Image source: Aquaculture Advisory Council, 2024

BERGEN SUMMER RESEARCH SCHOOL POLICY BRIEF | JUNE 2026

Climate Mitigation Strategies for Aquaculture in the EU

Blue Food Systems, Sustainability, and Justice

UNIVERSITY OF BERGEN

- *This policy brief aims to inform EU decision makers about aquaculture socio-ecological impacts and proposes complementary alternatives as mitigation strategies to transform the sector, aligning with 2050 EU net-zero greenhouse gas (GHG) emissions.*

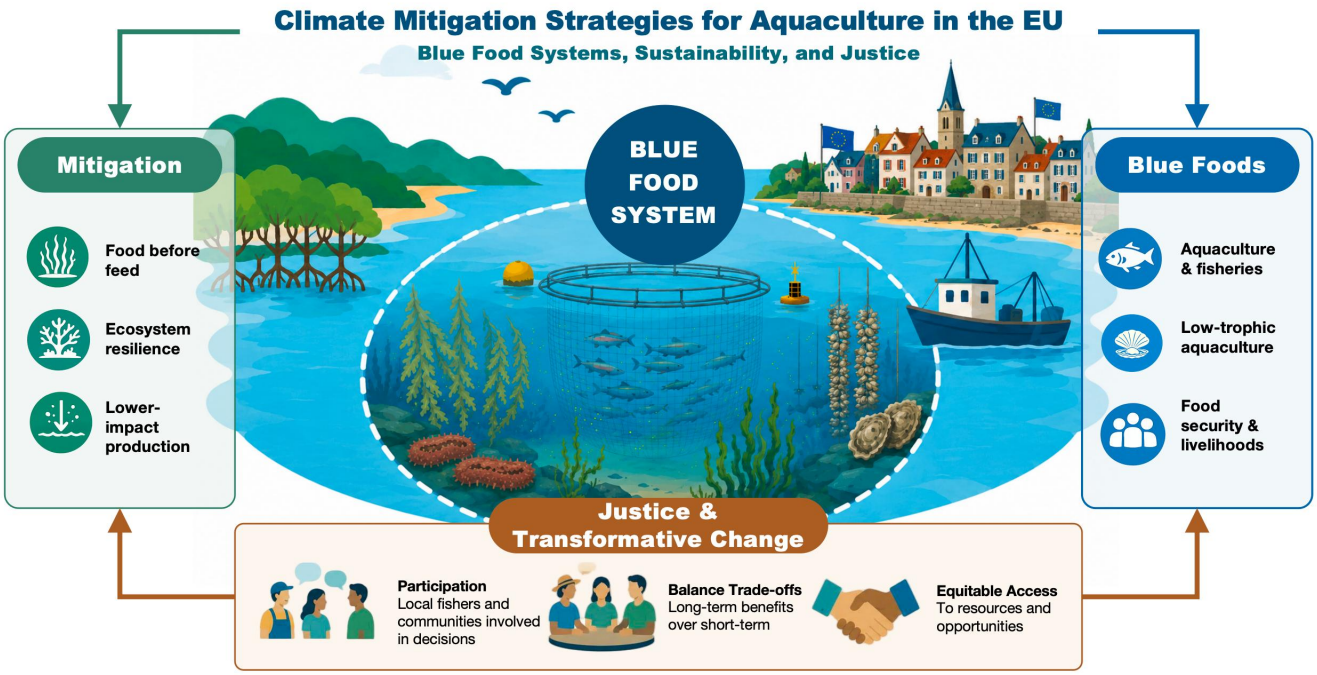

Figure 1. Climate mitigation strategies for aquaculture in the EU.

PROBLEM STATEMENT

Meeting the EU's net-zero greenhouse gas (GHG) emissions by 2050 target requires a renewed vision and shared effort across all sectors. Although GHG emissions have been reduced by 40%, swift action is needed to meet the interim reduction of 55% GHG emissions by 2030.

Food production causes nearly one-third of the global warming seen today (Crippa et al., 2021). Current projections indicate EU emissions will slowly decline under existing policies but this won't be enough to meet the 2030 targets set by EU Effort Sharing Regulation. Meeting these targets will depend on increased and faster reductions from the agricultural sector. Taking a **food systems perspective**, and explicitly including blue foods (fisheries and aquaculture) in future policy, will help decrease food production GHG emissions.

- This policy brief outlines complementary alternatives to develop Europe's aquaculture to contribute to sustainable, nutritious and just food systems with less climate impacts.
- There are a number of alternative approaches in aquaculture that offer potential.
- There are a range of species that offer opportunities for development including microalgae, macroalgae, bivalves and tunicates.
- Developing value chains that prioritise food for humans before feed for animals can help reduce the climate impacts of food systems.

Action is needed now. Aquaculture can support further reductions in methane emissions, but currently unsustainable practices have resulted in a slowed aquaculture production growth in the EU (Guillen, 2025). Aquaculture in the EU has the opportunity to provide a competitive, environmentally sustainable, low-carbon emissions source of protein support promoting food security (Guillen et al., 2025).

POSSIBLE ALTERNATIVES

Alternative 1 - Food before Feed

What? Currently, the dominant aquaculture industry in the EU produces high-trophic species such as salmon, tuna, seabass, trout, carp which covers 60% of the aquaculture production value. Such production requires external feed input. The feed source's origins are land-based farming products (from wheat, soya, and maize), or fishery-based products (such as fish oil, or crustaceans), or processed animal-based products. This "Food before Feed" alternative proposes prioritizing food consumption over food production, leading to an exclusion of the traditional high-trophic production practices within the food sector.

Why? Limitating high-trophic aquaculture production in the EU, will mitigate the food system impact by reducing energy consumption from the transport of feed and from aquaculture production, while still providing food for human consumption at an affordable cost.

How? This alternative requires a transformative change of the food sector industry to propose feed sources as a consumption product. However, it also implies a shift in consumer behavior, food consumption habits and diet, to embrace the novelty of the food products. To support this alternative, we highlight the possibility to impose a tax on high trophic aquaculture activities, and subsidize the food industry proposing feed source as a final consumable product.

Alternative 2 - Low Trophic Aquaculture (LTA)

What? Low Trophic Aquaculture does not require external inputs, such as feed and fertilizer, as it focuses on the production of lower levels of the food web, such as mussels, oysters and seaweeds.

Why? The traditional external environmental impacts related to transports and land-use of the high tropic aquaculture does not apply, as there are no external inputs. For the future of food production, prioritising LTA can provide significant reduction in feed energy input requirements, based on the usual assumptions of energy loss when moving up trophic levels. In some contexts, the potential for other ecosystem service contributions of LTA may help restore and improve marine ecosystems (e.g. restorative aquaculture).

How? We propose to recognise LTA as the only allowed aquaculture practices in the EU. In addition, to subsidize this sector and support its development in the food industry. Moreover, we highlighted the potential of LTA carbon sequestration and recommend further research in that field.

Alternative 3 - Local food circuit

What? Promote shorter and local circuits from production to consumption.

Why? Reduce the environmental impact of transport in the aquaculture sector.

How? Highly tax transport, and subsidies LTA practices collaborating with local food markets and restaurants.

Alternative 4 - Future research

What? Develop and promote future research on sustainable food production in aquacultures, and other high-tech sustainable food production industries such as cell production.

Why? Need to expend knowledge, and explore the potential of other alternatives.

How? Expend funds research related to those topics.

CONCLUSIONS

Blue foods represent a vast, and currently underutilized sector of regional and global food systems. On a national scale, 22 of the 27 (81%) current EU member states are maritime, while regionally 297 of the 341 EU NUTS (87%) are coastal: blue foods are dietary and cultural staples across the EU. Climate change and its effects require transformative systemic changes which provide innovative and just solutions that benefit local, regional, and transnational communities within the EU, as well as the wider global community and planet.

Moving towards lower impact aquaculture requires transformative change now to create food systems which reduce climate impacts and are less vulnerable to climate change. Food before feed, LTA, local food circuit, and promoting future research into high-tech sustainable food production offer complementary pathways towards a more equitable food and climate systems.

Listening to community voices and lived experiences would give valuable insights throughout these processes to ensure increased blue justice and equity amongst often marginalized coastal communities, and to smoothly incorporate these news food species into regional diets and culture. With collaboration between and within EU member states developed, thoughtful, and transparent policies will emerge that ensure the blue food sector develops in a manner that considers short-term tradeoffs and longer-term benefits.

FAIR FOOD

This policy brief encourages developing just and sustainable food systems with policy that explicitly considers blue food as a low climate impact food production.

1. Equitable and fair access to sustainable and healthy food for all.
2. Local food systems that are resilient to global changes.
3. Reconsider current food consumption behaviors, and consumers' views on food resources.
4. Policy that considers distributional justice, by reducing climate change impacts of food systems and reducing the burdens on the global south and future generations.

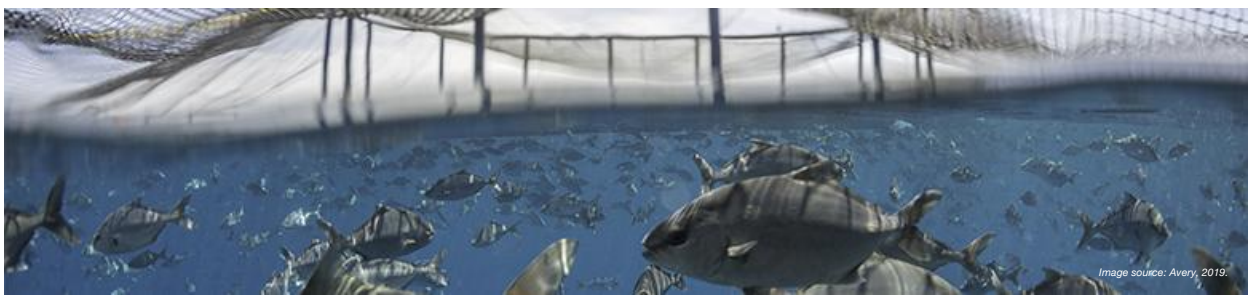

Image source: Avery, 2019.

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