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Development of Marine Fish Production in India: An Analysis

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Abstract

In the Indian economy, fishery sector is one of the most important and contributory sectors. The study examines the trend and growth of trend and growth of marine fish production in India, market-wise exports from India and craft-wise marine fish production in Tamil Nadu. The objectives of the present study are:

1. To find out the contribution of the fisheries sector production in India from 2005 to 2015.

2. To study the marine products market-wise exports from India to different countries during 2000-01 to 2017-18 and

3. To assess the trend and growth of marine fish production in India, market-wise exports from India and craft-wise marine fish production in Tamil Nadu.

In order to analyze the trend and growth of marine fish production in India, market-wise exports from India and craft-wise marine fish production in Tamil Nadu over a period, percentage methods, co-efficient of variations, linear trend and compound growth rate have used. The secondary data collected through the internet, books, newspaper, journals records and brochures from 2005 to 2015. It inferred that production performance of marine fish capture, on an average over a period was found to be higher than the production performance of inland fish capture. The study reveals that the marine fish production in India, market-wise exports from India and craft-wise marine fish production in Tamil Nadu have been increasing at a compounded growth rate of 6.44 percent, 7.43 percent and 3.02 percent respectively. The trend coefficients are positive and significant at 5 percent level indicating a positive movement in the marine fish production in India, market-wise exports from India and craft-wise marine fish production in Tamil Nadu. The trend coefficient for marine fish production in India, market-wise exports from India and craft-wise marine fish production in Tamil Nadu is 0.032, 0.077 and 0.054. The analysis shows that trend in the marine fish production in India, market-wise exports from India and craft-wise marine fish production in Tamil Nadu are positive and significant and the growth is increasing at a compounded rate of 6.44 percent, 7.43 percent and 3.02 percent respectively. The value R^2 indicates that the 86 to 68 percent variations in dependent variable explained by time variable.

Keywords: Marine resources; Fishery sector; Employment; Export earnings; Mechanised vessels.

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Introduction

Fishing is an ancient human production activity of mankind. It has developed universally throughout the world through centuries till today.[1] Fishery sector is the only sector which offers cheap and good animal protein to people, particularly to the economically weaker sections of society and thereby it is in an advantageous position to ensure

national food security.[2] The nature, process and problems of fishery are quite different compared to that of other sectors.[3]

The fishery sector is important to Indian economy as it provides employment for 95 lakhs fishermen, an average annual per capita supply of 3.5 kg of animal protein food, and about 4 percent of the nation's total export earnings.[4] The actual annual average of marine fish production in India is 1.73 million tonnes.[5] Fishery sector contributes about 4 percent to the Nation's total export earnings.[6] The potential of average annual fish production is estimated to be 4.5 million tonnes.

The fishery sector has registered an impressive growth rate of over 60 percent in the last decade.[7] Fisheries were essentially the source of livelihood for different sections of fish workers.[8] The large scale exploitation of inshore fishery by mechanised vessels resulted in depletion of marine resources.[9]

There are fishing villages which are located among 13 maritime districts of Tamilnadu, namely, Chennai, Chengalpattu, Cuddalore, Nagapattinam, Mallipattinam, Pudukottai, Pathayr, Ramanathapuram, Rameswaram, Tuticorin, Mandabam, Colachel and Kanyakumari. The southern districts of Tamilnadu, Rarnanathapuram, Tirunelveli, Thoothukudi and Kanyakumari together contributed 64.2 percent of total catch.[10] The southern districts of Tamilnadu, Rarnanathapuram, Tirunelveli, Thoothukudi and Kanyakumari together contributed 64.2 percent of the total catch.[11] The study examines the trend and growth of trend and growth of marine fish production in India, market-wise exports from India and craft-wise marine fish production in Tamil Nadu.

Objectives

The objectives of the present study are:

1. To find out the contribution of the fisheries sector production in India from 2005 to 2015.
2. To study the marine products market-wise exports from India to different countries during 2000–01 to 2017–18 and
3. To assess the trend and growth of marine fish production in India, market-wise exports from India and craft-wise marine fish production in Tamil Nadu.

Materials and Methods

In order to analyze the trend and growth of marine fish production in India, market-wise exports from India and craft-wise marine fish production in Tamil Nadu over a period, percentage methods, co-efficient of variations, linear trend and compound growth rate have used. The secondary data collected through the internet, books, newspaper, journals records and brochures from 2005 to 2015.

Fish Production in India

India lies to the north of the equator and it is bounded in the south by the Indian Ocean, in the west by Arabian Sea and in the east by Bay of Bengal. India consists of 28 states and 7 union territories of which there are 9 maritime states and 4 maritime union territories. In 1951 total fish production was about 0.8 million tonnes. This has increased to 3.8 million tonnes in 1990–91 and exceeds 5.6 million tonnes in 2007–2008.

The contribution from marine sources was slightly more than 51 percent. About 10 percent of fish production is exported bringing in foreign exchange earnings of ₹8607.97 crores in 2008–2009 (FSI, 2009). The traditional structure of Indian fishing is evident in the type of tools of production used in fishing and their ownership pattern. At present nearly 67 percent of fishing crafts engaged in marine fishing in India consists of purely traditional crafts (non-motorized); 20 percent are mechanized vessels, and about 13 percent are motorized traditional boats.

Traditional crafts, including motorized ones, therefore, comprise 80 percent of total boat population in India. It is interesting to note that as early as 1972, India had a total boat population of 230,000 of which traditional fishing crafts (including motorized) constituted about 94 percent and the remaining 6 percent were mechanized boats. Within a span of 37 years, the number of mechanized boats has increased from about 13000 to 57000, an increase by 270 percent and the number of traditional crafts has fallen from about 217000 to 150000, a fall by 15 percent.

Table 1 shows the total contribution of the fisheries sector production in India from 2005 to 2015.

Table 1: Fish production in India

Year	Marine (in million tonnes)	Percentage to total	Inland (in million tonnes)	Percentage to total	Total
2005	2.9	43.94	3.7	56.06	6.7
2006	3.2	45.07	3.9	54.93	7.0

(Contd.)

Year	Marine (in million tonnes)	Percentage to total	Inland (in million tonnes)	Percentage to total	Total
2007	3.1	44.29	3.9	55.71	6.9
2008	3.4	42.50	4.6	57.50	7.9
2009	3.3	41.77	4.6	58.23	7.8
2010	3.1	38.75	4.9	61.25	7.9
2011	3.8	43.68	4.9	56.32	8.2
2012	3.9	41.05	5.6	58.95	8.9
2013	3.8	42.22	5.2	57.78	9.0
2014	3.6	37.11	6.1	62.89	9.6
2015	3.4	34.34	6.5	65.66	10.0

Source: Fisheries Statistics, 2012, FAO Handbook on Fisheries Statistics, 2016, GoI, 2012, and CMFRI, various annual reports.

Comparative total fish production of inland and marine capture in India is presented in Table 1. In India, the total marine fish production was 6.7 million tones in 2005 and from which it increased to 10 million tonnes in 2015. The declining trend the marine fish production in the years 2007 and 2009 is due to monsoon conditions. However, in 2015 the marine fish production reached a peak level of 10 million tonnes. On the other hand, the marine capture fish production showed an increasing trend for 2.9 million tonnes in 2005 to 3.4 million tonnes in 2015, and the inland capture fish production showed an increasing trend for 3.7 million tonnes in 2005 to 6.5 million tonnes in 2015. From Table 1, it could also see that production performance of inland capture of India's fish show a higher proportion than marine capture in all the years during the period 2005 to 2015. The proportion ranges from 56.06 percent during the year 2005 to 65.66 percent during the period 2015. The proportion of marine fish capture, which is 43.94 percent in 2005, had decreased to 34.34 percent during 2015 through the amount of production performance of marine capture showed a decreasing trend.

The average amount of fish production over a period and stability of performance of inland and marine fish capture in India during the period 2005 to 2015 presented in Table 2.

Table 2: Average level and stability of production of Inland and marine capture in India from 2005 to 2015

Particulars	Inland capture	Marine capture	Total fish production
Mean (X)	3.4091	4.9000	8.1727
Standard Deviation (S.D)	0.33001	0.90554	1.09735
Co-efficient of Variation (C.V)%	9.68	18.48	13.43

It inferred from Table 2 that production performance of marine fish capture, on an average over a period was found to be higher than the production performance of inland fish capture. The average amount over the period from 2005 to 2015 was 4.9000 million tonnes for marine fish capture and 3.4091 million tonnes for inland fish capture. The value of the coefficient of variation specifies that the production performance of inland fish capture was relatively stable over 11 years compared to production performance of marine fish capture. The marine products market-wise exports from India to different countries during 2000–01 to 2017–18 are exposed Table 3.

Table 3 brings the major fish export markets of India. USA, European Union, China, South East Asia and the Middle East are the dominant fish export market for India. It is seen that the European Union and China have shown a positive trend, while Japan has shown a negative trend.

Fisheries in Tamil Nadu

Tamil Nadu supplying different species of inland and marine fish ranks fifth among Indian states. The fish production in the marine sector is better than that of inland sector. Tamil Nadu has a long and glorious tradition of maritime activity. It is by natural that marine fishing has become one of the earliest and important occupations of the people of Tamil Nadu.

Tamil Nadu is endowed with a long coastal length extending from Chennai to Kanyakumari, with 359 landing centres located on the coastline of

Table 3: Market wise marine products exports to different countries

Market	Quantity/ Value	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18
Japan	Quantity in ton	68983	64905	54916	50020	57832	59785	67437	67373	57271	62690	70714	85800	76648	71484	78772	75393	69039	85651
	Value in Crore	2560.39	1820.69	1534.76	1163.69	1202.45	1155.97	1353.38	1227.59	1234.01	1289.58	1683.39	2140.67	1999.59	2463.83	3040.26	2610.74	2621.37	2846.3
	US$ Million	562.75	383.07	317.17	253.86	266.96	262.79	299.2	305.49	278.61	278.56	373	456.35	372.57	410.95	502.29	403.48	394.5	445.27
Usa	Quantity in ton	41747	49041	61703	53153	50045	55817	43758	36612	36877	33444	50095	68354	92447	110880	129667	153695	188617	247780
	Value in Crore	1164.4	1421.38	2051.12	1682.06	1556.09	1639.24	1347.8	1016.94	1021.55	1012.52	1990.26	2977.53	4026.48	7744.67	8830.12	8633.4	11482.16	14769.8
	US$ Million	255.93	299.05	424.51	365.84	345.52	372.62	297.08	253.05	227.29	213.52	438.49	637.53	747.45	1286.04	1458.24	1334.05	1731.81	2320.05
European Union	Quantity in ton	68827	82895	94541	96284	117742	136842	149773	149381	155161	164800	170963	154221	158357	174686	188031	186349	189833	190314
	Value in Crore	1025.34	1150.07	1388.47	1470.99	1819.28	2134.25	2760.32	2664.24	2854.07	3013.33	3459.4	3810.44	4176.42	6129.69	6715.58	6311.45	6892.19	7115.96
	US$ Million	225.37	241.97	287.84	319.95	405.4	484.02	610.95	663.18	635.34	637.4	765.15	805.38	777.41	1013.28	1106.67	970.77	1038.59	1116.74
China	Quantity in ton	182771	134767	170811	123738	124826	137076	203513	139792	147312	144290	159147	84515	87776	75783	59519	50042	45443	49701
	Value in Crore	827.42	597.23	762.48	676.46	693.25	849.45	1156.96	1009.59	1296.39	1790.89	1977.81	1259.23	1444.86	1766.72	1349	1432.25	1341.94	1448.03
	US$ Million	181.86	125.66	158.23	151.6	154.1	191.99	259.06	252.9	281.9	379.7	440.1	263.3	269.47	293.12	221.44	220.69	202.19	227.39
South East Asia	Quantity in ton	40748	52424	44097	50670	63842	60140	67650	63818	88953	149353	233964	343962	340944	380061	409931	328900	484819	616707
	Value in Crore	462.97	538.75	642.38	545.77	628.83	585.85	616.7	573.97	873.09	1479.55	2114.48	4193.27	4357.28	8046.59	8620.85	7499.16	11461.83	14250.3
	US$ Million	101.76	113.35	133.15	119.13	139.77	132.7	136.43	143.5	191.08	314.85	469.36	880.09	811.8	1320.95	1416.82	1152.86	1728.19	2237.07
Middle East	Quantity in ton	17236	19159	19668	14711	16624	22270	23585	25752	27177	34907	43983	38155	41419	58040	64608	5w3905	52973	62220
	Value in Crore	188.32	181.06	204.74	201.52	244.42	307.65	371.06	393.96	475.72	553.55	670.35	894.38	1113.34	1599.37	2020.86	1793.67	1830.58	1849.1
	US$ Million	41.39	38.1	42.4	43.92	54.7	69.64	82.47	98.05	105.2	117.05	148.31	186.85	209.26	272.65	333.1	276.46	275.93	290.46
Others	Quantity in ton	20161	21279	21561	23441	30418	40234	56924	58972	90083	88953	84225	87014	130623	112822	120716	97609	104224	124871
	Value in Crore	215.05	247.87	297.36	351.46	502.37	572.9	757.3	734.62	853.11	909.11	1005.77	1321.72	1738.29	2462.4	2864.93	2140.16	2240.83	2827.4
	US$ Million	47.26	52.15	61.6	76.46	112.03	130.44	167.75	182.93	189.22	191.77	222.5	278.94	323.71	410.71	472.56	329.62	406.4	444.57
Total	Quantity in ton	440473	424470	467297	412017	461329	512164	612641	541701	602835	678436	813091	862021	928215	983756	1051243	945892	1134948	1377244
	Value in Crore	6443.89	5957.05	6881.31	6091.95	6646.69	7245.3	8363.53	7620.92	8607.94	10048.5	12901.47	16597.2	18856.3	30213.26	33441.6	30420.8	37870.9	45106.9
	US$ Million	1416.32	1253.35	1424.9	1330.76	1478.48	1644.21	1852.93	1899.09	1908.63	2132.84	2856.92	3508.45	3511.67	5007.7	5511.12	4687.94	5777.61	7081.55

Source: www.mpeda.gov.in, 2018

eight marine districts alleged with a number of fish landing centre. There are 8 major fishing harbours in Tamil Nadu. Marine fishing is predominant in the districts of Ramanathapuram, Nagapattinam, Kanyakumar, Pudukottai and Caddalore.

Actual marine fish production is for below the potential production because of adoption of traditional fishing technique. Modernisation of crafts is a need of the hour. Having almost reached a plateau in fish catch from the coastal water, deep sea fishing is to be given needed fillip. Survey of new fishing grounds, increased efficiency of fishing crafts through mechanization, creation of adequate infrastructure facilities at landing centres, improved trawlers, adoption of intensive fish cultures and additional thrust to brackish water fish farming is indispensable for elevating the marine fish production in the state.

In Tamil Nadu mechanised crafts, motorised crafts and non-mechanised crafts are operated with various gears combination. In 2000, an increase of 218.58 percent in the mechanized craft is recorded. Mechanisation of fishery operations has resulted in enhanced production. Such an increase in fish landings improves productivity and generates an income; promote development of infrastructural facilities in several areas and above all supplies additional quantum of much protein rich fish for the growing population.

Mechanisation of fishing crafts is progressively on the increase in Tamil Nadu. Marine fish landings when worked out per boat show that mechanization had contributed to a much of higher level of efficiency than the traditional methods adopted. Fish catch by mechanized units is heavier than non-mechanised units in respect of Chennai, Pudukottai, Ramanathapuram, Tuticorin and Tirunelveli districts. In order to improve fishing production, besides speeding up mechanization offshore and deep sea exploitation should be encouraged by providing adequate cold storage and marketing facilities throughout the year.

The craft-wise marine fish production in Tamil Nadu for the year 2009–2010 is portrayed in Table 4. Portrays the craft-wise marine fish production in Tamil Nadu for the year 2009-2010. The total marine fish production during the year is 401566 tonnes. Among the districts of Tamil Nadu, Ramanathapuram District occupied the first place in marine fish production with 72281.88 tonnes. In non-mechanised also, Ramanathapuram District marked a high level of 14709.36 tonnes. In Tamil Nadu, mechanised fish production was more than non-mechanised and other types of crafts.

Table 4: Craft wise marine fish production by districts of Tamil Nadu

S. No.	District	Marine Fish (Quantity in Tonnes)								
		Mechanised	Percentage to total	Non-mechanised	Percentage to total	Motorized	Percentage to total	Shore Seine	Percentage to total	Total
1.	Chennai	17452.70	71.01	6374.06	28.99	7125.79	95.07	369.60	4.93	31322.15
2.	Tiruvallur	4475.05	71.01	1634.37	28.99	1827.13	95.07	94.77	4.93	8031.32
3.	Kancheepuram	11187.63	71.01	4085.93	28.99	4567.81	95.07	236.92	4.93	20078.30
4.	Villupuram	7831.34	71.01	2860.15	28.99	3197.47	95.07	165.85	4.93	14054.81
5.	Cuddalore	12306.39	71.01	4494.53	28.99	5024.59	95.07	260.82	4.93	22086.13
6.	Nagapattinam	50344.33	73.25	18386.70	26.75	20555.16	95.07	1066.16	4.93	90352.35
7.	Thiruvarur									
8.	Thanjavur									
9.	Pudukkottai	20585.24	71.01	7518.12	28.99	8404.78	95.07	435.94	4.93	36944.07
10.	Ramanathapuram	40275.46	71.01	14709.36	28.99	16444.13	95.07	852.93	4.93	72281.88
11.	Thoothukudi	31325.26	71.01	11440.62	28.99	12789.88	95.07	663.39	4.93	56219.24
12.	Tirunelveli	4475.05	71.01	1634.37	28.99	1827.13	95.07	94.77	4.93	8031.32
13.	Kanyakumari	23494.02	71.01	8580.46	28.99	9592.41	95.07	497.54	4.93	42164.43

Source: Commissioner of Fisheries, Chennai – 6

The result of the analysis showing trend and growth of marine fish production in India, market-wise exports from India and craft-wise marine fish production in Tamil Nadu presented in Table 5.

Table 5 reveals that the marine fish production in India, market-wise exports from India and craft-wise marine fish production in Tamil Nadu have been increasing at a compounded growth rate of 6.44 percent, 7.43 percent and 3.02 percent respectively. The trend coefficients are positive and significant at 5 percent level indicating a positive movement in the marine fish production in India, market-wise exports from India and craft-wise marine fish production in Tamil Nadu. The trend coefficient for marine fish production in India, market-wise exports from India and craft-wise marine fish production in Tamil Nadu is 0.032, 0.077 and 0.054.

Table 5: Trend and growth of marine fish production in India, market-wise exports from India and craft-wise marine fish production in Tamil Nadu

Trend Equation: Log $w = a + bt$

Particulars	Trend Coefficients		R^2	CGR (percentage)
	a	*b*		
Marine fish production in India	24.17	0.032*	0.72	6.44
		(13.73)		
Market-wise exports from India	25.52	0.077*	0.86	7.43
		(19.22)		
Craft-wise marine fish production in Tamil Nadu	21.11	0.054*	0.68	3.02
		(11.03)		

*Significant at 5 percent level.
Note: CGR = Compound Growth Rate
Figures in parentheses indicate *t*-values.

The analysis shows that trend in the marine fish production in India, market-wise exports from India and craft-wise marine fish production in Tamil Nadu are positive and significant and the growth is increasing at a compounded rate of 6.44 percent, 7.43 percent and 3.02 percent respectively. The value R^2 indicates that the 86 to 68 percent variations in dependent variable explained by time variable.

Conclusion

The present study focuses on amplification the keenness of seafood trade of India and its competence and relative advantage in Indian market. These results have clearly shown that India does have relative benefit in exporting fish and fish products. It is optimistic sign for fisheries as rising business and highlighted for the additional growth and study in order to make fisheries more profitable and modest in international market.

However till the production of Fisheries in India is very less compared to other countries in the world. Hence, the proper attention and care has to be taken by the government, Fisher Folks, Tourists, People residing near coastal area to take a pledge against usage of plastics, petrol, oil based boats for fishing, using chemicals for faster growth of fish, following the restrictions made by the government.

Government has to take necessary steps to solve the problems between the countries to protect the fishermen and to have a cordial relationship between other countries. By following these production of fisheries can be increased. It will automatically increase the production of fishes in the coastal areas rather than the fish growing centres.

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