(ISSN: 0973-7049(P))

The Bioscan AN INTERNATIONAL QUARTERLY JOURNAL OF LIFE SCIENCES 21(3): S.I (3), 1124-1138, 2026 www.thebioscan.com

AN ECONOMETRIC ASSESSMENT AND FORECASTING OF FISH PRODUCTION AND MARINE PRODUCT EXPORTS IN INDIA: EVIDENCE FROM 2000 01 TO 2024–25

Dr. P. Jayaprapakaran
Associate Professor, PG & Research Department of Economics, The Madurai Diraviam Thayumanavar Hindu College, Tirunelveli, Tamil Nadu. Affiliated to Manonmaniam Sundaranar University, Tirunelveli 627 012.
https://orcid.org/0000-0003-1298-365X

DOI: https://doi.org/10.63001/tbs.2026.v21.i03.S.I(3).pp1124-1138

KEYWORDS
Fish Production, Marine Product Exports, Growth Instability, Cuddy-Della Valle Index, ARIMA forecasting, India.

Article Info

Received:
07.06.2026
Accepted:
24.07.2026
Published:
17-08-2026

Abstract

The study analysed the growth, instability, correlation, composition, and future outlook of fish production and marine product exports in India from 2000–01 to 2024–25. Secondary data were obtained from the Handbook of Fisheries Statistics and the Marine Products Export Development Authority (MPEDA). Linear trend, Compound Annual Growth Rate (CAGR), coefficient of variation, Cuddy–Della Valle Instability Index, Pearson's correlation, regression analysis, and ARIMA forecasting were utilized. The findings indicated positive and statistically significant trends in marine, inland, and total fish production, with inland fish production achieving the highest growth rate of 7.3 percent. Marine product exports experienced significant growth, with export quantity and value increasing by 6.63 percent and 12.60 percent, respectively. The value of exports demonstrated greater instability compared to the quantity of exports.

A strong positive association was observed between fish production and marine product export value. Frozen shrimp continued to be the dominant export product, with the USA and Southeast Asia becoming significant export destinations. ARIMA forecasts indicated an overall positive outlook for fish production and marine product exports from 2025–26 to 2029–30. The study emphasized the significance of sustainable production, diversification of exports, value addition, development of infrastructure, and market expansion to fortify India's fisheries sector.

Introduction

The fisheries sector is among the most rapidly expanding sectors of the agricultural economy, playing a crucial role in food security, nutrition, employment, rural livelihoods, and sustainable development. The escalating

worldwide appetite for aquatic foods has increased the significance of fisheries and aquaculture within food systems and international trade (FAO, 2024). India boasts abundant fishery resources, featuring a lengthy coastline, a substantial Exclusive Economic Zone (EEZ), rivers, reservoirs, lakes, ponds, and wetlands, positioning it among the foremost fish-producing nations globally. In the last twenty years, the sector has undergone significant growth, especially in inland fisheries and aquaculture, bolstered by technological innovations, enhanced agricultural methods, and governmental initiatives. Beyond fulfilling local dietary needs, the fishing sector aids in job creation and the socio-economic development of coastal and rural populations. India has also built a large marine products export sector, with exports reaching 17,81,602 tonnes valued at ₹60,523.89 crore in 2023–24.

Exports of marine products are a significant source of foreign exchange revenue for India. The nation exports a wide range of goods to important foreign markets, such as frozen fish, frozen shrimp, cephalopods, and other seafood. The United States, China, the European Union, Japan, and Southeast Asia continue to be significant destination markets for frozen shrimp, which continues to be the top export commodity in terms of both quantity and value (MPEDA, 2022; MPEDA, 2025). Fish production, infrastructural development, value addition, and fisheries development have all benefited from government efforts including the Blue Revolution and the Pradhan Mantri Matsya Sampada Yojana (PMMSY).

Few studies have used contemporary data and thorough econometric methodologies to analyze the long-term performance of fish production and marine product exports jointly, despite the fact that numerous studies have looked at each topic independently. Thus, the current study, "An Econometric Assessment and Forecasting of Fish Production and Marine Product Exports in India: Evidence from 2000–01 to 2024–25" examines the trends, growth, instability, and correlation between fish production and marine product exports and forecasts how well they will perform in the future. The findings are expected to provide valuable insights for policymakers, researchers, and other stakeholders in promoting sustainable fisheries development and enhancing India's competitiveness in the global seafood market.

Review of Literature

Kumar (2004) investigated the export dynamics of India's fisheries and found considerable rise in fish and fishery exports during the post-liberalization period. The analysis revealed India's export potential and accentuated the importance of improved quality and sanitary regulations for international competitiveness. Shinoj et al. (2009) examined the changing composition and destinations of India's fish and fishery exports. The research

revealed a growing diversity and a transition toward value-added products, highlighting the significance of product quality and market diversification. Rani et al. (2014) analysed the performance and competitiveness of India's ornamental fish export sector. The research identified a rise in exports alongside escalating global competition and emphasized the necessity for improved technology, quality, and market promotion. Suresh and Parappurathu (2018) investigated capital formation within India's fisheries sector. The research noted a rise in investment that was inconsistent and highlighted the importance of infrastructure, technology, and value addition for the sustainable development of fisheries.

Guledagudda et al. (2020) analysed the growth, instability, and direction of India's fish exports using CAGR, the Cuddy–Della Valle instability index, and Markov Chain analysis. The research indicated that South East Asia constituted a important export market in terms of quantity, although the USA excelled in export value, with frozen shrimp being the foremost export product. Jeevitha et al. (2023) examined India's marine product exports from 2001 to 2021 employing growth and instability measures. The study identified significant growth in crustacean exports and highlighted the importance of value addition and product diversification to maintain export competitiveness. Chandrasekar et al. (2024) investigated the growth, instability, and geographical diversification of India's marine product exports. The study identified a growing diversification in markets alongside escalating export instability, underscoring the necessity for broader markets and value-added products. Purkait et al. (2025) examined the growth and instability of India's fish production and marine exports thru the application of CAGR and the Cuddy–Della Valle Instability Index. The research indicated positive growth in both sectors, accompanied by somewhat greater instability in exports. Suresh et al. (2026) analysed fish production, exports, and competitiveness over various technology and policy stages. The study revealed accelerated growth in inland fisheries and a bidirectional relationship between fish production and exports, despite a gradual decline in India's comparative advantage in marine products.

The reviewed studies revealed that substantial research had been undertaken regarding fish production, export performance, competitiveness, and market diversification. Nevertheless, the majority of research concentrated on individual aspects or short durations. Few investigations have jointly analysed fish production and marine product exports, especially by using trend analysis, growth, instability assessment, correlation analysis, and long-term forecasting. Hence, the present study endeavoured to fill this void by examining India's fish production and marine product exports from 2000–01 to 2024–25 and

forecasting their future performance.

Objectives of the Study

The objectives of the present study are as follows:

1. To analyse the trend and growth of fish production and marine product exports in India.
2. To measure the instability in fish production and marine product exports using the Cuddy-Della Valle Instability Index.
3. To examine the relationship between fish production and marine product export value in India.
4. To analyse the composition and direction of India's marine product exports.
5. To forecast fish production and marine product exports for the next five years using the ARIMA model.

Methodology

The study utilized secondary data spanning from 2000–01 to 2024–25. Data on marine, inland, and total fish production were obtained from the Handbook of Fisheries Statistics published by the Department of Fisheries, Government of India. Data on marine product exports, encompassing both quantity and value, were sourced from the Handbook on Fisheries Statistics and the Marine Products Export Development Authority (MPEDA). The data were compiled into annual time-series observation for empirical analysis.

The long-term trend in fish production and marine product exports was analysed utilizing a linear trend model, $\mathbf{Y_t = a + bt + e_t}$. Where '$Y_t$' denotes fish production or marine product exports, 't' indicates time, 'a' serves as the intercept, 'b' functions as the trend coefficient, and 'e_t' represents the error term.

The Compound Annual Growth Rate (CAGR) was calculated utilizing the semi-logarithmic model, $\mathbf{Ln\ Y_t = a + bt + e_t}$. The CAGR was determined using the formula: $CAGR = (e^b - 1) \times 100$. Where 'b' denotes the estimated regression coefficient.

The Cuddy–Della Valle Instability Index was employed to assess instability in fish production and marine product exports. The computation was expressed as $\mathbf{CDVI = CV\sqrt{1 - R^2}}$. Where CV denotes the coefficient of variation, while R^2 indicates the coefficient of determination derived from the trend equation. The CV measured the overall relative variability of the series, whereas the CDVI identified instability after adjusting for the underlying time trend.

Pearson's correlation coefficient was employed to analyse the relationship between fish production and marine product exports. A simple linear regression model was utilized to examine the relationship between fish production and the value of marine product exports. A simple functional equation was

(ISSN: 0973-7049(P))

The Bioscan AN INTERNATIONAL QUARTERLY JOURNAL OF LIFE SCIENCES 21(3): S.I (3), 1124-1138, 2026 www.thebioscan.com

defined as, $\mathbf{E_t = \alpha + \beta P_t + \varepsilon_t}$. Where '$E_t$' denotes the value of marine product exports, 'P_t' denotes fish production, 'α' represents the intercept, 'β' indicates the regression coefficient, and 'ε_t' is the error term.

The changing composition of marine product exports was analysed by the percentage share of major export categories in total marine product exports. The direction of exports was examined in relation to their allocation among major international markets.

The Autoregressive Integrated Moving Average (ARIMA) model was utilized to forecast fish production and marine product exports for the next five years. The ARIMA model is denoted as ARIMA(p,d,q). Where 'p' signifies the autoregressive order, 'd' indicates the order of differencing, and 'q' represents the moving-average order. The suitable model was chosen according to conventional model-selection criteria like AIC and BIC, in addition to diagnostic tests of the residual. Given the limited number of annual observations, the ARIMA forecasts were interpreted as indicative projections rather than precise long-term predictions. The data were analysed using SPSS, EViews, and R software.

Results and Discussion

The fish production in India was analysed by evaluating both marine and inland fish production from 2000–01 to 2024–25. Table 1 presents the annual production of marine fish, inland fish, and total fish production, quantified in thousand tonnes, to evaluate the changing trends in fish production during the study period.

Table 1

Trend in Fish Production in India for the Period 2000–01 to 2024–25

(In Thousand Tonnes)

Year	Marine Fish	Inland Fish	Total Fish Production
2000–01	2811	2845	5656
2001–02	2830	3126	5956
2002–03	2990	3210	6200
2003–04	2941	3458	6399
2004–05	2779	3526	6305
2005–06	2816	3756	6572
2006–07	3024	3845	6869
2007–08	2920	4207	7127
2008–09	2978	4638	7616
2009–10	3104	4894	7998
2010-11	3250	4981	8231
2011-12	3372	5294	8666
2012-13	3321	5719	9040
2013-14	3443	6136	9579
2014-15	3569	6691	10260

2015-16	3600	7162	10762
2016-17	3625	7806	11431
2017-18	3756	8948	12704
2018-19	3853	9720	13573
2019-20	3727	10437	14164
2020-21	3476	11249	14725
2021-22	4127	12121	16248
2022-23	4432	13113	17545
2023-24	4494	13899	18393
2024-25	4615	15160	19775

Source: Compiled from Handbook of Fisheries Statistics, Government of India.

Table 1 illustrates the trend in marine, inland, and total fish production in India from 2000–01 to 2024–25. Marine fish production rose from 2,811 thousand tonnes in 2000–01 to 4,615 thousand tonnes in 2024–25, demonstrating an overall rising trend despite occasional fluctuations. production dropped in specific years, notably from 2,990 thousand tonnes in 2002–03 to 2,779 thousand tonnes in 2004–05 and from 3,727 thousand tonnes in 2019–20 to 3,476 thousand tonnes in 2020–21. It later recovered and attained its peak of 4,615 thousand tonnes in 2024–25. Inland fish production, conversely, exhibited a significantly more robust and stable growth, escalating from 2,845 thousand tonnes to 15,160 thousand tonnes during the study period. Consequently, inland fisheries became the primary factor in the growth of India's total fish production. Total fish production rose from 5,656 thousand tonnes in 2000–01 to 19,775 thousand tonnes in 2024–25, with consistent growth from 2004–05 onwards. The data revealed that the significant increase in India's fish production during the study period was predominantly driven by the rapid growth of inland fisheries, whereas marine fisheries contributed to growth at a rather sluggish rate. These trends formed the basis for additional examination of the growth rate and instability of fish production.

Table 2
Growth and Trend of Fish Production in India for the Period 2000-01 to 2024-25

Category	Trend Coefficient	R^2	CAGR (%)	t-value	Significance
Marine Fish	69.952	87.8	2.0	12.849	1 per cent
Inland Fish	488.095	91.5	7.3	15.732	1 per cent
Total Fish	558.048	91.9	5.4	16.132	1 per cent

Source: Estimated by the Researcher

Table 2 illustrates the trend and growth of fish production in India over the study period. The results indicated that marine, inland, and total fish production exhibited positive and statistically significant trends at the 1 percent level. Marine fish production exhibited a trend coefficient of 69.952, a R^2 value of 87.8 percent, and a compound annual growth rate (CAGR) of

2.0 percent. The t-value of 12.849 confirmed the significance of the trend. Inland fish production exhibited a significantly elevated trend coefficient of 488.095 and a CAGR of 7.3 percent, indicating considerably faster growth than marine fish production. The R^2 value of 91.5 percent and t-value of 15.732 demonstrated a strong and statistically significant positive trend. Total fish production exhibited a strong upward trend, characterized by a trend coefficient of 558.048, a R^2 value of 91.9 percent, and CAGR of 5.4 percent. The t-value of 16.132 validated its statistical significance.

The findings demonstrated that inland fish production experienced a significantly higher growth rate than marine fish production, evidenced by its CAGR of 7.3 percent in contrast to 2.0 percent. The significant positive trends in all three categories confirmed the continuous growth of India's fish production from 2000–01 to 2024–25.

Table 3
Instability in Fish Production in India for the Period 2000-01 to 2024-25

Category	Mean	SD	CV (%)	Cuddy–Della Valle Index (%)	Level of Instability
Marine	3,434.12	549.53	16.00	5.60	Low
Inland	7,037.64	3,755.49	53.36	15.56	Moderate
Total	10,471.76	4,284.78	40.92	11.66	Moderate

Source: Estimated by the Researcher

Table 3 displays the descriptive statistics and instability of fish production in India from 2000–01 to 2024–25. The mean production was 3,434.12 thousand tonnes for marine fish, 7,037.64 thousand tonnes for inland fish, and 10,471.76 thousand tonnes for total fish production. Marine fish production exhibited a coefficient of variation of 16.00 percent and a Cuddy–Della Valle Instability Index of 5.60 percent, signifying low instability. Inland fish production exhibited a greater coefficient of variation of 53.36 percent and a trend-adjusted instability of 15.56 percent, signifying moderate instability. Total fish production exhibited a moderate degree of instability, characterized by a coefficient of variation of 40.92 percent and a Cuddy–Della Valle Index of 11.66 percent. In general, the findings suggested that marine fish production exhibited a higher degree of stability, whereas inland fish production experienced greater fluctuations around its long-term growth trend. Total fish production exhibited moderate instability, indicative of the combined fluctuations in both marine and inland fisheries.

Table 4
Trend in India's Export of Marine Products, 2000–01 to 2024-25

Year	Quantity (Tonnes)	Value (₹ crores)
2000–01	440473.00	6443.89
2001–02	424470.00	5957.05
2002–03	467297.00	6881.31
2003–04	412017.00	6091.95
2004–05	461328.51	6646.69
2005–06	512163.56	7245.30
2006–07	612641.50	8363.53
2007–08	541700.83	7620.92
2008–09	602835.34	8607.94
2009–10	678436.07	10048.53
2010-11	813090.85	12901.47
2011-12	862021.41	16597.23
2012-13	928214.67	18856.26
2013-14	983755.56	30213.26
2014-15	1051243.49	33441.61
2015-16	945891.90	30420.83
2016-17	1134948.09	37870.90
2017-18	1377243.70	45106.89
2018-19	1392559.00	46580.37
2019-20	1289651.00	46662.85
2020-21	1149510.00	43720.98
2021-22	1369264.00	57586.48
2022-23	1735286.00	63969.14
2023-24	1781602.00	60523.89
2024-25	1698170.00	62408.45

Source: Compiled from Handbook of Fisheries Statistics, Government of India.

Table 4 illustrates the trend of India's marine product exports for both quantity and value from 2000–01 to 2024–25. The data indicated a general upward trend in both the quantity and value of exports, despite some variations over the study period. The export quantity rose from 440,473 tonnes in 2000–01 to 1,698,170 tonnes in 2024–25. Following several variations in the early years, exports surpassed one million tonnes in 2014–15 and attained 1,392,559 tonnes in 2018–19. The quantity decreased to 1,149,510 tonnes in 2020–21, then experienced a robust rebound to a high of 1,781,602 tonnes in 2023–24, before to a slight reduction in 2024–25.

The export value rose significantly from ₹6,443.89 crore in 2000–01 to ₹62,408.45 crore in 2024–25. It surpassed ₹10,000 crore in 2009–10 and ₹30,000 crore in 2013–14, reaching ₹46,662.85 crore in 2019–20. After a downturn in 2020–21, export value rebounded, to a zenith of ₹63,969.14 crore in 2022–23, followed by some fluctuations. The results demonstrated that both quantity and value of exports experienced significant growth, with the value of exports rising at a quicker pace than the quantity. The

variations noted in recent years underscored the necessity for additional examination of the growth and instability of India's marine product exports.

Table 5
Trend, Growth and Instability of Marine Product Exports

Indicator	Export Quantity	Export Value
Trend coefficient	57,422.977	2,714.040
R^2	92.92	91.45
CAGR (%)	6.63	12.60
CV (%)	46.31	76.71
CDVI (%)	12.32	22.43
Level of Instability	Moderate	High

Source: Estimated by the Researcher

Table 5 illustrates the growth and instability of India's marine product exports from 2000–01 to 2024–25. The export quantity and value exhibited robust positive trends, with R^2 values of 92.92 percent and 91.45 percent, respectively. The export quantity had a trend coefficient of 57,422.977 tonnes and a CAGR of 6.63 percent. The coefficient of variation at 46.31 percent and the coefficient of dispersion at 12.32 percent suggested a moderate level of instability. The export value exhibited a trend coefficient of ₹2,714.040 crore and a higher CAGR of 12.60 percent. The coefficient of variation at 76.71 percent and the coefficient of deviation at 22.43 percent showed a high level of instability. On the whole, the value of exports increased significantly more rapidly than the quantity of exports, while also displaying greater instability, indicating that export earnings were affected by not just the quantity of exports but also by prices, product mix, and international market conditions.

Table 6
Relationship between Fish Production and Marine Product Exports in India, 2000–01 to 2024–25

Fish Production	Export Quantity	Export Value
Marine Fish Production	0.978***	0.964***
Inland Fish Production	0.961***	0.975***
Total Fish Production	0.968***	0.978***

Note: N = 25. *** indicates significance at the 1 per cent level.

Table 6 illustrates the correlation between fish production and marine product exports in India. All correlation coefficients exhibited positive values and were statistically significant at the 1 percent level, signifying strong positive relationships. Marine fish production exhibited a strong correlation with export quantity (r = 0.978) and export value (r = 0.964), but inland fish production demonstrated

correlations of 0.961 and 0.975, respectively. Total fish production showed a correlation of 0.968 with exports quantity and 0.978 with export value. The most significant correlation was observed between total fish production and export value (r = 0.978). Nonetheless, these findings suggested a correlation rather than a causal relationship, establishing a foundation for more investigation through regression analysis. Given that the variables had significant upward time trends, the high correlation coefficients must be explained with caution and do not inherently indicate a causal relationship.

Table 7
Regression Relationship between Fish Production and Marine Product Export Value, 2000–01 to 2024–25

Fish Production Variable	Constant	Production Coefficient	t-value	R^2	F-value
Value of Marine Fish Production	-98,583.49	36.637	17.348***	0.929	300.958
Value of Inland Fish Production	-10,922.91	5.421	20.923***	0.950	437.782
Value of Total Fish Production	-22,691.43	4.767	22.448***	0.956	503.908

Source: Estimated by the Researcher
*** indicates significance at the 1 per cent level.

Table 7 displays the regression results on the relationship between fish production and marine product export value. All production coefficients exhibited positivity and were statistically significant at the 1 percent level, indicating a strong positive association. Marine fish production exhibited a coefficient of 36.637 with an R^2 value of 0.929, whilst inland fish production had a coefficient of 5.421 with an R^2 of 0.950. Total fish production exhibited a coefficient of 4.767 and the peak R^2 value of 0.956. The F-values of 300.958, 437.782, and 503.908 validated the statistical significance of the respective models. The results indicated a strong positive association between fish production and marine product export value. However, since both series exhibited pronounced time trends, the regression results should be interpreted as long-run association rather than evidence of a causal effect.

Table 8
ARIMA Model Selection and Diagnostic Results for the Period 2000–01 to 2024–25

Variable	Selected ARIMA Model	AIC	BIC	Ljung–Box p-value (Lag 5)	Residual Diagnosis

Marine Fish Production	ARIMA (0,2,1)	309.919	312.190	0.540	Adequate
Inland Fish Production	ARIMA (0,2,1)	313.044	315.315	0.695	Adequate
Total Fish Production	ARIMA (2,2,0)	329.075	332.482	0.573	Adequate
Export Quantity	ARIMA (3,2,1)	601.894	607.572	0.474	Adequate
Export Value	ARIMA (2,2,1)	454.013	458.555	0.924	Adequate

Note: Given the relatively short annual time series, the forecasts should be interpreted as indicative projections rather than precise long-term predictions. The ARIMA table is also clear, and the Ljung–Box p-values are all above 0.05.

Table 8 displays the chosen ARIMA models along with their diagnostic results for fish production and marine product exports. The models were chosen based on AIC and BIC criteria, and the adequacy of residuals was evaluated using the Ljung–Box test. Marine and inland fish production were best represented by ARIMA (0,2,1), whereas total fish production adhered to ARIMA (2,2,0). The export quantity was represented by ARIMA (3,2,1), whereas the export value was represented using ARIMA (2,2,1). The Ljung–Box p-values for all models exceeded the 5 percent significance level, suggesting an absence of significant residual autocorrelation and satisfactory model adequacy. The chosen ARIMA models were deemed suitable for producing five-year projections forecasts for the period of 2025–26 to 2029–30.

Table 9

Forecast of Fish Production and Marine Product Exports in India for the Period 2025–26 to 2029–30

Year	Marine Fish Production (000 tonnes)	Inland Fish Production (000 tonnes)	Total Fish Production (000 tonnes)	Export Quantity (tonnes)	Export Value (₹ crore)
2025–26	4,693.47	16,237.44	21,225.34	1,632,193	69,941
2026–27	4,771.95	17,314.88	22,365.36	1,770,715	73,531
2027–28	4,850.42	18,392.32	23,569.56	1,952,642	74,590
2028–29	4,928.90	19,469.76	24,920.26	2,042,332	78,292
2029–30	5,007.37	20,547.20	26,188.64	2,021,761	82,982

Note: Marine, inland and total fish production were forecast independently using their respective

ARIMA models, therefore, the forecasted total may not equal the sum of the separately forecast marine and inland components.

Table 9 displays the forecasts of fish production and marine product exports for the period 2025–26 to 2029–30. The results suggested a generally optimistic perspective for the fisheries sector. Marine fish production was anticipated to grow from 4,693.47 to 5,007.37 thousand tonnes, whereas inland fish production was forecasted to ascend from 16,237.44 to 20,547.20 thousand tonnes, the independently forecast total fish production was projected to increase from 21,225.34 to 26,188.64 thousand tonnes. The projected export quantity is anticipated to rise from 1.63 million tonnes in 2025–26 to 2.04 million tonnes in 2028–29, subsequently seeing a slight decrease to 2.02 million tonnes in 2029–30. The anticipated export value is expected to increase from ₹69,941 crore to ₹82,982 crore throughout the forecast duration. The forecasts suggested a positive trend for fish production and marine product exports, with inland fisheries playing a significant role in the total increase in production.

Table 10

Composition of India's Marine Product Exports for the Period 2000–01 to 2024-25

(₹ crores)

Marine Product	2000–01	2010–11	2020–21	2024–25
Frozen shrimp	4,482	5,718	32,520	43,334
Frozen fish	875	2,624	2,942	5,212
Cuttlefish	289	1,105	1,626	2,397
Squid	324	1,011	1,999	3,078
Others	474	2,443	4,634	8,387
Total	**6,444**	**12,901**	**43,721**	**62,408**

Source: Compiled from Handbook of Fisheries Statistics, Government of India.

Table 10 indicated that frozen shrimp consistently constituted the dominant component of India's marine product exports during the study period, with its export value rising from ₹4,482 crore in 2000–01 to ₹43,334 crore in 2024–25. The value of frozen fish surged from ₹875 crore to ₹5,212 crore, while cuttlefish and squid escalated from ₹289 crore and ₹324 crore to ₹2,397 crore and ₹3,078 crore, respectively. The 'Others' segment had significant growth from ₹474 crore to ₹8,387 crore, indicating some diversification of the export basket. On the whole, India's marine product exports continued to be predominantly focused on shrimp, while the increasing share of other items indicated a slow diversification.

Table 11

Direction of India's Marine Product Exports for the Period 2000–01 to 2024-25

(₹ crores)

Export Market	2000–01	2010–11	2020–21	2024–25
USA	1,164	1,990	17,990	22,723
Middle East	188	670	1,840	2,328
Japan	2,560	1,683	3,033	3,453
European Union	1,025	3,459	6,023	9,430
South East Asia	1,290	4,092	11,785	18,840
Others	215	1,006	3,046	5,635

Note: Minor differences between the sum of individual markets and total exports are due to rounding.

Source: Compiled from Handbook of Fisheries Statistics, Government of India.

Table 11 illustrated a notable change in the geographical distribution of India's marine product exports from 2000–01 to 2024–25. In the fiscal year 2000–01, Japan emerged as the foremost destination, with exports totalling ₹2,560 crore, succeeded by Southeast Asia at ₹1,290 crore and the USA at ₹1,164 crore. By the year 2024–25, the United States became the foremost market, with exports rising to ₹22,723 crore, followed by Southeast Asia at ₹18,840 crore and the European Union at ₹9,430 crore. The Middle East recorded a rise from ₹188 crore to ₹2,328 crore, but Japan exhibited a slight increase to ₹3,453 crore, leading to a decrease in its comparative significance. The results demonstrated a distinct geographical shift in India's marine product exports toward the USA and Southeast Asia, along with a growing diversification of export markets.

Conclusion

The study analysed the growth, instability, correlation, composition, direction, and future outlook of fish production and marine product exports in India from 2000–01 to 2024–25. The results indicated a significant rise in fish production, with inland fisheries experiencing more rapid growth compared to marine fisheries. Marine product exports experienced a significant rise in both quantity and value, however the value of exports exhibited relatively greater instability. A strong positive correlation was observed between fish production and marine product exports. Frozen shrimp continued to be the dominant export commodity, while the export market progressively shifted toward the USA and Southeast Asia. The ARIMA forecasts suggested an overall positive outlook for fish production and marine product exports from 2025–26 to 2029–30. The results indicated considerable potential for further growth in India’s fisheries sector. Sustainable production, diversification of exports, technical progress, development of infrastructure, and broader market accessibility are crucial for strengthening the sector's contribution to India's economy and Blue Economy.

Policy Implications

The results underscored the necessity of enhancing inland fisheries via sustainable aquaculture, contemporary production

techniques, superior fish seed, and effective resource management, while sustainable marine resource governance and climate-adaptive fishing methods would support the preservation of marine fish production. The continued dominance of frozen shrimp indicated the necessity of advocating for product diversification and value-added seafood offerings to boost export revenues and lessen reliance on a single commodity. Simultaneously, broadening export markets and fortifying cold-chain, processing, storage, quality-control, and transportation infrastructure would strengthen the competitiveness and stability of India's marine product exports. A comprehensive strategy that integrates sustainable production, technical innovation, export diversification, and market expansion would support the long-term growth of India's fisheries sector and its role in the Blue Economy.

Limitations of the Study

The research predominantly utilized secondary annual data spanning from 2000–01 to 2024–25. The analysis was confined to specific indicators of fish production and marine product exports, excluding an independent assessment of factors like international prices, exchange rates, trade policies, climate variability, and worldwide demand. Moreover, the ARIMA forecasts were derived from a short annual time series and should hence be regarded as suggestive estimates.

Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Funding

The author received no financial support for the research, authorship and/or publication of this article.

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