



Premium Market Assessment

TomGoxy[®] ZERO

Table of contents

- a) Table of contents
- b) Executive summary
- c) Disclaimer
- d) Introduction and background

1. Introduction

- TomGoxy Zero

2. Export value chain analysis

- Market trends and developments
- International trade of shrimp
- Quality assessment parameters
- Export value chain analysis
- Farm-gate prices
- Processing forms and preparation types
- SWOT analysis - TomGoxy Zero

3. Value chain development requirements

- Key elements
- EU Regulations

4. Premium product assessment

- Certifications
- Transparency & Traceability
- Antibiotic-free & food secure production
- Animal welfare
- Product quality and specifications
- Carbon footprint reduction
- Brand differentiation, premium positioning
- Novel ingredients
- Mangrove

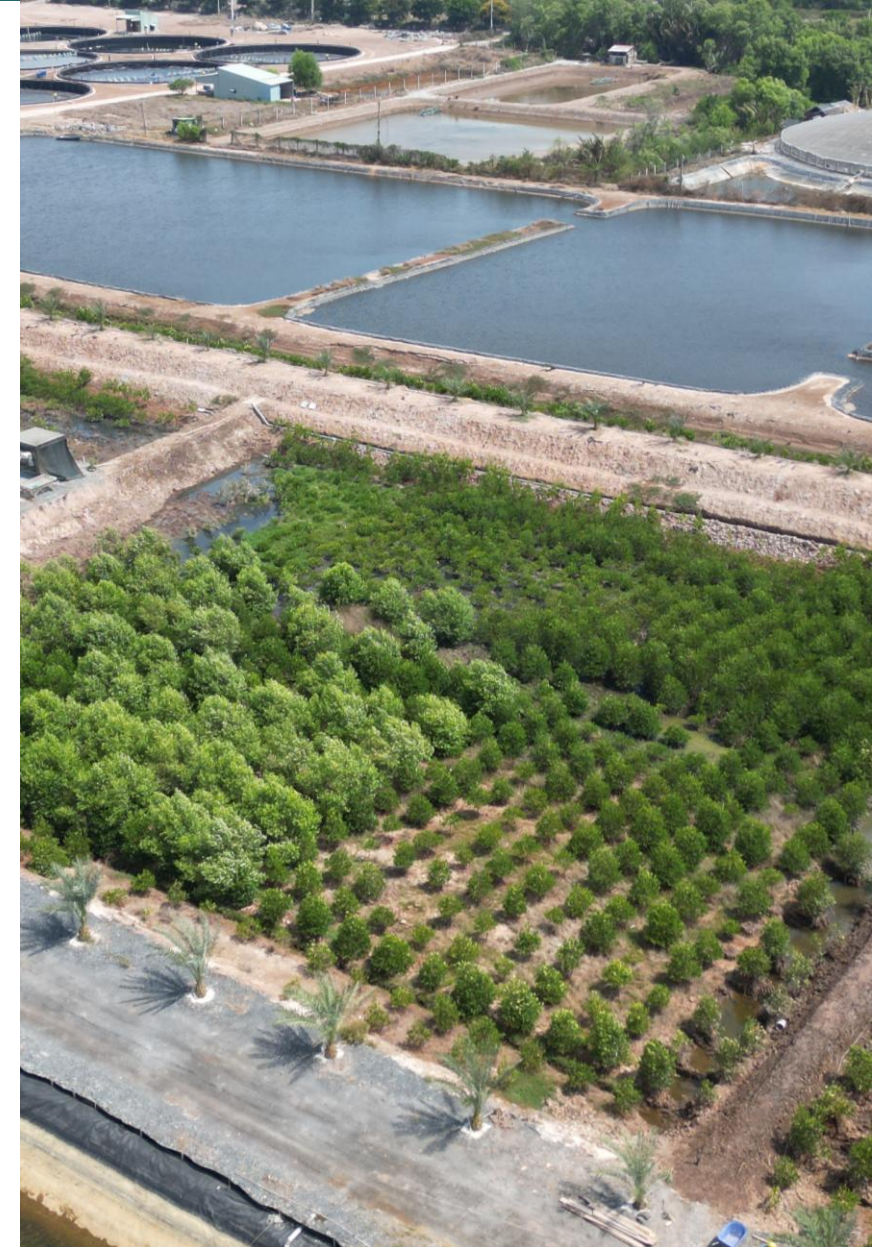
5. Roadmap to premium

- Roadmap to premium
- Competitive strategy – TomGoxy Zero
- Benchmark of product
- Route to market – smallholder recommendations

6. Market validation

- Concluding

7. Annexes



Executive summary

TomGoxy Zero is well positioned to turn its integrated mangrove–shrimp concept into a premium, commercially scalable offer for EU/UK markets by anchoring on ASC certification, develop an attractive mangrove storyline and close collaboration with value-chain partners.

TomGoxy Zero demonstrates how intensive Vannamei shrimp farming can be combined with mangrove restoration while remaining commercially viable. The partnership between Van Oord Ocean Health, RYNAN Technologies Vietnam and Larive International delivers a high-productivity, low-impacting farming system, that reduces nutrient discharge, lowers energy and water use and supports measurable mangrove recovery. In doing so, it provides a lighthouse model for climate-resilient shrimp production and a blueprint that can be scaled to other shrimp-producing regions globally.

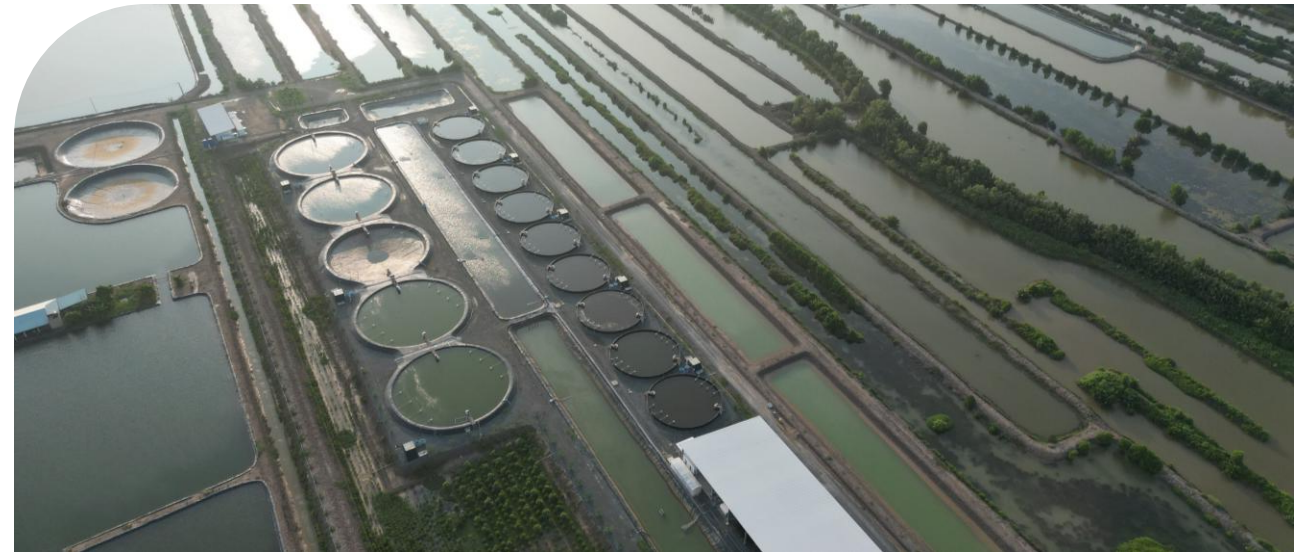
Export value chain analysis

Vietnam faces intensifying competition from Ecuador and India in both US and European markets. Ecuador, in particular, benefits from lower production costs and free-trade access to the EU. The EU-27 account for ~14.3% of Vietnamese shrimp exports, with the Netherlands as the key distribution hub. Raw Vannamei import prices EU range between \$6.40-8.30/kg CFR, with certification (ASC/BAP) enabling an estimated premium of 5% over conventional shrimp. Given Vietnam’s relatively high production costs, long-term competitiveness requires differentiation in processing, sustainability performance and branding rather than reliance on volume-based and price-driven competition.

Value chain development requirements

For TomGoxy Zero, certification is central to turning sustainability performance into market value, but it must be embedded in a broader value-chain upgrade. ASC is the most relevant baseline for EU/UK retail access, with BAP important for selected North American and Asian buyers; GLOBALG.A.P. mainly plays a role in direct EU retail supply. Organic routes (Naturland/EU Organic) are not feasible due to stocking-density limits and buffer-zone requirements that conflict with the high-intensity model and the current site layout.

To deliver a premium product, each step in the chain needs to align: feed mills must supply ASC-compliant, deforestation-free feed; hatcheries need to provide ablation-free larvae; farms must operate with robust biosecurity, antibiotic-free production, mangrove integration and full certification compliance. Processors safeguard chain of custody, product quality and cold-chain integrity, while importers and retailers ensure traceability, alignment with evolving EU regulations (CSDDD, General Food Law, Digital Product Passport) and credible communication of the mangrove and carbon story towards consumers. Existing schemes strengthen discipline on animal welfare, social safeguards, food safety and environmental management, but they do not explicitly reward intensive systems that actively restore mangroves, creating room for additional differentiation.



Executive summary

TomGoxy Zero is well positioned to turn its integrated mangrove–shrimp concept into a premium, commercially scalable offer for EU/UK markets by anchoring on ASC certification, develop an attractive mangrove storyline and close collaboration with value-chain partners.

Premium product proposition

Nine critical factors define TomGoxy Zero's premium positioning:

1. **Certification:** ASC as licence to operate in Europe and BAP where required in North America.
2. **Transparency and traceability:** Alignment with EU rules, GDST and Chain of Custody requirements.
3. **Antibiotic-free production:** A key condition for certification and a strong consumer health driver.
4. **Animal welfare:** Ablation-free broodstock and humane slaughter, responding to emerging buyer expectations.
5. **Product quality:** Consistent size, visual appearance and compliance with maximum residue limits are important drivers for consumers.
6. **Carbon footprint reduction:** Contribution to retailers' Scope 3 objectives through reduced energy use and mangrove-linked blue-carbon benefits.
7. **Brand differentiation:** Clear storytelling around mangrove restoration, climate resilience and farmer livelihoods.
8. **Novel ingredients:** A future-oriented lever rather than a near-term requirement for using insect meal, algae oil or single cell protein.
9. **Mangrove integration:** A distinctive CSR and ESG proposition for importers and retailers seeking demonstrable ecosystem restoration.

Roadmap to premium and market validation

Given the foreseen 400 MT annual capacity, TomGoxy Zero is best positioned to follow a focused differentiation strategy aimed at niche segments rather than volume-driven commodity channels. The primary geographic focus should be on the UK and EU where ASC certification, climate commitments and consumer sustainability awareness are strongest. Priority off-take channels include specialised supermarkets, online retailers, meal-kit providers, and purpose-led foodservice. Large price-driven retailers should be approached cautiously as they risk eroding the premium and pulling the concept back into commodity competition.

Market validation from [anonymized importer] confirms the willingness to pay premium for TomGoxy Zero's verified environmental credentials. Using conventional Vietnamese farm-gate prices (€5.22/kg for 16/20 count), TomGoxy Zero is expected to target around €5.85-€5.63/kg farm-gate, equivalent to an 8-12% premium over conventional production or roughly 5-7% above ASC-certified shrimp products. Realising and sustaining this premium will require early, structured collaboration between producer, importer and retailers on CSR narrative, benefits, cost allocation and consumer communication.

Strategic conclusion and recommendations

In summary, TomGoxy Zero should position itself not as a low-cost producer but as a first mover in premium "intensive-plus-restorative" shrimp farming, leveraging certification, verified mangrove restoration and targeted EU/UK niche channels to capture and sustain a price premium. Success demands close value chain collaboration to meet premium positioning requirements and develop compelling market narratives.

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Introduction and background

Research background

Background

In the Mekong Delta, Van Oord, RYNAN Smart Aquaculture and Larive International are partnering to integrate mangrove restoration with shrimp farming, improving sustainability and efficiency. The TomGoxy Zero approach supports CERF's ambition for scalable, climate-resilient, nature-based solutions and is intended as a lighthouse model for Vietnam and other major shrimp producers facing climate risk and stricter EU standards.

To advance the mangrove-integrated *Litopenaeus Vannamei* concept, exploration of the premium market segment is essential to differentiate mangrove-cultivated shrimp from traditionally produced shrimp with higher carbon footprints. Stronger price realisation for verifiably sustainable, mangrove-cultivated shrimp will accelerate adoption of these models and unlock investment at farm and processor level.

Two studies are designed to validate premium market potential and build a credible, certifiable route-to-market, linking demand, standards and measurable product quality, to underpin a bankable business case and enable scalable rollout of TomGoxy Zero.

Research structure

1) Study 1A: Premium market assessment & differentiation strategy.

This study maps priority premium segments (EU/NL and selected export markets), buyer requirements, acceptable claims and willingness to pay, quantifies potential price uplifts and defines the go-to-market positioning for mangrove-cultivated Vannamei shrimp.

2) Study 1B – Route to certification and quality assurance (this document).

This study determines the optimal certification pathway, develops sustainability criteria, sets product-quality specifications, benchmarks performance versus conventional shrimp and delivers a practical certification roadmap for producers and processors.

The two components inform each other: market insights from Study 1A guide the prioritisation of criteria and claims in Study 1B, while the feasibility and costs established in Study 1B refine the commercial assumptions and pricing scenarios in Study 1A. This report presents the methods and outputs for Study 1B.

This report presents **Study 1A**. Its outcomes validate market potential, define a clear differentiation strategy and acceptable claims, identify target buyers and channels, and establish pricing corridors and messaging, providing the commercial basis that, together with Study 1B, underpins a bankable business case and scalable rollout of TomGoxy Zero.



1. Introduction



TomGoxy Zero

TomGoxy Zero demonstrates how intensive shrimp farming can combine environmental restoration and commercial viability.



Establishment

This concept emerged from a strategic partnership that unites complementary expertise, with each partner bringing distinct capabilities to enable success. RYNAN Technologies Vietnam provides the TomGoxy farming technology, farm system expertise in design, construction, and farm operations. Van Oord Ocean Health contributes knowledge in mangrove restoration, ecological monitoring, and carbon market integration. Larive International leads on project development, structuring, management, and the scaling of the model to new markets.



Concept

TomGoxy Zero represents a paradigm shift in sustainable aquaculture, pioneering an intensive shrimp farming system that integrates mangrove restoration with resource-efficient production practices. The initiative demonstrates a commercially viable model where environmental regeneration and high-yield aquaculture coexist, potentially offering a blueprint for scalable and sustainable shrimp production globally.



Core aspects

The TomGoxy Zero system eliminates nutrient discharge into waterways and supports mangrove restoration, enhancing biodiversity, coastal protection, and carbon sequestration. At the same time, it delivers substantial efficiency gains, achieving up to a 300% increase in productivity, a 75% reduction in energy use, and a 60% reduction in water consumption compared to conventional shrimp farming. The system produces around 24 metric tons of antibiotic-free, fully traceable Vannamei shrimp per 1,000 m² annually across three production cycles, demonstrating that high yields can be achieved alongside measurable environmental benefits.



Future ambitions

TomGoxy Zero delivers a new standard for sustainable aquaculture, providing intensive Vannamei farming with mangrove filtration. The pilot project serves as an operational showcase for global scaling. The sector currently produces 5.4 million metric tons of Vannamei annually, spread across 47 countries. By combining mangrove nature-based solutions with a profitable business case, we deliver a scalable solution that balances commercial farming with the global need for environmental restoration.



Route to premium

While the concept demonstrated significant productivity gains, achieving these comes at a cost. Allocating land to mangrove restoration rather than shrimp ponds reduces the area available for production and, consequently, farm earnings. To assess the potential for scaling up, this study examines the route to premium markets, that can pay the price levels required to ensure the commercial viability of this more sustainable production model.



2. Export value chain analysis



Market trends and developments

Vietnam remains a competitive exporter but faces pressure from low-cost producers expanding their market shares.

The global shrimp market

The global shrimp sector continues to evolve, shaped by shifting production dynamics, fluctuating prices, and changing patterns of consumption. China remains the world's largest producer and consumer of shrimp, reflecting the strength of its domestic aquaculture industry, large internal market and dominant role as importer. However, Ecuador has emerged as the largest exporter, supported by efficient production systems, lower costs, and logistical advantages that allow it to supply major global markets effectively. Vietnam, while among the most competitive exporters, faces increasing challenges in maintaining its position as Ecuador and India expand market shares in both the United States and Europe¹. These competitors benefit from relatively lower production costs and geographic advantages in serving those markets.

The past few years have been particularly volatile for shrimp prices. In 2022, global prices surged as a result of high input and feed costs, price inflation, and logistics disruptions. This was followed by a sharp collapse in 2023, driven by oversupply and weakening demand in key importing countries. By 2024, prices began to stabilize as supply and demand moved back into balance. Looking ahead, the medium-term outlook remains positive³. Global shrimp consumption is expected to grow steadily, rising from approximately 8 million tons in 2025 to between 9 and 10 million tons by 2030, supported by population growth, urbanization, and expanding middle classes in developing economies².

Consumption trends

Consumption trends differ significantly between regions. In developing countries, demand for shrimp continues to rise as incomes increase and diets diversify, although shrimp remains a relatively high-priced product often viewed as a luxury item. As a result, demand is highly elastic and sensitive to economic conditions. In developed markets, consumption tends to decline during periods of economic downturn, but structural shifts are also underway. Consumers in these markets are placing greater emphasis on sustainability, traceability, and animal welfare⁵. Retailers increasingly require certification as a precondition for off-take, as these standards help guarantee responsible production practices. At the same time, convenience has become a major driver of consumption, with value-added products such as peeled, cooked, or ready-to-eat shrimp gaining market share, especially among younger consumers.

Regulatory and food safety

Regulatory and food safety standards strongly influence global shrimp trade and market access. Shrimp exports from Asia have faced scrutiny over contamination with banned antibiotics and other residues. The EU enforces a zero-tolerance policy through its RASFF system, while the U.S. FDA applies strict import alerts. In 2024, only six Vietnamese shipments were rejected in the EU, yet record rejections occurred in the U.S. Between 2012 and 2024, Vietnam, India, and Malaysia consistently ranked among the countries with the highest refusal rates⁴. Compliance pressures have accelerated adoption of certification and traceability schemes such as ASC and BAP, now essential for market access in Europe. Strengthened oversight and transparent supply chains are increasingly key to maintaining buyer confidence and competitiveness.

Trade agreements and tariffs

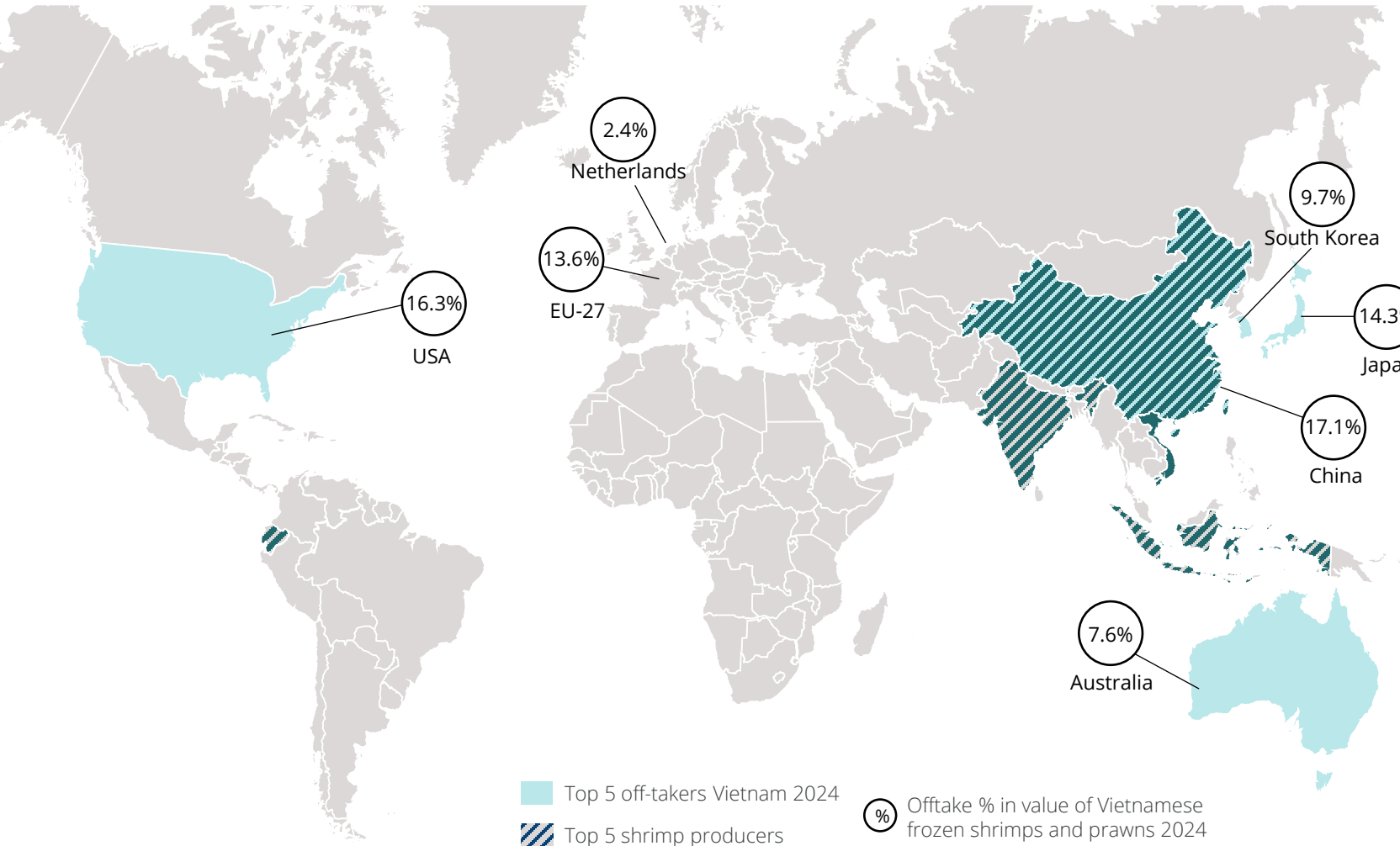
The global shrimp trade is significantly shaped by tariff regimes and preferential trade agreements, which determine the competitiveness of exporters in key consumer markets. Within the European Union, most shrimp imports benefit from duty exemptions or reduced tariffs through preferential arrangements such as the Generalised Scheme of Preferences (GSP), which has recently been extended until 31 December 2027. India as one of the beneficiaries of the GSP, enjoying a reduced import duty of around 4.2%.

In contrast, countries without preferential access or free trade agreements, including China and Indonesia, continue to face import duties of ~12%. Ecuador, on the other hand, enjoys zero tariffs through its Free Trade Agreement with the European Union, strengthening its position as one of the leading shrimp exporters globally. Vietnam benefits from similar preferential treatment under the EU-Vietnam Free Trade Agreement (EVFTA), which reduces the import duty on most raw shrimp products from 12% to 0%⁶. This has provided Vietnamese exporters with an important advantage in maintaining market access and competitiveness.

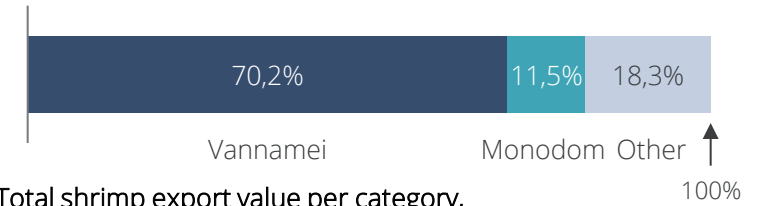
Looking ahead, Indonesia is moving toward the implementation of its Comprehensive Economic Partnership Agreement (CEPA) with the European Union, signed in September 2025⁷. Once ratified, the CEPA is expected to reduce import duties on shrimp, enhancing Indonesia's competitiveness in the European market and potentially increasing competitive pressure on Vietnamese exporters.

International trade of shrimp

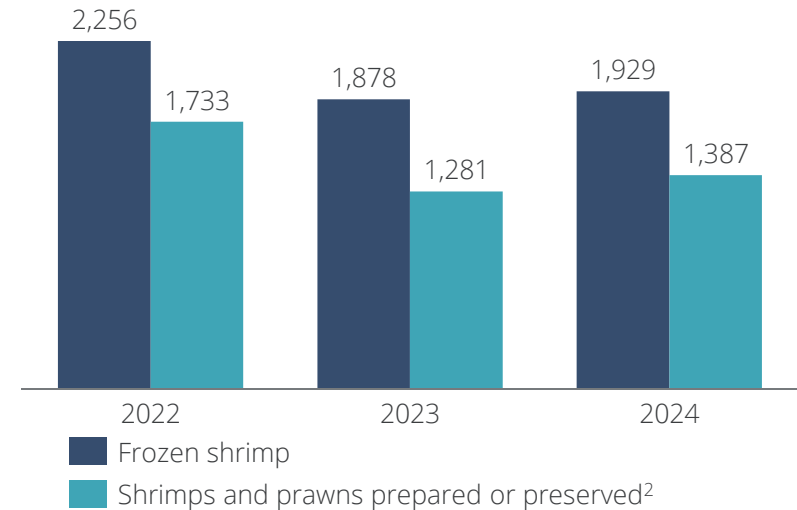
The EU-27 remains a relatively minor destination for Vietnamese shrimp exports



Shrimp export composition, by variety in % from Vietnam (2024)³



Total shrimp export value per category, in MN USD from Vietnam (2022-2024)³



Share of global shrimp exports, top 5 producing countries in MT (2024, ITC²)

	2022	2023	2024
Ecuador	1,140,881	1,201,390	1,199,855
India	704,031	712,913	733,148
Vietnam	407,768	326,727	347,464
Indonesia	231,413	209,066	214,021
China	125,854	132,014	163,888
Global	3,607,956	3,520,119	3,596,303

Quality assessment parameters

Taste, nutritional value and appearance are important markers to define the quality of the product

Shrimp are widely valued by consumers for their distinctive flavor and high nutritional quality. They are recognized as a rich source of protein, with low fat content and significant micronutrient value, making them an attractive and versatile food product. Assessments of shrimp quality typically focus on parameters such as taste, appearance, and nutritional composition. These quality indicators are often evaluated through biochemical analyses, including measurements of glycine and glutamate levels (key amino acids influencing flavor), astaxanthin concentration (which contributes to both coloration and nutritional value), and overall protein content.

Taste

Glutamate is well-known as a key component of "umami" taste, which is a pleasant savory flavor. Shrimp containing natural glutamate at optimal concentrations typically have a richer, more appealing taste. Glycine also contributes to sweetness in taste profiles. Together, these amino acids enhance the flavor experience for consumers, making the shrimp more enjoyable to eat.

Nutritional value

Glycine and glutamate are amino acids that form part of the protein composition of shrimp. Their presence at these levels reflects good protein quality and nutritional content. Consumers benefit from shrimp that provide these amino acids, which are important for human metabolism, including as building blocks for body proteins and as neurotransmitter precursors.

Shrimp are valued for their high protein content, typically containing 18-20% protein by weight. This high protein level, coupled with extremely low-fat content (usually less than 2%), creates an optimal nutritional profile that positions shrimp as a healthy protein choice in the market.



Appearance

Astaxanthin is a carotenoid pigment known for its antioxidant properties and contribution to shrimp color. It is what gives shrimp their characteristic pink or reddish color, which is important for consumer appeal. Good pigmentation is associated by consumers with fresh, high-quality shrimp.

Beyond color, appearance quality includes the shrimp's translucency, uniform size, intact body segments and absence of black spots or discoloration. The shell should have a natural sheen without being slimy, and the meat should appear firm and well-structured. Visual freshness indicators such as bright clear eyes, firmly attached head, and absence of melanosis (black spots) are critical quality markers.

Market Preferences

While some quality parameters are similar across markets, there are differences in the processing levels of shrimp requested. In Northern and Western Europe, easy and quick meal shrimp, fully processed with head- and shell-off, are most popular.

In Southern Europe, there is a preference for shell-on and head-on shrimp, valuing the full animal in their cuisine, similar to Asia, where freshness and the full animal are prioritized. In both markets, consumers are willing to peel the shrimp. However, the trend is shifting towards more processed, easy-to-cook products in both Asia and Southern Europe.

Processing forms and preparation types

At the retail level, shrimp products vary widely in processing, presentation and preparation

Product types

When examining shrimp products at the retail level, a variety of terms are used to describe the form and level of processing applied to the product. These designations help buyers and consumers understand exactly how the shrimp has been prepared, whether it retains its shell, head, or tail, and whether it has been peeled, deveined, or cooked. Shrimp are generally offered in the following product forms, and referred to with the following abbreviations:

Common product denominations

HOSO	Head on, Shell Off	PDTO	Peeled, Deveined, Tail On
HOTO BP	Head on, Tail On, Body Peeled	CPTO	Cooked, Peeled, Tail On
HLSO	Headless, Shell On	PND	Peeled & Deveined

These product forms reflect different levels of processing and value addition. For instance, HOSO and HLSO are often exported in bulk for further processing, while PDTO, CPTO, and PND are more consumer-ready and commonly found in frozen retail packs or ready-to-cook formats⁹.

Beyond processing level and presentation form, shrimp size is also a key classification factor, in combination with method of preserving. Size is typically expressed as the number of pieces per pound (or per kilogram) for individually quick frozen (IQF) products. For example, PDTO 26/30 IQF refers to peeled, deveined, tail-on shrimp with 26 to 30 pieces per pound.

Alternatively, shrimp may be preserved and shipped in brine or block frozen, where the product is packed and frozen together in solid blocks of ice. This method is more cost-effective and suitable for bulk export but can compromise flavour and texture due to freezer burn and is less convenient for portioning compared to individually frozen shrimp.

Value added products

Value-added shrimp products refer to processed forms that enhance convenience, appearance, or market appeal beyond raw shrimp. These products vary widely in preparation style, shape, breading, texture, and intended use, catering to different consumer preferences and price points. In Northern European, American, and UK markets, demand for peeled and ready-to-cook or ready-to-eat shrimp is particularly strong, driven by preferences for convenience and minimal handling during preparation. Even in regions that have traditionally favored unpeeled or head-on shrimp, there is a growing youth-led shift toward value-added, convenience-oriented formats as consumer lifestyles and retail channels evolve.

Common preparation types

Torpedo	Filolayer	Marinated
Butterfly	Skewered	Blanched

Breaded and other value-added shrimp products are almost exclusively made from Vannamei shrimp. This preference stems from their consistent size and shape, lower cost, reliable supply, and superior frying performance compared to other varieties. While value-added products may suggest that a higher price can be commanded per kilogram of final product, this is not necessarily the case. In shrimp breading, the ingredients and inputs used for value addition are often less expensive than the shrimp itself. For example, a Tempura shrimp product may consist of 40-50% shrimp and 50-60% other ingredients, including water, flour, starch, and seasoning.

Peeled & Deveined (PND) Vannamei, small individually quick frozen (IQF), Super Choice



Headless, Shell On (HLSO), Vannamei Block Frozen, Thufico, Vietnam

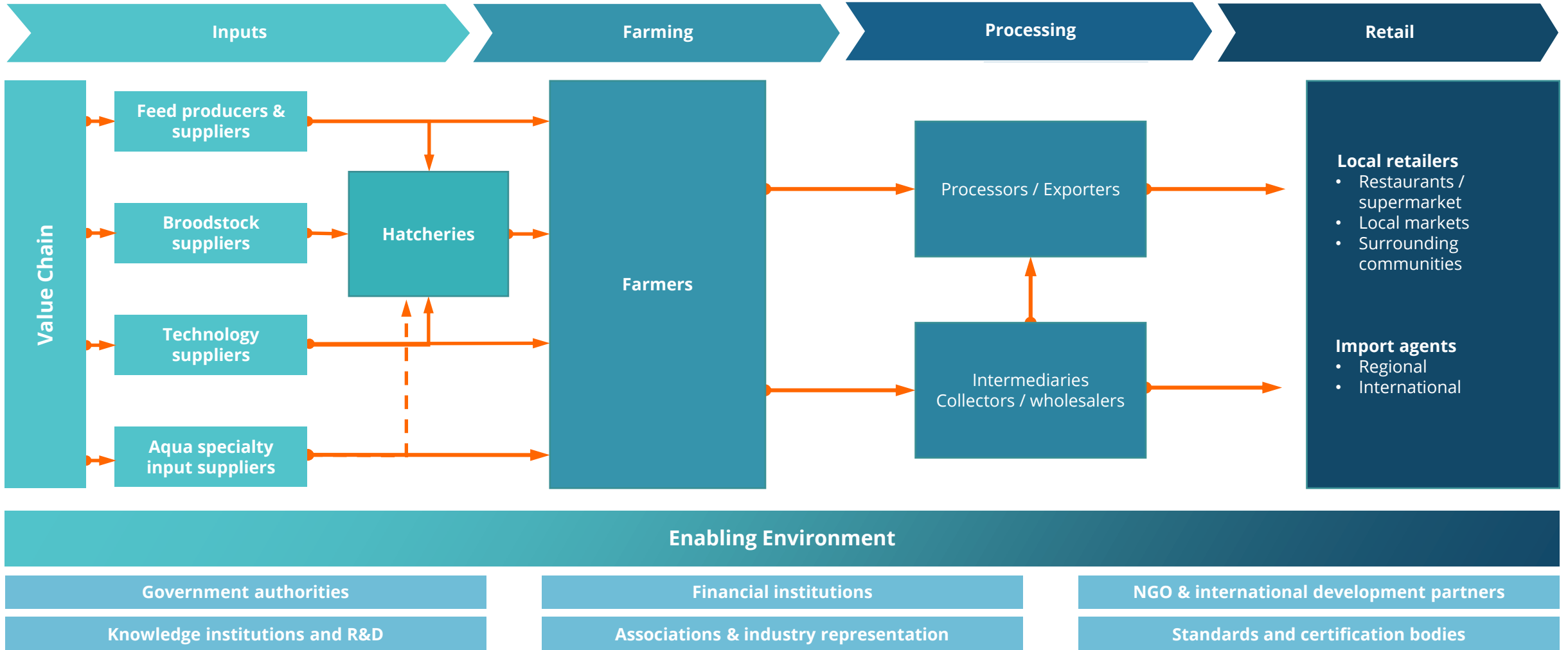


Torpedo or Tempura shrimp



Export value chain analysis

Bringing shrimp to consumers involves many actors across the value chain.



Farm-gate prices

Farm-gate shrimp prices in Vietnam are size-based and updated frequently, providing transparent market signals to producers

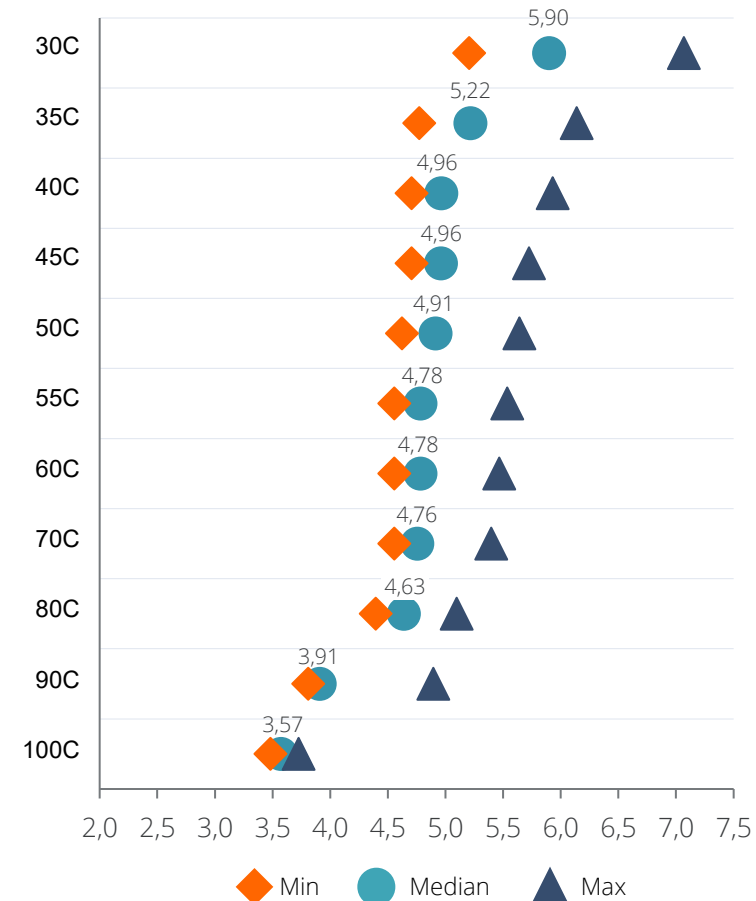
Farm-gate prices for Vannamei shrimp in Vietnam are primarily determined by size classification, expressed as the **count (C) of head-on shrimp per kilogram**. Processor X [anonymised] regularly disseminates updated farm-gate price information to its network of contracted and partner farmers. Typically, these prices are communicated between **3 and 9 times per month** through digital chat groups, enabling timely information sharing and reinforcing price transparency within the supply chain.

Once harvested, shrimp are graded by weight and retain this classification throughout processing, even though their actual weight decreases during deheading, shell removal, and trimming. The size grade is therefore based on the original head-on weight, which remains the industry reference for pricing and trade, even after subsequent processing steps reduce net product weight.

When expressed in count-per-kilogram terms, these categories are typically converted to count-per-pound equivalents following international market conventions commonly defined as **Jumbo** (10/15 count), **Large** (16/20–20/25), **Medium** (26/30–31/40), and **Small** (41/50 or smaller). Each category caters to distinct market segments, reflecting differences in consumer preference, purchasing power, and end-use applications.

Given Processor X established role as a major exporter to European markets, its pricing data serve as a reliable reference point for analyzing farm-to-export value formation. A comparative assessment of farm-gate and export prices across equivalent size categories allows for an estimation of value addition within the processing stage. Depending on the underlying contractual arrangements, these export prices generally incorporate shipping and logistics costs, most frequently under Cost and Freight (CFR) terms.

Farm-Gate Prices Paid by Processor X for Raw Vannamei Shrimp,³²
(€/kg) by Size Category (count per kg), January–October 2025



Export: price variations

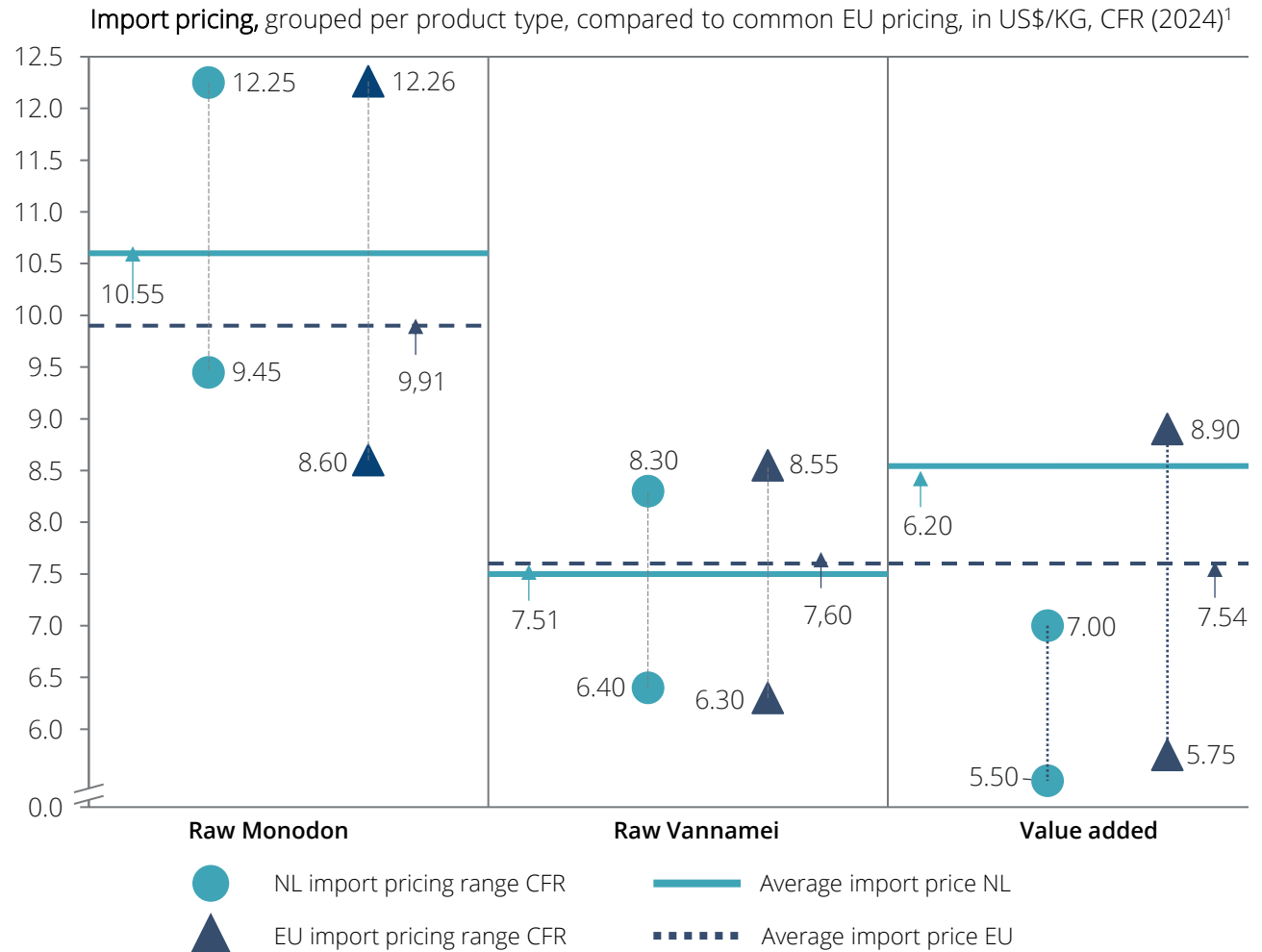
Monodon shrimp tend to command a higher price per kilo than Vannamei due to lower farming intensity and higher production costs.

Besides product-specific aspects such as size, processing level, and product form, shrimp export prices are also influenced by logistical and market factors. Nearly all shrimp imported into Europe are frozen and transported by sea, while air shipment is reserved for fresh, high-end niche products where speed and quality justify the higher cost. With rising reefer container rates from Asia to Europe, transport expenses now make up a larger share of the final landed price. While relevant for the **CFR** (Cost and Freight) price, this impact is not reflected in the **FOB** (Free on Board) price, which only covers costs up to loading at the port of origin, excluding international freight and insurance costs borne by the importer.

Beyond logistics, broader market dynamics also shape export pricing. Factors such as global demand trends, competition from other major producers and currency fluctuations between exporting and importing countries influence the price levels observed in the European market.

These logistical and market factors provide important context for interpreting export price patterns. Based on a large sample of export data from Vietnam to Europe, the prices shown on the right illustrate how import values vary across product categories. The figures indicate the median price per kilogram for each high-over category. The Netherlands serves as a major entry point for Vannamei shrimp exports, functioning as a distribution hub for further supply across the European continent.

Overall, raw monodon shrimp tend to command higher prices per kilogram than Vannamei shrimp. This price gap reflects differences in production intensity, growth cycles, and farming costs⁹. Monodon is generally cultivated at lower densities, often in semi-intensive or extensive systems, leading to higher per-unit costs but a premium product favored in certain European markets. In contrast, Vannamei can be farmed more intensively and efficiently, resulting in larger volumes and lower average prices.



Note: 1. The 25th and 75th percentiles of the transaction values are reported to represent the typical pricing range while mitigating the influence of extreme outliers. The average price is derived by dividing the total import value by the total imported quantity (in kilograms), rather than by taking the average unit prices of individual transactions.

SWOT analysis - TomGoxy Zero

Internal origin

Strengths

- **Market diversification:** Vietnam has one of the most diversified export portfolios among major shrimp suppliers, with around 50 percent of its products sold within Asia and Oceania, while also maintaining a strong foothold in both the European and American markets..
- **EU-Vietnam Free Trade Agreement (EVFTA):** Vietnam benefits from a strong competitive edge in the European market by reducing tariffs on most shrimp products from 12% to 0%. This preferential access enhances Vietnam's price competitiveness and supports export growth to the EU.
- **Processing capacity:** Vietnam's is increasingly focused on value-added products such as cooked, peeled, and ready-to-eat shrimp. This shift enhances export value, meets growing consumer demand for convenience, and strengthens Vietnam's position in premium global markets.
- **Level of intensification:** The level of intensification in Vietnam is high, and the application of technologies is therefore accessible. This enables faster adoption of new technology.
- **Value chain collaboration and initiatives:** Under the Netherlands' combi-track approach, the shrimp value chain shows strong, carbon-reduction-focused collaboration, with coordinated links from broodstock and inputs through to the farm gate.

Weaknesses

- **High costs of production:** Producing shrimp in Vietnam is significantly more expensive than in its main competitor countries, with costs nearly double those of Ecuador. This is largely due to high input and labor expenses, limited infrastructure and equipment efficiency, and low farming success rates that reduce overall productivity.
- **Distance to premium markets:** Vietnam's relative distance from key premium markets in Europe and the United States results in higher and rising logistics costs, making it increasingly difficult to remain competitive compared to exporters located closer to these destinations.
- **Integrated certification:** Although relevant for all producing countries, there is currently no certification that specifically recognizes the integration of mangrove and intensive shrimp farming. Without such certification, it is difficult for producers to command premium export prices.
- **Residue detection:** Ongoing concerns over traceability and compliance with international food safety standards (ea. antibiotic use) partially to undermine buyer confidence and create barriers to expanding premium market access
- **Fragmentation of farms:** Farms in Vietnam are commonly small-scale (approximately 1 hectare) with high-intensity models. This creates fragmentation in sourcing and traceability challenges.

SWOT analysis – TomGoxy Zero

External origin

Opportunities

- **Premium market access via certification:** Concept aligns with certification requirements, enabling entry to premium-price channels.
- **Farmer adoption pressure:** Disease pressure resulting in high mortality rates are making traditional models unviable, increasing readiness to switch.
- **Lack of clean water will be mitigated by natural recirculation systems** where farmers struggling with water quality can utilize natural recirculation systems, allowing farmers to reuse their water while providing safe and clean water for their systems.
- **Growing domestic market:** Vietnam, with a population exceeding 100 million, represents a substantial market. Rising purchasing power and awareness of quality and sustainability are driving domestic demand.
- **Global growth of sustainable protein:** Global demand for sustainable protein and shrimp continues to increase, positioning shrimp as a viable solution to meet the total market requirements.
- **Regulations shift towards mangrove restoration and water quality:** The system is future-proof with respect to mangrove restoration and water quality standards. Regulatory changes are moving towards sustainability and ecosystems, positioning the TomGoxy system favorably.
- **Supply chain carbon reduction ambitions from companies:** This concept aligns with companies' carbon reduction ambitions in the supply chain, as the TomGoxy model reduces carbon emissions in shrimp production, benefiting retailers' sustainability targets across the supply chain.

Threats

- **Free trade agreements:** Competing exporters such as India, and Indonesia are gaining or negotiating preferential access to major markets through new or expanded trade agreements, reducing the comparative advantage of Vietnam in serving the European market.
- **Certification standards:** Increasingly stringent certification requirements across the entire value chain, pose a potential challenge, as a strong performing farm alone will not be sufficient to meet the evolving standards to command premium prices for the product.
- **Climate vulnerability:** Vietnam's shrimp farming areas are highly exposed to the impacts of climate change, including rising sea levels, salinity fluctuations, extreme weather events, and disease outbreaks linked to temperature shifts.
- **Post-larvae availability:** Within Vietnam, the availability of high-quality disease-free post-larvae remains challenging. This poses a threat to the production system and is therefore important to have a steady supply of quality post-larvae for value chain security.
- **Antibiotic residue cases in Vietnam:** Antibiotic residue incidents where products are rejected from EU and US markets due to non-compliant residues can decrease trust in Vietnamese shrimp and enforce higher levels of container testing, creating complications in the supply chain.



3. Value chain development requirements



Value chain development requirements – Key elements

Commanding premium prices requires coordinated value chain efforts

To be able to command and sustain premium prices in the shrimp market, producers and value chain actors must position their product as demonstrably superior in quality, integrity or both. Doing so requires a coordinated effort across the entire value chain, from hatchery to retail, focused on delivering verified value that resonates with high(er)-end buyers. Consumers willing to pay more do so when they can clearly recognize and trust the added value behind the product. Beyond size and flavour, several other key dimensions contribute to this perception. The following aspects are a non exhaustive list, which are further extended and expanded on in the following chapter:

- 1. Comprehensive certification:** Beyond the farm-level certifications such as ASC (Aquaculture Stewardship Council) and BAP (Best Aquaculture Practices), premium markets increasingly expect certification to extend to processing facilities and even to the feed supply chain¹³. This end-to-end assurance provides confidence that every stage of production adheres to best practices.
- 2. Sustainability and food safety standards:** Buyers and consumers expect measurable commitments to sustainability, particularly regarding the responsible use of antibiotics, the safety and quality of feed inputs, and a verifiable chain of custody that ensures full traceability from origin to plate. Demonstrating neutral or positive impacts on water resources and ensuring products are free from phosphates further enhances market credibility.
- 3. Animal welfare and ethical practices:** The welfare of shrimp is increasingly recognized as a factor influencing both ethical sourcing and product quality. Practices such as avoiding oblation (the removal of eyestalks)¹¹ are becoming important differentiators in premium markets that value more humane production methods.
- 4. Presentation, and packaging:** The visual and emotional appeal of the product at the point of sale is critical. Strong branding supported by clear sustainability messaging, attractive packaging, and well-prepared, consumer-friendly product formats reinforce the perception of superior value. Retail presentation should align with premium positioning, signaling quality, care, and trustworthiness.
- 5. Reliability of supply:** Consistency in quality, availability, and delivery timelines is a key determinant of long-term relationships with premium buyers. Retailers and importers seek partners who can guarantee continuity of supply while maintaining the high standards that justify premium pricing.

Value chain roles in achieving premium shrimp for TomGoxy Zero

Inputs	
Feed manufacturer	Provision of quality, ASC-compliant feed from 31 Oct 2025
Hatcheries	Oblation free, high quality larvae supply
Technology provider	Traceability technology solutions
Farming	
Farm	Enhanced biosecurity to reduce disease pressure
	Mangrove / ecosystem integration & carbon reduction
	Responsible health management; no antibiotics use
	Traceability systems
	Certification compliance
	Third party auditing
Processing	
Processor	Processing certification compliance
	Chain of custody and traceability assurance
	Cold chain optimization
Importing	
Importer	Chain of custody and traceability assurance
	Product diversification and market alignment
Retail	
Retailer	Certified and transparent sourcing
	Communication, branding and in-store presentation

Value chain development requirements – EU Regulations

Europe enforces strict regulations on the import of aquaculture products, with plans to further raise the bar.

Shrimp producers in Vietnam must comply with a range of European Union (EU) regulations to access and maintain market entry. These frameworks ensure responsible sourcing, product safety, and traceability throughout the supply chain.

1. EU Corporate Sustainability Due Diligence Directive (CSDDD)

The Corporate Sustainability Due Diligence Directive (CSDDD) establishes mandatory obligations for companies operating in or supplying to the EU to identify, prevent, and mitigate adverse human rights and environmental impacts throughout their supply chains²⁴. For shrimp exporters, this includes demonstrating compliance not only within farm operations but also across feed production, hatcheries, processing facilities, and logistics.

Key Focus Areas:

- **Human rights coverage:** Companies must proactively address labor conditions, fair wages, worker safety, and gender equality. This includes ensuring that suppliers and subcontractors adhere to internationally recognized human rights and labor standards.
- **Environmental stewardship:** Firms are required to monitor and reduce their environmental footprint, including greenhouse gas emissions across Scopes 1, 2, and 3, wastewater discharge, and resource use (energy and water). Demonstrating sustainable aquaculture practices and ecosystem management—such as mangrove restoration—can contribute to compliance.
- **Supply chain visibility:** Businesses must establish full visibility over their production and sourcing networks, mapping inputs such as feed, seed, and energy use. This transparency helps identify risk hotspots and allows for targeted sustainability interventions.
- **Stakeholder engagement:** The CSDDD encourages companies to engage with workers, local communities, NGOs, and public authorities to address grievances, build partnerships, and report on progress. Effective engagement demonstrates due diligence and good faith compliance

2. EU General Food Law & Fisheries Control Regulation

The General Food Law (Regulation EC No. 178/2002) and the Fisheries Control Regulation form the backbone of the EU's food safety and traceability framework. These regulations ensure that all food products, including imported shrimp, are safe, traceable, and compliant with EU hygiene and labeling standards²⁶.

Key Requirements:

- **Event-based traceability** - Operators must document and link each stage of production, processing, and transport through standardized systems such as GS1 barcoding or digital traceability platforms. This enables rapid identification and withdrawal of non-compliant or unsafe products.
- **"One step forward, one step back" principle** - Every operator in the supply chain must be able to identify their immediate supplier and immediate customer, ensuring continuity of traceability from pond to plate.
- **Risk-based monitoring and verification** - Importers are required to implement risk-based controls and verification measures, such as residue testing, health certificates to ensure compliance with the EU sanitary standards.
- **Transparency and Accountability** - The framework emphasizes the importance of data sharing and documentation. Data must be verifiable back to the farm and vessel.²⁷

Upcoming regulations:

Two upcoming EU policies are expected to significantly influence shrimp exports. **The EU Digital Product Passport (DPP) Initiative** will introduce a standardized digital system to enhance product transparency and traceability, allowing consumers, retailers, and regulators to access detailed information on origin, production methods, and sustainability attributes²⁸. In parallel, the new **EU Antibiotic Regulation**, taking effect by September 2026, will impose stricter limits on antibiotic use in aquaculture. European buyers are likely to adjust sourcing strategies ahead of implementation reflecting growing scrutiny over antibiotics use and animal welfare.



4. Premium product assessment

Premium factor assessment

Nine key factors determining market access and premium pricing for shrimp



Commanding premium prices in both retail and foodservice channels requires far more than traditional product attributes such as size, form, flavor profile, or price. Success increasingly depends on meeting a comprehensive set of buyer expectations that shape perceptions of quality and determine market eligibility. For shrimp suppliers, processors, and wholesalers serving supermarkets, restaurants, hotels, and ready-meal producers, access to premium markets is now defined by their ability to demonstrate compliance, sustainability, traceability, and product differentiation.

Premium buyers demand not only certified and traceable shrimp, but increasingly also look for tangible proof of ethical production, value-added processing, and reduced environmental impact. Retailers and distributors seek suppliers who can ensure consistent quality, transparent sourcing, and alignment with shifting consumer preferences for responsibly produced seafood. In this context, premium pricing is achieved not through volume but through credibility, innovation, and verified performance across the supply chain.











The nine factors outlined in the following framework represent the critical pathways to premium market access, grouped into three interlinked pillars:

- (1) Market Access:** focusing on compliance, certification, and trade readiness;
- (2) Premium Drivers:** encompassing product quality, sustainability, and brand differentiation
- (3) Innovation:** addressing innovation, traceability technology, and environmental and social accountability.

Together, these elements form the foundation for Vietnam's shrimp sector to strengthen its position in the most demanding global seafood markets and sustain long-term price premiums. The following slides provide a deeper examination of these nine factors and the relevance for TomGoxy.










Premium factors: Certifications

ASC certification is the license to operate on the European market whilst BAP is the license to operate in the North American market.

Market access		<p>Certification plays a critical role in the export market, where retailers increasingly require certified shrimp. As further discussed in Study 1B on certification options for shrimp, two major farm-level certifications dominate international trade: the Aquaculture Stewardship Council (ASC) certification, which primarily serves the European market, and the Best Aquaculture Practices (BAP) certification from the Global Seafood Alliance, which provides key market access to North America.</p>																			
																					
																					
																					
Premium drivers		<p>Aquaculture Stewardship Council</p> <p>The ASC certification is built around 4 principles, Legal compliance, Environmental management, Human and labor rights and Animal welfare¹². The ASC standard is a developing standard, whereas standards become develop over time. Some of the major field developments in the ASC certification are:</p>																			
		<p>1. Legal compliance</p> <ul style="list-style-type: none"> Full traceability from feed mills → farms/hatcheries → supply chain (mandatory May 2027)²³ 																			
		<p>2. Environmental Stewardship:</p> <ul style="list-style-type: none"> Farm Siting - Protection of local ecosystems with buffer zones and mangrove restoration Water Management - Responsible water use to prevent water quality deterioration or salinization of adjacent waterbodies or land, plus responsible biosolids management 																			
		<ul style="list-style-type: none"> Feed Use - From October 31, 2025, certified farms must use ASC-conforming feed from ASC certified feed mills 																			
Innovation		<p>3. Human and labor rights</p> <ul style="list-style-type: none"> Living wage assessment with improvement plans, community engagement and transparent contracts. 																			
		<p>4. Animal Welfare:</p> <ul style="list-style-type: none"> Eyestalk ablation - Shrimp must be sourced from ablation-free lines within the transition period (May 2025 - May 2031) Antibiotic use - New controls aligned with WHO's One Health approach, with no antibiotic use on ASC labeled shrimp³⁰. <p>The ASC standard is a mandatory certification for producers that want to produce for international retailers:</p> <table border="0"> <tr> <td>Albert Heijn</td> <td>(Netherlands)</td> <td>Kaufland</td> <td>(Germany)</td> </tr> <tr> <td>Jumbo</td> <td>(Netherlands)</td> <td>Penny</td> <td>(Germany)</td> </tr> <tr> <td>Lidl</td> <td>(Europe)</td> <td>Coop</td> <td>(Switzerland)</td> </tr> <tr> <td>Sainsbury</td> <td>(UK)</td> <td>Carrefour</td> <td>(France)</td> </tr> </table> <p>BAP Certification</p> <p>BAP certificate is established by the the Global Seafood Alliance (GSA) in 2002. It is a multi-stage certificate from hatcheries, feed mills, farms, processing plants including the CoC. It uses a "Star" system indicating how many links are certified.</p> <p>Focus areas:</p> <table border="0"> <tr> <td>1. Environmental responsibility</td> <td>3. Food safety</td> </tr> <tr> <td>2. Animal health and welfare</td> <td>4. Social accountability</td> </tr> </table> <p>Market positioning: Preferred by many US retailers</p> <p>Premium Impact:</p> <p>Certification typically enables approximately a 5% premium over conventional shrimp. The strategic approach pursues certification as a market access tool, focusing on either the EU market or North America. ASC certification is selected for Europe, while BAP certification is chosen for North America.</p>	Albert Heijn	(Netherlands)	Kaufland	(Germany)	Jumbo	(Netherlands)	Penny	(Germany)	Lidl	(Europe)	Coop	(Switzerland)	Sainsbury	(UK)	Carrefour	(France)	1. Environmental responsibility	3. Food safety	2. Animal health and welfare
Albert Heijn	(Netherlands)	Kaufland	(Germany)																		
Jumbo	(Netherlands)	Penny	(Germany)																		
Lidl	(Europe)	Coop	(Switzerland)																		
Sainsbury	(UK)	Carrefour	(France)																		
1. Environmental responsibility	3. Food safety																				
2. Animal health and welfare	4. Social accountability																				










Premium factors: Transparency & Traceability

Meeting traceability requirements is a key condition for entering the European market.

Market access		Transparency and traceability have evolved from mandates to market access requirements for the European market, aligning with Scope 3 reporting requirements. The regulatory landscape and consumer expectations converge to make full supply chain visibility non-negotiable for premium positioning. Compliance with import market regulations is essential.	<p>Essential traceability data points:</p> <ul style="list-style-type: none"> • Specific farm identification and location. • Harvest date and batch tracking codes. • Feed sources and genetics used. • Sustainability certifications linked to product²¹. <p>Traceability sector initiatives</p> <p>The Global Dialogue on Seafood Traceability (GDST) is a leading sector initiative and non-profit foundation that manages global standards for digital seafood traceability across the supply chain. GDST promotes a unified framework for tracking seafood from origin through every stage, improving transparency, sustainability, and combating illegal fishing and unethical practices.</p> <p>Aligning with GDST standards, the ASC onKey Data Elements (KDE) project enhances digital traceability for ASC-certified shrimp by capturing critical data points at every supply chain stage, from farm and feed sources to final retailer²². The system tracks ASC-certified products using unique codes that transfer data digitally as products move through processing, packaging, and transport stages.</p> <p>Sainsbury's (UK retailer) and Lyons Seafoods Ltd (supplier) are collaborating with ASC to pilot and improve this digital traceability system. Their involvement ensures that shrimp sold to customers is traceable, responsibly sourced, and meets high sustainability standards.</p>
			
		<p>EU</p> <p>EU Corporate Sustainability Due Diligence Directive (CSDDD): Requires companies to demonstrate responsible sourcing and supply chain transparency, with particular focus on human rights and environmental impacts.</p>	
		<p>EU General Food Law & Fisheries Control Regulation: Establishes fundamental food safety and traceability requirements for all food products entering the EU, including seafood.</p>	
Premium drivers		<p>North America:</p> <p>FDA Food Safety Modernization Act (FSMA), Section 204: US market access requirement</p>	
		Beyond regulatory requirements, consumer and buyer demand for product traceability continues to increase.	
		Large buyers require standards-based traceability systems that provide end-to-end supply chain visibility, ensure data collection, enable interoperable data sharing, and verify compliance. Farm-level challenges translate directly to Scope 3 challenges for buyers, making comprehensive traceability essential for accessing premium markets. ²⁹	
Innovation		<p>Requirement for certification</p> <p>Compliance with certification standards such as ASC and BAP requires meeting traceability criteria and implementing chain of custody systems that track products from inputs to outputs.</p>	<p>Premium Impact:</p> <p>Transparency and traceability serve as market access requirements for premium markets and are essential for market entry and certification. These capabilities enable brands to communicate their sustainability story effectively.</p>
			










Premium factors: Antibiotic-free & food secure production

With increasing consumer awareness, antibiotic-free production is a key driver for entering premium export markets.

Market access		Antibiotic-free production represents one of the most important factors driving consumer decisions to purchase premium shrimp. This has prompted certification bodies such as ASC to prohibit antibiotic use in their standards. While disease remains the leading cause of shrimp losses globally, scrutiny of antibiotic use continues to intensify among buyers and consumers worldwide. Market access increasingly depends on responsible farming practices that eliminate antibiotic dependency.	<p>MRL testing</p> <p>MRL (Maximum Residue Limit) testing for antibiotic residues in aquaculture products involves collecting tissue samples (like shrimp muscle), then using validated laboratory methods such as liquid chromatography-mass spectrometry (LC-MS/MS) to measure the concentration of antibiotic residues present. The test results are compared with the regulatory maximum allowed concentrations, the MRL, and any sample containing residues above this limit is considered non-compliant and subject to regulatory action or rejection.</p> <p>Regulatory pressure and restrictions:</p> <ul style="list-style-type: none"> • The WHO's One Health approach drives antimicrobial resistance reduction initiatives.³⁰ • The EU strictly regulates antibiotic use in aquaculture, with complete bans on substances such as chloramphenicol and nitrofurans • To export shrimp to European markets, governments must maintain an approved residue monitoring plan that demonstrates no prohibited substances—including antibiotics critical to human health—are used in aquaculture products destined for the EU <p>Certification requirements:</p> <p>ASC standard explicitly prohibit preventive use of antibiotics in certified shrimp production¹¹. When used, it requires strict controls and documentation if antibiotics are needed and a veterinarian is allowed.</p> <p>Premium impact:</p> <ul style="list-style-type: none"> • Antibiotic-free production is in accordance with certification and therefore provides market access. • It is expected that buyers already factor the premium on certification into account as it is part of the certification standards.
			
		<p>Preventive use of antibiotics</p> <p>A common practice involves farmers using preventive antibiotics in their crops to maintain shrimp health over the production cycle. This practice, which certification bodies are working to eliminate, differs from therapeutic use.</p>	
		<p>While ASC-certified shrimp farmers are not permitted to use antibiotics at all on ASC-labeled shrimp, ASC-certified farms are only allowed to use antibiotics/medicines after a qualified veterinarian or fish health professional has diagnosed a disease. This includes medicines that are legally authorized.</p>	
Premium drivers		<p>More importantly, ensuring antibiotics are out of the system of the shrimp so that no residues can be found in shrimp that are consumed by consumers is critical. ASC shrimp then cannot carry the logo of antibiotic-free anymore.</p>	
		<p>Consumer awareness</p> <p>Consumers are increasingly aware of antibiotic residues and the health risks associated with antimicrobial resistance (AMR). There is awareness that these products are harmful to health and not safe to eat. This is the second and third engagement driver for consumers.</p>	
		<p>Consumer awareness is highest in Northern and Western Europe, UK, USA, and Australia, as well as New Zealand markets.¹²</p>	
Innovation			
			










Premium factors: Animal welfare

The UK market is a frontrunner in animal welfare, with ablation-free practices and electric stunning becoming industry norms.

Market access		Animal welfare considerations are emerging as premium differentiators, particularly in European markets where consumer consciousness around ethical treatment drives purchasing decisions. While aquaculture welfare standards lag behind terrestrial livestock, leading farms are proactively addressing these concerns before they become mandatory across all markets.	<ul style="list-style-type: none"> • Newer methods apply electric stunning immediately after harvest to bring shrimp into shock, after which they are iced. • A combination of electric stunning and an ice slurry can also be used as an effective method. • Benefits of electric stunning: reduced stress and suffering during slaughter, fewer bruises, better texture, and stronger ethical production values.³⁷ • Electric stunning is increasingly requested by UK retailers to raise animal-welfare standards and align with consumer expectations.
		Key animal welfare issues in shrimp production:	
		Eyestalk Ablation	
		<ul style="list-style-type: none"> • The removal of one eye of a shrimp broodstock is a traditional practice to accelerate maturation in broodstock at hatchery level. This involves removing or damaging the eyestalk to trigger reproduction. • This practice, called ablation, has been in the news in the Netherlands since 2022 and has gained attention. Retailers are declaring that they only want to source from ablation-free hatcheries; premium European buyers already demand ablation-free sourcing. • The ASC has acted upon this shift and adjusted its regulations: shrimp must be sourced from ablation-free lines within the transition period (May 2025–May 2031)¹². • Industry direction is clearly moving toward complete elimination of ablation, with efforts underway to change practices that are still commonly used. 	
Premium drivers			<p>Premium Impact</p> <ul style="list-style-type: none"> • Ablation-free status is becoming a mandatory factor for certification and therefore important to comply with. • For electric stunning, this is increasingly a requirement to distribute to premium retailers in the UK. <p>The animal welfare factor serves as a market access tool for premium markets and is mandatory for certification. While UK retailers are frontrunners in animal welfare standards, it is expected that this requirement is becoming increasingly widespread.</p>
			
			
Innovation		<ul style="list-style-type: none"> • During harvesting, shrimp are traditionally placed in baskets with ice-water slurry (typically 0–4 °C) to induce a cold shock from which they do not recover; they are then packed in boxes with ice to keep the product fresh for transport³⁸. 	
		<ul style="list-style-type: none"> • There is ongoing debate about effectiveness: in warm environments, if the water rises above 4 °C, the method becomes less effective and can increase stress for the animals. 	










Premium factors: Product quality and specifications

Optimise operational costs relative to shrimp size to maximise margins, with MRL compliance as a market access requirement.

Market access		Product quality is the tangible manifestation of premium value that consumers directly experience. While sustainability credentials open premium market doors, consistent quality excellence keeps them open and justifies premium pricing to end consumers.	<p>Product quality can be divided into four criteria:</p> <p>1. Taste, Texture, and Color</p> <p>Shrimp delivers "good unique flavor, texture, and color" These sensory attributes are key selling points.</p> <p>2. Freshness</p> <p>Chinese consumers particularly value "appearance, color, and freshness" Freshness is a critical quality factor for premium positioning.⁴⁸</p> <p>3. Appearance</p> <p>Visual appeal crucial with less than 0.5 seconds decision time at purchase Chinese market specifically values appearance as a quality indicator³¹.</p> <p>4. Nutritional Quality</p> <p>Low-fat/high-protein profile with high nutritional value "Loaded with Omega-3s, vitamins, and minerals".</p> <p>Premium Impact:</p> <ul style="list-style-type: none"> • Clear evidence shows that larger sizes command higher prices. However, production costs are also higher. Therefore, operational efficiency must be calculated. • MRL (Maximum Residue Limits) serves as a market access specification tool. • Without quality standards, access to higher-value markets cannot be achieved. Only in China can lower product quality still command higher prices.
		Size and Price Differentiation Product quality shows clear price differentiation based on shrimp size, measured by count per kilogram:	
		<ul style="list-style-type: none"> • 20 counts (50g per piece) to 100 counts (10g per piece) per kg • Categories typically segmented in 10-count increments 	
		Larger shrimp command higher prices due to increased production costs, longer cultivation periods, higher feed requirements, and greater risk exposure during extended pond time. Biomass capacity limitations require adjusted stocking densities.	
Premium drivers		Market Preferences	
		The prices of the different sizes are part of a demand and supply mechanism that can influence the prices of the sizes not fully linear. Some market preferences are:	
		<ul style="list-style-type: none"> • Chinese consumers prefer diverse size ranges⁴⁸ • US/European markets pay premiums for larger size's • European retail: "Jumbo" or "king" shrimp command higher prices in the retails. 	
Innovation		MRL Compliance	
		Maximum Residue Limits (MRL) for antibiotics must remain below specific thresholds. Retailers require residue levels measured in micrograms per kilogram (µg/kg), with some importers requiring below 1,000 PPB (parts per billion).	














Premium factors: Carbon footprint reduction

Carbon footprint reduction has to align with retailers' strategic ambitions, with retailers favoring suppliers that cut Scope 3 emissions.

Market access		Carbon footprint reduction has rapidly evolved from a sustainability nice-to-have to a commercial imperative, requiring suppliers to meet Scope 3 emission targets. While ASC certification establishes the sustainability baseline, measurable carbon reductions create additional value and sourcing criteria.	<p>Lower emission becomes a competitive advantage</p> <p>Scope 3 emission reduction becomes increasingly important for retailers, thereby influencing the sourcing strategy of retailers. Moving towards products with lower carbon emissions is a trend that is seen⁴¹.</p> <p>Life Cycle Analysis</p> <p>LCA is the generally accepted approach for companies to understand environmental impacts across the full range of inputs and outputs associated with their products. An LCA looks at every step in the journey of shrimp – from land and energy resources needed to produce feed ingredients, to the impacts of resources used to grow shrimp at the farm²⁰. The LCA may also examine the impacts of processing and transporting shrimp, and accounts for any waste and loss in the supply chain. This thorough assessment provides a full picture of each stage of the production process and its associated greenhouse gas emissions.</p> <p>Impact on premium prices:</p> <ul style="list-style-type: none"> • Within the retail landscape, there is an increasing demand for carbon footprint reduction, primarily through adjustments in feed. However, the cost of reducing the carbon footprint is becoming a market access requirement for higher-value markets. It is expected that carbon footprint management will become a competitive advantage for producers that monitor their Scope 3 emissions. • It is recommended to have a clear LCA (Life Cycle Assessment) of shrimp production to understand how you can contribute to the Scope 3 ambitions of buyers and retailers.
		Industry Carbon Profile	
		Shrimp production carbon footprint: 3.3-5.8 kg CO ₂ e/kg liveweight. Scope 3 elements in these are:	
		<ul style="list-style-type: none"> • Agricultural ingredients in feed (~50% of feed emissions) • Energy use from aerators • Loss of mangroves • Ice production and cold chain • Transportation¹⁷ 	
Premium drivers			
		Scope 3:	
		For Scope 3 emissions, the Product Carbon Footprint requires retailers to report on the footprint of a product. This is of course also important for reducing greenhouse gas emissions.	
Innovation		Major retailers, especially from Europe, require suppliers to meet Scope 3 emission targets. Thai Union's \$150M Blue Loan specifically for sustainable shrimp procurement signals how financial markets are creating premium payment mechanisms ⁴³ .	
		For example, Ahold Delhaize's net-zero Scope 3 targets aim to achieve an 83% reduction in value chain emissions by 2050 (from a 2020 baseline), with the remaining 17% addressed through verified removals ³⁹ .	










Premium factors: Brand differentiation, premium positioning

Differentiation is possible if an own brand is built and not absorbed by the private label volume of retailers.

Market access		Brand differentiation transforms commodity shrimp into premium products through strategic storytelling that connects production values to consumer values. Successful branding moves beyond feature listing to emotional connection, creating comprehensive premium positioning that justifies price through perceived value multiplication.	Carbon Footprint – A clear overview of the reference product provided on the carbon footprint of the product, and also in relation to other products ¹⁹ .	
		BlueYou case example		Private label branding (white label branding)
		BlueYou is one of the only aquaculture companies that has obtained a premium price for their sustainability efforts in different aquaculture products.		When looking at the branding in the retail landscape, shrimp is commonly sold under private label. This makes the producer less influential on the shrimp that is produced. The branding of the products lies with the retailer.
		BlueYou's shrimp branding tells a storyline of environmental restoration, transparent supply chains, animal welfare, and premium taste, aiming to make the products a symbol for sustainable and ethical seafood worldwide. ⁴⁷		The labels on the packaging showcase some observations in branding:
Premium drivers		An overview of the packaging is provided in Annex I.	<ul style="list-style-type: none"> • Certification logo at the packaging • Named jumbo or king prawn for the larger sizes • Responsibly sourced is terminology that is used on the packaging mainly in the UK 	
		Name of the product		QR code
		Pacific White Shrimp – reflecting back to the origin of the product of Vannamei shrimp.		The QR code is not yet used often, fully showcasing the origin of the product with a good storyline. This would be innovative in the current landscape.
Innovation		Labels	Impact on premium prices: <ul style="list-style-type: none"> • A company like BlueYou has achieved a premium for their products due to strong branding and taking the branding up by themselves. • If you are supplying to larger retailers, the product falls under the private label and therefore differentiation is less possible in the branding strategy. • Collaborating with retailers that allow branding influence is important to differentiate. 	
		ASC certification: A clear visual of the certification on the packaging that cannot be missed.		
		Responsible farmed – Mentioned on the packaging		
		Antibiotic-free – A clear message on the antibiotic-free nature of the products		
		Sustainability branding		
		Ocean impact tracker offered – a tool that provides an overview of the impact of the product on the ocean.		

Premium factors: Novel ingredients

Novel feed ingredients drive sustainable innovation in aquaculture, positioning early adopters as preferred suppliers.

Market access		Novel ingredients are positioned at the forefront of premium aquafeed innovation, driving sustainability and supply chain resilience. While no clear correlation yet exists between the adoption of these ingredients and premium pricing, their strategic importance continues to grow. Early adopters view innovations such as insect meal, algal oil, and single-cell protein not merely as cost factors but as long-term investments in sustainability, brand differentiation, and enhanced market access, securing their position as preferred suppliers as the industry evolves.
		
		Insect meal opportunity: Insect meal, produced from larvae such as the black soldier fly, is a sustainable, protein-rich alternative to fishmeal in aquaculture. It offers a balanced amino acid profile, supports animal health, and promotes circular economy practices by using organic waste as feedstock. ³³ However, high production costs and limited supply currently keep prices above fishmeal, constraining large-scale adoption until greater scale and efficiency are achieved ³⁴ .
		
Premium drivers		Algal oil Algal oil offers a sustainable source of essential omega-3 fatty acids (EPA and DHA), vital for the health and growth of farmed fish and shrimp. Unlike fish oil, it is derived from microalgae grown in controlled environments, providing a stable supply independent of wild fisheries ³⁵ . However, limited production capacity and high costs currently restrict large-scale adoption and broader market expansion.
		
		Single Cell Protein: Single Cell Protein (SCP), produced from microorganisms such as algae, yeast, fungi, and bacteria, is an emerging protein-rich feed ingredient. It offers a sustainable alternative to traditional fishmeal, reducing pressure on marine resources while providing consistent quality and supply for aquaculture feed formulations ³⁶ .
Innovation		
		

Case example:

Albert Heijn, Protix, and Skretting have partnered to produce sustainable farmed shrimp with a significantly reduced marine footprint. This collaboration integrates Dutch retail giant Albert Heijn, shrimp importer Klaas Puul, feed manufacturer Skretting Ecuador, innovative feed suppliers Protix and Veramaris, and Ecuadorian shrimp farm Cofimar.

Skretting has developed a novel shrimp feed for Cofimar that replaces conventional fishmeal and fish oil with sustainable alternatives: Protix insect meal (derived from black soldier fly larvae) and Veramaris algal oil, which provides omega-3 fatty acids EPA and DHA.

This feed formulation also incorporates deforestation-free soy to meet Aquaculture Stewardship Council (ASC) certification requirements.

Through sustainable feed ingredients including insect meal and algal oil, Albert Heijn can reduce environmental impact associated with traditional shrimp farming, positioning the retailer as a sustainability leader while supporting responsible sourcing commitments.









Impact on premium prices:

The use of novel ingredients is gaining attention within the supply chain as it contributes to lower emissions, thus becoming an increasingly important factor for market access. However, there are no clear examples yet showing a direct link between sustainability innovations and premium pricing.

To drive the use of novel ingredients, there must also be clear benefits for producers. Differentiation may emerge as markets begin to reward verified environmental performance or penalize its absence.

Premium factors: Mangrove

Mangrove restoration holds CSR value for importers and retailers, with a narrative that needs to be developed collaboratively.

Market access		Mangrove-integrated aquaculture offers a clear premium pathway for black tiger shrimp (<i>Penaeus monodon</i>) production in Vietnam, particularly in Ca Mau province. This technique, known as silvo-aquaculture, involves farming organic black tiger shrimp in low-density ponds surrounded by mangrove forests. Farmers maintain their livelihoods while preserving environmental integrity.	<p>This collaboration aims to recover and protect vital mangrove ecosystems, having signed a Memorandum of Understanding in 2025. The project focuses on restoring 10 hectares of degraded mangrove forests near Omarsa's shrimp farms in the Gulf of Guayaquil.</p> <p>Product Environmental Footprint</p> <p>Current requirements for Life Cycle Assessment (LCA) and Product Carbon Footprint calculations for Scope 3 emissions focus on carbon emissions. Since "blue carbon sinks" (mangroves sequester carbon at rates exceeding terrestrial forests while providing critical ecosystem services), this sequestration effort is currently excluded from Scope 3 and LCA methodologies¹⁷.</p> <p>Carbon-neutral methodologies and certifications exist for sequestration; however, only retailers carefully evaluate these claims to avoid "greenwashing."</p> <p>When product environmental footprint requirements become more widespread among retailers, the mangrove integration can become more relevant.</p>
		Camimex, one of Vietnam's largest black tiger shrimp processors, has established a project with partners DFCD and FMO to preserve 50% of mangrove coverage in farming areas. This initiative increases farmer income by 10% through offering premium prices for organic shrimp cultivation in integrated mangrove systems ⁴⁵ .	
		Another large Vietnamese processor, Minh Phu, has adopted similar practices and achieved Monterey Bay Seafood Watch program's green "Best Choice" rating by 2025 for organic black tiger shrimp cultivated in mangrove systems ⁴⁷ .	
Premium drivers		Organic black tiger monodon shrimp command higher prices than Vannamei shrimp, particularly in sushi-grade segments for the Japanese market. Extensive lower-volume production facilitates these price premiums.	<p>CSR Value</p> <p>The value proposition for buyers lies in supporting climate change mitigation efforts, as retailers and buyers position themselves as contributors to ecosystem restoration in the Mekong Delta. This also aligns with importers' recognition of macro challenges, such as mangrove deforestation, salinity intrusion, and coastal erosion, which threaten the sector's future.</p> <p>This aligns directly with UN Sustainable Development Goals, particularly targeting climate action and life below water.</p>
		Vannamei	
		The combination of Vannamei shrimp and mangrove systems remains unestablished. Many mangrove areas have been deforested to create space for intensive shrimp pond development. Current certification bodies maintain strict standards requiring proof of no deforestation since 1999 to ensure that other mangroves have not been deforested. When farmers are committed to restoring more than 50% of mangrove areas under ASC certification standards, this demonstrates the importance of avoiding further deforestation and actively restoring degraded mangrove and Vannamei shrimp farming areas. However, restoring historical mangrove areas remains out of the certification policies.	
Innovation			<p>Impact on premium prices:</p> <ul style="list-style-type: none"> The impact of mangrove integration on premium prices for Vannamei shrimp has not yet materialized. Given the CSR value of the projects, importers are willing to pay a premium; however, clear alignment across the value chain to retail is required.
		Omarsa, the Ecuadorian shrimp producer, partnered with Labeyrie Fine Foods to establish and participate in the Aquaculture Stewardship Council (ASC) mangrove restoration project in Ecuador.	

An aerial photograph of a large, multi-story building with a prominent red-tiled roof. The building has a complex, stepped design with several rectangular protrusions and recessions. The roof is made of reddish-brown tiles. The building is situated on a street corner. To the right, there is a blue structure, possibly a bus stop or a small building, and several white cars parked or driving. The overall scene is captured from a high angle, showing the layout of the building and its surroundings.

5. Roadmap to premium

Roadmap to premium

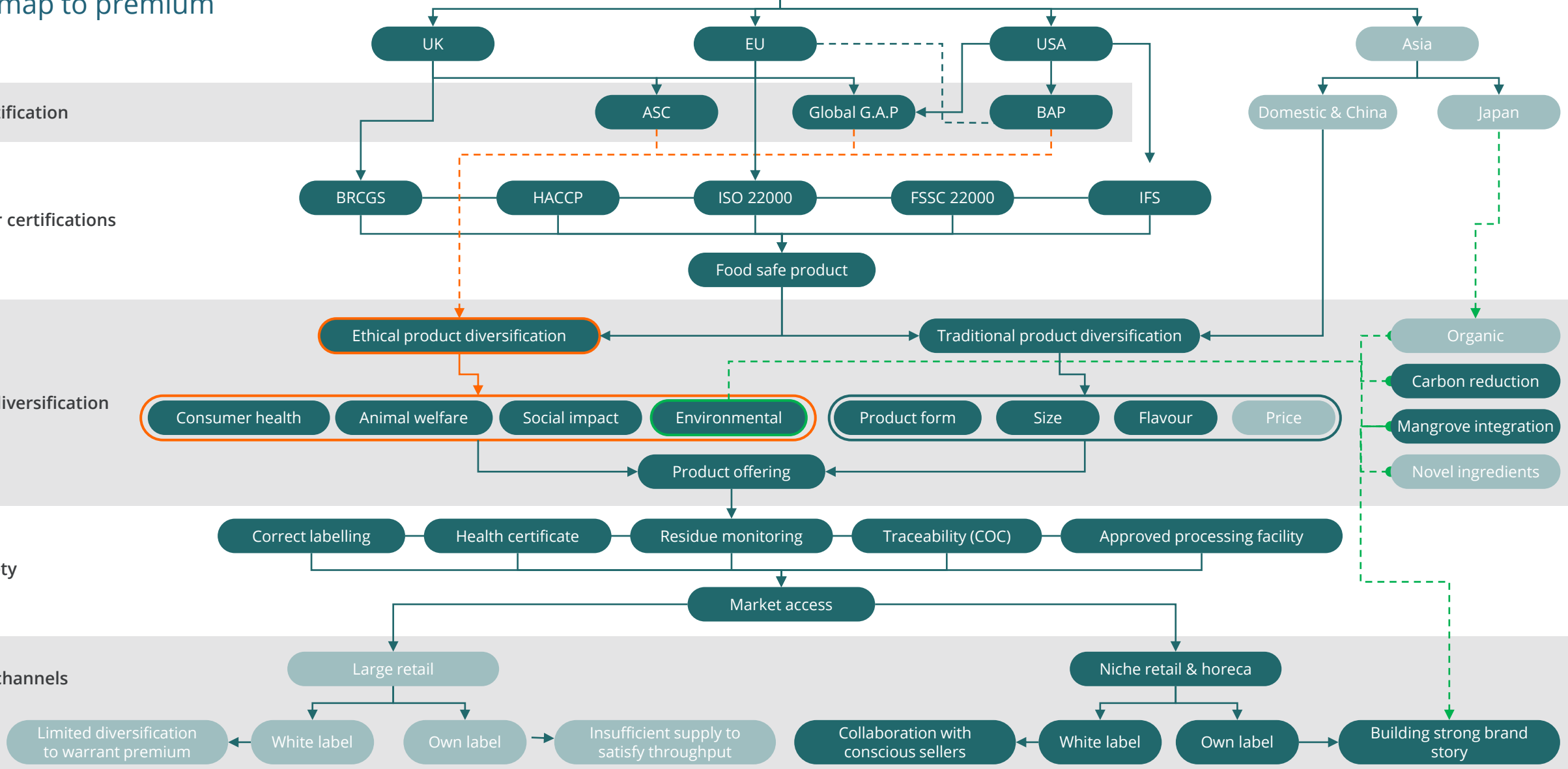
Farm certification

Processor certifications

Product diversification

Food safety

Off-take channels



- Relevant for TomGoxy
- Out of scope for TomGoxy
- Certification focus areas
- Environmental considerations

Competitive strategy – TomGoxy Zero

Differentiation focus is required for the niche markets

To define the competitive strategy of the TomGoxy Zero we assessed the scope variable and the competitive advantage of the TomGoxy Zero concept.

Scope

The expected capacity is approximately 400 MT per year across two farms using the same model. This volume is too low for mainstream retailers to build a dedicated, branded range or to guarantee steady weekly supply; a retailer such as Albert Heijn would require 20,000–25,000 MT of shrimp annually.

Given this constraint, any committed buyer for TomGoxy Zero should be targeted within niche markets rather than the total market.

Competitive advantage

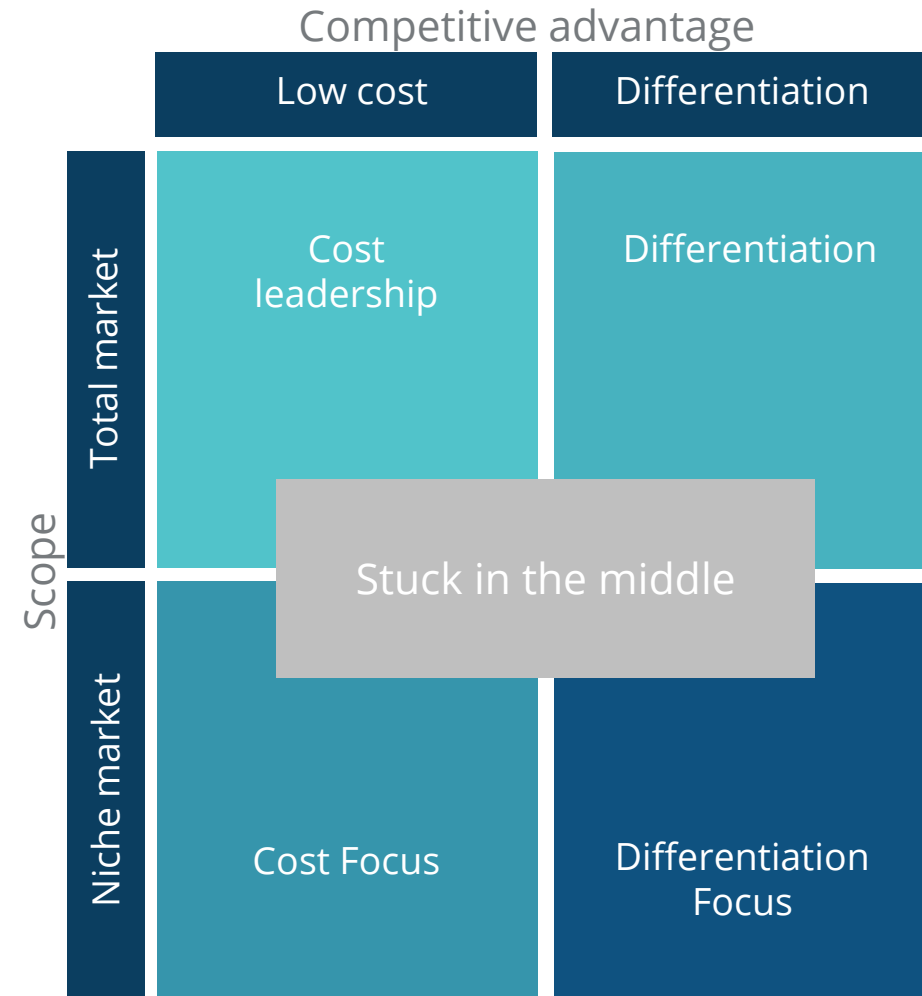
Operationally, TomGoxy Zero aims to produce shrimp at a competitive cost level relative to Vietnamese peers, yet the mangrove-integrated system introduces additional capital expenditure. As a result, competing purely on global commodity price, especially against low-cost origins such as Ecuador, is neither realistic nor desirable.

The concept's advantage lies in its verified sustainability attributes; lower carbon footprint, antibiotic-free production, environmental benefits from mangrove integration, improved water stewardship and strong traceability. These shift the product away from commodity pricing towards a differentiated value proposition.

Competitive strategy

Given the assessed scope and advantages, we recommend a differentiation focus aimed at niche markets. Position TomGoxy Zero as premium, sustainable, traceable shrimp with clear environmental and social credentials, securing a price premium rather than competing on cost. Prioritise specialised supermarkets, online retailers with a sustainability proposition, sustainable product ranges within selected retailers, meal-kit providers and purpose-led foodservice.

For the future when volume increases it is recommended to avoid large, price-driven tenders in the total market to prevent getting “stuck in the middle”. As capacity increases, reassess broader retail options while keeping differentiation at the core of the offer.



Benchmark of product

TomGoxy shrimp are outperforming traditional shrimp on important parameters

TT	Parameter	Unit	Traditional shrimp	TomGoxy shrimp	Difference
1	Astaxanthin	mg/kg	21,85	29,5	+ 35%
2	Glycine & glutamate	ppm	95	102	+ 7%
3	Protein Level	%	21	23	+ 9%

Benchmark results

Based on the results in Table 1 above, the quality parameters indicate that a higher value corresponds to a higher product quality. Therefore, the results show that TomGoxy shrimp are of higher quality compared to the traditional benchmark.

Astaxanthin

Astaxanthin drives the vibrant reddish-pink color consumers associate with premium shrimp. Higher levels of the TomGoxy shrimp mean.

- More attractive color and appearance, a key purchase trigger in seafood markets.
- Fresher-looking product due to stronger natural pigmentation.
- Enhanced antioxidant capacity, supporting health benefits and shelf life.

Some shrimp farmers are adding astaxanthin to their ponds to increase its levels in the shrimp, aiming to achieve higher test results as an important parameter for quality.

Glycine & Glutamate

Glycine provides subtle sweetness and glutamate delivers savory umami, together driving taste richness.

- Higher levels in TomGoxy shrimp indicate:
- More intense natural shrimp flavor.
- Enhanced palatability and eating experience.
- Better alignment with consumer taste preference for “richer, sweet-savory seafood”.

Protein content






Shrimp are already recognized as a lean, high-protein superfood, but TomGoxy shrimp push this advantage further:

- 23% protein vs 21% in traditional shrimp.
- Provides stronger nutritional profile for health-conscious markets.
- Signals high tissue development and good feed conversion in farming system.

Route to market – smallholder recommendations

Small-holders can position themselves strategically to become interesting for premium market sourcing.

For small-holders to access premium markets, a number of requirements or targeted improvements are required at farm level. These relate to certifications, transparency and traceability, antibiotic-free and food secure production, animal welfare and product quality. These are all areas where farmers can directly influence their positioning.

Market access		Certification is effectively the licence to operate in premium export markets and, at present, the only proven pathway for farmers to secure a direct price premium. However, the associated costs are a major bottleneck for individual smallholders. In Study 1B, it is outlined what concrete steps smallholders can take to become eligible for certification, with a focus on collective applications through cooperatives and farmer associations to share costs and administrative effort. Participation in the ASC Improver Program can help ensure early compliance with the necessary standards for premium markets.
		Transparency and traceability are essential for off-takers who must report to overseas retail markets and comply with EU import regulations. Smallholders can strengthen their position by improving record-keeping and documentation of farm activities, input purchases and use, and labour. While this may not immediately increase farm-gate prices, it makes farms more attractive to premium buyers and prepares them for formal certification.
		Antibiotic-free & food secure production: Antibiotic-free production is a key requirement for premium export markets and an emerging trend in domestic markets. Farmers should prioritise the use of probiotics instead of antibiotics and if antibiotics are absolutely necessary, apply them responsibly with sufficient withdrawal time to ensure residues are below legal limits. Accurate records of any treatments are critical to demonstrate compliance and build trust with off-takers.
		Animal welfare: to align with animal-welfare expectations and ASC/BAP requirements, smallholders should source PL from ablation-free hatcheries and, where possible, request electric stunning from harvest service providers. These practices support both compliance with certification schemes and the strategic positioning of the farm in premium markets.
Premium driver		Product quality: As larger shrimp sizes typically achieve higher prices, size grading is an important lever for farmers. However, larger sizes also entail higher production costs and longer cycles. Farmers are therefore advised to calculate their operational efficiency and cost per kilogram at different harvest sizes and use this analysis to determine the optimal harvest point that maximises margin rather than only targeting the largest possible size. Also, farmers need to ensure compliance with MRL specifications, as these are requirements for premium markets. Excessive MRL levels can lead to rejections, resulting in losses and harm to the farm's reputation.



A close-up photograph of a hand holding a clear plastic cup filled with several large, translucent shrimp. The shrimp are piled together, showing their segmented bodies, long antennae, and legs. The background is a blurred outdoor setting with green foliage. A semi-transparent blue horizontal bar is overlaid across the middle of the image, containing the text "6. Market validation" in white.

6. Market validation

Concluding

Collaboration with importers and retailers is recommended, focusing on niche retail where branding influence can be exerted.

Premium factors

When considering the premium market for Vannamei shrimp, it is important to recognize that this is a trading business subject to price fluctuations both year-to-year and within seasons. Even with premium pricing, products remain exposed to these market variations.

To access premium segments in North America, Europe, and the UK, markets that pay higher price, certification through BAP or ASC remains essential. These certifications signal key attributes valued by end markets: animal health, sustainable farming practices, traceability, and antibiotic-free production.

From farmgate to consumer, the product passes through multiple stages in the value chain, with each player capturing margin before reaching the final purchase. Where certification is a requirement, consumers are not paying an additional premium specifically for products with environmental benefits beyond the certified standard.

Therefore, any additional premium must be absorbed and distributed throughout the value chain based on the CSR value of the project. Collaboration across the value chain is an important step to capture and share this premium.

Retailers predominantly sell aquaculture products under white/private labels, making differentiation difficult, especially without sufficient volume to justify distinct positioning. Strong branding and storytelling are powerful tools to communicate and differentiate products with environmental benefits. These differentiating narratives create the foundation for obtaining premiums based on the shrimp's environmental credentials.

Recommendations

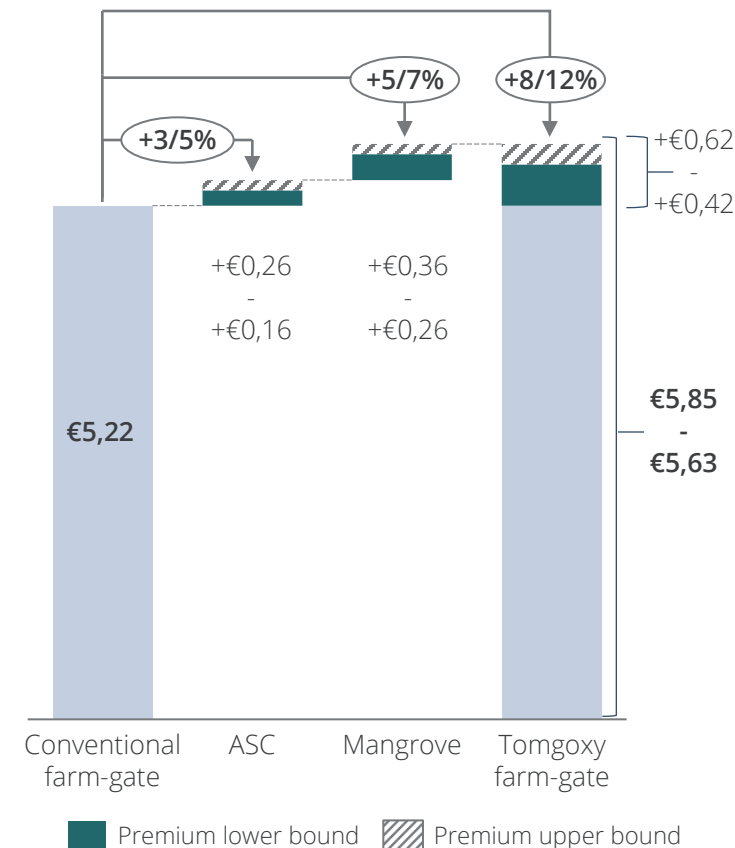
For TomGoxy Zero, we recommend first establishing certification for the farming model to access overseas premium markets. Given the environmental focus of the farming model, we advise targeting Europe and the UK, where ASC certification aligns with environmentally conscious consumers. Obtaining certification provides a confirmed premium over non-certified shrimp.

This certification requires strong value chain collaboration, including partnerships with sustainable and antibiotic-free hatcheries and sourcing ASC-certified feed for inputs.

Post-farmgate, reliable processors and importers are necessary to enter markets and fulfill all quality, certification, safety, and import requirements. The product must then differentiate through strong branding that tells the story of mangrove restoration efforts, including carbon sequestration and biodiversity benefits. These claims must be substantiated to avoid greenwashing concerns, requiring collaboration with importers and retail outlets.

Current production volumes do not support targeting large retailers. We therefore advise focusing on online retailers such as Crisp, meal-kit providers like HelloFresh and Marley Spoon, and purpose-led foodservice providers for the hospitality sector with a sustainability angle. Strong partnerships will help convey and strengthen this narrative. As volume grows through scaling, brand awareness will increase, enabling access to larger market opportunities.

Estimated premium & farm-gate sales for TomGoxy Vannamei Shrimp (€/kg) - Size 16/20



TomGoxy[®] ZERO



LARIVE
INTERNATIONAL



RYNAN[®]
SMART AQUACULTURE



Ocean Health

Van Oord



Marine ingenuity

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7. Annexes



Annex I: BlueYou branding

With a strong branding and differentiation strategy focusing on niche markets such as Horeca and premium supermarkets, aquaculture producers are able to obtain premium pricing.



IMPACT DIMENSION	IMPACT INDICATOR	PERFORMANCE	RATIONALE
Life on Planet & Natural Resources			
Climate Change	Product Carbon Footprint (PCF)	● ● ●	Moderate PCF (3 - 8 kg CO ₂ eq./kg product at store)
Biodiversity Loss	Loss of biodiversity & biosphere integrity	● ● ●	Well managed but system inherent risks
Deforestation	Land use change due to deforestation	● ● ●	No direct risk, indirect risk through feed production
Freshwater Depletion	Risk for freshwater depletion	● ● ●	Moderate direct risk, indirect risk through feed production
Eutrophication	Discharge of nitrogen (N) and phosphorous (P)	● ● ●	High nutrient input through feed but well-managed
Toxic Compounds	Pollution with toxic chemicals and pesticides	● ● ●	Strict criteria for the use of chemicals and toxic compounds
People & Coastal Communities			
Human Rights	Human rights & decent work conditions	● ● ●	Low risk for human rights violations, ASC Social Criteria
Workers' Safety	Exposure to health & safety hazards	● ● ●	Low risk for unsafe working conditions, ASC Social Criteria
Community Inclusiveness	Fair value chain participation by communities	● ● ●	Corporate farm / no community inclusion
Animal Welfare			
Living Conditions	Husbandry system & rearing conditions	● ● ●	High stocking density and low habitat structure
Physical Stress	Stress & injuries during rearing and harvesting	● ● ●	Moderate risk for stress during rearing and harvesting
Humane Slaughter	Pain & suffering during slaughter	● ● ●	No stunning before transfer to ice slurry
Carbon Footprint and Reference Foods kg CO ₂ eq. / kg Product at Store POS			

