

EXECUTIVE SUMMARY

A Study on Strategies for Building a Fishery By-product Upcycling Ecosystem

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1. Purpose

- Traditional fisheries management has largely treated by-products as waste or low-value outputs, limiting the industry's growth.
- However, growing interest in the Circular Economy (CE) highlights upcycling as a promising alternative to transform fisheries into a high value-added sector.
- This study analyzes the current status and cases of upcycling, assesses consumer perceptions and conducts expert insights, and FGI and IPA.
- Based on these results, it proposes a vision, strategic goals, and core tasks for industrializing fishery by-product upcycling.
- A roadmap and implementation framework are also suggested to support sustainable, high-value fisheries development.

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- The ultimate goal of this study is to achieve high-value-added industrialization and zero-waste fisheries, contributing to national CE policy, resource conservation, and carbon neutrality.

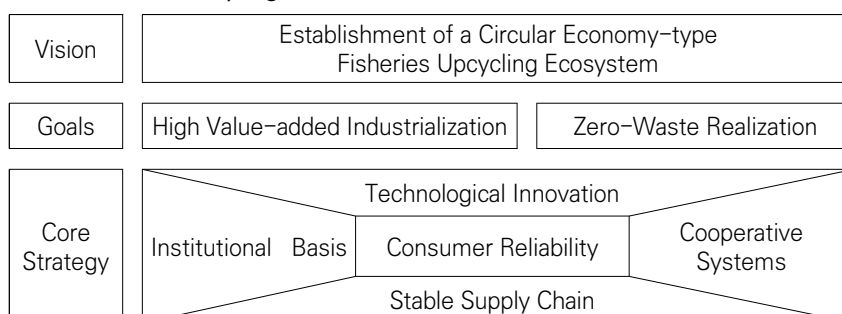
2. Methodology and Features

- Multi-layered approach: literature review, case studies, surveys, FGI, Importance-Performance Analysis (IPA).
 - Literature review: Examines domestic and overseas by-product generation, institutions, and industry status to identify policy gaps and best practices.
 - Case studies: Analyze by-product utilization, biomaterials, supply chains for raw materials, and ESG-driven markets.
 - Surveys, FGI and IPA: Reveal consumer distrust (concerning food sanitation and safety), and identify the need for institutional and supply chain stability.
- IPA Analysis and Roadmap:
 - Short-term: legal and institutional reform, trust-building.
 - Mid-term: technology commercialization, market expansion.
 - Long-term: global entry, zero-waste completion.
- Differentiation of this study: A clear definition of ecosystem-based “Fisheries Upcycling” and a practical policy roadmap are presented, not limited to technology

3. Result

- Vision: “Sustainable CE industrial ecosystem based on fisheries by-products.”
- Goals: (i) High value-added industrialization (ii) zero-waste.
- Five Core Strategies:
 - ① Strengthen consumer awareness and trust, ② Reform legal and institutional frameworks, ③ Stabilize supply chains, ④ Innovative technology development, ⑤ Develop regional specialization and global cooperation
- Roadmap (3 Steps):
 - Step 1 (Short-term, 2026–28): Establishment of legal frameworks, certification systems, collection center development
 - Step 2 (Mid-term, 2029–33): Functional material commercialization, market expansion (10% share)
 - Step 3 (Long-term, 2034–40): Full recovery achievement, global market expansion, CE ecosystem completion

〈Summary Figure 1〉 Vision & Goals for Industrialization



4. Policy Contributions

- Draft “Fisheries By-product Resource Act,” certification, procurement incentives, regional hubs, R&D support, governance, international collaboration.
- ① Legal and institutional foundation: Enactment of a “Fisheries By-product Resource Act” (tentative), introduction of dedicated certification systems, and linkage with preferential public procurement.
- ② Supply chain security: Development of regional hubs and clusters to ensure stable raw material supply and quality control.
- ③ Consumer trust enhancement: Strengthened hygiene and safety verification, credible certification, pilot projects in public catering, and eco-labeling.
- ④ Support for innovative technologies: Designation of bio & healthcare material R&D as a national priority, with industry-academia-research collaboration for commercialization and international certification.
- ⑤ Governance and global cooperation: Establishment of multi-stakeholder governance, and expansion of international joint research and certification partnerships.

5. Expected Outcomes

- If the policies and strategies proposed in this study are

implemented, the following economic, environmental, social, and policy effects can be expected:

▪ **Economic Effects**

- ① Increase in the resource utilization rate of fisheries by-products.
- ② Expansion of high value-added product markets.
- ③ Creation of new industries based on fisheries resources.
- ④ Growth of exports and global competitiveness.

▪ **Environmental Effects**

- ① Realization of zero-waste through full utilization of by-products.
- ② Reduction of carbon emissions.
- ③ Contribution to the conservation of the marine environment.

▪ **Social Effects**

- ① Strengthening of consumer trust and awareness.
- ② Creation of regional employment opportunities.
- ③ Revitalization of local economies.
- ④ Establishment of a successful model for social consensus.

▪ **Policy Effects**

- ① Resolution of legal and institutional uncertainties.
- ② Reduction of entry barriers for industries.
- ③ Enhancement of policy coherence and consistency.
- ④ Reinforcement of the foundation for global market expansion.