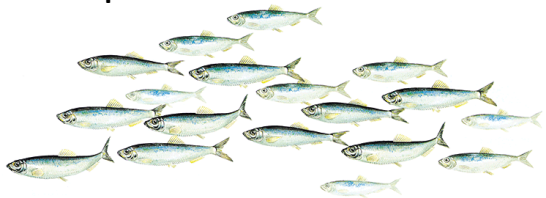


From Hallström et al. 2019 Combined climate and nutritional performance of seafoods J Cl Prod

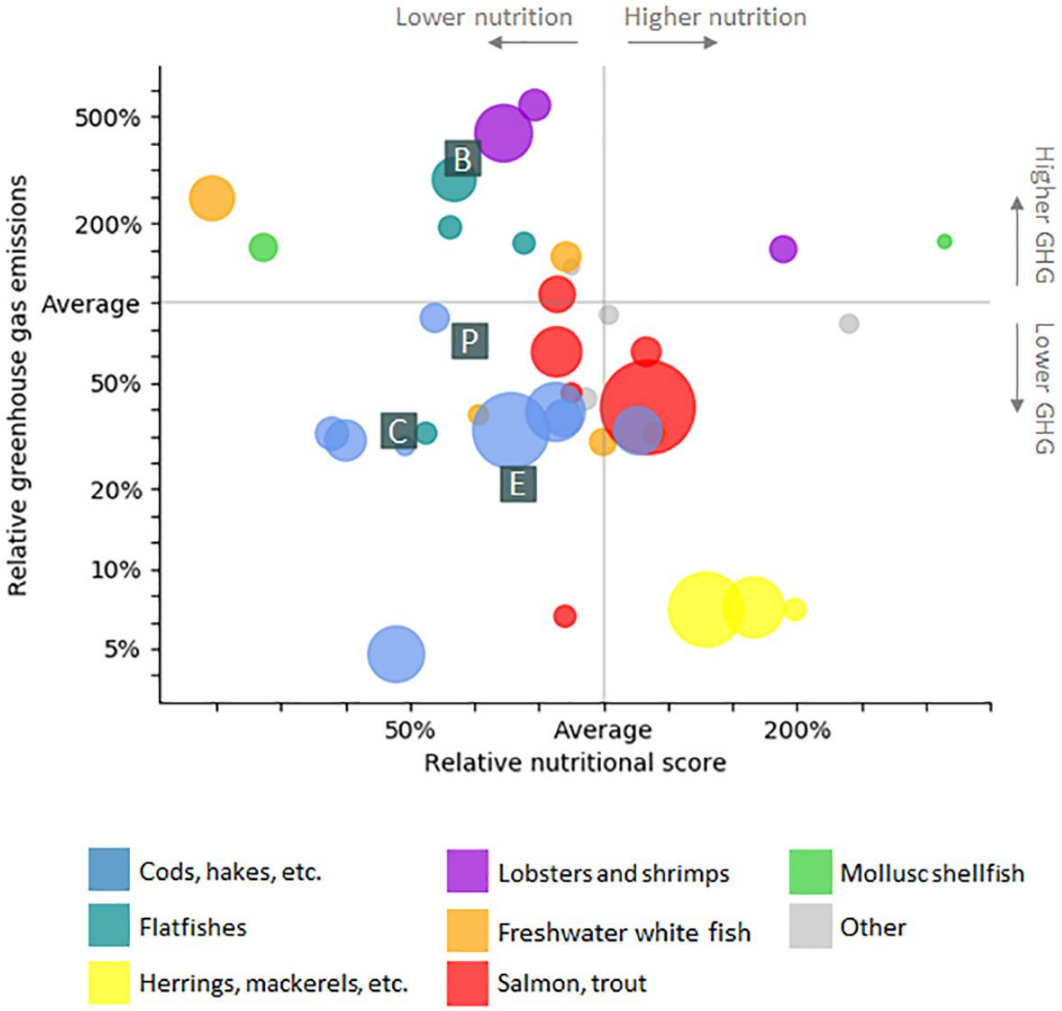
Illustrations (mostly): Sjömatsfrämjandet

Greenhouse gas emissions

Sprat



Illustrations (mostly): Sjömatsfrämjandet

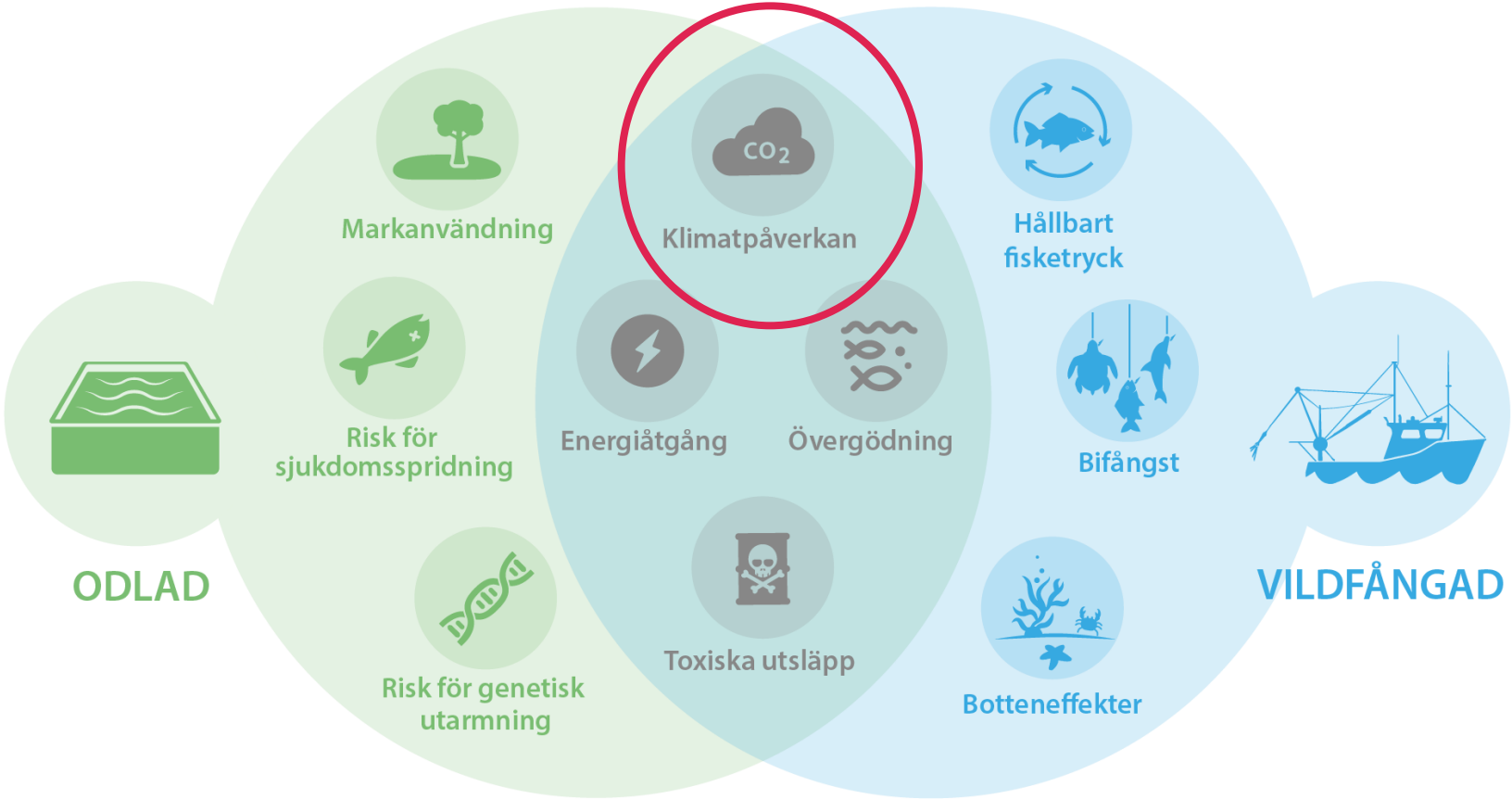


Hallström et al. 2019 Combined climate and nutritional perfromance of seafoods J CI Prod

(**Question:** Is farmed seafood less nutritious than wild-caught?)

Answer: No, it is the species more than production method that determines nutrition. Farmed seafood spans the range from lowest to highest nutritional content. The nutritional content of fed farmed seafood can to some extent be influenced through the feed.

Aquaculture versus Fisheries



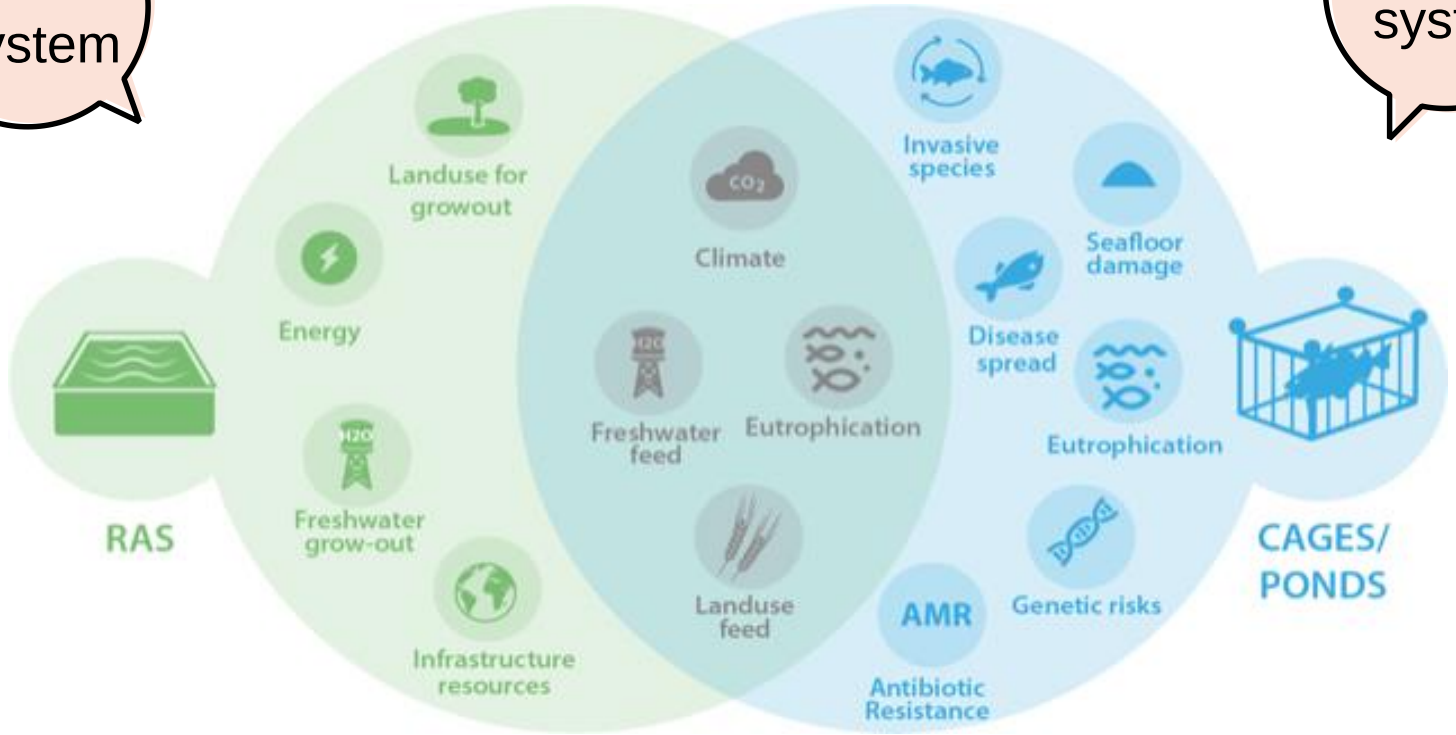
How reduce climate impact of seafood?

How reduce climate impact of seafood?

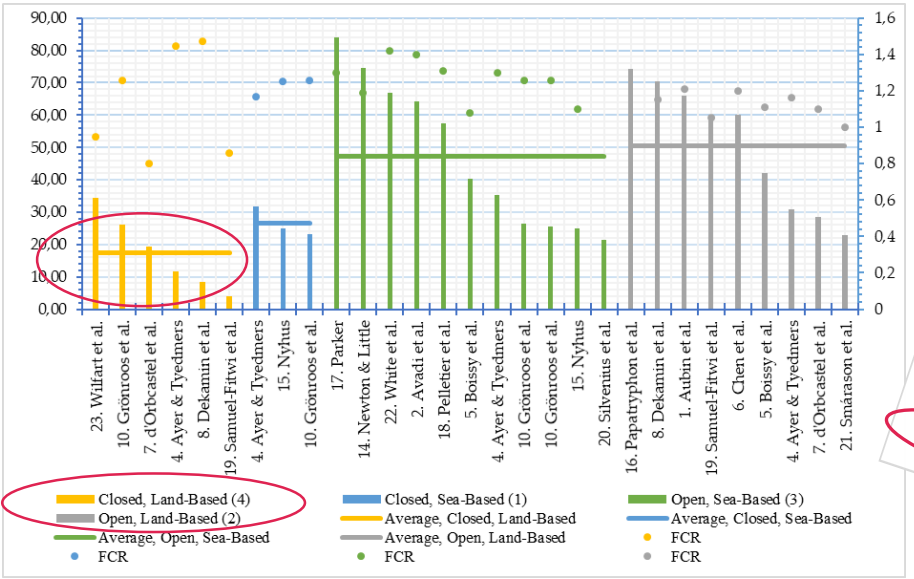
1. *Reduce feed and fuel use*
2. *Select low impact feeds*
3. Select/develop/optimize low impact fishing and farming technologies

Closed system

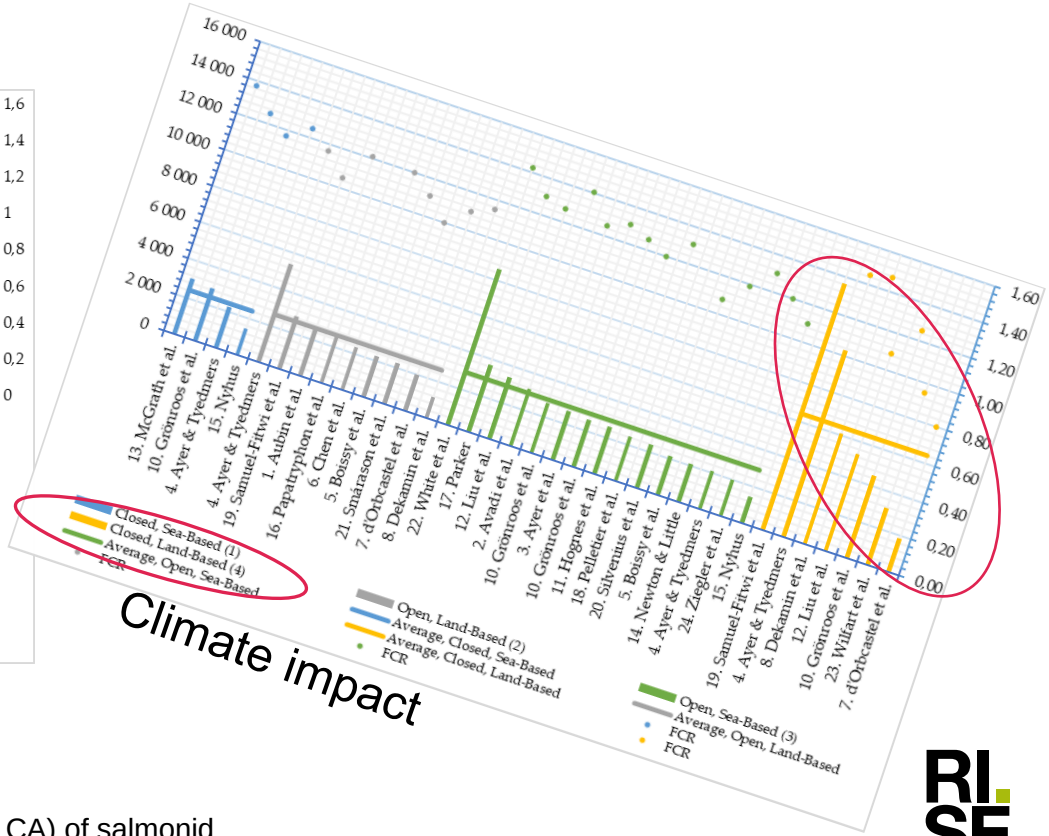
Open system



Environmental tradeoffs in aquaculture



Eutrophication



Climate impact

Philis et al. 2019 Comparing Life Cycle Assessment (LCA) of salmonid aquaculture production systems: Status and perspectives

But not always…
welcome to Gårdsfisk

Bergman et al. 2020

Environmental Science & Technology

pubs.acs.org/est

Article

Recirculating Aquaculture Is Possible without Major Energy Tradeoff: Life Cycle Assessment of Warmwater Fish Farming in Sweden

Kristina Bergman,* Patrik J. G. Henriksson, Sara Hornborg, Max Troell, Louisa Borthwick, Malin Jonell, Gaspard Philis, and Friederike Ziegler

Cite This: https://dx.doi.org/10.1021/acs.est.0c01100

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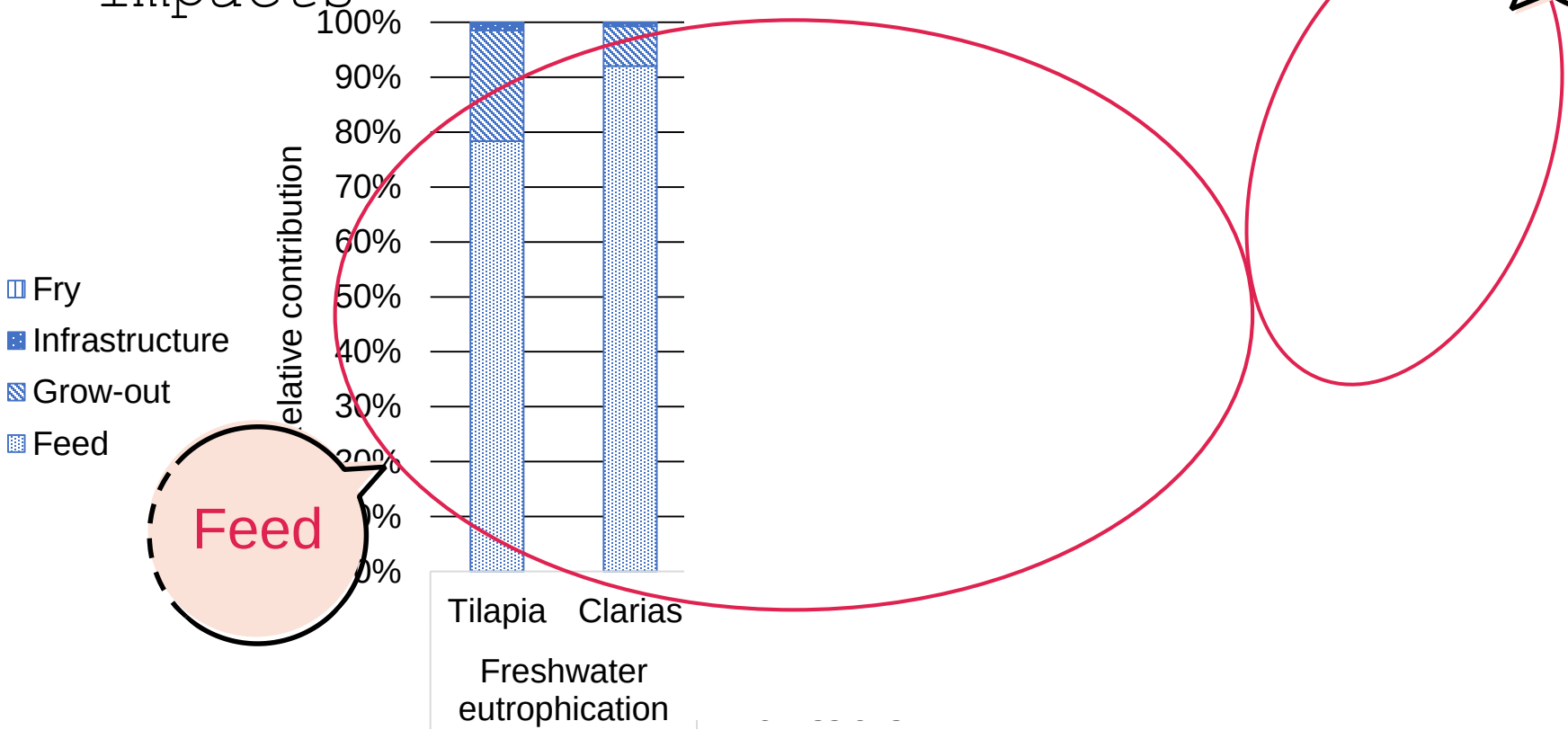
ABSTRACT: Seafood is seen as promising for more sustainable diets. The increasing production in land-based closed Recirculating Aquaculture Systems (RASs) has overcome many local environ-

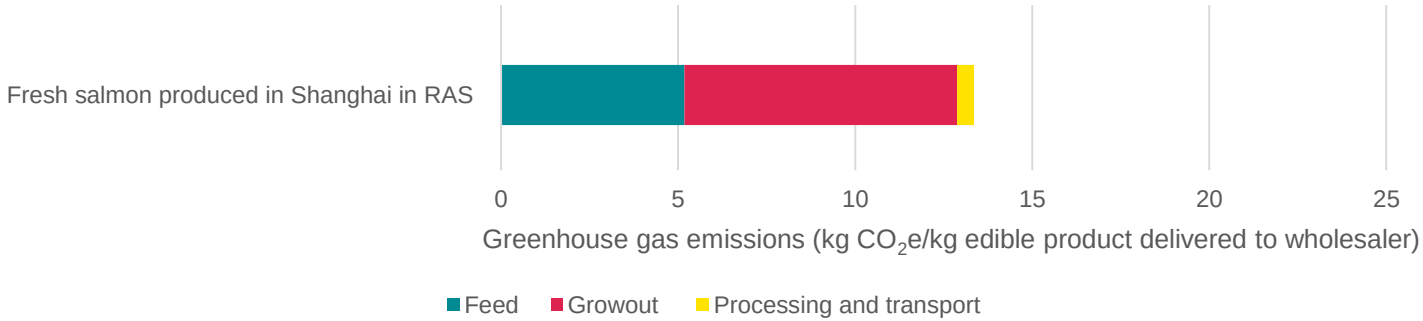
Environmental pressures associated with different aquaculture systems

Contribution of different steps to tot
impacts



Supply chain thinking

What do we compare?



Sources: Winther et al. 2020 and Skontorp Hognes et al. 2017

Conclusions

- Nutrition depends more on species than production technology
- Feed dominates the climate impact of fed aquaculture
- Landbased aquaculture has many advantages- and to minimise climate impact- choose feed, energy source and materials carefully! And use as much as possible of your product for food

Thank you! Questions?

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46 704 205609

What is ”low impact feed

- Feed that does not require intensive feed itself (!)
- …is not produced in an energy-intensive fishery or farming system
- …uses renewable energy
- …gives a high yield
- …has a high nutrient content, especially of critical nutrients (e.g. fatty acids, minerals)
- …has a high palatability and positive health effects on the fish

Illustrations (mostly): Sjömatsfrämjandet

Scallop

Shrimp

European lobster

Oyster

Atl.cod

Alaska pollock

Perch

Atl.salmon

Herring

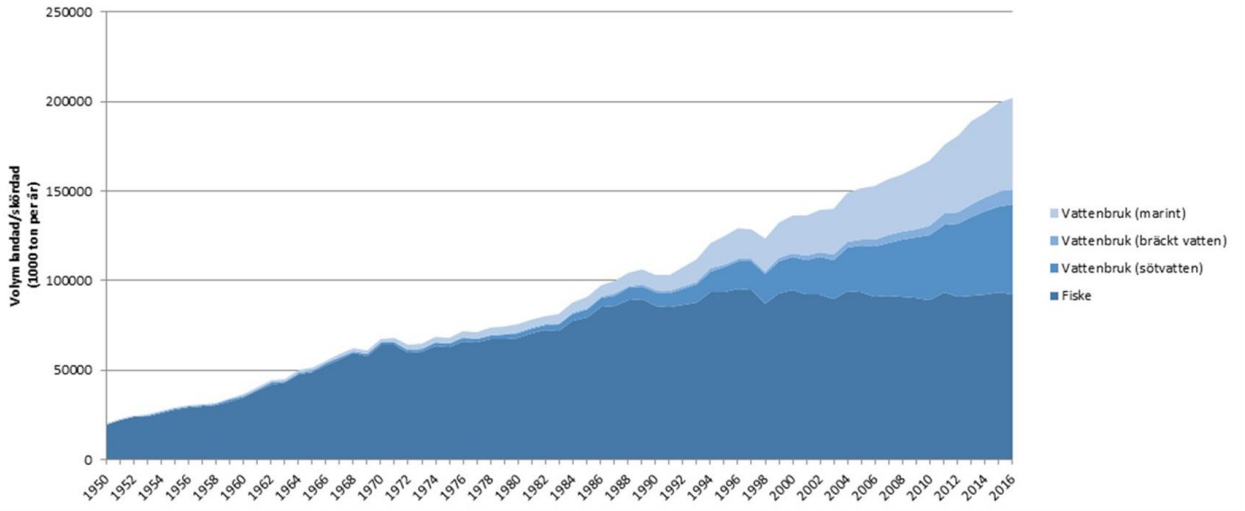
Sprat

Mackerel

Greeenhouse gas emissions

Nutrient density

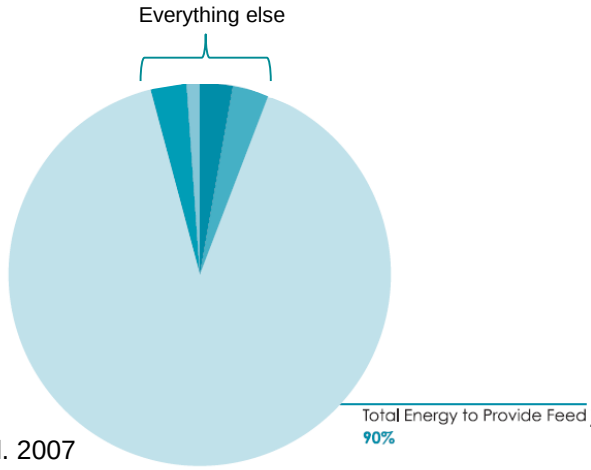
Seafood is growing- and could grow more (much more)



Costello et al. 2019 The future of food from the sea https://oceanpanel.org/blue-papers/future-food-sea
Costello et al. 2020 The future of food from the sea https://www.nature.com/articles/s41586-020-2616-y

Drivers of seafood climate impact

Mc Grath et al. 2015 ES&T



Tyedmers et al. 2007

	CEU (GJ)	BRU (kg C)	GHG Em. (kg CO_2-e)	Acd. Em. (kg SO_2-e)	Eut. Em. (kg PO_4-e)
Norway	26.2	111,100	1,790	17.1	41.0
UK	47.9	137,200	3,270	29.7	62.7
Canada	31.2	18,400	2,370	28.1	74.9
Chile	33.2	56,600	2,300	20.4	51.3
Average[1]	31.1	89,400	2,160	20.4	49.3

Feeds · Smolts · Farm Energy · Farm N/P Emissions

Pelletier et al. 2009

Ziegler et al. 2016

Avadí et al. 2013

Ziegler et al. 2013 J Cl Prod

Ziegler et al. 2013 J Cl Prod