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RESEARCH ARTICLE

AN ECONOMIC ANALYSIS OF THE PERFORMANCE OF MARINE FISH PRODUCTION IN INDIA AND TAMIL NADU

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ABSTRACT

Marine fisheries in India is accorded priority in the planned development process due to its significant contribution to the economy for generating income in the most backward regions and creating employment to the people who are in the lowest rungs of the social ladder besides providing foreign exchange earnings and ensuring food and nutritional security. Tamil Nadu is one of the important coastal states in the east coast which has the highest fishing population in India. With this background the study was carried out with the objective of examining the performance of marine fish production in India and Tamil Nadu and to find out the annual growth rate. The study was based on secondary data taking twenty one years of marine fish production in India and Tamil Nadu. Ordinary Least Square Method and AGR were applied for analysis.

INTRODUCTION

Fisheries are one of the oldest traditional industries of the world. Fishing equipment's and methods improved through the centuries, mechanization came to fishing in the 20th century. The use of mechanical propulsion for fishing boats was the first major technological development. The period since the end of the World War II had been the time of unprecedented changes in marine fisheries. In the earliest times, most of the food stuff was used at once. But as population increased, food needs also increased and hence the new techniques such as drying, smoking and salting were developed for preserving fishes. Individual fishing was replaced by collective efforts involving large and more effective gears. According to the FAO survey, the number of people involved in fishing and fish farming has tripled since 1970. Recent estimates (World Bank, 2008) suggest that the difference between potential and actual net economic benefits could be as high as US$50 billion annually. At a global level, this situation warrants better governance, stronger policy legal frame work and more effective management system leading to increasing productivity, reducing over capacity of fishing efforts and enhancing the real value of landed fish.

World Marine Fisheries

World marine resources include Atlantic Ocean, Pacific Ocean, Indian Ocean, Southern ocean and Arctic Ocean. The total coastal line distance of the world is 586153 kilometers, of which Africa has 37,908 kilometers, Asia 163,609 kilometers, Oceania 52,488 kilometers, North and Central America 183,950 kilometers, South America 30,663 kilometers, Europe 69,43 kilometers and former USSR has 47,842 kilometers. In the world coastal line, India accounts for only 0.17 per cent (FAO, 2008).

Fisheries in India

In India, agriculture is the largest sector of economic activity. It provides not only food and raw materials but also employment to a very large population. Among the agriculture resources, Fisheries occupies an important role in the Indian economy specially in the way of earning foreign exchange. The fishing sector has a place of pride in the national economy. The significance of this sector is two dimensional i.e. employment potential and export potential. India has a coastline of about 8118 kilometers, with an Exclusive Economic Zone (EEZ) of 2.02 million square kilometers, comprising 0.86 million square kilometers to the west coast, 0.56 million square kilometers on the east coast, 0.60 million square kilometers around the Andaman and Nicobar Islands (http://www.un.org/depts). There are 3322 fishing villages. Under the law of the sea, an EEZ is a sea zone over which a state has special rights over the exploration and use of marine resources, including production of energy from water and wind. It stretches from the seaward edge of the state's territorial sea out to 200 nautical miles from its coast. In casual usage, the term may include the territorial sea and even the continental shelf beyond the 200-mile limit. There is a need for rationalisation of restricted zones along coast for fisheries and aquaculture. India is the third largest producer of fish,

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preceded by China and Peru. India is the Second largest producer of fresh water fish preceded by China, 7th largest producer of capture fish in the world and harbor a large percentage of the world's fishermen (FAO Statistics, 2008; Bavinck, *et al.,* 2008). Indian fishing sector has contributed 1.07 per cent to the country's GDP and 5.84 per cent to the agricultural GDP (MoA., 2008). The estimated fishery resources, both inland and marine are capable of yielding 10 million tonnes of fish per year (NIS, 2009). Development of fisheries, considering the available extent of resources, can play a significant role in increasing fish production and thereby the national income.

Table 1. Ocean fisheries statistics

Region	Area Million Km^2	%	Volume Million cu km	Percent	Mean Depth km	Max Depth km	Coastline km	Fish Capture million tonnes	%
Pacific Ocean	155.6	46.4	679.6	49.6	4.37	10.924	135663	84.234	71.0
Atlantic Ocean	76.8	22.9	313.4	22.5	4.08	8.605	111866	24.045	20.3
Indian Ocean	68.6	20.4	269.3	19.6	3.93	7.258	66526	10.197	8.6
Southern Ocean	20.3	6.1	91.5	6.7	4.51	7.235	17968	0.147	0.1
Arctic Ocean	14.1	4.2	17.0	1.2	1.21	4.665	45389	-	-

Source: Ocean Fisheries Statistics, 2009

Table 2. Fishing crafts operating in the coastal state and union territories

Sl. No.	State / Union Territory	Non-Mechanized	Motorized crafts	Mechanized boats	Total
1	Andhra Pradesh	53,853	4,164	8,642	66,659
2	Goa	1,094	1,100	1,092	3,286
3	Gujarat	9,222	5,391	11,372	25,985
4	Karnataka	19,292	3,452	2,866	25,610
5	Kerala	28,456	17,352	4,206	50,014
6	Maharashtra	10,256	286	8,899	19,441
7	Orissa	10,993	26,490	1,276	38,759
8	Tamil Nadu	33,945	8,592	9,896	52,433
9	West Bengal	4,650	270	3,362	8,282
10	Andaman and Nicobar	1,180	160	230	1,570
11	Daman and Du	252	350	805	1,407
12	Lakshadweep	894	306	478	1,678
13	Pondicherry	7,297	505	560	8,362
	Total	181,234	44,578	53,684	279,496

(Source: Handbook on Fisheries Statistics, 2010).

As seen by the number of traditional craft and small-mechanized vessels, the major fishing activities are still concentrated in the areas within 0 to 70-80 meter depth zone. As compared to the west coast, concentration of traditional craft (including motorized) is more on the east coast (57 per cent of the total). In the case of mechanized vessels, the trend is reverse. The scale of mechanization is also reflected in the total fish landings of the two coasts. At the national level, the mechanized sector contributes 67 per cent of the landing. In 1969 it was a mere 20 per cent. Motorized sector contributes 25 per cent and the balance 8 to 10 per cent is contributed by the traditional crafts. With the advent of mechanization, use of traditional harvesting gear like bag net, cast net, small meshed gill net has declined and more efficient gear like purse seines have become popular.

Marine Fisheries in Tamil Nadu

Tamil Nadu is having a coastline of about 1076 kms. It has 13 coastal districts and 591 fishing villages with a total marine fishermen population of about 8.61 lakhs, of which 2.60 lakh fishermen are actively engaged in fishing. The marine fishery resources comprise of 1.9 lakh sq.km of Exclusive Economic Zone (EEZ) and a continental shelf of about 41,412sq.kms (Balaji, 2000). Tamil Nadu is one of the important coastal states in the east coast, pioneering and implementing many development and welfare scheme. The Planning and the public policy on fishery have tremendously improved this sector in the State. Input supply programme, creation of infrastructure and fishery policies in the plans have contributed well in the marine fishery development of the State. Technology, marketing and export potential of marine fish resources have significantly added to the progress of this sector.

Objectives of the Study

- To examine the performance of Marine Fish Production in India and Tamil Nadu
- To find out the Annual Growth Rate and the Trend value of Marine Fish Production in India and Tamil Nadu.

Literature Studies

Dipakar Naik (2001) made a study on trends in marine fish landings and marine fish marketing in different maritime districts of Orissa during 1996 to 1999. He has given his findings that marine fish production in Orissa has been increased from 38.70 thousand tonnes in 1980-81 to 133.46 thousand tonnes in 1996-97 and it declined to 121.08 thousand tonnes in 2000-01. On an average the State has recorded a growth rate of 8.86 per cent for marine fish production during last one and half decades. Marine fish marketing in Orissa has been carried out by a large number of intermediaries forming a long chain of market channels. In short, five or less number of intermediaries forming the market channel for the marine fish in Orissa. In the existing marketing system the fishermans share have been decreased to the extent of 22.20 per cent from 26.76 per cent with the increase in middlemen from one to five in the market channel. Shiyani (2002) has made an analysis on district-wise and species-wise growth and instability of marine fisheries in Gujarat. It has been concluded from the study that relative share of Junagadh, Kutch and Jamnagar districts in the total marine fish production of the state increased substantially

over a period of time, whereas a drastic decline in the case of Valsad and Amreli districts was noticed. The instability indices were comparatively higher during 1970-80 in all the districts except Kutch, Amreli and Jamnagar. The compound growth rates of fish production of almost all the species were positive and significant. It has been suggested that awareness campaign among the fishermen on the importance of mesh size regulation would be useful for the sustainable benefit of marine fisheries in the long run. The Government should take necessary steps to enforce sea law demarcating different fishing grounds for different craft gear combination which will help maintaining socio-economic balance instead of creating socio-economic conflicts among the fishermen. Mini and Srinath (2003) have made an appraisal about the trawl fishery of Tamil Nadu for the period from 1985 to 2000. In this article, the trends of fish production in Tamil Nadu and catch composition have been analyzed. It has been estimated that the annual average of marine fish production during 1985 - 2000 was 3.51 lakh tonnes representing 15.8 per cent of total all India landings. The fish landings showed increasing trend during the year 1985 to 1992, and decreasing trend in 1993, recovered in 1997 and again decreasing trend in 2000. It has been found that the reason for the fluctuations was the increased number of trawlers and extension of the fishing ground for upward trend. The reason for the downward was the over exploitation. In the analysis of catch composition, it was concluded that Silverbellies was the most abundant constituent (23.2 per cent) followed by Cluepids (14.2 per cent), Penaeid prawns (10.5 per cent), Croakers (4.8 per cent), Carangids (4.3 per cent), Rays (3.9 per cent), Thread-fin-breams (3.9 per cent), Cephalopods (3.8 per cent), other perches (3.3 per cent), Goat fishes (3.1 per cent), Crabs (2.8 per cent), Lizard fishes (2.6 per cent), Ribbon fishes (1.1 per cent) and Pigface breams (1.0 per cent).

Narayankumar, *et al.,* (2005) had pointed out that the trainees had shown interest and there was improvement in understanding the importance of hygiene in post-harvest fishery operation. They have also understood the importance of value addition and hygienic handling of fish in increasing the value or income from their existing catch. In this situation, the study indicated that appropriate awareness campaigns emphasising the importance of cleanliness and hygiene may be organised with the help of the local NGO's who are working closely with the fishers. Hence, they can take up suitable processing and handling methods to improve their income and their standard of living in the days to come. Aswathy *et al.* (2010) has made a study in Kerala state to analyse the bio-economic conditions of commercially exploited marine fishes for assessing their sustainability in the context of existing management practices. A comparative analysis of the compound annual growth rate during the periods 1985-1996 and 1997-2006 showed that most of the marine fish species had positive growth during 1985-1996, whereas the growth rate was negative for most of the resources during the same period. According to them, even with the regulatory measures of the ban period, the current fishing efforts is above the economically sustainable level and the effort is very near to the open access equilibrium level. They have stressed that there is an urgent need for capture fisheries management in the state through community based fishery management practices.

MATERIALS AND METHODS

The present study was analyzed from the sources of secondary data. The data were collected from Ministry of Agriculture, Hand Book on Fisheries Statistics, Tamil Nadu Fisheries Dept. Policy Notes, Central Statistics organization, Govt. of India. The data was analyzed for a period of twenty one years from 1990- 91 to 2010-11. The data collected were tabulated and analyzed for the purpose of giving precise information. The trend value was calculated with the help of Ordinary Least Square Method (OLS) and Annual Growth Rate (AGR).

RESULTS AND DISSCUSSION

While examining the phases in marine fisheries development in India, we can note three different phases (Srinath, 2003). The first phase depicts that the landings were predominantly by the non-mechanized indigenous crafts and gears until 1966. In this period the maximum landings were only 9 lakh tonnes. The second phase from 1966-1985 shows the use of improved gear materials. The motorization of country crafts was initiated during this period. The total landings were 16 lakh tonnes which led to expansion in exports. The third phase from 1985 till 2008 shows rapid expansion in the fish landings of nearly 30 lakh tonnes. This was due to the intensification of mechanized fishing and the increased growth in the motorization of boats. This phase was much improved with the efficiency of multi-day fishing which helped in the expansion of fish landings.

A comparative observation of total marine fish production in Tamil Nadu and India is presented in Table 3. In Tamil Nadu, the total marine fish production was 2.88 lakh tonnes in 1990-91and there is a gradual increase till 2003-2004 with 3.81 lakh tonnes. But in the year 2004-2005 the total marine fish production declined to 3.07 lakh tonnes. The declining trend in 2004-05 in the marine fish production was due to the occurrence of tsunami which totally disturbed the fish production. The marine fish production reached 4.04 lakh tonnes in 2010-2011(CMFRI, 2011). Compared with Tamil Nadu, the total marine fish production in India for the year 1990-1991 is 23.0 lakh tonnes. There seems to be fluctuations in marine fish production in India and in the year 2004-2005, India also witnessed a decline with 27.78 lakh tonnes, while it was 29.4 lakh tonnes in the previous year. The projected value(Y=2776.429 + 17.53203 X) for Fish production in India at 2020 is estimated to be 3109.54 tonnes. The fruitfulness of this production status can be purely enjoyed by the fishing community only if it fetches a good price to them. The production trend can be further increased by adopting proper strategies such as proper breeding season, help in growth of coral reefs to increase fish production. The annual growth rate (AGR %) for India is produced in table.3. in column 3. The percentage of AGR is higher for the year 1996-97 with 9.50 per cent, which is followed by 7.39 per cent for the year 2006-07 and 6.39 per cent for the year 1991-92. The AGR percent is very low for the year 2009-10 with -10.43 per cent, which is followed by -8.60 per cent for the year 1998-99 and -5.53 per cent for the year 2004-05. The projected value (Y=356.6280952 + 4.976078 X) for Fish production in Tamil Nadu for the year 2020 is estimated to be 451.1735 tonnes. The Annual Growth rate (AGR) in percentage for Tamilnadu

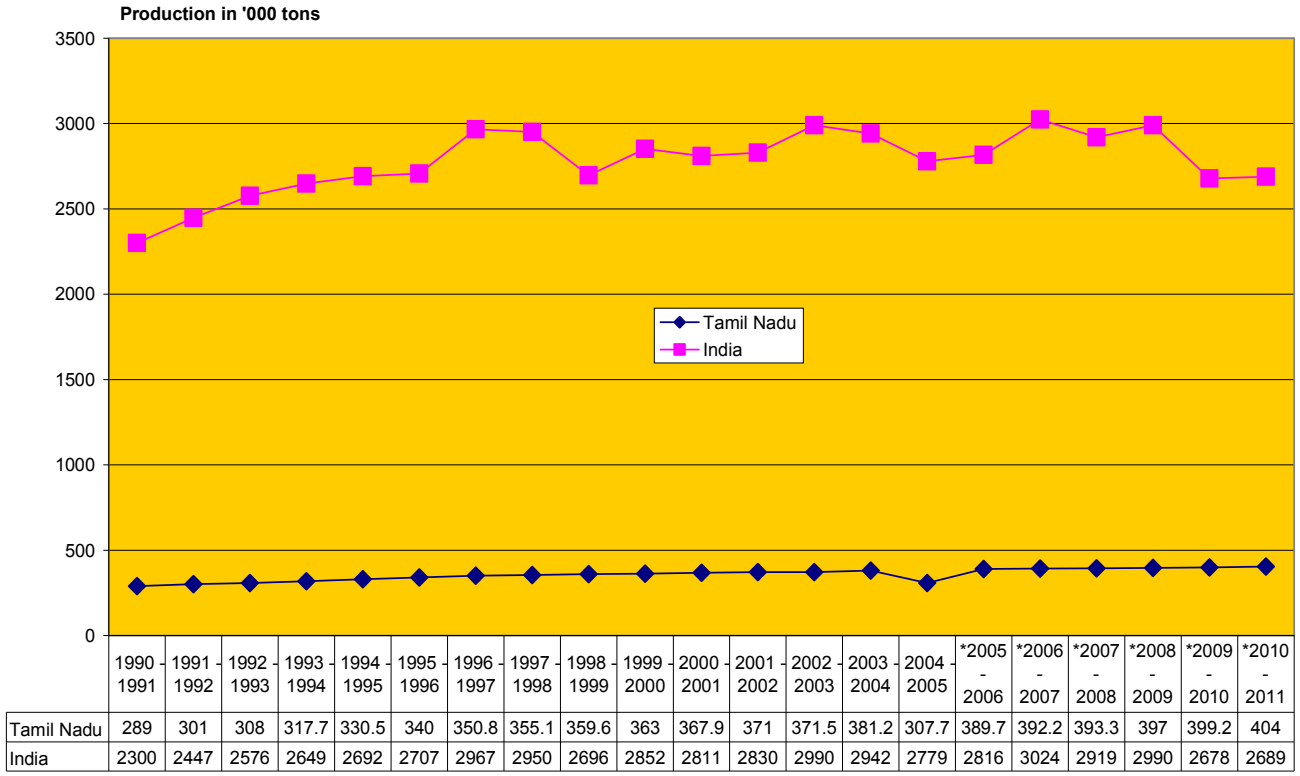
Table 3. Total marine fish production and average growth rate of marine fish production in India and Tamil Nadu

(IN '000 TONNES)

Year	Fish Production in India	AGR % In India*	Fish Production In Tamil Nadu	AGR % Tamil Nadu*
1990-1991	2300.21	-	288.95	
1991-1992	2447.25	6.39246	301.00	4.170272
1992-1993	2576.25	5.271223	308.00	2.325581
1993-1994	2648.84	2.817661	317.72	3.155844
1994-1995	2691.81	1.62222	330.50	4.02241
1995-1996	2707.06	0.566533	340.00	2.874433
1996-1997	2966.81	9.59528	350.79	3.173529
1997-1998	2950.46	-0.5511	355.10	1.228655
1998-1999	2696.46	-8.60883	359.55	1.253168
1999-2000	2852.05	5.770158	363.00	0.959533
2000-2001	2810.5	-1.45685	367.86	1.338843
2001-2002	2829.77	0.685643	371	0.853586
2002-2003	2989.85	5.656997	371.5	0.134771
2003-2004	2941.5	-1.61714	381.15	2.597577
2004-2005	2778.87	-5.52881	307.69	-19.2733
2005-2006	2816.05	1.337954	389.71	26.6567
2006-2007	3024.16	7.390139	392.19	0.636371
2007-2008	2919.49	-3.46113	393.27	0.275377
2008-2009	2990.15	2.420286	397	0.948458
2009-2010	2678.35	-10.4276	399.21	0.556675
2010-2011	2689.12	0.402113	404	1.19987
Total	31467.81		4174.58	

Source: Ministry of Agriculture, Hand Book on Fisheries Statistics, 2006. Tamil Nadu Fisheries Dept. Policy Notes, 2006-07 to 2011-2012 Central Statistics organization, 2007 and Govt. of India, 2010. * Manipulated by the Investigator (Column 3,4)

(IN '000 TONNES)



	1990-1991	1991-1992	1992-1993	1993-1994	1994-1995	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	*2005-2006	*2006-2007	*2007-2008	*2008-2009	*2009-2010	*2010-2011
Tamil Nadu	289	301	308	317.7	330.5	340	350.8	355.1	359.6	363	367.9	371	371.5	381.2	307.7	389.7	392.2	393.3	397	399.2	404
India	2300	2447	2576	2649	2692	2707	2967	2950	2696	2852	2811	2830	2990	2942	2779	2816	3024	2919	2990	2678	2689

Total fish production in Tamil Nadu and India (1990-2011)

is shown in Table 3 of the column 5. The growth rate is very high with 26.66 per cent for the year 2005-06, which is followed by 4.17 per cent for the year 1990-91 and 4.02 per cent for the year 1994-95. Only one year 2004-05 shows negative growth rate of 19.27 per cent. The low production level was due to the occurrence of Tsunami, Which totally disturbed the fish production.

Conclusion

The production performance is appreciable in both Tamil Nadu and India, except for few years. While having a comparative view it is found that the production level of Tamil Nadu is higher than India. In spite of its various complexities and intrinsic sectoral conflicts marine fisheries has come to an

industrial footing and requires rigorous research on all economic aspects for management of sustainable resource utilization enabling to face new challenges of globalization.

Suggestions

1. Allocating specific sea areas for the non mechanised boats by strictly banning motorised and mechanised boats from entry could improve the fish cultivation.
2. The gear (Karai Valai) applied in mechanized boats should be replaced, so that the scarce resources and species lying at the bottom of the sea will not be ruined. The rules and regulation in the use of common properties should be clear to avoid environmental degradation.
3. It is risky business both in terms of life and for boat for the fishing community. So insurance facilities may be provided to them and its awareness must be invoked.

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