

## Open consultation on the scope of the report “Sustainable fisheries and aquaculture for food security and nutrition”

### Q1: What are some of the additional themes and emerging trends that should be analysed in the updated HLPE-FSN report?

EFFOP recommends that the updated HLPE-FSN report include a focused interest on the important role of marine ingredients as an enabler for sustainable seafood production, from products such as fish oil and fishmeal that originate both as whole fish from both sustainably managed fisheries and as by-products from direct human consumption markets.

In total, 90% of fishmeal and 64% of fish oil were utilised by the aquaculture sector as strategic components of feeds in 2024, providing critical nutrients such as essential amino acids and omega-3 fatty acids such as EPA and DHA. These ingredients thus play an important supporting role in ensuring food security in the blue value chain.

EFFOP therefore points to the following to be analysed further in the report:

- **The role of nutrition in animal health and welfare:** Marine ingredients, like fishmeal and fish oil, have been crucial to the growth and intensification of aquaculture, serving as the cornerstone of feed formulations worldwide. While other ingredients now contribute to nutrients in feed, marine ingredients remain strategically important by providing unique nutrients that cannot be easily replaced by other sources. These nutrients are essential for supporting animal health and welfare, growth and robust immune function.
- **Circular use of fish resources:** A growing share of marine ingredients is produced from fish by-products that would otherwise be wasted, improving resource efficiency and supporting a circular bioeconomy that is increasingly important for sustainable food systems. In 2022, by-products accounted for 34 percent of global fishmeal production and 53 percent of fish oil production (FAO, The State of World Fisheries and Aquaculture, 2024). These figures illustrate the evolving role of by-products in marine ingredient production as the sector progressively transitions towards higher circularity and highlights the importance of further optimising their use to strengthen sustainability and food

security with regards to the UN sustainable development goals for promoting responsible consumption and production and the judicious use of our marine resources.

- **Environmental performance of marine production:** The report should also focus on the environmental performance of marine products compared to other food products. Evidence show that marine products generally have a significantly lower carbon footprint than terrestrial products. Recognising the broader environmental context is important when assessing the role of marine production within a sustainable food system. Within this context, marine ingredients such as fishmeal and fish oil provide a practical example of how environmental performance considerations are translated into operational practices, showing significantly lower carbon footprints when compared to terrestrial ingredients.
- **Resilience of aquatic food systems:** Aquaculture has become the fastest growing food production sector globally with output reaching 130 million tonnes in 2022 and surpassing capture fisheries for the first time, contributing 51 percent towards total global seafood production. This milestone reflects aquacultures expanding role in rising demand for nutrient-rich foods as capture fisheries production remains largely unchanged. Growing aquaculture strengthens food security by diversifying supply, supporting livelihoods, and helping supply essential dietary nutrients. Marine ingredients help make aquaculture more stable and resilient by improving feed efficiency, supporting animal health and production performance, especially under climate and market pressures. Recognising these trends in the HLPE-FSN report would better reflect the sector's strategic importance and support evidence-based policy for resilient aquatic food systems.

## **Q2: What technical or data innovations, and their policy implications, should be taken into account?**

In recent years, the understanding of sustainability in fisheries and aquaculture has evolved significantly. Today, sustainability is assessed through comprehensive and data-driven approaches that reflect the full environmental footprint of production systems. This shift has important implications for both monitoring practices and policy design. Therefore, EFFOP

emphasises the ability to monitor sustainability to ensure environmental performance in the seafood sector with standardised metrics.

In this context, the Life Cycle Assessment (LCA) has become a central and widely used tool to assess and monitor sustainability performance. LCA provides a transparent and holistic framework by evaluating environmental impacts across the entire lifecycle of a product. This allows for the identification of areas for improvement and will empower producers to base decisions on a comprehensive understanding of environmental effects and thereby make genuinely targeted improvements. It typically covers multiple impact categories, including greenhouse gas emissions, energy and resource use, water and land use, and has become an important reference point for sustainability assessment.

LCA is increasingly used as a standardised framework for sustainability monitoring and reporting, supported by international initiatives to harmonise data and methodologies. In the marine ingredient sector for example notably the Global Feed Life Cycle Assessment Institute (GFLI) database has become an important tool to provide a harmonious open-source platform to allow stakeholders to gain an insight into different footprints of important ingredients in aquafeeds. The EU Product Environmental Footprint Category Rules (PEFCR) for Feed for Food-Producing Animals has been an important tool for harmonising LCA methodology so all food and feed products can be measured and scrutinised equally. The GFLI provides a globally recognised, scientifically reviewed source of environmental footprint data for feed ingredients, calculated according to consistent methodologies aligned with FAO-LEAP guidelines and accepted within the EU PEFCR framework. In parallel, the PEFCR Feed methodology provides an EU-harmonised approach for measuring the environmental performance of feed production across multiple impact categories, ensuring consistency and comparability across assessments.

From a policy perspective, the use of a standardised process and recognised assessment framework is essential to ensure the reliability and comparability of sustainability data to support evidence-based decision-making as various sectors in the blue food value chain continue to grow in their contribution to global food security.

**For more information see:**

- Glencross, B. D., Bachis, E., Robb, D., & Newton, R. (2024). The Evolution of Sustainability Metrics for the Marine Ingredient Sector: Moving Towards Holistic Assessments of Aquaculture Feed. *Reviews in Fisheries Science & Aquaculture*, 32(4), 545–561.  
<https://doi.org/10.1080/23308249.2024.2337426>
- The Global Feed Life Cycle Assessment Institute (<https://globalfeedlca.org/>)
- EU-PEFCR Feed (<https://fefac.eu/priorities/sustainability/pefcr-feed/>)

**Q3: What specific challenges and opportunities should be highlighted for in regards to small-scale fisheries, different aquaculture systems, women and youth, inland fisheries, Indigenous Peoples, communities and individuals marginalised by market and policies, low-income consumers, Small Island Developing States (SIDS)**

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**Q4: Which case studies, regional perspectives, or examples of good practice should be included?**

EFFOP recommends that the updated HLPE-FSN report place greater emphasis on the overall role of independent certification, assurance systems and industry standards in strengthening traceability and due diligence across fisheries and aquaculture value chains. As supply chains have become more complex, these tools have emerged as practical mechanisms to operationalise transparency, accountability and responsible sourcing, and to respond to increasing expectations from regulators, markets and society.

Across different parts of the fishing and aquaculture value chain, actors have developed and adopted a range of certification and assurance approaches to address risks, improve traceability and support continuous improvement. For example, certification programmes focused on marine ingredients used in feed illustrate how traceability, sourcing controls, and facility-level requirements can be applied at the processing stage, while aquaculture-focused standards

demonstrate how traceability and assurance can be extended across farming operations and downstream supply chains. These initiatives show how voluntary tools are being used in practice to structure due diligence, manage risks and provide verifiable information.

At the regulatory level, the EU Common Fisheries Policy (CFP) provides a regional example of how public governance frameworks underpin traceability and responsible sourcing for marine ingredients. The CFP establishes legally binding requirements for fisheries management in the EU, including science-based catch limits, monitoring and control mechanisms, and traceability obligations. These measures rely on the ICES scientific advisory process, through which data from stock assessments, catch reporting, monitoring systems and compliance controls are analysed and translated into management advice. This helps reduce uncertainty over time and strengthens the scientific basis for fisheries management decisions.

Together, these examples illustrate how certification and public policy frameworks can contribute to improved traceability, strengthened due diligence and greater transparency across fisheries and aquaculture value chains. Including this in the HLPE-FSN report would provide practical and transferable insights into how sustainability objectives can be implemented.

**Q5: Are there other references, data, publications, or other kinds of knowledge, which should be included in the report?**

EFFOP recommends including the Leadbitter et al. (2025) publication '*Biodiversity consequences of replacing animal protein from capture fisheries with animal protein from agriculture*' and the Hilbourn et al. (2022) publication '*Recent trends in abundance and fishing pressure of agency-assessed small pelagic fish stock*'.

Leadbitter et al. (2025) investigates how global biodiversity would be affected if the protein currently supplied by marine capture fisheries had to be produced on land instead. The paper estimates that substituting today's marine capture protein with the current global mix of beef, pork, and poultry would require around 4.99 million km<sup>2</sup> of additional agricultural land, which is equivalent to 152 percent of all remaining intact Brazilian rainforest. This illustrates the scale

of land-use and ecological pressure the substitution from marine to terrestrial protein entails. The findings underline the importance of assessing fisheries, aquaculture and feed policies from a system-wide perspective, as measures that reduce marine ingredient production without considering replacement sources risk shifting environmental impacts onto land, where biodiversity pressures are already more severe.

- Leadbitter, D., Aebischer, N. J., Auchterlonie, N. A., Benton, T. G., Froehlich, H. E., Hall, S., ... Hilborn, R. (2025). Biodiversity Consequences of Replacing Animal Protein From Capture Fisheries With Animal Protein From Agriculture. *Reviews in Fisheries Science & Aquaculture*, 1–13. <https://doi.org/10.1080/23308249.2025.2585414>

Hilbourn et al. (2022) provides a comprehensive overview of trends in abundance and fishing pressure for small pelagic fish stocks that supply food, fishmeal and fish oil. Based on single-species scientific assessments covering approximately 60 percent of the global small pelagic catch, the paper shows that despite high natural variability in individual stocks, average fishing pressure and biomass levels have remained broadly stable since 1970. On average, assessed stocks have been maintained slightly above the biomass associated with maximum sustainable yield. The findings contribute to a more nuanced understanding of the dynamics of small pelagic fisheries and the role of science-based management in shaping long-term sustainability outcomes.

- Hilborn, R., Buratti, C. C., Díaz Acuña, E., Hively, D., Kolding, J., Kurota, H., Baker, N., Mace, P. M., de Moor, C. L., Muko, S., Osio, G. C., Parma, A. M., Quiroz, J-C, & Melnychuk, M. C. (2022). Recent trends in abundance and fishing pressure of agency-assessed small pelagic fish stocks. *Fish and Fisheries*, 23, 1313–1331. <https://doi.org/10.1111/faf.12690>

## **Q6: How to address trade-offs between production growth, environmental integrity, and social equity in aquatic food systems?**

EFFOP emphasises that the trade-offs between production growth, environmental integrity and social equity in aquatic food systems requires recognising that growth in aquaculture and feed production is essential for food security. Marine ingredients, such as fishmeal and fish oil provide essential nutrients, including high-quality protein and omega-3 fatty acids, that support animal health and welfare, efficient feed use and the production of nutritious food for human consumption. Ensuring access to these nutrients is therefore a key component of a resilient and secure food system as global demand for aquatic food continues to increase. Importantly, the increasingly efficient use of marine ingredients in aquafeeds illustrates how such trade-offs can be reduced over time. Continuous improvements in feed formulation and feed conversion efficiency mean that many aquaculture systems now produce significantly more edible fish protein than they use in the form of marine ingredients (Glencross et al., 2024).

Simultaneously, this growth must take place within a strong environmental and social framework. To ensure environmental integrity LCA has become a central tool for measuring and improving sustainability performance across the full production lifecycle and across multiple impact categories. Harmonised LCA-based approaches, such as the GFLI database and the EU PEFCR Feed methodology, provide a standardised and science-based reference that supports comparability, transparency and evidence-based policy decisions.

Moreover, to ensure social equity, EFFOP emphasises the importance of traceability and due diligence throughout the value chain to ensure responsible sourcing, accountability, and trust among regulators and consumers. In this context, third-party certification, assurance systems and industry standards play an important role in enabling fisheries and aquaculture actors to respond effectively to increasing expectations for transparency and responsible practices.

Together, EFFOP considers that trade-offs are most effectively addressed not by constraining production, but by guiding growth through improved nutritional efficiency, harmonised environmental metrics and robust traceability systems. This approach will support the delivery of increased volumes of nutritious aquatic food while maintaining environmental integrity and

promoting social responsibility across value chains in strengthening traceability and due diligence across fisheries and aquaculture value chains.

Glencross, B. D., Bachis, E., Robb, D., & Newton, R. (2024). The Evolution of Sustainability Metrics for the Marine Ingredient Sector: Moving Towards Holistic Assessments of Aquaculture Feed. *Reviews in Fisheries Science & Aquaculture*, 32(4), 545–561.

<https://doi.org/10.1080/23308249.2024.2337426>

**Q7: Please insert below any additional comment.**

EFFOP – Marine Nutrients Europe is the European trade association representing the European fishmeal and fish oil producers across Denmark, the Faroe Islands, Iceland, Ireland, Norway, Germany, France, the United Kingdom, Estonia, Latvia, Finland, Malta, and Spain. The industry plays a critical role in supporting the global aquaculture sector, helping to feed the world with healthy, sustainable fish products. The annual production is approx. 600,000 tonnes of fishmeal and 190,000 tonnes of fish oil, with an export value of around EUR 2 billion.

EFFOP encourages the HLPE-FSN report to recognise fishmeal and fish oil as strategic marine nutrients. When responsibly sourced and efficiently produced, they support animal health and welfare, strengthen the resilience of aquaculture, reduce waste through by-product use, and contribute to sustainable fisheries and food security.