

Analysis on the Development Status of Guangdong Province's Aquatic Products Industry and Its Export Competitiveness

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ABSTRACT

Against the backdrop of intensifying global competition in the aquatic products trade, Guangdong Province, as a core region for both the production and export of aquatic products in China, holds significant research value in studying its development status and the evolution of its competitiveness. Based on production and export data from 2013 to 2023, this paper systematically analyzes the industrial foundation, market performance, and competitiveness characteristics of Guangdong's aquatic products industry. The findings reveal that: On the production side, the total output of aquatic products in Guangdong has grown at an average annual rate of 1.46%, consistently ranking among the top three nationwide over the long term, although the growth rate has exhibited non-linear fluctuations. On the export side, although Guangdong has maintained its position as the leading exporter of agricultural products in China for many years, its competitiveness faces multiple challenges. The Trade Competitiveness Index (TC) dropped from 0.45 in 2013 to -0.19 in 2023; the Revealed Comparative Advantage Index (RCA) fell from its peak of 0.66 in 2021 to 0.51 in 2023. Additionally, the export market is overly reliant on traditional regions, while emerging markets, despite showing growth, have not yet formed a stable support base. Other prominent issues include a low proportion of high-value-added products, insufficient added value across the industrial chain, and more. Finally, the paper proposes targeted policy recommendations in areas such as technological upgrading, cold chain infrastructure development, market diversification, and industry standardization.

KEYWORDS

Aquatic products; Competitiveness; Guangdong Province

1. INTRODUCTION

Against the dual backdrop of deepening global economic integration and the upgrading of residents' consumption structures, aquatic products—as an important source of high-quality protein and a traditional bulk commodity in international trade—have seen their strategic significance grow increasingly prominent. According to statistics from the Food and Agriculture Organization (FAO) of the United Nations, the total value of global aquatic products trade exceeded \$180 billion in 2022, accounting for over 12% of agricultural product trade. Among these, the Asia-Pacific region, with nearly 45% of the global share, has become the core hub for the circulation of aquatic products worldwide. As the world's largest producer and third-largest exporter of aquatic products, China produced a total of 68.6591 million metric tons of aquatic products in 2022. It not only serves as a key supplier in the global aquatic products supply chain but has also established unique competitive advantages in the international market through regional industrial agglomeration and the construction

of trade networks [1]. Located along the South China Sea, Guangdong Province boasts the longest coastline in China, stretching 4,114 kilometers—accounting for 20% of the national total—as well as the country’s largest sea area, covering 419,000 square kilometers. In addition, it possesses over 30% of the nation’s tidal flat resources. These natural endowments have laid the foundation for Guangdong’s status as a “major maritime province.” At the same time, as a pioneer in China’s reform and opening-up, Guangdong has leveraged its geographical advantages of proximity to Hong Kong and Macao, a highly dynamic private economy, and a mature processing and manufacturing system to gradually build a comprehensive industrial chain encompassing fishing, aquaculture, deep processing, cold chain logistics, and international trade. In 2022, the province’s total aquatic products output reached 9.229 million metric tons, with marine products accounting for over 60%. For 27 consecutive years, Guangdong has ranked first in the country in terms of total aquatic products output. The export value of aquatic products reached \$5.83 billion, accounting for 28.6% of the national total, maintaining its position as the top-ranking province or municipality in China. The main export destinations include high-end markets such as the United States, the European Union, ASEAN countries, and Hong Kong, China. Key export categories cover high-value-added products such as shrimp, tilapia, and tuna products. The export of aquatic products from Guangdong is not only a core growth driver of the region’s marine economy but also an important window through which to observe China’s participation in global competition within the aquatic products trade.

However, in the context of a complex and rapidly changing global trade environment, Guangdong’s leading position in aquatic products exports is facing multiple challenges. On the one hand, international market demand is becoming increasingly fragmented—developed countries are continuously raising standards for food safety and sustainable fisheries, leading to greater uncertainty in import demand. On the other hand, domestic regional competition is intensifying, with coastal provinces such as Shandong and Fujian leveraging their advantages in specialty species and deep-processing technologies to steadily erode Guangdong’s traditional market share. At the same time, rising production costs, relatively low value-added along the industrial chain, and insufficient international brand influence are also constraining further improvement in the competitiveness of Guangdong’s aquatic products exports. Against this backdrop, a systematic assessment of the current status, strengths and weaknesses, and the mechanisms underlying the formation of competitiveness in Guangdong’s aquatic products exports is not only crucial to the high-quality development of the regional marine economy, but also holds significant practical importance for safeguarding national aquatic products trade security and advancing the “going global” strategy for agriculture.

2. LITERATURE REVIEW

2.1. Concepts Related to Export Competitiveness

"Export" refers to the economic activity in which enterprises of a country or region sell goods, services, or technologies to overseas markets through international trade channels. Its core lies in achieving value-added by participating in the international division of labor. Yu Jinping (2024) identified the key supporting dimensions of export stability, emphasizing that enterprises must ensure long-term competitiveness in export operations through continuous innovation, precise cost control, and efficient supply chain management [2]. Aquatic products export refers to the commercial activity of delivering aquatic animals and their products produced domestically to overseas markets via international trade networks. This includes not only the supply of resources at the primary production stages such as fishing and aquaculture, but also technical processes such as grading, packaging, refrigeration, and deep processing, ultimately enabling the physical goods to flow in international markets and realize economic returns. Export competitiveness, in essence, refers to a country’s or region’s ability to systematically enhance the production efficiency and differentiated advantages of its products. The formation of export competitiveness relies on the synergistic interaction of three core elements: First is the "foundation advantage": Products must leverage unique endowments such

as natural resources, accumulated technological capabilities, or economies of scale to establish an initial competitive edge distinct from rivals. Second is the "channel capability": This involves optimizing transport and logistics networks, improving mechanisms for coping with trade frictions, and breaking through technical barriers to trade, thereby establishing an operational foundation that can support large-scale, stable exports. Third is the "value-adding capability": Through technological innovation, managerial upgrading, and brand building, enterprises can push products up the value chain and achieve sustainable improvement in profitability.

2.2. Research on the Export Competitiveness of Aquatic Products

The academic community primarily evaluates the level of international competitiveness and its influencing factors in aquatic products through quantitative measurement indices. Kazim Saricoban & Elif Kaya (2023), in their analysis of the top ten global seafood-exporting countries, found that although the United States holds a large share of the global market, its actual competitiveness is relatively weak. In contrast, countries with smaller market shares, such as Vietnam and Denmark, demonstrate stronger competitiveness due to specialized production and cost advantages [3]. Domestic scholars have focused on the regional performance of China's aquatic products. Cai Tiantian (2021) pointed out that China exhibits strong competitiveness in Northeast Asian trade, but its exports rely heavily on low-priced primary products, with relatively low technological content and added value [4]. Wang Liyan and Li Shiqin (2016), analyzing Fujian Province, found that although the province is rich in aquatic resources, its resource-based advantages have been declining year by year. The low degree of product processing and vulnerability to trade barriers further constrain its competitiveness [5]. Overall, index-based analyses reveal a key paradox in the competitiveness of aquatic products: market share may be overestimated, while technological content and added value are the true determinants of actual competitiveness.

2.3. Literature Review and Commentary

Although existing studies have touched upon the competitiveness of aquatic products trade, most focus either on the national level or on the analysis of individual species. There remains a lack of systematic research specifically targeting Guangdong Province, which is reflected in three main shortcomings: First, there is an insufficient dynamic characterization of the structural features of Guangdong's aquatic products exports. Second, there is a lack of joint quantitative analysis using composite indices to assess the export competitiveness of Guangdong's aquatic products. In response to these gaps, this paper first reviews the historical evolution and current characteristics of Guangdong's aquatic products exports. Then, through a linked analysis of three key indicators—the Trade Competitiveness Index (TC), the Revealed Comparative Advantage Index (RCA), and the Export Efficiency Index (EF)—it quantitatively measures the competitiveness level of Guangdong's aquatic products. The aim is to provide theoretical references and practical insights for promoting the high-quality development of aquatic products exports in Guangdong and across China.

3. ANALYSIS OF THE CURRENT STATUS OF AQUATIC PRODUCTS PRODUCTION AND EXPORTS IN GUANGDONG PROVINCE

3.1. Analysis of the Current Status of Aquatic Products Production in Guangdong Provinces

As one of the core regions for aquatic products production in China, Guangdong Province demonstrates significant representativeness in both production scale and growth trends. As shown in Table 1, between 2013 and 2023, the total output of aquatic products in Guangdong steadily increased from 8.1613 million metric tons to 9.2402 million metric tons, with an average annual growth rate of approximately 1.46%, consistently ranking among the top three nationwide in terms of output over

the long term. However, this growth process has not been linear but has been subject to phased impacts from multiple factors: In 2017, the output experienced a temporary decline due to industry adjustments and resource constraints. Starting in 2018, with the full implementation of national policies for the protection of marine fishery resources, the output gradually rebounded. Between 2018 and 2019, the further strengthening of the summer fishing moratorium system, coupled with the introduction of measures for the sustainable utilization of fishery resources, temporarily disrupted the production rhythm, leading to fluctuations in output. After 2020, with the advancement of upgraded aquaculture technologies and deeper industrial transformation, production efficiency improved significantly, propelling the output into a phase of sustained and stable growth. The proportion of Guangdong’s aquatic products output to the national total has long remained stable at around 13%. This ratio not only reflects its core role as a “stabilizing force” in the national aquatic products production system, but also highlights the close correlation between its production capacity and the overall demand across the country.

Table 1. Current Status of Aquatic Products Output in China and Guangdong Province

Year	National Total	Growth Rate	Guangdong	Growth Rate	Proportion (%)
2013	6172.00	4.47%	816.13	3.37%	13.22%
2014	6461.52	4.69%	836.34	2.48%	12.94%
2015	6699.65	3.69%	858.22	2.62%	12.81%
2016	6901.25	3.01%	873.79	1.81%	12.66%
2017	6445.33	-6.61%	833.54	-4.61%	12.93%
2018	6457.66	0.19%	842.44	1.07%	13.05%
2019	6480.36	0.35%	866.4	2.84%	13.37%
2020	6549.02	1.06%	875.81	1.09%	13.37%
2021	6690.29	2.16%	884.52	0.99%	13.22%
2022	6865.91	2.62%	894.03	1.08%	13.02%
2023	7116.17	3.64%	924.02	3.35%	12.98%

From a regional comparative perspective (see Table 2), the spatial distribution of aquatic products production in China exhibits clear north-south disparities. The three southern provinces—Guangdong, Fujian, and Zhejiang—have achieved long-term stable growth in output by leveraging favorable climatic conditions and continuously upgrading their aquaculture technologies. Among them, Fujian Province has seen the most significant increase, with output growing by 35.2% over the past decade, registering an average annual growth rate of 3.1%, making it the fastest-growing province in the south. Guangdong Province has maintained a year-on-year growth trend and, in 2019, surpassed Shandong Province in output to become one of the leading regions in national aquatic products production. Zhejiang Province, while maintaining output at a baseline level of around 6 million metric tons for many years, has in recent years gradually broken historical records through technological improvements and model innovations, demonstrating steady and promising development potential. In contrast, the three northern provinces—Shandong, Liaoning, and Jiangsu —have experienced more pronounced fluctuations in output. Although Shandong Province has long ranked first in the country with an absolute output scale averaging 8.813 million metric tons per year, its production dropped sharply by 7.1% in 2017 due to adjustments in fisheries policies. Although output has since gradually recovered, the volatility remains significant. Liaoning Province and Jiangsu Province, constrained by the decline of nearshore fishery resources and increasing ecological and environmental pressures, have exhibited a typical “rise followed by decline” trend in output—initially achieving growth through the expansion of traditional aquaculture, but later being forced to reduce production due to ecological constraints.

Table 2. Aquatic Products Output in Major Coastal Provinces of China

Year	Guangdong	Shandong	Liaoning	Fujian	Zhejiang	Jiangsu
2013	816.13	863.16	505.03	658.48	550.82	509.38
2014	836.34	903.74	525.67	695.84	574.17	518.75
2015	858.22	931.27	531.28	733.90	597.83	521.05
2016	873.79	950.19	550.07	767.80	604.54	520.74
2017	833.54	868.00	479.44	744.57	594.45	507.60
2018	842.44	861.40	450.82	783.89	589.61	494.84
2019	866.40	823.27	455.01	814.58	576.72	484.12
2020	875.81	828.61	462.30	832.98	589.55	490.18
2021	884.52	854.42	482.41	853.07	599.05	493.80
2022	894.03	881.27	489.23	861.40	621.72	504.86
2023	924.02	913.85	508.12	890.20	647.93	522.05

3.2. Analysis of the Current Status of Aquatic Products Exports in Guangdong Provinces

The scale of aquatic products exports in Guangdong Province has long ranked first among all agricultural product exports in the province and maintains a leading position among eastern coastal provinces and municipalities. From a national perspective, after China’s aquatic products exports reached a historical peak of 4.33 million metric tons in 2017, they declined for six consecutive years due to constraints such as global supply chain disruptions and increasingly stringent quarantine standards in importing countries. It was not until 2023 that a slight rebound began to emerge. Against this backdrop, the fluctuation pattern of Guangdong’s aquatic products exports has been even more pronounced. As shown in Table 3, the export volume of Guangdong’s aquatic products has followed a typical “M-shaped” trajectory: In 2018, it reached a peak of 690,000 metric tons over the past decade. In 2021, driven by the policy benefits of the Regional Comprehensive Economic Partnership (RCEP), exports grew rapidly by 14.3%. However, in 2022, due to repeated domestic COVID-19 outbreaks, the export volume plummeted to 520,000 metric tons, exposing a high sensitivity to external environmental changes. More notably, Guangdong’s share of national aquatic products exports has been declining continuously: In 2013, its export value accounted for 16.4% of the national total. Over the following decade, this proportion fell year by year, dropping to just 11.8% by 2023. This downward trend not only reflects Guangdong’s shrinking market share in the international aquatic products market but also, more profoundly, highlights the competitive challenges it faces—including the weakening of traditional cost advantages, insufficient proportion of high-value-added products, and eroded pricing power. A comprehensive view of both national export trends and Guangdong’s export dynamics shows that although Guangdong remains the leading exporter among eastern coastal provinces, maintaining its international market competitiveness is facing severe challenges. There is an urgent need to reshape its strengths through industrial upgrading and strategic adjustment.

Table 3. Comparative Analysis of Export Volume and Value of Aquatic Products in China and Guangdong Province

Year	National Export Volume (10,000 t)	Guangdong Export Volume (10,000 t)	Guangdong's Share (%)	Guangdong Export Value (USD 100M)	National Export Value (USD 100M)	Guangdong's Share (%)
2013	395.91	50.41	12.73%	33.3	202.63	16.43%
2014	416.33	48.17	11.57%	32.72	216.98	15.08%
2015	406.03	51.4	12.66%	30.99	203.33	15.24%
2016	390.37	53.42	13.68%	32.27	207.38	15.56%
2017	433.94	57.41	13.23%	34.36	211.5	16.25%
2018	432.2	69.4	16.06%	35.83	223.26	16.05%
2019	426.79	57.81	13.55%	32.05	206.58	15.51%
2020	381.18	53.8	14.11%	28.14	190.41	14.78%
2021	380.07	61.5	16.18%	34.4	219.26	15.69%
2022	376.3	51.91	13.79%	29.54	230.31	12.83%
2023	379.82	45.85	12.07%	24.05	204.63	11.75%

As shown in Table 4, during the period from 2015 to 2023, the export market structure of Guangdong's aquatic products underwent significant adjustments, with the combined share of the top five traditional markets declining by 12 percentage points to 43.25%. During this process, the performance of major markets showed clear divergence: The U.S. market share experienced a sharp decline, plummeting from 27.1% to 7.72%, a drop of nearly 80%. The Canadian market continued to contract under the ongoing impact of anti-dumping measures. At the same time, some emerging markets performed remarkably well: South Korea, benefiting from the policy advantages of the China—South Korea Free Trade Agreement (FTA), saw its market share increase tenfold, rising from 0.23% to 2.3%. Japan expanded its share to 4.76%, supported by innovations in cold-chain technology. Hong Kong SAR maintained a stable share exceeding 20%, continuing to serve as an important re-export hub. This evolution in market structure reflects that Guangdong's aquatic products exports are shifting from heavy reliance on traditional markets toward a more diversified export portfolio. At the same time, the province also faces challenges such as trade barriers and stricter technical standards.

Table 4. Share of Export Value (in USD 100M) by Major Markets in Guangdong's Aquatic Products Exports

Year	Hong Kong	Share (%)	U.S.	Share (%)	Japan	Share (%)	Canada	Share (%)	South Korea	Share (%)
2015	8.52	25.58%	8.12	24.37%	0.84	2.53%	0.85	2.56%	0.08	23%
2016	9.08	27.75%	7.47	22.83%	0.89	2.73%	1.18	3.60%	0.07	22%
2017	8.64	27.87%	8.4	27.10%	0.86	2.77%	1.18	3.81%	0.12	39%
2018	7.68	23.79%	7.58	23.49%	1.12	3.48%	1.31	4.07%	0.15	48%
2019	7.16	20.84%	4.95	14.42%	1.06	3.07%	1.14	3.31%	0.12	35%
2020	8.93	24.91%	4.33	12.07%	1.05	2.94%	0.8	2.24%	0.19	54%
2021	10.4	32.52%	4.56	14.23%	1.87	5.84%	1.05	3.28%	0.49	52%
2022	10	35.66%	3.31	11.76%	1.91	6.80%	1.06	3.76%	0.63	25%
2023	8.95	26.01%	2.66	7.72%	1.64	4.76%	0.85	2.46%	0.79	30%

4. ANALYSIS OF THE EXPORT COMPETITIVENESS OF AQUATIC PRODUCTS IN GUANGDONG PROVINCE

Drawing on existing literature [6–8], this study employs a linked analysis of three key indicators—the Trade Competitiveness Index (TC), the Revealed Comparative Advantage Index (RCA), and the

Export Efficiency Index (EF)—to reveal the evolving international competitiveness of Guangdong’s aquatic products. The measurement results of these indices are presented in Table 5.

The Trade Competitiveness Index (TC) is the most direct measure of a product’s international competitiveness. Its value ranges between -1 and 1. A positive TC indicates that exports exceed imports, reflecting strong export competitiveness; A negative TC, on the other hand, reflects a net import status. In 2013, Guangdong’s Trade Competitiveness Index (TC) for aquatic products reached a high of 0.45, significantly above the critical threshold of 0. This indicated that at the time, the export value of aquatic products was substantially higher than the import value, giving Guangdong a clear trade surplus. Backed by abundant fishery resources, a mature processing system, and low-cost labor, Guangdong’s aquatic products held an important share in the international market, with its trade surplus continuing to expand. However, this competitive advantage showed a continuous decline over the following decade: by 2023, the TC index had dropped sharply to -0.19, marking a transition from a net export to a net import status and signaling a significant weakening of Guangdong’s competitive edge in aquatic products. This reversal was driven by a dual pressure of expanding imports and shrinking exports: On the import side, since 2016, the import value of aquatic products in Guangdong has generally shown a volatile upward trend, reflecting both the growing domestic demand for high-end aquatic products driven by consumption upgrading, and the increasing reliance on imported raw materials in the processing sector. On the export side, exports have been in decline since 2019. In 2020, they fell by 12.2% due to the impact of the global COVID-19 pandemic, and the decline widened further to 18.6% in 2023, marking the largest annual drop in the past decade. From the perspective of underlying drivers, the decline in the TC index is fundamentally the result of a combination of fluctuating external demand, rising trade barriers, and insufficient resilience of the local industry. Guangdong’s aquatic product exports have long been dependent on traditional markets and primary processed products. When external demand contracts or product standards are upgraded, the region lacks high-value-added products that could help hedge against risks. As a result, export volumes have shrunk and the trade balance has reversed.

The Revealed Comparative Advantage Index (RCA) measures the relative strength of a region’s export share compared to the global average, reflecting the degree of specialization of a certain product in the global market. Between 2013 and 2021, Guangdong’s RCA for aquatic products rose from 0.57 to 0.66, and although it never exceeded the threshold of 1, which is commonly regarded as indicating “strong competitive advantage,” it consistently surpassed the national average, demonstrating that during this period, Guangdong’s aquatic products exports achieved a breakthrough improvement in competitiveness. This upward trend was primarily driven by two factors: first, technological innovations in aquaculture, such as the promotion of recirculating aquaculture systems (RAS) and selective breeding of superior varieties, which significantly enhanced farming efficiency and product quality; and second, the development effects of industrial clusters, as the Pearl River Delta region established a complete industrial chain encompassing seedling breeding, feed processing, adult fish farming, and deep processing, which helped reduce production costs and improve responsiveness. In 2021, Guangdong’s aquatic products exports reached \$3.44 billion, accounting for 0.44% of the province’s total exports, with the export value surging by 22.2% year-on-year, far outpacing the national average growth rate of 15.2%, which confirmed the positive impact of industrial agglomeration and technological upgrading on competitiveness. However, starting in 2022, the RCA index began to decline continuously, falling to 0.51 in 2023, returning to the relatively low range seen during 2013–2015; this downturn is directly related to global supply chain disruptions and the contraction of overseas markets, and more alarmingly, the sharp fall after the 2021 peak in RCA reveals the high external dependency and inherent vulnerability of Guangdong’s aquatic products export structure—when the international market environment is stable, the economies of scale within industrial clusters can rapidly enhance competitiveness, but once faced with external shocks, the lack of diversified market presence and support from high-value-added products quickly becomes a major weakness.

The Export Efficiency Index (EF) reflects the output efficiency per unit of resource input and serves as a key indicator for evaluating industrial production efficiency; between 2013 and 2023, Guangdong’s EF value for aquatic products consistently remained in the high range of 1.17 to 1.3, significantly above the national average, indicating that its production efficiency has continued to lead. In 2017, the EF value peaked at 1.3, reaching the highest historical level of output efficiency per unit of GDP for aquatic products, an achievement driven by the well-developed processing system and cold-chain logistics network in the Pearl River Delta region, where technology empowerment and model innovation substantially improved the efficiency of resource conversion. In terms of production scale, Guangdong’s annual aquatic output has consistently remained above 8 million metric tons, climbing to 9.24 million metric tons in 2023, accounting for 12.9% of the national total and securing its position among the top three producing provinces in China. As the core production area, the Pearl River Delta has achieved high-efficiency output under conditions of limited land and water resources by relying on intensive farming models and digital management technologies. However, in 2017, while the EF value reached its peak, Guangdong’s aquatic output experienced a 4.6% year-on-year decline, even as the province’s GDP growth rate remained high at 11.5%, highlighting the structural characteristics of industrial transformation and upgrading: traditional, extensive farming models have gradually contracted due to ecological pressures and resource constraints, while higher-value-added deep processing and recreational fisheries have not yet fully compensated for the resulting production gap. Although production efficiency remains at the forefront nationally, if the industrial structure cannot be further optimized through technological innovation and market expansion, the long-term advantage of the EF index may weaken due to capacity bottlenecks.

Table 5. Export Competitiveness Indices

Year	TC	RCA	EF
2013	0.4526	0.5705	1.2771
2014	0.3772	0.5467	1.2451
2015	0.3169	0.5387	1.2042
2016	0.3922	0.5453	1.1730
2017	0.3095	0.5903	1.2957
2018	0.1547	0.6173	1.2218
2019	-0.0309	0.6161	1.2453
2020	0.1234	0.6092	1.2451
2021	0.1021	0.6654	1.2443
2022	-0.1070	0.5689	1.2407
2023	-0.1923	0.5138	1.2387

5. RESEARCH CONCLUSIONS AND POLICY RECOMMENDATIONS

This paper focuses on the current development status and export competitiveness of Guangdong Province’s aquatic products industry, analyzing its industrial standing, market performance, and the evolving logic behind its competitiveness. On the production side, from 2013 to 2023, Guangdong’s aquatic products output increased from 8.1613 million metric tons to 9.2402 million metric tons, with an average annual growth rate of 1.46%. Its share of the national total has remained stable at around 13%, consistently ranking among the top three in China and playing a vital “stabilizing” role in the country’s aquatic production. However, the growth trajectory has been non-linear: in 2017, output experienced a brief decline due to industry adjustments and resource constraints, but rebounded after 2018 as a result of strengthened marine conservation policies, extended seasonal fishing bans, and technological upgrades in green aquaculture. In a regional comparison, the southern provinces—including Guangdong, Fujian, and Zhejiang—have achieved continuous growth by leveraging their favorable climate and technological advantages. Notably, Guangdong surpassed Shandong in 2019.

In contrast, the northern provinces—Shandong, Liaoning, and Jiangsu—have seen more pronounced fluctuations, largely due to policy regulation and ecological pressures. On the export side, although Guangdong has long ranked first in China in terms of agricultural product exports, its export competitiveness has come under increasing pressure. The market structure has become increasingly differentiated: traditional markets such as the United States and Canada have seen a sharp decline in market share, while emerging markets like South Korea, Japan, Hong Kong SAR, and others have performed strongly. Competitiveness indicators reveal the following trends: The Trade Competitiveness Index (TC) dropped from 0.45 in 2013 to -0.19 in 2023, indicating a shift from a net export to a net import status and a notable weakening of competitive advantage. The Revealed Comparative Advantage Index (RCA) rose from 0.57 in 2013 to 0.66 in 2021, before falling back to 0.51 in 2023, retreating to the lower range seen in 2013-2015. The Export Efficiency Index (EF) has remained in the high range of 1.17 to 1.3, reflecting sustained production efficiency leadership, though it now faces capacity bottlenecks. In summary, Guangdong's aquatic products exports are transitioning from a traditional reliance on conventional markets and low-value products toward greater diversification. However, issues such as low risk resilience, weak competitiveness, and insufficient value-added products continue to constrain its long-term competitiveness. To regain and strengthen its position, industrial upgrading and strategic adjustments are urgently needed. Based on the above conclusions, the following policy recommendations are proposed:

Strengthening Technology Transfer and Industrial Upgrading Support: The core issue behind the decline in the export competitiveness of Guangdong's aquatic products lies in the low conversion rate of technological achievements. The government should establish a special fund for the industrialization of deep-processing technologies in aquatic products, with a focus on supporting the commercialization of key technologies such as fish protein peptide and collagen extraction. Financial subsidies of 50% should be provided to small and medium-sized enterprises (SMEs) for the purchase of advanced processing equipment. Additionally, the government should collaborate with leading universities such as South China Agricultural University and Guangdong Ocean University to establish an aquatic technology transfer center, facilitating the signing of technology licensing agreements between research institutions and enterprises. Enterprises that successfully achieve technology transfer should be granted a 20% corporate income tax reduction, and prioritized for inclusion in the government procurement catalog to expand their market opportunities.

Optimizing Cold-Chain Logistics Infrastructure: The inefficiency of cold-chain logistics is a major constraint on the export quality of Guangdong's aquatic products. The government should formulate the "Three-Year Plan for Upgrading Cold-Chain Logistics Infrastructure in Guangdong Province", aiming to construct 10 intelligent cold-chain storage clusters in the Pearl River Delta region. These clusters will be equipped with automated sorting systems and real-time temperature and humidity monitoring devices, with the goal of increasing cold storage utilization rates to over 90%. Enterprises purchasing energy-efficient refrigerated trucks should receive a 30% reduction in purchase tax. Furthermore, efforts should be made to promote the development of the "Greater Bay Area Cold-Chain Data Sharing Platform", integrating data resources from customs, logistics enterprises, and inspection and quarantine authorities to achieve full digitalization of the customs declaration, warehousing, and transportation processes.

Improving the Diversification of Export Market Layout: The export of Guangdong's aquatic products is overly dependent on traditional markets such as the United States and Hong Kong SAR. Leveraging the policy benefits of the RCEP, the government should develop and implement the "Guangdong Aquatic Products ASEAN Market Expansion Action Plan". This includes establishing five overseas warehouses in key locations such as Ho Chi Minh City and Bangkok to provide one-stop services including warehousing, repackaging, and customs clearance, thereby reducing enterprise logistics costs by over 30%. A "zero-tariff" filing system should be introduced for enterprises exporting to ASEAN countries, and the procedures for issuing Certificates of Origin should be simplified. At the same time, the government should collaborate with the Ministry of Commerce to establish an

“Emerging Market Development Risk Compensation Fund”, offering 50% subsidies on export credit insurance premiums for enterprises exporting to markets in the Middle East and Africa, helping them mitigate risks related to political instability and exchange rate fluctuations.

Promoting Industry Standardization and Collaborative Mechanisms: The processing enterprises in Guangdong’s aquatic products sector face severe issues of homogenized competition, with small-scale enterprises accounting for 83% of the industry and deep-processed products making up less than 15% of total output. Industry associations should take the lead in formulating the “Guangdong Provincial Technical Specifications for Deep-Processing of Aquatic Products”, clearly defining production standards for ready-to-eat products and functional foods, and mandating the phasing out of outdated production capacities such as frozen product lines that fail to meet HACCP certification requirements. Efforts should also focus on promoting the establishment of an aquatic processing industry alliance, guiding small and medium-sized enterprises toward specialized transformation based on a division of labor across the “breeding—processing—sales” industrial chain. An industry self-discipline fund should be set up, and a blacklist system should be implemented for enterprises engaging in malicious price undercutting to stabilize the export pricing system.

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