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Performance of Indian Marine Aquaculture: A Kick Around

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Abstract: *The fisheries sector has recorded faster growth as compared to the agricultural sector in all the decades. The growing production of fish suggests that fisheries sector is booming and contributing to the economic growth of the nation. The marine fisheries sector in India constitutes of 19753 crores of Gross Value at land centre 28511 crores at retail point. The sector has export earnings of US $2.84 billion with a 3 per cent in total exports from the country. The present study aims to trace out the trends in export and production of marine fish in India using available secondary data. The data collected has been analysed using the tools like Compound Growth Rate, Mean, Standard Deviation, and Coefficient of Variation, Linear Trend and Linear Regression Model. The export from the country has witnessed a major rise from 678436 million tonnes in 2009-10 to 1392559 million tonnes in 2018-19 of which frozen shrimp are the most exported marine fish product followed by frozen fish. This study concludes that the export and production performance of India in Marine Fisheries sector is satisfactory with an increasing Compound Growth Rate.*

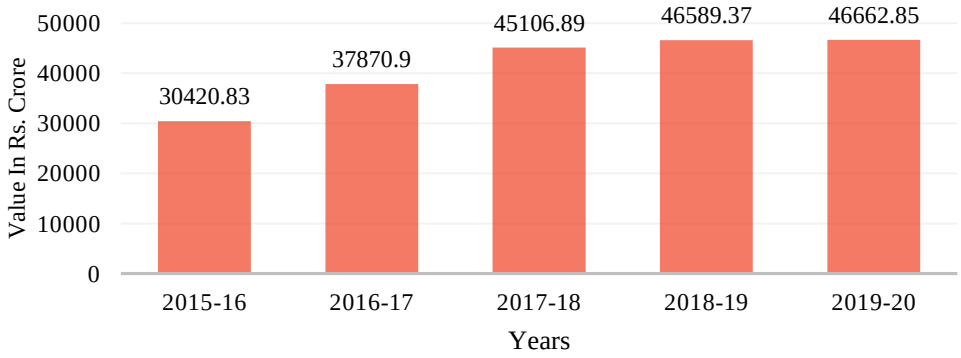
Key Words: *Fisheries, Marine, Production, Export, Growth.*

1. INTRODUCTION:

Agricultural sector contributes to 19.9 per cent of the Gross Domestic Product of the country. Fisheries are considered an important allied sector of agricultural sector and it plays an important role in the Indian economy. The fisheries and aquaculture production contributes around 1 per cent to India's Gross Domestic Product (GDP) and over 5 per cent to the agricultural GDP as on 2019 and Fisheries sector, being an integral part of the Kerala economy, provide food security and protein nutrition along with employment generation, contributing to 1.5 percent of the state GDP as on 2014-15.Apart from its contribution to GDP and employment, the sector catalyses growth in a number of industries. It is a source of cheap and nutritious food. Fish is vital for healthy State. It is loaded with important nutrients such as protein, iodine and vitamin D. It is a great source of Omega-3 fatty acids, which are incredibly important for the body and brain of human being. Many observational studies show that people who eat fish regularly have a lower risk of heart attacks, strokes and death from heart diseases. Regular fish consumption can reduce asthma in children, it has numerous benefits like vision protection and improved mental health. So, it is very essential to include fish in our daily diet. Fisheries sector contributes to the national income, exports, food and nutritional security and in employment generation. This sector is also a principal source of livelihood for a large section of economically underprivileged population of the country, especially in the coastal areas. Share of agriculture and allied activities in the GDP is constantly declining. It has been observed that agriculture sector is gradually diversifying towards high value enterprises including fisheries.

The fisheries sector has recorded faster growth as compared to the agricultural sector in all the decades. The growing production of fish suggests that fisheries sector is booming and contributing to the economic growth of the nation. More than 14 million fishermen and fish farmers are totally dependent on fisheries for their livelihood in India. Fish production in India has touched 141 lakh tonnes in 2019-20. It was a mere 0.75 million tonne in 1950-51. The world production during the same period has gone up from 23.5 million tonnes to around 174 million metric tonnes in 2020.The marine fisheries sector in India constitutes of 19753 crores of Gross Value at land centre 28511 crores at retail point. The sector has an export earnings of US $2.84 billion with a 3 per cent in total exports from the country.

Fig. 1.1: Value of Marine Fisheries Export from India during 2015-16 to 2019-20



There has been a considerable increase both in the quantum and value of export of fish and fish products since 1960-61. In 1960-61, 0.02 million tonnes worth US $ 10 million were exported. It increased to 1392559 million tonnes worth US $ 6728.50 million in 2019-20. It seems that the liberalization policies initiated in the 1990s helped the fisheries sector in attaining a higher growth in exports. Four decades ago, a humble beginning was made in shrimp export and today the export basket of fisheries includes more than 60 items. Shrimp, however, remains the major item of fisheries' exports in terms of both quantity and value. In 2018-19 the share of frozen shrimp was 44.101 per cent in quantity and 68.25 per cent in the value of export earnings from fisheries.

2. LITERATURE REVIEW :

India's export of fish and fish produces comparing the changing patterns and the causes leading to the same has been investigated on the basis of commodity wise and market wise export of marine fish products. Post considering commodity wise and market wise data, the frozen shrimp and fin fish are found the largest exported items and the primary destinations are European union, Japan and USA and concluded by analysing factors that affect the marine production in India and giving insights into measures to enhance the fishery sector of the country **(*Shinoj et al., 2009*)**. The study on 'Indian fish export to USA' have analysed how the fisheries sector plays a key role in providing employment and nutritional security. The study focussed on analysing the problem of fluctuations in imports and exports and used Compound Growth Rates to analyse the trend. Their study concluded that an increase in focus on nutrition has caused an increase international trade of fish. The study also revealed that crustaceans contributed to the most of export of fisheries from India to USA and hence suggested that measures be undertaken to make the export of fisheries sustainable **(*Nisar et al., 2019*)**.

3. OBJECTIVES OF THE STUDY :

- To examine the trends in marine production and export in India.
- To analyse the growth rate of item wise export performance of marine in India.

4. MATERIALS AND METHODS :

- ***Collection of Data*:** For the current study, data was collected in secondary format.
- ***Source of Data*:** The secondary data was collected from Government publications like Department of Fisheries, State government / UTs Administration, Fisheries Handbook India 2020, Marine Products Export Development Authority, Kochi and www.indiastat.com, which consists of the production and export performance of marine fisheries in India.
- ***Period of Study*:** 2009-10 to 2018-19
- ***Tools used*:** Compound Growth Rate, Mean, Standard Deviation, Coefficient of Variation, Linear Trend and Linear Regression Model.

5. RESULT AND DISCUSSION :

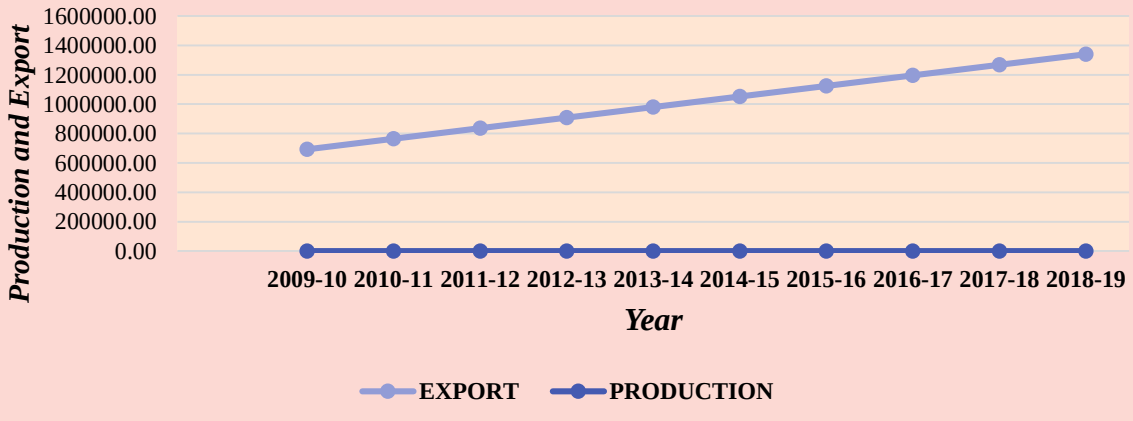
Table 5.1: Export and Production of Marine Fish Products in India 2010-11 to 2019-20

Year	Quantity of Export (In Million Tonnes)	Production (In Lakh tonnes)
2009-10	678436	31.04
2010-11	813091	32.5
2011-12	862021	33.72
2012-13	928215	33.21
2013-14	983756	34.43
2014-15	1051243	35.69
2015-16	945892	36
2016-17	1134948	36.25
2017-18	1377244	37.56
2018-19	1392559	38.53
CGR	**7.321**	**2.204**
MEAN	**1016740.5**	**34.893**
SD	**230981.3**	**2.334**
CV	**22.72**	**6.69**

Source: Marine Products Export Authority, Kochi

The marine fish production and its export from India during the period 2009-10 to 2018-19 shown in the table 5.1. The general trend of production of marine fish in the country has increased from 31.04 lakh tonnes in 2009-10 to 38.53 lakh tonnes in 2018-19. The marine fisheries sector has virtually ceased to grow even as inland fisheries continue to expand. The inland fisheries with a Compound Growth Rate of 8.183 have burgeoning consumer demand, convenient marketing and good returns which are few of the reasons for the higher Compound Growth Rate when compared to the growth rate of marine fisheries. The marine export was maximum in 2018-19 with 1392559 million tons with a value of 46589.37 Crore rupees. The export has an increasing trend but fell from 1051243 million tons to 945892 million tons in 2015-16. This is due to depreciation of euro, weaker economic condition in China and devaluation of Yen. The Compound Growth Rate was estimated at 7.321 per cent.

Fig 5.1: Trend in Export and Production of Marine Fish in India



Source: Computed Data

Linear Trend Equation: $Y = \alpha + \beta\,(t) + \varepsilon$

$$Marine\ Production = 621362.8 + 71886.85\ (Year_{\ 2009\ to\ 2019}) + \varepsilon$$

$$R^2 = 0.967$$

Marine Export = 30.72 + 0.76 (Year $_{2009\ to\ 2019}$) + Ɛ
$R^2 = 0.887$

Table 5.2: Linear Regression Results for Marine Production and Export in India

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	-1943281.669	383000.316		-5.074	0.001***
	MARINE PRODUCTION	84814.389	10947.783	.939	7.747	0.000***
R^2 = 0.882; **Adjusted R^2** = 0.868						
Dependent Variable: MARINE EXPORT						

Source: Computed Data
Note: ***1% significance level

Table 5.2 shows the dependence of marine export on the production of marine fish products in India. Exports of marine products are considered the dependent variable and production of marine fish are considered as the independent variable. The R squared value is 88.2 per cent showing that the goodness of fit of the model. The high level of R square explains that 88.2 per cent of the variance in marine export is explained accurately by marine fish production.

Regression Equation: $\boldsymbol{Y = \alpha + \beta X + Ɛ}$

$Y_{(Export)} = -1943281.669 + 84814.389_{(Production)} + Ɛ$

Where,
Y = Independent Variable or Export of Marine Fish
α = intercept or constant
β = x intercept
x = Independent Variable or Marine Production
Ɛ = Error Term

Year	Frozen Shrimp		Frozen Fish		Frozen Cuttle		Frozen Squid		Dried Items		Live Items		Chilled Items	
	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V
2010-11	1,51,465	5,718.13	3,12,358	2,623.89	59,159	1,104.57	87,579	1,010.57	79,059	954.94	5,208	142.15	21,118	257.54
2011-12	1,89,125	8,175.26	3,47,118	3,284.15	54,671	1,346.72	77,373	1,228.19	53,721	562.65	4,199	154.61	21,278	357.42
2012-13	2,28,620	9,706.36	3,43,876	3,296.86	63,296	1,354.28	75,387	1,378.08	72,553	819.9	4,373	197.89	26,868	537.11
2013-14	3,01,435	19,368.30	3,24,359	4,294.81	68,577	1,386.98	87,437	1,731.97	67,901	998	5,080	281.85	19,755	527.84
2014-15	3,57,505	22,468.12	3,09,434	3,778.50	82,353	1,833.21	69,569	1,275.25	70,544	1,010.16	5,488	301.15	71,404	635.93
2015-16	3,73,886	20,045.50	2,28,749	3,462.25	65,596	1,636.11	81,769	1,615.21	43,320	725.58	5,493	308.81	33,150	809.5
2016-17	4,34,486	24,711.32	2,96,762	4,460.90	63,320	1,944.50	99,348	2,575.29	61,071	871.74	6,703	403.75	71,815	769.81
2017-18	5,65,980	30,868.17	3,53,192	4,674.03	69,183	2,356.46	1,00,845	2,451.87	88,997	1,042.37	7,034	286.11	19,501	647.41
2018-19	6,14,145	31,800.15	3,38,933	4,916.82	60,210	1,975.97	1,01,101	2,506.99	95,296	1,323.45	10,178	388.88	17,207	616.22

2019-20	6,52,253	34,152.03	2,23,318	3,610.01	70,906	2,009.79	87,631	2,196.59	84,417	981.5	7,287	324.26	21,202	631.84
CGR	**17.82**		**-2.17**		**1.39**		**2.38**		**2.96**		**7.82**		**0.03**	
MEAN	**386890**		**307810**		**65727**		**86804**		**71688**		**6104**		**32330**	
SD	**177739.3**		**46765.17**		**7680.01**		**11.66.86**		**16089.93**		**1777.95**		**21185.57**	
CV	**217.672**		**658.203**		**855.82**		**784.36**		**445.545**		**343.33**		**152.602**	

Table 5.3: Item Wise Export of Fisheries Product in India from 2010-11 to 2019-20

Source: Marine Products Export Authority, Kochi

Note: Q – Quantity (In Million Tonnes); V – Value (Rs. In Crore)

Frozen shrimp had the highest export quantity in India during 2019-20. The export of frozen shrimp had increased from 151465 million tonnes in 2010-11 to 652253 million tonnes in 2019-20 with a positive Compound Growth Rate of 17.82 per cent. The second highest exported product was frozen fish which had an increasing trend from 312358 million tonnes in 2010-11 to 223318 million tonnes in 2019-20. Whereas, the Compound Growth Rate of frozen fish has shown a negative growth of -2.17 per cent. The lowest exported item was live items with export quantity of 7287 million tonnes in 2019-20. The export of live items was increasing significantly, that is, from 5492 million tonnes in 2009-10 to 10178 million tonnes in 2018-19 with a Compound Growth Rate of 6.73 per cent.

6. FINDINGS :

- The marine fish production has increased to 38.53 lakh tonnes in 2018-19, showing an immense rise from 31 lakh tonnes in 2009-10.
- The export from the country has also witnessed a major rise from 678436 million tonnes in 2009-10 to 1392559 million tonnes in 2018-19 of which frozen shrimp are the most exported marine fish product followed by frozen fish.

7. CONCLUSION :

This study concludes that the production performance of India in Marine Fisheries sector is satisfactory with an increasing Compound Growth Rate. The export of marine fisheries in India has an increasing trend where frozen shrimp is exported the most with a Compound Growth Rate of 19.19 per cent is mainly due to the instigation of '*vannamei'* shrimp, one which has high demand worldwide to the export baskets of India (*Neha Dewan, 2017*). India has a great scope ahead in frozen shrimp export as the countries like US and China are the major importers of India's Shrimp (*The New Indian Express, 2022*).

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