



FOODIMAR

POLICY RECOMMENDATIONS

Identifying and reducing market-entry barriers
and the scale-up of seafood side-stream-
derived products



Sustainable Blue
Economy Partnership



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Executive Summary

Seafood side-streams represent a significant and underutilised resource within European food systems, offering strong potential to support circular economy objectives and generate new value across food, feed, and bio-based sectors. Despite increasing technological capability, large-scale commercialisation remains limited due to a set of interconnected barriers. Regulatory complexity, including unclear classification, lengthy approval processes, and a lack of harmonised standards, continues to create uncertainty and delay market entry. At the same time, limited access to scale-up and processing infrastructure restricts the transition from innovation to industrial production. Even where technical solutions exist, weak business cases, driven by high processing costs, uncertain demand, and limited investment incentives, constrain commercial viability. These challenges are further compounded by difficulties in accessing consistent, high-quality raw materials, due to supply variability, competing uses, logistical constraints, and regulatory limitations.

Addressing these barriers requires coordinated and targeted policy action. Improving regulatory clarity and developing harmonised standards can reduce uncertainty and support market confidence, while increased investment in pilot, demonstration, and regional processing infrastructure is needed to bridge the gap between research and commercial deployment. Strengthening market conditions through better access to finance and closer value chain integration can improve the business case for innovation, while enhanced coordination and logistics can support more reliable access to raw materials. Taken together, these measures will help unlock the full potential of seafood side-stream valorisation. Existing practices across Europe already demonstrate that such approaches are both technically feasible and commercially viable when supported by the right enabling conditions. With focused policy action, there is a clear opportunity to accelerate progress, improve resource efficiency, and strengthen the development of a more sustainable and competitive blue bioeconomy.

The seafood sector generates significant volumes of side-streams, including heads, skins, viscera, shells, and other by-products arising from harvesting, processing, and aquaculture operations. It is estimated that 50–70% of total fish biomass can become side-streams depending on the species and processing method, representing a significant underutilised resource within current value chains.¹

Across Europe, a large share of this biomass is still directed towards low-value uses such as fishmeal, fish oil and fertilisers, or is otherwise discarded, despite increasing pressure to improve resource efficiency and reduce waste. This reflects broader inefficiencies across aquatic food systems, where around 17.5% of edible aquatic food losses in Europe occur during processing on land.² At the same time, demand is growing for alternative sources of proteins, lipids, and bioactive compounds, particularly in food, feed, nutraceutical, and cosmetic markets.

Advances in biotechnology, processing technologies, and value chain innovation have made it increasingly feasible to convert seafood side-streams into valuable ingredients and materials. Side-streams are now recognised for their potential as sources of collagen, peptides, omega-3 fatty acids, and bioactive compounds. These developments align closely with European policy priorities on the circular economy, resource efficiency, and sustainable food systems, as well as broader ambitions under the European Green Deal and Bioeconomy Strategy.

Despite this growing potential, the large-scale valorisation of seafood side-streams remains limited. While technological solutions are advancing, uptake at commercial scale is constrained by a range of interrelated barriers that affect the viability, scalability, and market acceptance of side-stream-derived products.

This reflects a range of structural and systemic challenges affecting different stages of the value chain, from raw material access and processing through to market uptake. Addressing these challenges is increasingly important in the context of EU priorities on sustainable food systems, resource efficiency, and industrial competitiveness.

This report identifies the most critical barriers to the market entry and scale-up of seafood side-stream-derived products and proposes targeted policy actions to address them. Rather than providing an exhaustive overview of all possible challenges, it focuses on a small number of high-impact barriers that have been consistently highlighted across existing research, stakeholder interviews, and advisory inputs. By combining insights from literature and practice, the report aims to provide a clear and practical basis for policy development.

¹. [*Making the objectively best choice for side-stream resources*](#)

². [*World Economic Forum - Investigating Global Aquatic Food Loss and Waste*](#)

This report is based on a combination of literature review and targeted stakeholder input, providing an evidence-informed overview of the main barriers to the valorisation of seafood side-streams and the development of related products.

The analysis draws on existing research and policy literature, including European and international studies on seafood by-products, circular bioeconomy strategies, and market-entry challenges. Key sources include project reports, such as the WaSeaBi report on Legal and Regulatory Barriers³, and broader policy and scientific publications addressing regulatory frameworks, value chain dynamics, and technological developments in the seafood sector. These are complemented by relevant insights from EU-level discussions and initiatives related to bio-based industries.

In addition, the report incorporates primary stakeholder input, including:

- Targeted interviews with a small number of representatives from research organisations, industry, and cluster networks, and
- Responses from a small advisory group survey focused on perceived barriers and policy priorities.

Given the exploratory and qualitative nature of this input, stakeholder contributions are presented in aggregated and anonymised form and are used to identify recurring themes and practical challenges rather than to provide statistically representative results.

The selection of barriers in this report is based on a process of triangulation across sources, identifying those issues that are consistently reflected in both the literature and stakeholder input. This approach enables the report to focus on a limited number of high-impact, policy-relevant barriers, while maintaining a clear link between evidence and recommended actions.



3. Legal and Regulatory Barriers Hindering WaSeaBi Concept Adoption



04

Policy Recommendations

Regulatory Complexity

4.1

Regulatory complexity remains one of the most significant barriers to the market entry and scale-up of seafood side-stream derived products. The main uncertainty is not absence of regulation but rather companies face uncertainty around how existing frameworks interact, are interpreted, and are applied in practice across Member States.



Frameworks such as the Novel Food Regulation, animal by-product (ABP) legislation, and sector-specific rules for food, feed, and cosmetics can create uncertainty around which regulatory pathways apply to different materials and processes. While these frameworks are designed to ensure safety, their combined application can be difficult to navigate, especially for novel or hybrid products that fall between established categories.

In addition, the absence of clear and widely accepted product standards for certain side-stream-derived categories, such as marine hydrolysates and collagen, affects both regulatory clarity and market uptake. Companies often lack transparency on data requirements, safety assessments, and documentation expectations, leading to duplication of effort and delays. These challenges are particularly pronounced for SMEs, which typically have limited capacity to manage complex regulatory processes. In parallel, gaps in broader policy frameworks, such as the limited coverage of blue biomass and innovation in aquaculture within the EU sustainability taxonomy, further constrain access to finance by creating uncertainty for investors and limiting recognition of these activities within sustainable investment criteria.

Evidence from Stakeholders

- Advisory board responses indicate that regulatory uncertainty and approval processes (e.g. Novel Food) are perceived as major barriers to commercialisation.
- Interview feedback suggests that unclear documentation requirements and regulatory pathways can delay or prevent product development, particularly for smaller companies.
- Industry and cluster stakeholders highlight the lack of standardisation (e.g. for hydrolysates and collagen) as a key obstacle to building market trust and comparability.
- Research stakeholders note challenges in classifying emerging or novel biomass (e.g. new species or underutilised resources) within existing regulatory frameworks.

These findings are consistent with wider EU-level discussions, which identify regulatory complexity and uncertainty as key constraints for bio-based innovation.

4.1

Regulatory Complexity

Policy Actions

Introduce a risk-based fast-tracked pathway for low-risk products

Streamline approval processes (e.g. under Novel Food) for well-characterised materials and established methods. Define low-risk products using clear, risk-based criteria (e.g. known species, Category 3 materials, traceability, and compliance with safety limits) to enable proportionate approval while maintaining high standards.

Develop clear EU-level guidance on classification and regulatory pathways

Provide practical guidance and decision tools to clarify how side-stream-derived products are categorised across food, feed, and other sectors.

Support the development of harmonised product standards

Establish common specifications and quality benchmarks to improve consistency, comparability, and market confidence.

Improve clarity on data and documentation requirements

Develop clearer guidance and shared templates to reduce uncertainty and duplication in safety assessments. This should build on existing EU systems (e.g. EFSA guidance and Novel Food requirements), while improving transparency for both new products and new processes applied to existing materials.

Good Practice Examples

The fishmeal and fish oil industries operate under established standards for quality, safety, and traceability, enabling large-scale processing, international trade, and consistent product quality—demonstrating the value of standardisation for market development.⁴

The EU Animal By-Product (ABP) Regulation (Regulation (EC) No 1069/2009) provides a risk-based classification system (Category 1–3) for animal-derived materials, illustrating how clear categorisation can support safe utilisation, even if application remains restrictive in some cases.⁵

⁴. [The State of World Fisheries 2022](#)

⁵. [Regulation \(EC\) No 1069/2009](#)

Scale-up and Processing Infrastructure

4.2



A lack of appropriate infrastructure for handling, processing, and scaling seafood side-streams remains a critical barrier to their effective valorisation. While technologies for extracting value from side-streams are increasingly available at laboratory or pilot scale, many companies face difficulties in transitioning to commercial-scale production.

Key constraints exist across the value chain. At the point of capture and landing, limited onboard storage and handling capacity can result in side-streams being discarded or downgraded. This is often reinforced by weak economic incentives, where low market value makes it not viable for vessels to retain and land side-streams, particularly in contexts where discarding is permitted.

Further along the chain, the availability of regional processing facilities, pilot plants, and demonstration-scale infrastructure remains uneven, limiting opportunities for companies—particularly SMEs—to test, validate, and scale production. High capital investment requirements beyond pilot scale represent a significant barrier to commercialisation. In addition, gaps in cold chain infrastructure and traceability systems constrain the efficient recovery, transport, and use of perishable materials.

The highly perishable nature of many marine side-streams further reinforces these challenges, creating tight timeframes for collection and processing. As a result, delays in handling or stabilisation can quickly reduce material quality and value. Together, these factors create a persistent gap between innovation and market deployment, often referred to as the “scale-up bottleneck.”

Evidence from Stakeholders

- Survey responses indicate that limited access to pilot and scale-up infrastructure is among the most significant barriers to commercialisation.
- Industry stakeholders report difficulties in moving from proof-of-concept to industrial-scale production, particularly where investment risks are high.
- Interviews highlight logistical constraints at sea, including limited space and storage capacity on vessels, restricting the recovery of side-streams.
- Cluster organisations highlight limited regional processing capacity and weak links to downstream users, reducing incentives to utilise side-streams and limiting scaling.

These findings align with wider EU-level discussions, including CBE JU stakeholder engagement⁶, which identify scale-up infrastructure as a key bottleneck for bio-based innovation.

[*6.CBE Stakeholder Forum 2026 - Final Report*](#)

4.2

Scale-up and Processing Infrastructure

Policy Actions

Support the development of regional processing and valorisation hubs

Establish shared facilities for collection, stabilisation, and processing of side-streams, particularly in proximity to landing sites and aquaculture operations.

Increase access to pilot and demonstration-scale infrastructure

Expand support for shared pilot and demonstration facilities, including funding mechanisms that enable companies, particularly SMEs, to access and use existing infrastructure. This should be complemented by targeted investment in additional capacity where gaps exist, helping to reduce scale-up risk and accelerate commercialisation.

Provide targeted financial support for scale-up investment

Introduce and continue to fund instruments and incentives to bridge the gap between R&D and commercial deployment, particularly for SMEs.

Strengthen logistics and handling capacity at sea and at landing sites

Support investments in onboard equipment, storage solutions, and landing infrastructure to improve recovery and quality of side-stream materials.

Good Practice Examples

Regional initiatives in countries such as Iceland demonstrate how cluster-based infrastructure, coordinated value chains and strong underlying business models can support near-complete utilisation of fish biomass, supported by shared facilities and strong industry collaboration.⁷

The EU has supported the development of pilot and demonstration infrastructure through programmes such as Horizon Europe and the Circular Bio-based Europe Joint Undertaking (CBE JU), enabling companies to test and scale bio-based solutions in controlled environments.⁸

⁷ [*Iceland Ocean Cluster*](#)

⁸ [*Circular Bio-Based Europe Joint Undertaking*](#)

Business Case & Market Viability

4.3

Despite growing technical potential, many seafood side-stream-derived products struggle to achieve a viable business case, often due to a disconnect between innovation activities and market demand. While raw materials are typically low-value, the processing required to convert them into higher-value products can be costly and resource-intensive, making it difficult to compete with established ingredients that benefit from mature supply chains and economies of scale.



Market uncertainty further limits progress, with companies facing challenges in identifying stable demand, securing offtake agreements, and attracting investment for scale-up. As a result, promising innovations may fail to reach commercialisation due to limited market pull or unclear value propositions, particularly for SMEs and early-stage ventures. This highlights the need for funding schemes to support early market validation, including engagement with end-users, application-specific performance testing, and the use of mechanisms such as letters of intent or offtake agreements to demonstrate demand and reduce investment risk.

In addition, variability in raw materials can affect product consistency and functional performance, creating further barriers to market uptake. Consumer perception and product positioning, especially in food applications, can also influence acceptance, particularly where sustainability benefits are not clearly communicated or understood.

Evidence from Stakeholders

- Stakeholder input highlights economic viability and market uncertainty as key barriers, including difficulties in identifying demand, securing long-term offtake, and justifying investment.
- Industry participants point to a mismatch between R&D driven innovation and market demand, alongside challenges in competing with established ingredients on price, performance, and consistency.
- Limited investor confidence further constrains scale-up, particularly where business models remain unproven, or markets are not yet established.
- Stakeholders also note challenges related to product consistency, functional performance, and market perception, especially for higher-value or consumer-facing applications.

4.3

Business Case & Market Viability

Policy Actions

Support market-driven innovation and business case development

Align funding programmes more closely with demonstrated market demand, including requirements for market validation and industry engagement including addressing product performance, quality consistency, and application-specific functionality.

Facilitate access to finance for scale-up

Develop targeted financial instruments to reduce investment risk, including blended finance, guarantees, or public-private co-investment schemes.

Strengthen market linkage mechanisms

Support matchmaking platforms and value-chain coordination initiatives to connect producers, processors, and end-users.

Promote demand through public procurement and market incentives

Encourage the uptake of side-stream-derived products where appropriate (e.g. in feed, materials, or public-sector supply chains).

Good Practice Examples

Collaboration platforms such as industry clusters and networks (e.g. Marine Protein Network in Norway⁹ and the Iceland Ocean Cluster⁷) demonstrate how active matchmaking and value-chain coordination can support the development of commercially viable applications by connecting suppliers, processors, and end-users.

Several Norwegian companies use salmon side-streams to produce high-value ingredients such as collagen, hydrolysates, and oils. For example, Hofseth BioCare converts skins and trimmings for nutraceutical and feed markets, illustrating how high-value applications can support viable business cases.¹⁰

⁹. [*Marine Protein Network Norway*](#)

¹⁰. [*Hofseth BioCare*](#)

Raw Material Access & Supply

4.4

Reliable access to suitable raw materials remains a key challenge for the valorisation of seafood side-streams. Although large volumes are generated, companies often struggle to secure consistent, high-quality supply.

Competition within existing value chains limits availability, as valuable side-streams are already used in established markets such as feed and pet food or exported before local processing can take place. In addition, supply is highly variable and depends on species, seasonality, and catch volumes. This creates uncertainty for processors, making consistent production difficult.



Logistical and regulatory constraints further restrict access. Challenges in collection, storage, and transport, particularly for perishable materials, reduce the volume of usable biomass, while regulatory classifications (e.g. animal by-products) limit the range of applications. In addition, the centralisation of biomass flows and processing capacity can further constrain local access and increase transport complexity.

Together, these factors hinder the development of stable and scalable supply chains for side-stream-derived products.

Evidence from Stakeholders

- Industry stakeholders report challenges in securing stable, year-round access to raw materials, particularly where materials are already used in established markets such as feed or pet food.
- Interviews highlight that export practices and value chain structures can limit local access to side-streams for valorisation.
- Stakeholders note difficulties linked to seasonality and variability in raw material supply, affecting both availability and consistency.
- Logistical constraints, including collection, storage, and rapid processing requirements, are identified as key limitations for effective utilisation.
- Regulatory classifications (e.g. under ABP rules) are reported to restrict the use of certain materials, reducing the accessible resource base.

4.4

Raw Material Access & Supply

Policy Actions

Improve access to raw materials through local value-chain coordination

Support mechanisms to connect local producers, processors, and end-users, ensuring more efficient allocation and utilisation of side-streams.

Encourage local processing and retention of biomass

Introduce incentives or policy measures that support regional valorisation and reduce the export of unprocessed raw materials.

Strengthen logistics and collection systems

Invest in infrastructure and systems that enable efficient collection, storage, and transport of side-streams, particularly at landing sites and aquaculture facilities.

Review regulatory constraints on material use

Assess existing regulatory classifications (e.g. under ABP frameworks) to ensure that appropriate materials can be safely used in higher-value applications.

Good Practice Examples

Denmark provides a concrete example of how proximity between landing, processing, and further valorisation can improve access to raw materials. In hubs such as Skagen, large-scale fishmeal and oil producers (e.g. FF Skagen) are closely integrated with fisheries and processing activities, enabling the continuous collection and utilisation of fish by-products and trimmings. This model demonstrates how co-location of infrastructure and industry integration can ensure stable raw material flows and reduce losses of perishable side-streams.¹¹

In Türkiye, Kılıç Deniz provides a relevant example of an integrated aquaculture system covering farming, feed production, processing, logistics, and waste management. According to its 2024 Sustainability Report,¹² side-streams from its operations are processed through the Mavi Deniz rendering facility, with recycled fish waste increasing to 15,974 tonnes in 2024. This demonstrates how integrated infrastructure and traceability can support circular valorisation of aquaculture by-products.

¹¹ [FF Skagen Landing Sites](#)

¹² [Kilic Deniz Sustainability Report 2024](#)

Conclusion

Unlocking the value of seafood side-streams depends less on technological feasibility, and more on overcoming a set of interconnected structural challenges. As this report highlights, gaps across regulation, infrastructure, market conditions, and supply chains continue to limit progress towards large-scale, commercially viable solutions.

While these challenges are closely linked, addressing them does not require simultaneous action across all areas. Instead, a structured and phased approach is needed, beginning with the development of a clear roadmap to prioritise actions, identify key bottlenecks, and sequence interventions effectively. Initial efforts should focus on reducing uncertainty and enabling early progress, particularly through improved regulatory clarity, targeted scale-up support, and stronger market linkages.

To unlock the full potential of seafood side-streams, policy must support not only technological innovation but also the wider enabling conditions for commercial deployment, including clear regulatory pathways, reliable access to raw materials, shared demonstration infrastructure, early market validation, and finance mechanisms tailored to SMEs.

Importantly, existing practices across Europe show that effective models already exist. Scaling these approaches will depend on creating the right conditions for industry actors to operate with greater certainty and efficiency. A coordinated policy approach, guided by clear priorities and timelines, is essential to move side-stream valorisation from isolated pilot cases to scalable blue bioeconomy value chains.





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