

## Production of Marine Fishing in Nagapattinam District of Tamilnadu

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**Abstract:** Fisheries is one of the important food production sectors in India contributing to the livelihood as well as the food security of a large section of the economically under-privileged population. In recent years, it has assumed greater significance and its contribution towards State and National economy, livelihood and nutritional security, rural employment generation and foreign exchange earnings have been enormous. Therefore, the present study aims to analyze the production of marine fisheries in the Nagapattinam district of Tamilnadu. The study analyzed the various aspects of production of marine fisheries in the study area. The analysis revealed that average number of trips, average operating cost, average production of fish, average value of sales, average profit and the major problems of the different boat operators.

**Keywords:** Marine Fisheries, Marine Fisheries in Nagapattinam district of Tamilnadu

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### I. Introduction

Marine fisheries have innate significance in providing food security, income generation and livelihood for the fishers of the coastal districts of India. The Indian fisheries sector contributes about 1.1 per cent of total GDP and 5.3 per cent of agricultural GDP. Tamil Nadu has the coastal length of 1076 km consisting of 13 coastal districts and 591 marine fishing villages. On an average, Tamil Nadu's marine fish production is about 10 to 12 per cent of that of India's production. It is seen that the marine fish production has increased tremendously over the decades, with the modernization of fishing crafts and technology, thereby resulting in the fluctuation of the same, thus rendering intense debate on growth and instability. It also has implication on food supply and macroeconomic stability. Hence, fisheries growth and a sustained stability of fish production have gained its due importance. Instability in fish production also affects the price stability and consumer purchasing power. The growth and instability of marine fish production have been studied intentionally to know the performance of the marine fish production of Tamil Nadu<sup>1</sup>.

The marine fishery is the economic backbone of this coastal District. Having a long coastal area, This District plays a major role in marine commodities. The marine ecosystem provides mankind with food, medicines, industrial products and pleasure. This ecosystem has to be maintained in a healthy state, if it is to provide people the benefits in a sustained manner. Natural, healthy ecosystems have evolved over millions of years, resulting in complex interactions with the environment and all the species living in them. Such interactions allow the optimal utilization of the ecosystem resources by a maximum number of species that includes the human beings. The waters along the Bay of Bengal coast of India are biologically very productive and possess several unique environmental features. However, little is known about the marine biodiversity resources along the Bay of Bengal coast in Nagapattinam District, Tamilnadu State.

In near-shore areas, the mixing of nutrient rich bottom waters and warm surface waters creates conditions similar to up-welling and the number and intensity of cyclones in the Bay of Bengal are likely to increase due to global warming. The input of freshwater and silt impacts the salinity of the coastal and estuarine waters as well as coastal circulation patterns. Some coastal areas serving as nursery grounds for commercially valuable species of prawns are polluted. The areas of critical biological diversity are the mangrove rich habitat along the coast of Nagapattinam District. A Catamaran is a light watercraft.

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1 Radhakrishnan Kalidoss (2016) " Marine fisheries growth, performance and institutional arrangements in Tamil Nadu" International Journal of Fisheries and Aquatic Studies 2016; 4(5): 342-346

The catamaran was the invention of the paravas, an aristocratic fishing community in the southern coast of Tamilnadu State, south India. Building a catamaran is a community affair in small fishing villages and it is a decentralized labor-absorbing activity. This also helps distressed people be occupied in creative ways. The traditional coastal-fishing is considered a Globally Important Agricultural Heritage System.<sup>2</sup>

## II. Review of Literature

Review of literature is an important aspect of any research. It helps us to trace out the past trends in any particular branch of the subject. Review of literature helps us to identify the areas of research. There have been a lot of studies conducted in the various fields of fisheries both at the national and international level. Some of the previous related research studies have been reviewed in the succeeding pages.

Ganesh Kumar, et al (2008)<sup>3</sup> conducted a study in all the major coastal states and some selected inland states to understand the domestic marketing of fish in India. The total marketing costs of auctioneer, wholesaler, retailer, vendor, marine fishermen cooperative society and contractor/freshwater fishermen cooperative society have been found to be Re 0.98, Rs 8.89, Rs 6.61, Rs 4.50, Rs 6.00 and Rs 3.51, respectively. The marketing efficiencies for Indian major carps (IMC), sardine and seer fish have been found to vary from 34 per cent to 74 per cent, depending on the length of market channel. The marketing efficiency has been found more in the case of marine species than freshwater species, since the latter travel longer distances from the point of production to consumption centre, passing many intermediaries as compared to the former. The fisherman's share in the consumer's rupee has shown variations across species, marketing channels and markets. The infrastructure facilities at most of the surveyed landing centres, fishing harbours and wholesale and retail markets have been found grossly inadequate and poorly maintained. The study has highlighted the need for formulating a uniform market policy for fishes for easy operation and regulation so that the country's fish production is efficiently managed and delivered to the consuming population, ensuring at the same time remunerative prices to the fishers.

Lavanya Ravikanth Anneboina and K. S. Kavi Kumar (2016)<sup>4</sup> found that mangroves contribute significantly to the enhancement of fish production in the coastal states of India. Further, the paper also analyses the contribution of mangroves to commercial marine fisheries output in India and the same is estimated to be in the range of 23 – 34 per cent, which in economic terms is valued between Rs. 1.46 – 2.15 lakhs per hectare in 2012-13 prices. The relative contribution of mangroves to total fish catch estimated in the Indian context is comparable to that estimated in other countries.

Lavanya Ravikanth Anneboina, et al (2017)<sup>5</sup> their results based on econometric analysis indicate that i) mangroves contribute significantly to the enhancement of fish production in the coastal states of India, and ii) the marginal effect of mangroves on total marine fish output is 1.86 tonnes per hectare per year, which translates into a percentage contribution of mangroves to commercial.

Chand and Nityananda Das (2002)<sup>6</sup> have given an account of basic requirements for an organized Fish Market. They have specified the essential infrastructure facilities needed for an organized market. It has been suggested that to make the entire fish marketing system successful, apart from having an organized fish market, right marketing strategies are essential. For this, the identification of consumers' needs and nature of demand for products and services is necessary.

Kanaga, et al (2018)<sup>7</sup> carried out a study in the coastal villages of Tirunelveli district, Tamil Nadu. Data were collected from the policy implementer i.e., administrator, stake holders i.e., fishermen and the policy makers i.e. administrator and policy makers concerned based on their perception of effectiveness of fisheries policies on marine resources management. Information on eleven marine fisheries regulations policies for sustainable marine fishery resources management were considered and analyzed in this study. The result revealed that among the eleven bans on catching the endangered and threatened species, prohibiting the use of

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<sup>2</sup> <https://www.nagapattinam.nic.in/departments-3/fisheries-department/>

<sup>3</sup> B. Ganesh Kumar, K.K. Dattaa, P.K. Joshia, P.K. Katihab, R. Sureshc, T. Ravisankard , K. Ravindranathe and Muktha Menona (2008) " Domestic Fish Marketing in India – Changing Structure, Conduct, Performance and Policies", Agricultural Economics Research Review Vol. 21 (Conference Number) 2008 pp 345-354.

<sup>4</sup> Lavanya Ravikanth Anneboina And K. S. Kavi Kumar (2016) "Contribution Of Mangroves To Marine Fisheries In India", Working Paper 145/2016 April 2016 Madras School Of Economics.

<sup>5</sup> Lavanya Ravikanth Anneboina and K.S Kavi Kumar (2017) " Economic analysis of mangrove and marine fishery linkages in India" Ecosystem Services, Vol.24, pp.114-123.

<sup>6</sup> Chand, B.K. and Nityananda Das, (2002), Basic requirements of an organised fish market, Fishing Chimes, Vol.22, No.3, pp.53-54.

<sup>7</sup> Kanaga V., Rajakumar M., Sujathkumar N.V., Jawahar P. 4, Senthiladeban R. And Brita Nicy A (2018) " Endearing Marine Fisheries Regulations–A Study In Tirunelveli District At Gulf Of Mannar, Tamil Nadu", International Journal Of Agriculture Sciences, Volume 10, Issue 5, pp. 5311- 5314.

fishing gear with a mesh size of 10mm (knot to knot), declaration of marine national park and biosphere reserve and prohibition to operate pair trawling and purse seining in the sea are more effective to maintain the resources at sustainable level in Gulf of Mannar coast.

Rajasenan, et al (2012)<sup>8</sup> examined the commodity chain trap of marine fishery in Kerala, at both material and value terms, and its ramifications in the globalised fishery chains. The marketing chains, both material and value, are very complex in nature since they involve many types of markets and large number of intermediaries and participants. The study also scrutinizes the sensitivity of consumers' and country's responses in terms of dietary and hygienic standards relating to seafood trade.

Farejiya, et al (2017)<sup>9</sup> pointed out that the fish production in India from inland and marine ecosystems is estimated at 10.07 million tonnes. The percentage contribution of marine fish production has shown a declining trend from 44.08% (2005) to 34.66% (2015) whereas, the inland fish production indicated the increasing trend from 55.92% (2005) to 65.34% (2015). The Compound Growth Rate (CGR), Coppock's instability of marine fish production in coastal states have been analyzed in the present study. The states of Karnataka and Andhra Pradesh have shown high growth and high instability, while the state of Kerala indicated slowly down growth and medium range of instability. The states of West Bengal, Maharashtra and Odisha are showing low growth and low instability, whereas, the state of Gujarat and Goa are at medium range of growth and instability. Tamil Nadu state is at the low growth and high instability. Predicted trends of marine fish production have also been analyzed based on the data for the period 2005 to 2015.

### **III. Statement of the Problem**

Among the minor fishing harbours in Tamil Nadu, fisheries in the Nagapattinam fisheries are of considerable economic significance to the district. Besides providing direct employment, it is also an important income generator for the district. The main occupation of Nagapattinam is fishing in the waters of the Bay of Bengal and selling the catch in the fish market. There are a large number of the ice factories for preserving the fish. Thus, Nagapattinam coastal area is known to have rich resources of pelagic, demersal, crustacean and molluscan fisheries. At this backdrop, the study of production of marine fish in the Nagapattinam district is quite important for formulating sound policies for the future. Therefore, the study is lead by answering the research questions as how the fish production activities are carried out? what are the various problems faced by the fisherfolks in the marine fishing in the Nagapattinam district. Hence, the present study aims to analyze the production of marine fisheries in the Nagapattinam district of Tamilnadu.

### **IV. Research Methodology**

The study analyzes the production of marine fishing industries in Nagapattinam district of Tamilnadu. Survey method has been used to fulfill the objectives of the research. The study builds upon the primary data. Four out of 46 marine fishing landing centres of the district are selected for field survey. Since most of the fishermen and middle man are illiterate, questionnaire-based interviews were conducted. Prior to the preparation of the questionnaire, several informal discussions were conducted with individuals and groups from the selected landing centres, based on this final questionnaire were prepared to analyze the production of marine fishing in the study area. In the study, a total sample of 200 respondents, from boat operators (50 from each landing centres, namely Akkaraipettai, Pazhayar, Poompuhar, Arcottuthurai) was selected on the basis of convenience sampling method to analyze the production of marine fish.

### **Fish Production in Nagapattinam District**

The fish production in the Nagapattinam District is analyzed in the succeeding pages.

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8 D Rajasenan and Rajeev B, "Fishery Commodity Chain Trap vis-à-vis Global Quality Standards: An Analysis of the Kerala Marine Fishery" *Developing Country Studies* www.iiste.org (Online) Vol 2, No.5, 2012.

9 Farejiya M. K., Dixit A. K, Raut. B. M, Ashish Kumar, Vinod Kumar. M, Rama Rao. K, Kiran S. (2017) " Distribution, Growth, Instability and Trend Analysis of Marine Fish Production in the Coastal States of India" , *International Journal of Current Trends in Science and Technology*, Vol.7, No.9, 2017.

### Experience in Fish Production

The experience of the fish producers is one of the vital factors for developing their fishing operations. Through experience, they can decide the area of fishing, time of fishing and maintain the productivity of their workers and able to solve their problems when a critical situation arises, therefore, the experience of the fish producers is given in table 1.

**Table 1: Experience in fish production**

S.No	Experience (Year)	No. of Respondents	Percentage
01	Less than 5 years	18	09.00
02	5 – 10 years	56	28.00
03	More than 10 years	126	63.00
	Total	200	100.00

Source: Primary data

It is observed from the table 1 that the majority of the respondents are having fishing experience more than 10 years, followed by 28 per cent of the respondents having about 5 – 10 years of experience and only 9 per cent of the respondents are having the minimum experience. Therefore, it can be inferred from the table that most experienced producers alone are engaged in the fish production in the study area.

### No. Family members involved in fishing

The number of family members of the fish producers involved in the fishing operations is shown in table 2.

**Table 2: No. Family members involved in fishing**

S.No	No. of Family Members	No. of Respondents	Percentage
01	Less than 3	26	13.00
02	3 – 5	45	22.50
03	More than 5	129	64.50
	Total	200	100.00

Source: Primary data

It is understood from the table 2 that as much as 65 per cent of the respondents' family members involved in the fishing operation was more than 5 members, about 23 per cent of the respondents' members engaged in the fishing operation was 3-5 members and a small portion of the respondents' family members involved in the fishing operation was less than 3 members. Therefore, it can be assumed that usually the entire family members of the producers depend upon the fishing operation for their livelihood in the study area.

### Type of Vessels Owned

The types of vessels used by the fish producers in the study area are shown in table 3.

**Table 3: Type of vessels owned**

S.No	Type of Vessels	No. of Respondents	Percentage
01	Mechanized vessels	110	55.00
02	Motorized vessels	66	33.00
03	Non-motorized vessels	24	12.00
	Total	200	100.00

Source: Primary data

It is observed from the table 3 that majority of the respondents (55 per cent) owned mechanized vessels followed by 33 per cent of the respondents having motorized vessels and only 12 per cent of the respondents used non-motorized vessels for fish production. It is inferred from the table that due to the advent of new technology, the fisheries industry in the study area is dominated by mechanized and motorized vessels.

### Ownership of The Vessels

The type of ownership of the fishing vessels used by fish producers in the study area is shown in table 4.

**Table 4: Ownership of the vessels**

S.No	Ownership	No. of Respondents	Percentage
01	Fully owned	172	86.00
02	Partnership	21	10.50
03	Leased	07	03.50
	Total	200	100.00

Source: Primary data

It is understood from the table 4 that more than three-fourth of the respondents are the sole owners of the fishing vessels, a minimum of 10.50 per cent of the respondents have the vessels on partnership basis. A meagre portion of the respondents has used leased vessels for fish production. Therefore, it is assumed that the fish producers in the study area have used their own vessels for fish production.

### Number Of Workers

The number of workers employed by the fish producers for fish production in the study area is presented in table 5.

**Table 5: No. Of workers**

S.No	No. of Member	No. of Respondents	Percentage
01	Less than 5	40	20.00
02	5-7	125	62.50
03	More than 7	35	17.50
	Total	200	100.00

Source: Primary data

Table 5 shows that the majority of the respondents employed 5 – 7 workers, 20 per cent of respondents engaged less than 5 workers and about 18 per cent of the respondents employed more than 7 workers for fish production. Therefore, it can be inferred from the table that the majority of fish producers have employed a maximum of 7 workers for fish production in the study area.

### Nature Of Workers

There are different type of workers are involved in fish production. Some fish producers used all their family members; others may employ hired workers in addition to their family members. Therefore the nature of the workers involved in the fish production in the study area is presented in the table 6.

**Table 6: Nature of workers**

S.No	Nature of Worker	No. of Respondents	Percentage
01	All family members	23	11.50
02	Both family members and hired workers	116	58.00
03	Only hired workers	61	30.50
	Total	200	100.00

Source: Primary data

It is understood from the table 6 that the majority of the respondents have used hired workers in addition to their family members, nearly 31 per cent of the respondents wholly depend upon hired workers and a small portion of the respondents engaged their family members for fish production. Therefore, it can be inferred from the table that most of fish producers depend upon hire workers from the fishing community for fish production.

### Average Number of Trips Per Month

The average number of trips made by the fish producer per month in the study area is given in table 7.

**Table 7: Average number of trips per month**

S.No	Trips per Month	Type of Boats		
		Mechanized Vessels	Motorized Vessels	Non-Motorized Vessels
01	Less than 3 trips	18 (16.36)	09 (13.64)	02 (08.33)
02	3 – 5 trips	85 (77.27)	26 (39.39)	03 (12.50)
03	More than 5 trips	07 (06.36)	31 (46.97)	19 (79.17)
	Total	110 (100.00)	66 (100.00)	24 (100.00)

Source: Primary data, figures in the brackets are percentage to total

Table 7 shows that out of 110 mechanized vessel operators, more than three-fourth of them making 3 – 5 trips per month, followed by 16 per cent of the respondents have made less than 3 trips per month and only about 6 per cent of the respondents have made more than 5 trips per month for fish catching. This is due to mechanized vessel operators taking more the number of days per trips as compared to motorized vessels.

Among the motorized vessel operators, as much as 47 per cent of the respondents have made more than 5 trips per month, about 39 per cent of the respondents have made 3-5 trips per month and only about 14 per cent of the respondents have made less than 3 trips per month for fish production.

Out of 24 non-motorized vessel operators, more than three-fourth of the respondents have made more than 5 trips per month, about 13 per cent and 8 per cent of the respondents have made 3-5 and less than 3 trips per month for fish production. It is understood from the table that motorized and non-motorized vessels operators take a minimum number of days per trips as compared to mechanized vessel operators.

### Operating Cost For Fish Production

The major operating cost includes diesel, labour, and other consumables. The average operating cost incurred by the fish producers per trip in the study area is analyzed in table 8.

**Table 8: Operating cost per trip**

Type of Vessels	No. of Respondents			Total
	< Rs. 1 lakh	Rs. 1 – 1.5 lakh	> Rs. 1.5 lakh	
Mechanized	59 (53.64)	36 (32.73)	15 (13.64)	110 (100.00)
Motorized	< Rs. 10,000	Rs. 10,000 – 15,000	> 15,000	Total
	43 (65.15)	18 (27.27)	05 (07.56)	66 (100.00)
Non motorized	< Rs.1000	Rs. 1000 – 1500	> Rs.1500	Total
	17 (70.83)	05 (20.83)	02 (08.33)	24 (100.00)

Source: Primary data, figures in the brackets are percentage to total

Table 8 shows that out 110 mechanized boat operators, the majority of them have incurred the operating cost of less than Rs.1,00,000 followed by nearly 33 per cent of the respondents who have spent Rs. 1,00,000 – 1,50,000 and about 14 per cent of the respondents have incurred the operating cost of more than Rs.1,50,000 per trip. Therefore, it can be inferred from the study that operating cost for mechanized boat operators is less than Rs. 1,50,000 lakh per trip in the study area.

Out of 66 motorized boat operators, the majority of the respondents have incurred the operating cost of less than Rs.10,000, about 27 per cent of the respondents who have incurred Rs.10,000 – 15,000 and only 8 per cent of the respondents have spent operating costs more than Rs.15,000 per trip. Therefore, it can be inferred from the table that the average operating cost per trip for motorized boat operators is Rs. 15,000 in the study area.

Among the non-motorized boat operators, nearly 70 per cent of the respondents have incurred the operating cost of less than Rs.1,000 and 21 per cent of the respondents has spent Rs. 1,000 – 1,500 per trip. A small portion of the respondents has incurred the operating cost per trip of more than Rs.1,500. Therefore, it can be inferred from the table that the average operating cost per trip for non-motorized boat operators in the study area is less than Rs. 1,500 in the study area.

### Average Production Of Fish

The boat wise average production of fish per trip in the study area is shown in table 9.

**Table 9: Average production of fish per trip**

Type of Vessels	No. of Respondents			Total
	< Rs. 2 lakh	Rs. 2 - 3 lakh	> Rs. 3 lakh	
Mechanized	28 (25.45)	67 (60.91)	15 (13.64)	110 (100.00)
Motorized	< Rs. 25000	Rs. 25000 – 50000	> 50000	Total
	17 (25.76)	41 (62.12)	08 (12.12)	66 (100.00)
Non motorized	< Rs.3000	Rs. 3000 – 5000	> Rs.5000	Total
	07 (29.17)	13 (54.17)	04 (16.67)	24 (100.00)

Source: Primary data, figures in the brackets are percentage to total

It is understood from the table 9 that the majority of the mechanized boat operators fish catch was Rs. 2 – 3 lakh followed by one-fourth of the respondents fish catch was less than Rs.2,00,000 per trip. About 14 per cent of the respondents' fish catch was more than Rs.3 lakh per trip. It is understood from the table that average fish catch of the mechanized boat operators is less than Rs. 3,00,000 lakh in the study area.

In case of motorized boat operators, the majority of the respondents fish catch was Rs.25,000 – 50,000, about 26 per cent of the respondents fish catch was less than Rs.25,000 and only 12 per cent of the respondents fish catch was more than Rs.50,000 per trip. Hence, it can be concluded that the average fish catch of the motorized boat operators is less than Rs.50,000 per trip in the study area.

Among the non-motorized boat operators, more than fifty per cent of the respondents fish catch was Rs.3,000 – 5,000 followed by 29 per cent of the respondents fish catch was less than Rs. 3,000 and 17 per cent of the respondents fish catch was more than Rs. 5,000 per trip. Therefore, it can be inferred from the table that the average fish catch of the non-motorized boat operators is less than 5,000 in the study area.

### Average Fish Sold

The boat wise average value of fish sold per trip in both the domestic and export market in the study area is shown in table 10.

**Table 10: Average fish sold per trip**

Type of Vessels	No. of Respondents			Total
	< Rs. 3 lakh	Rs. 3 -3.5 lakh	> Rs. 3.5 lakh	
Mechanized	32 (29.09)	58 (52.73)	20 (18.18)	110 (100.00)
Motorized	<Rs. 50,000	Rs. 50,000 -75,000	> 75000	Total
	25 (37.88)	36 (54.55)	05 (07.58)	66 (100.00)
Non motorized	<Rs.5000	Rs. 5000 -7000	> Rs.7000	Total
	13 (54.17)	07 (29.17)	04 (16.67)	24 (100.00)

Source: Primary data, figures in the brackets are percentage to total

Table 10 shows that the majority of the mechanized boat operators sold Rs. 3 – 3.5 lakh fish per trip, about 29 per cent of the respondents sold less than Rs.3 lakh and 18 per cent of the respondents have sold Rs.3.5 lakh fish per trip. Therefore, it can be inferred from the table that average sales of fish by mechanized boat operators is less than Rs. 3.5 lakh in the study area.

Among the motorized boat operators, the majority of the respondents have sold the fish for Rs. 50,000 - 75,000 lakh, about 37 per cent of the respondents have sold the fish less than Rs. 50,000 and 8 per cent of the respondents have sold more than Rs.75,000 per trip. Therefore, it can be inferred from the table that the average sale fish by motorized boat operators is less than Rs. 75,000 in the study area.

Out of 24 non-motorized boat operators, the majority of the respondents have sold the fish less than Rs.5,000, nearly 29 per cent of the respondents have sold the fish between Rs. 5,000 -7,000 and about 17 per cent of the respondents have sold the fish more than Rs.7,000 per trip. Therefore, it can be concluded that the average value of the sale of fish by non-motorized boat operators is Rs. 7,000 per trip in the study area.

### AVERAGE PROFIT

The boat wise average profit earned by the fish producers per trip in the study area is shown in table 11.

**TABLE 11: Average Profit Per Trip**

Type of vessels	No. of Respondents			Total
	< Rs. 50000	Rs. 50000 – 1 lakh	> Rs. 1 lakh	
Mechanized	19 (17.27)	64 (58.18)	27 (24.55)	110 (100.00)
Motorized	< Rs. 10000	Rs. 10000 -15,000	> 15000	Total
	07 (10.61)	41 (62.12)	18 (27.27)	66 (100.00)
Non motorized	<Rs.3000	Rs. 3000 -5000	> Rs.5000	Total
	05 (20.83)	13 (54.17)	06 (25.00)	24 (100.00)

Source: Primary data, figures in the brackets are percentage to total

It is understood from the table 11 that out 110 mechanized boat operators, the majority of respondents have earned the profit of Rs. 50,000 to Rs.1 lakh, nearly one-fourth of the respondents have earned the profit of more than Rs.1 lakh and 17 per cent of the respondents have earned the low profit of less than Rs. 50,000 per trip. Therefore, it can be assumed that the average profit of mechanized boat operators is more than Rs. 50,000 per trip in the study area.

In case of motorized boat operators, the majority of them have earned the profit of Rs. 10000 -15,000 followed by 27 per cent of the respondents have earned more than 15,000 and about 11 per cent of the

respondents have earned the profit of less than Rs.10,000 per trip. Therefore, it can be inferred from the table that the average profit of the motorized boat operators is more than Rs.10,000 per trip in the study area.

Among the non-motorized boat operators, the majority of them have earned the profit of Rs.3,000 – Rs.5,000, nearly one-fourth of the respondents have earned the profit of more than Rs.5,000 and 21 per cent of respondents have earned the low profit of less than Rs.3,000 per trip. Therefore, it can be inferred from the table that the average profit of non-motorized boat operators is more than Rs.3,000 per trip in the study area.

### Experience and Fish Production

By the level of experience, the producers are grouped into lesser experienced, experienced and highly experienced groups. The respondents who have Less than 5 years of experience is grouped as lesser experienced, the respondents who have the experience of 5-10 years is considered as experienced and the respondents who have more than 10 years of experience in fishing production is classified as highly experienced. The experience and fish production of mechanized boat operators is shown in table 12.

**Table 12: Experience and fish production of mechanized boat operators**

Level of Experience	No. of Respondents			Total
	< Rs. 2 lakh	Rs. 2 - 3 lakh	> Rs. 3 lakh	
Lesser experienced	13 (68.42)	04 (21.05)	02 (10.53)	19 (100.00)
Experienced	03 (11.54)	12 (46.15)	11 (42.31)	26 (100.00)
Highly experienced	12 (18.46)	51 (78.46)	02 (03.08)	65 (100.00)
Total	28 (25.45)	67 (60.91)	15 (13.64)	110 (100.00)

Source: Primary data; figures in the brackets are percentage to total

It is understood from the table 12 that out of 19 lesser experienced mechanized boat operators, the majority (68.42 per cent) of their productivity is low, about 21 per cent of the respondents' average fish catch is Rs.2-3 lakh and just 11 per cent of the respondents' fish catch is more than Rs. 3 lakh per trip. Among the experienced respondents most of the respondents' average fish catch is more than Rs.2 lakh. Similarly, almost 82 per cent of the respondent' average fish catch is more than Rs.2 lakh per trip in the study area. It can be inferred from the table that higher the experience higher the productivity among the mechanized boat operators in the study area.

### Experience And Fish Production Of Motorized Boat Operators

The experience-wise distribution of motorized-boat operators and their level of fish production is shown in table 13.

**Table 13: Experience and fish production of motorized boat operators**

Level of Experience	No. of Respondents			Total
	< Rs. 25000	Rs. 25000 – 50000	> 50000	
Lesser experienced	02 (33.33)	03 (50.00)	01 (16.67)	06 (100.00)
Experienced	02 (14.28)	10 (71.00)	02 (14.28)	14 (100.00)
Highly experienced	13 (28.26)	28 (60.87)	05 (10.87)	46 (100.00)
Total	17 (25.76)	41 (62.12)	08 (12.12)	66 (100.00)

Source: Primary data; figures in the brackets are percentage to total

Table 13 exhibits that among the lesser experienced motorized boat operators, fifty per cent of the respondent' average fish catch is Rs.25,000-50,000, nearly 33 per cent of the respondents' fish catch less than Rs.25,000 and 17 per cent of the respondents' average fish catch is more than Rs.50,000 per trip. It is noteworthy to mention that the majority of the experienced and highly experienced respondents' average fish catch is more than Rs.25,000 per trip. Therefore, it can be inferred from the table that the experienced motorized boat operators' average fish catches is higher than that of lesser experienced operators in the study area.



### Experience and Fish Production of Non-Motorized Boat Operators

The experience-wise distribution of the non-motorized boat operators and the productivity is analyzed in table 14.

**Table 14: Experience and fish production of non-motorized boat operators**

Level of Experience	No. of Respondents			Total
	< Rs.3000	Rs. 3000 – 5000	> Rs.5000	
Experienced	01 (33.33)	01 (33.33)	01 (33.33)	03 (100.00)
Highly experienced	06 (28.57)	12 (57.14)	03 (14.29)	21 (100.00)
Total	07 (29.17)	13 (54.17)	04 (16.67)	24 (100.00)

Source: Primary data; figures in the brackets are percentage to total

Table 14 shows that all the respondents are more than five years of experience in the fishing industry. There is no variation in the level of fish production among the experienced non-motorized boat operators. Out of 21 highly experienced non-motorized boat operators, the majority of their average fish catch is Rs.3,000-5,000, about 29 per cent of the respondents' fish catch is less than Rs.3,000 and 14 per cent of the respondents' average fish catch is more than Rs.5,000 per trip. It is understood from the table that the experience leads higher productivity among the non-motorized boat operators in the study area.

To find out whether there is any significant difference between level of experience of the different boat operators and their productivity, a null hypothesis framed and tested with the help analysis of variance.

#### Null hypothesis

There is no significant difference between the experience of the different boat operators and their productivity.

**Table 15: Anova test**

		Sum of Squares	Df	Mean Square	F	Result
Mechanized boat operators	Between groups	488.22	2	244.11	1.06	Not significant
	Within groups	1379.33	6	229.88		
	Total	1867.55				
Motorized boat operators	Between groups	194.00	2	97.00	1.38	Not significant
	Within groups	422.00	6	70.33		
	Total	616.00				
Non-motorized boat operators	Between groups	21	2	10.50	0.42	Not significant
	Within groups	75	3	25.00		
	Total	96				

The calculated F value is less than that of Table value at 5 per cent level and 1 per cent level in all cases. Therefore, the null hypothesis is accepted. Hence it can be concluded that there is no significant difference between the level of experience of the different boat operators and their productivity.

#### Problems of Fish Producers

The Garrett Ranking Technique (Garrett, 1969) was to evaluate the problems faced by fish producers in the study area. In this method, fish producers were asked to rank the given problem according to the magnitude of the problem. The order of merit given by the respondents was converted into rank by using the following formula.

$$\text{Percentage position} = \sum_{j=1}^n [(R_{ij} - 0.5) / N_j] \times 100 \dots (1)$$

Where,

R<sub>ij</sub> = Rank given for the *i*th item by the *j*th individual, and

N<sub>j</sub> = Number of items ranked by the *j*th individual.

The percentage position each rank thus obtained was converted into scores by referring to the table given by Henry Garrett. Then each factor the scores of individual respondents were added together and divided by the total number of respondents for whom scores were added. These mean scores for all the factors were arranged in the order of the ranks and inferences were drawn.

**Table 16: Problems of the fish producers (n = 200)**

S.No	Nature of Problem	Mean Score	Rank
01	Shortage of skilled labours	92	I
02	Inadequate financial assistance	87	II
03	Lack of constant demand for fish	85	III
04	High operating and fixed cost	81	IV
05	Low compensation during closed season	79	V
06	Lack of government support	72	VI
07	Poor infrastructure facilities	69	VII
08	Violent act of fishermen of other county	65	VIII
09	High dependency of middle men	63	IX
10	Natural calamities	61	X
11	Lack of adequate information in advance	59	XI
12	Excessive control of the government	57	XII

Source: Primary data

It could be seen from the table 16 that the shortage of skilled labours was ranked first with a score of 92 Garrett points. Inadequate financial assistance was the second reason with a score of 87 points. Lack of constant demand for fish was ranked third and high operating and fixed cost was ranked as fourth with a score of 85 Garrett points and 81 Garrett points respectively.

## V. Conclusion

To conclude, fisheries is one of the important food production sectors in India contributing to the livelihood as well as the food security of a large section of the economically under-privileged population. In recent years, it has assumed greater significance and its contribution towards State and National economy, livelihood and nutritional security, rural employment generation and foreign exchange earnings have been enormous. Therefore, the government should initiate steps to develop infrastructure facilities on par with international standards such as development of fishing harbours, fish landing centres, fish processing parks, mid sea fish processing unit to benefit the fisher folk and also aim at increasing the fish production besides conservation of fishing resources. The Government should commit itself towards the holistic development of fisheries in the State and improve the living standards of the fishing communities.

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