

Nordic Climate Change Forum for Fisheries and Aquaculture

III NMTT-ICES Workshop

“Consumers and Climate Change”

January 16, 2025, Hotel Marine Plaza, Helsingborg, Sweden

Content

AVM summary1

Setting the Scene.2

 Opening, introductions and background by NMTT and ICES.....2

 Latest news on our understanding of how climate change affects fisheries and aquaculture and possible mitigation and adaptation policies.2

 Climate impact of our diet and the role of seafood.4

 Marketing sustainability, environmental and climate aspect – legal framework and enforcement practices.....5

Life Cycle Assessment and carbon labelling in the Nordics.6

 Setting the scene: on harmonizing of LCAs, recent advances and further research needs for LCAs of seafood.6

 Current status on Product Environmental Footprint Rules (PEFCR) for marine fish for human consumption (unprocessed).7

 Practical lessons from the use of LCA in the seafood industry: How do we get it done and get value from the exercise? other industries/How to deal with a challenging aquaculture and fisheries supply chain7

 Norway’s NewTools project (project by Folkehelseinstituttet, Norway), Developing scores for the environmental and social sustainability of foods.8

 Iceland Country Case: Carbon Footprint of Icelandic Food!.....8

Understanding consumer awareness and changing buying habits.9

 Sweden’s Mistra Sustainable Consumption project and how taxes can be used to change consumer behaviour.9

 A fish processors view on labelling for sustainability, food intake and CO2.9

 Do consumers care about labelling for climate change?9

 A fisher organisation perspective on CO2 taxes and carbon labelling.10

AVM summary

On 16 January 2025 I participated at the International Council for the Exploration of the Sea (ICES) / Nordic Marine Think Tank (NMTT) 3rd workshop for Nordic Climate Change Forum for Fisheries and Aquaculture in Helsingborg, Sweden.

The workshop focused on the impact of fishery on climate change and vice versa; on measuring climate impact, especially using life cycle assessments, on communication to consumers and consumers' behaviour in terms of climate impact and labelling.

The most relevant topics for Kangamiut are those relating to our scope 3 carbon emissions; that is, those emissions that are found in our upstream and downstream value chain and for us probably constitute >99% of our greenhouse gas (GHG) emissions.

Life cycle assessments, LCAs, (if done properly) measure the carbon emissions through the entire life cycle of a product, but a major gap in seafood LCAs is the lack of inclusion of emissions from the release of organic carbon created from the disturbance of the seabed from trawling as well as inclusion of data on carbon sequestration from the build up of carbon in the fish themselves. Especially the emissions from the seabed are a matter of much uncertainty and debate. First of all, it is very difficult to measure, and second, the available studies show divergent results although the majority show a significant contribution of trawling to GHG emissions.

LCAs as a measurement tool was widely discussed and linked to the upcoming CSRD reporting where LCAs were proposed as a central tool given the fact that they measure not only carbon emissions but also land use change and many other environmental impacts. However, the biodiversity dimension is not (yet) included in LCAs.

The importance of truthful and precise communication of environmental, social and ethical claims were discussed; for Kangamiut this is mostly relevant in the context of our websites, LinkedIn communications and Seafood Expo booths.

My complete notes from the workshop including relevant references are available below. Enjoy!

Setting the Scene.

Moderated by Carl-Christian Schmidt

This opening session will provide an update on the latest climate change science as it relates to the fisheries sector and a brief review of mitigation and adaptation policies. What are the implications for the fishing and aquaculture industries? The session will also look at the megatrends of food consumption and provide insights on the role of marketing law.

Opening, introductions and background by NMTT and ICES

Carl-Christian Schmidt

Nordic Marine Think Tank (NMTT) established 2012 – meeting 4 times/year to discuss issues within fisheries and aquaculture. A full report will be published after the meeting.

Latest news on our understanding of how climate change affects fisheries and aquaculture and possible mitigation and adaptation policies.

David Reid, Chair ICES Science Committee.

The International Council for the Exploration of the Sea (ICES) provides advice on +100 fish stocks to the European Commission. See <https://www.ices.dk/Pages/default.aspx>.

ICES was established 120 years ago → huge amount of fisheries/stock data collected over time.

Changed title of presentation: Climate change, carbon budgets and fisheries: interacting effects

ICES strategic initiative on climate change impacts in marine ecosystems.

Ocean changes with impact on fisheries: Ocean heat content (up), ocean pH (down), ocean oxygen (down).

Topic for talk: Climate change impact on fisheries and *vice versa*.

All stock assessments are designed for a world of variation but not for trends and bias – and climate changes are trends rather than natural variation, so it undermines our understanding of ecosystems. Modelling of fish stocks is based on what we have seen, not on what we haven't seen yet → uncertainties in stock assessments.

Impact of climate change on fisheries

Fishery population changes: Spatial distribution; productivity; growth; phenology (timing of life history). The spatial distribution changes are attracting the most attention.

Changes in spatial distribution do not (necessarily) change the stock size, but only where the stock is located – and stock assessment is often based on the original distribution adding another level of uncertainty. Changes are not unidirectional for all species, i.e. species do not necessarily move north – some move into deeper waters and some even move south.

Reference: Pinsky and Mantua on shifts in distribution of Atlantic Mackerel. The mackerel was not present in Icelandic zone in 1996, but 'all over the place' in 2010. Probably two causes: A stock that is doing well and spreading, and a stock that can live in new zones due to climate change.

Productivity changes according to sea surface temperature, and it's unidirectional.

Phenology: Many species start spawning earlier with higher temperatures. **Reference:** See McQueen & Marshall 2017. Changes in currents etc change larval dispersal.

Growth: Warmer waters lead to faster growth, but this requires a lot of energy, meaning you get a possibly larger population but with smaller and thinner fish. Smaller fish tend to produce less eggs and less viable eggs.

Fisheries impact on climate change

Fish and the biological carbon pump:

Report from workshop on assessing the impact of fishing on oceanic carbon – see ICES scientific report (David encourages us to write him to ask for the report). [Link to workshop info.](#)

A fish produces about 100 times its own weight in faecal matter in a lifetime → significant contribution to the organic seabed carbon content in addition to dead animals, plankton etc.

Metazoans sequester an enormous amount of carbon every year. Areas with high carbon release are coincident with areas of high fishing activity. Unfortunately, very little research on the carbon pump has been done on sea shelves where the vast majority of fishing takes place.

The higher in the feeding chain (predators), the less carbon sequestration.

Reference: Epstein et al. 2022- The impact of mobile demersal fishing on carbon storage in seabed sediment. *Global Change Biology*. [Link to publication.](#) A review of 49 studies investigating organic

carbon stocks. Counterintuitive results – some even show that in some areas fishing leads to an increase in ocean carbon storage.

Mitigation: Fishing in low carbon storage areas. Fishing where carbon stores are less sensitive. Leads to the idea of spatial fisheries management approach – carbon protection zones = closing off areas where you would see the highest amount of carbon release due to fishing.

Carbon emissions from fuel use in fishing: Fuel use increases even if world catches have plateaued because when stocks decline you need to use more fuel to find the fish.

Mitigation: Better, more fuel-efficient vessels; gear adaptations to less seabed contact; fishing behaviour – nearer fishing grounds; stock management – if we have healthier stocks, we automatically get more efficient fishing.

The area is extremely complex which makes policy making so much more difficult.

AVM personal communication with David Reid:

1. The carbon release from the seabed is worst for nephrod fisheries (i.e. the langoustines) as they are typically fishes in very carbon rich seabeds with gear that creates a lot of disturbance
2. **David encourages us to participate in the upcoming ICES workshop on the matter of carbon release from seabeds due to fishing - info on ICES website expected soon**
3. Various hypotheses as to why some fisheries may have a carbon sequestration effect rather than carbon release, but reasons not known at present
4. David is based in Copenhagen and very open to discussion!

Climate impact of our diet and the role of seafood.

Professor Elinor Hallström, National Food Institute, DTU, Denmark.

Global food system challenges: About 30% of total climate impact

In the Nordic countries the average person's diet carbon impact is 3 times higher than suggested per capita planetary boundaries.

Seafood accounts for about 3-11% of the total climate impact in Nordic diets – less for adolescents. Compared to 30-44% impact by red meat.

Seafood species with the highest climate impact are comparable to or even higher than locally produced beef whereas small pelagics have the lowest climate impact; large variation depending on the seafood species.

In most Nordic countries the consumption of seafood is lower than the amount recommended by nutritionists – and *vice versa* for red meat. Increased seafood consumption should have health benefits if it replaces the high red meat consumption → potential for reduced climate impact via a blue dietary transition. A systematic review found a 47% reduction of dietary climate impact by total or partial substitution of meat by fish.

However, studies that assess the environmental impact of diets still fail to assess other sustainability indicators such as biodiversity and abundance of stocks.

Potential for combined health and climate benefits.

A huge hurdle for all these studies is the reliance on – and scarcity of – data.

Marketing sustainability, environmental and climate aspect – legal framework and enforcement practices.

Christian Poll, Danish Consumer Ombudsman Institution, Denmark

Christian is former member of parliament (Alternativet 😊) and works half time for the ombudsman institution (forbrugerombudsmanden) and half time at DTU.

The Danish Consumer Ombudsman is an independent authority supervising the Danish Marketing Practices Act and other consumer protection legislation.

Environmental marketing has become a prioritized area, specifically focusing on green washing.

Published a quick guide in 2024 with recommendations (60 pages – so rather a recommendation document) related to green washing claims. [Link to recommendations in Danish](#). The legislation is the same in all EU.

Claims must be correct, precise, relevant and balanced.

Most cases are based on consumer or NGO complaints.

Claims about planned carbon emission reductions must be accompanied by a plan on how to achieve the goal!

If a company is using **carbon offsetting schemes**, this must be described in the marketing and must be verified – and even if these requirements are met, climate compensation claims are easily misleading. For example, for many afforestation projects, the carbon offsetting happens over a hundred or more years, i.e. it is not simultaneous. This adds simultaneity to the already know factors of **additionality, permanence, and leakage effects**.

This has led to a common Nordic Statement on climate compensation claims – you cannot claim the compensation as part of the climate impact of the product but make a statement on the side saying that in addition you make these and these specific offsetting efforts.

Sustainability claims

The sustainability playing field: With reference to the Brundtland Report definition, the Danish Ombudsman recommends not using sustainability claims at all because it is very difficult to substantiate that a product is sustainable.

Sustainability initiatives and reporting – be aware to **market the results of CSRD results** in a balanced way! You cannot promote the reporting per se as everyone has to do it anyway – common improvements in the sector are not “claimable” - you can communicate your climate/sustainability initiatives, but they do not make your company sustainable.

Life cycle assessments – if used to substantiate claims – must cover all relevant phases of a product's life cycle and cover all relevant impact categories, not just carbon emissions.

When marketing based on labels and certification schemes, the marketing should reflect the subject matter and target level of the certificate – i.e. be specific! If a scheme contains requirements for products, it may be used in the marketing of the product but not in marketing statements about the company.

Overall, you need to be as specific as possible and keep in mind the overall impression (picture, sounds etc)

The fishing industry specifically: Two complaints recently from Greenpeace and “Forbrugerrådet Tænk”. Both concern sustainability claims but no conclusion has been reached yet.

From 2026 it will be prohibited to use generic environmental claims without an excellent environmental performance; to use env. claims about the entire product when the env. benefit only concerns part of the product.

If in doubt you can apply for an advance approval from the Ombudsman on any claims you plan to use.

A ‘product passport’ is on its way from the EU.

Life Cycle Assessment and carbon labelling in the Nordics.

Moderated by Sara Hornborg, RISE, Sweden

The purpose of this session is to better understand the nature of life cycle assessment for seafood products and addressing the limitations and challenges in establishing an international comparative methodology. The session will also provide an overview of national relevant food labelling initiatives. Further, the role of the EU in ensuring a level playing field across the EU market for fish and fish products will be addressed.

Setting the scene: on harmonizing of LCAs, recent advances and further research needs for LCAs of seafood.

Sara Hornborg, senior researcher, RISE Research Institutes of Sweden, Sweden.

Use of representative and harmonized LCA data is essential for comparing food systems, diets etc.

Reference: Gephart et al. 2021 – Environmental performance of blue foods.

Recommend sorting the products groups on the key GHG drivers: Feed dominated (marine cages), energy dominated (wild fisheries), and biogenic dominated systems (extensive pond systems).

Poor transparency and the demanded effort are hurdles to harmonizing LCAs.

LCAs do not really take into account the biodiversity challenge – refers to the food biodiversity database ([link](#)). Biodiversity impact assessments are, however, on the rise in seafood LCAs

Reference: Bergman et al. 2024 - Integrating biodiversity impacts into seafood life cycle assessments: pathways for improvement.

Comparative metrics for biodiversity are much less easily understandable than for carbon emissions.

Demersal trawl impacts are not integrated into LCAs – this is a major gap!

Another question is how to capture the various effects on carbon sequestration from fisheries in LCAs.

For bivalves: consideration on impact from shell construction on LCA. **Reference:** Pernet et al 2025 – Cracking the myth: Bivalve farming is not a CO2 sink.

In terms of resilience of food systems, mismanagement and geopolitical/economic events are high impact factors in fisheries.

Current status on Product Environmental Footprint Rules (PEFCR) for marine fish for human consumption (unprocessed).

Henrik Stenwig, Sjømat Norge, Norway.

PEFCR invented by the Commission to allow better comparison between products in the same product category. First published in 2013, reviewed in 2021; new version coming in 2025

Royal Greenland apparently participated in the development of the standard?

Project to develop a PEFCR for marine (wild and farmed) fish was approved in 2019. The draft was endorsed by the Commission Dec 2024, meaning that now we have a standard for evaluating the environmental performance of marine fish. Final version expected published in February 2025.

Functional unit: Marine fish products for human consumption and packaging needed to deliver 1 kg of fish

Challenge: How can the value and usefulness of this tool be communicated to consumers?

AVM personal note: Very complex presentation, and I am not really sure how to convey a key message here (partially because there were quite a few details I did not fully understand), so if we want more information, we should look into the upcoming publication of the tool.

Practical lessons from the use of LCA in the seafood industry: How do we get it done and get value from the exercise? other industries/How to deal with a challenging aquaculture and fisheries supply chain

Erik Hognes, INAQ, Norway.

17 years of experience with seafood LCAs – consultant at INAQ.

How can LCAs be helpful in overall GHG reductions in fisheries? LCAs identify impacts and efficient improvement routes; they have the potential to have real impacts on decision makers (management/board members) if they understand and use LCAs in strategic decision making.

Generally, LCAs in seafood all point to energy use in catch (wild caught) to be the main point of impact.

There is an extensive amount of LCAs available on seafood.

The potential of environmental impact is dependent on how early in the decision-making process LCA knowledge is applied.

At the screening level, existing/published LCAs can be used to inform on potential environmental effects – as precision requirements go up, the workload, data need etc increases to do our own,

specific LCAs, especially if LCA is to be used to substantiate a commercial claim (complete verified LCA).

The CSRD requires management's commitments to engage in the value chain – LCA is their tool to do so, but management is rarely experienced in the use of LCAs.

The CSRD comes with a lot of requirements to understand the impact of the value chain, and this is what an LCA maps. LCAs can help identify tools and measures; it can help establish systems to manage environmental risks (great tool to identify blind spots); it can ensure reporting transparency by reporting on environmental impact and reduction measures.

Norway's NewTools project (project by Folkehelseinstituttet, Norway), Developing scores for the environmental and social sustainability of foods.

Rannvá Danielsen, senior researcher [Norwegian Institute of Sustainability Research](#), Norway.

Website: <https://norsus.no/en/om-instituttet/>

Tool in development.

Environmental impact categories for food products in general and for fisheries and aquaculture specifically.

Methodology: LCAs

Drivers of marine biodiversity loss: Direct exploitation, sea use change, climate change, pollution, invasive alien species and others. Judged direct exploitation as the most important biodiversity category for fisheries but have not yet decided on the best indicator for this category. For aquaculture, have not been able to propose which category could be the most relevant/impactful.

Social impact categories for food products in general and for fisheries and aquaculture specifically.

Methodology: Social LCAs

- ➔ Very nice overview of social impacts in fisheries and aquaculture – refer to their [publication](#) for details and overview. Could be valuable in a CSRD reporting context.

Working now on weighting social and environmental impacts for the tool to produce a single score

Audience questioned idea of numerical scoring of social impacts.

Iceland Country Case: Carbon Footprint of Icelandic Food.

Birgir Örn Smárason Research Group Leader, MATIS, Iceland

Matis is an Icelandic Food and Biotech R&D

Reference: Journal of Cleaner Production 2024, Hilmarsdottir; Is renewing Icelandic demersal trawling vessels resulting in lower greenhouse gas emissions? [Link to publication](#).

New project being launched: KIM – Fisheries carbon footprint with special focus on ESRS standards and legislation based on CSRD. *AVM note: This may be a relevant source for Kangamiut scope 3 reporting in the future, so we should keep an eye out for the results.*

Understanding consumer awareness and changing buying habits.

Moderated by Audun Lem, FAO

This session will focus on measures and initiatives taken by public authorities and private fisheries operators in underpinning consumers buying decisions for food, with a focus on fish and fish products. The session will also provide insights on consumer perceptions on climate change.

Sweden's Mistra Sustainable Consumption project and how taxes can be used to change consumer behaviour.

Jörgen Larsson, Associate Professor, Chalmers University

Climate impact of food in Sweden is almost twice as high as from car traffic.

Simulation project: Idea is to add taxes on food items that have a high climate impact and poor health value and subsidize food that is positive on both parameters. Excluding food items where health and climate benefits diverge, meaning fish is excluded (because of high GHG footprint).

AVM comment: Have not made detailed notes here because of the omission of fish in the simulation.

Introducing climate taxes on food only (not health related taxes) → no health benefits and hits low income people disproportionately

A fish processors view on labelling for sustainability, food intake and CO2.

Anna Elizabeth Jorgensen, Espersen A/S

Net Positive Fishing: At this point on time only based on dialogue and requests for data from suppliers.

Retailers are already asking questions for data to be provided via QR codes on the product - on e.g. catch certificate information, carbon footprint, sustainability labelling etc

Scope 3 target: 52% reduction by 2030 (base year 2021?)

Purchased fish accounts for 70% of Espersen's scope 3 emissions alone

One strategy is to replace high carbon species with lower carbon species

Part of EU funded WATSON project developing methods and tools to ensure traceability and data sharing of Norwegian whitefish throughout the entire supply chain from sea to consumer

Looking also to launch a pilot study themselves using their smallest production site (in Bornholm) to focus on mapping out the processes going on at this production site (less complex than their other production sites)

Do consumers care about labelling for climate change?

Anna Kristina Edenbrandt, Department of Economics, Swedish University of Agricultural Sciences, Sweden

Do consumers *need* climate information?

Online questionnaire, n = 1052 + purchase data. Consumers do not feel very confident on food climate impact knowledge which would support that consumers need the information.

Do consumers *want* climate information?

4 distinct consumer segments: Habitual meat eaters, meat reducers, devoted meat eaters and meat avoiders. A lower share of devoted meat eaters want climate related information (surprise 😬). All except meat avoiders find climate information hard to understand.

Can climate labels on food assist consumers in identifying lower emitting purchase patterns?

In a simulation study they showed that those 2/3 who wanted climate information, changes in purchase patterns were observed. This was also the case for consumers who did not want the information – so the conclusion is that putting the label on the food does have the possibility to change purchase patterns.

Overall a small but positive effect observed.

It is important to consider how to shape climate related information for consumers.

Conclusions: The heaviest emitters are the least knowledgeable about climate impact and they are also the ones that expressed the least interest.

Climate label can inform about climate impact and enable consumers to identify lower emitting purchase patterns. Climate labels can educate consumers and provide incentives for producers to reduce emissions. It is therefore of huge importance that it becomes mandatory to climate label food products.

A fisher organisation perspective on CO2 taxes and carbon labelling.

Ole Lundberg Larsen, Danish Fishermen's Producer Organisation (DFPO), Denmark

Danish statistics show that within the last 10-20 years the safety has significantly improved in the fisheries sector, now more in line with other occupations.

The fishing industry's carbon emissions have dropped more than 60% since 1990 (in DK, I guess). Due to decline in fishing activity and fewer, larger, and more fuel-efficient vessels.

Speculates that smaller vessels will suffer in proportionately as larger vessels will go abroad for fuelling and thereby evade the taxes → leakage issue.

AVM note: Very biased presentation lacking a holistic perspective, so I gave up taking detailed notes...