



PERFORMANCE OF TRADITIONAL AND MECHANISED FISHING SECTOR OF GOA

Dr MANOJ KAMAT ¹ SANCHILIANA FARIA ²

¹ Senior Faculty of Damodar College, Advisor - Goa Industrial Development Corporation

² Associate Professor and Research Scholar, Faculty in MES College of Arts & Commerce,
Zuarinagar, Goa

ABSTRACT

Marine and fresh water fishery contributes significantly to the state's economy. The traditional sector contributes 26% of the total fish landings as against 74% by the mechanized sector. Over the years, the State has experienced rapid mechanization in fishing. The trend in the fishery sector shows that, there is a continuous increase in the number of mechanized trawlers, canoes and non-mechanized crafts from 1960's to 2014,(GOG,2015). The objective of the study was to assess the performance of traditional and mechanised fishing sector of Goa. The study was descriptive and explorative in nature and the data was collected through questionnaire method from 25 canoe and 50 trawler owners in Goa. Technologically advanced 'trawling' has not only eroded Goa's estuaries and fish nurseries, but this encroachment has affected fish yield each year for over a decade. Fish production today by traditional Goan fisherman is usually characterized by low individual catches within a limited coastal waterline, and a high instability of income.

Keywords: Motorized and Non-Motorized Canoes, mechanised trawlers, Fishing gears, Role of fisheries department in Goa

INTRODUCTION

India is the second largest producer of fish in the world with a share of 5.68% of the Global total and contributing a value of Rs 30,213 crore through exports during 2013-14, FAO (2015). India's fisheries sector contributes about 1% to the overall GDP and 4.6% to the agricultural GDP, (Fisheries Development Board of India, GOI, 2014).

Fishing has traditionally been one of the chief occupations and the source of livelihood of the people living in the coastal areas of Goa. The state of Goa has a coastline of about 104 Km. It has 250 Kms of inland waterways and also a number of small tanks of fish ponds covering an area of 100 hectares. The coast is full of creeks and estuaries and is unique, as such a small stretch of coast of seven major rivers viz Terekhol, Chapora, Mandovi, Zuari, Sal, Talpona & Galgibag open into the sea and these provide excellent nurseries for major fishes as well as good shelters for fishing crafts. Out of 12 Taluka of the state, fishermen from 8 Taluka are involved in fishing activities and fishermen from 42 villages are involved in marine fishing. Estimated population of fishermen in the state is over 30,000 and population of active fishermen is 12,000. The state has a registered fleet of 1,420 mechanized boats, 780 non- mechanised canoes, 843 mechanised fishing trawlers, 7,309 nets, there are five fish landing centers and 14 fish landing ramps, (GOI;CMFRI,2010).

The marine fish production for the last year 2014 has been the highest recorded over past few years. The marine production has increased from 1,03,087 to 1,28,107 tonnes during the period from 2005 to 2014. This increase has primarily been due to introduction of bigger purse-seine fishing vessel of OAL (over all length of the boat) of around 70ft by some of the mechanized fisherman. These bigger vessels have helped the fisherman venture into deeper seas and in multiday fishing especially for



sardines. The dominant demersal species have been the prawns, squids and cuttle fish,(Department of fisheries,Goa, 2015). The maximum sustainable yield calculated from the data on the catch obtained and efforts used over the years for Goa is 85,407.61 tonnes (Monteiro,2006). Goa contributes to about 1.85% of the total marine fish landings of our country. (CMFRI, 2013). In overall the fisheries sector of Goa accounts for 3.10 percent of total GDP and 8.01 percent of the Agriculture Sector GDP at current prices for the year 2013-14,(Economic Survey, Goa, 2014).

AN OVERVIEW OF TRADITIONAL AND MECHANISED FISHING SECTOR IN GOA

Goa has nearly 90 of its villages, primarily in traditional coastal fishing operations. Traditional ramponkar communities have absorbed fishing into their principal occupation. Introduction of technologically advanced vessels like trawlers and purse seines, for commercial purposes in the last three decades has drastically affected the coastal traditional fishermen's activity in Goa. These mechanized vessels are engaged in trawling which is ecologically hazardous, as they fish in coastal waters and have destroyed the weeding grounds of shrimps, mackerels and other small crustacean families that cliché closely to coastal waters for food, breeding and living in harmony. They have exploited shallow water fishing grounds where the traditional ramponkar has been fishing for generations. Many of the traditional fishermen are dabbling in the tourism pie to make up for the fall in income, (Velenkar, S. C ,2015). There are also issues due to mechanization versus traditional fishing practices. Dwindling catches by the traditional sector due to which they find it difficult to survive in the competition with the large fishermen with mechanized resources. This has widened the gap between traditional fishermen and fishermen processing mechanized resources. Many fishermen use the old traditional methods of catching fish, especially because they are not well aware of the subsidies provided by the government and also of the new methods of catching fish. Besides some due to their poverty cannot switch over to mechanized system.

RESEARCH METHODOLOGY

Study Area: The study covers canoe owners and trawler owners from Mormugao taluka.

Choice of Respondents : The actual selection of the canoe owners and trawler owners is done on a random sampling basis. 25 canoe owners and 50 trawler owners from Baina, Cansaulim, Velsao and Khariwada for taken for the study.

Data analysis and interpretation:

The primary data and other relevant information were collected from 75 respondents with the help of open and closed ended questionnaire. The study was conducted from November 2015 to February 2016. The data collected from the primary sources is presented in suitably planned tables, graphs, piecharts, percentage bar diagrams. Suggestions, conclusions and inferences are derived from tables ,graphs which are prepared from the data collected.

OBJECTIVES OF THE STUDY

1. The main objective of the study is to evaluate and examine the performance of the traditional and canoe owners in Mormugao taluka of Goa.
2. To study about the total motorized and non-motorized canoes registered, taluka wise fishing gears registered in Goa, number of fishing trawlers in operation at major landing centres in Goa.
3. To study about the role played by the government of Goa for the welfare of fishing community.



LITERATURE REVIEW

1. Srinivasan (1981) studied about the status of marine fisheries of Tamil Nadu. He studied about the problems faced by traditional fishermen due to the increasing competition from mechanised boatmen following the prawn boom. He also stressed the importance of diversified techniques in maximising production and improving the productivity of artisanal fishermen. Further, the author has suggested that the present system of financially helping a few big boat owners may be changed in favour of helping a large number of small boat operators.
2. D.B.S., Kanakkan, A, (1993), studied about cost and earnings of trawlers in Kerala. Their objective was to find out the economics of 10 trawl units in 1991. The study states that trawlers were running in profit in 1991 at Cochin fisheries.
3. Panikkar, K.K.P., & Salim, K.P, (1993), conducted a study on economic performance of small and medium trawlers along the Andhra coast. Their study stated found that both medium and small trawl units were earning profits in 1991, but medium trawl units were economically more efficient than small trawl units.
4. D. B. S. Sehara, A. Kanakkan and K. P. Salini (1994), studied about the economics of trawling on Goan coast, from 1991-1992. On every 10 sample days in a month 10 trawl units per day were observed in the study. The variables studied were investment, cost of fishing and income. In their study they found that trawlers were running in profit in 1991-1992.
5. Selvaraj, K.N., Swaminathan,N., Sundaravaradarajan, K.R., &Aswathy, N, (1994) made a study on 'Economics of mechanised and non-mechanised marine fishing-some implications'. The study on 60 motorised and 60 non motorized trawlers in 1991 showed that fishing was major source of income for both motorized and non-motorized categories.
6. Kemparaju (1994) made a study on the drift gillnet fishery of the Goa state during the period 1985-88. In his study he found out from that the drift gillnet fishery during the period from 1985 to 1988 in major centres showed a steady improvement indicating its continued importance in the exploited fishery of Goa despite the fluctuations noticed. He also observed that in the small-scale fisheries sector, the drift gillnet fishing was significant as it exploits the higher value fishes such as seer fishes, tunas and sharks. Thus, the drift gillnet fishery has better development prospects in the state.
7. D.B.S. Sehara, (1998), made a study on 'Economic sustainability and management issues of trawl fishing in Gujarat'. The main objective was to analyse economic sustainability of trawlers in Gujarat and suggest some management measures or judicious operations of these units. The seasonal analysis of catch data confirmed that post-monsoon period provides higher quantity of catch and revenue.
8. Narayanakumar, R., Sathiadhas &Aswathy,N, (2009), evaluated the economic performance of different fishing methods followed in India along the coast by the mechanized, motorized and non-mechanized sector. Their study states that both the medium and small trawl units were earning profits in 1991, but medium trawl units were economically more efficient than small trawl unit.
9. Chakravartty & Sharma (2013) identified that a diverse range of fishing gears and methods have been evolved over a long period of time by the fishermen of Nalbari district to capture a



wide range of fish species. The survey of the fishing gears and their method of operation in Nalbari district has revealed that 36 types of fishing gears are in vogue in commercial use which belongs to several categories. Among all indigenous fishing devices “Katal fishing” is the unique and assured method of capturing big sized fishes.

AN OVERVIEW OF MOTORIZED AND NON-MOTORIZED CANOES IN GOA

Table 1: Total Motorized and Non-Motorized Canoes registered upto 2014 in Goa

Sr. No.	Taluka	Mechanized	Non- Mechanized	Total
1	Bardez	337	191	528
2	Tiswadi	277	160	387
3	Salcete	100	113	213
4	Vasco	436	192	628
5	Canacona	194	179	373
6	Pernem	133	55	188
7	Ponda	04	10	14
Total		1481	900	2331

[Source: Goan Fish Trails An Overview of Department of Fisheries of Goa ,Vol.-II-2015]

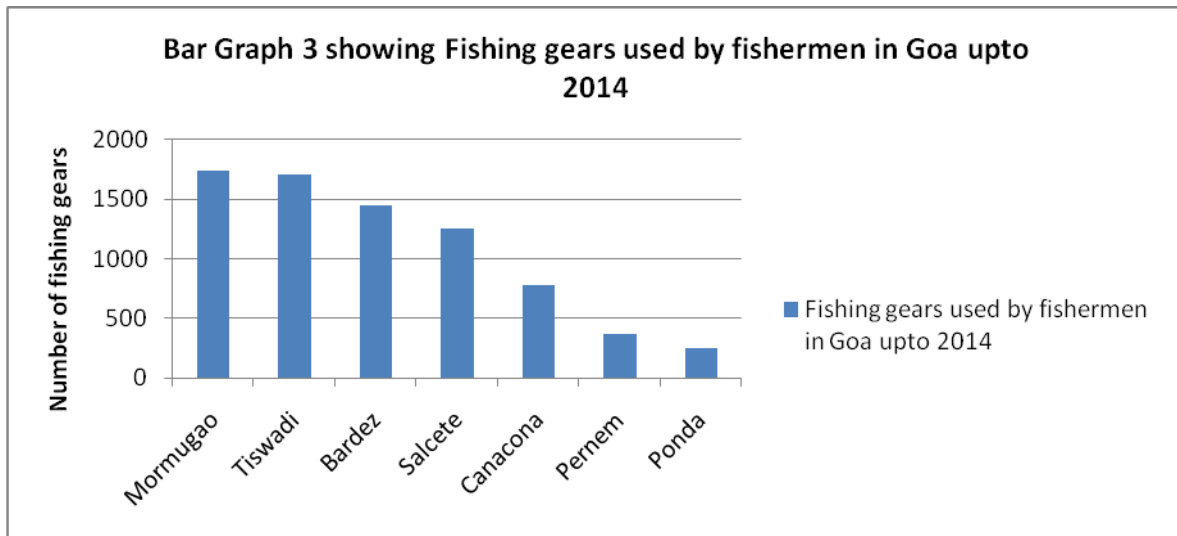
The above table signifies the total mechanized and non-mechanized canoes registered upto 2014 in Goa. The highest canoes registered were found in Vasco taluka i.e. 436 and 192 for non-motorized canoe, whereas the lowest canoes registered were found in Ponda taluka i.e. 4 for Mechanized Canoe & 10 for Non-mechanized in Ponda taluka.



TABLE 2: TALUKA WISE FISHING GEARS REGISTERED UPTO 2014

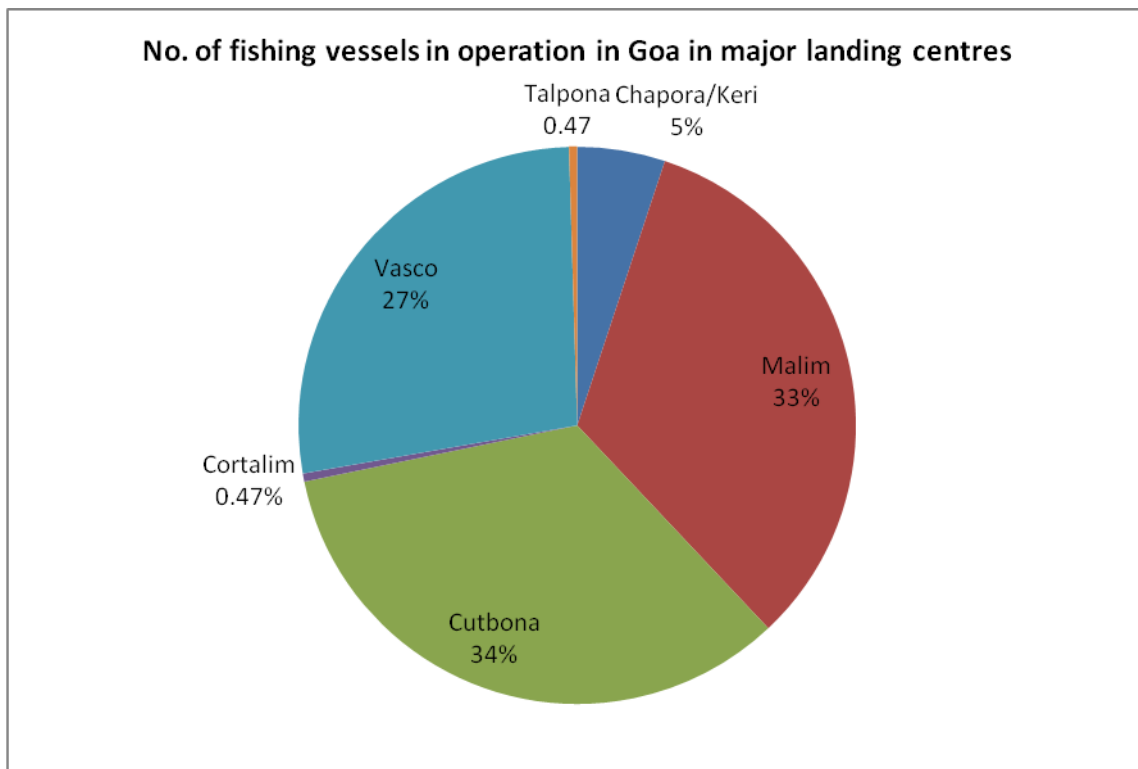
Sr. No	Type of gear	Tiswadi	Bardez	Ponda	Pernem	Canacona	Mormugao	Salcete	Total
1	Sea gill net	793	750	25	290	640	1042	368	3908
2	Sea cast net	1	7	Nil	5	36	Nil	Nil	49
3	River gill net	78	54	48	18	12	10	37	257
4	River cast net	1	31	2	16	15	2	Nil	67
5	Rampon net	14	5	Nil	Nil	8	5	26	58
6	Drag net	26	48	Nil	Nil	5	62	21	162
7	Purse-seine net	84	59	Nil	Nil	1	92	193	429
8	Trawl net	418	392	nil	21	18	358	364	1571
9	Barrier (Futauni)	69	57	72	6	36	48	46	334
10	Sluice gate	23	Nil	13	Nil	6	9	10	61
11	Stake net	79	49	85	8	Nil	6	194	421
12	Kadsari net	Nil	Nil	6	Nil	Nil	Nil	Nil	6
13	Other net	101	Nil	Nil	Nil	3	10	Nil	114
14	Ormol net	16	Nil	Nil	Nil	Nil	22	Nil	38
15	Singel net	8	Nil	Nil	Nil	Nil	70	Nil	78
Total		1711	1452	251	364	780	1736	1259	7553

[Source: Goan Fish Trails Vol.-II-2015(An Overview of Department of Fisheries of Goa)]



The above table 2 and Graph 3 depicts the taluka wise fishing gears registered in Goa upto 2014. In the seven taluka's of Goa there are 15 different types of gears used by the fishermen for their fishing activities. 51.74% sea gill net , 20.79 % trawl net, 5.67% purse seine net ,5.57%, stake net, 4.42% barrier (futauni, 3.40% river gill net, 2.14% drag net, 1.50% other nets, 0.88%, river cast net, 0.80 sluice gate, 0.76% rampon net, 0.64% sea cast net, 0.50% ormol net, 0.07 % kadsari net etc., are used by fishermen in all 7 talukas of Goa. The major fishing gears used by fishermen in Goa are sea gill net, trawl net, purse-seine net, and stake net, barrier (futauni) . The highest registration of gears is in Mormugao taluka i.e. 1042 for sea gill net gear.

Percentage Piechart 4 showing approximate number of fishing trawlers in operation in Goa at major landing centres during 2014



[Source: Goan Fish Trails Vol.-II-2015(An Overview of Department of Fisheries of Goa)]



- The above pie chart 4 depicts that Cutbona has the highest number of fishing vessels, followed by Malim jetty, Vasco jetty, Chapora, whereas Cortalim and Talpona jetty have the same share of percentage.

ROLE OF FISHERIES SECTOR FOR THE BENEFIT OF FISHING COMMUNITY

The marine and the fresh water fishery contributes significantly to the State's economy. The fisheries sector has boosted the State's Economy with the help of Fisheries co-operative movement in the state generating direct and indirect employment, (GOG, 2015). Continuous efforts are made by the fisheries department of Goa for sustaining the available fishery resources for present and future needs and to improve the quality of life of the fishermen. The state fisheries department has taken sincere efforts to balance the ecological integrity and bio-diversity in its territorial waters, thereby focusing more on the development of the sector by means of recognizing the conservation and management of fisheries resources and to arrest the soaring of its exploitation.

The main objective of the fisheries department is to increase fish production by utilization of the available natural resources, to ameliorate the socio economic conditions of the fisherman who belong to the weaker sections of the society. The other objectives are to provide infrastructure for marine and traditional fisheries ,to develop fresh water fish culture, to increase inland fish production and also to develop eco-friendly brackish water aquaculture. To achieve these objectives department is implementing various schemes like financial assistance to acquire fishing canoe, motorization of canoe, purchase of fishery requisites, subsidy on kerosene for out board motor operators, supply of insulated boxes, reimbursement of VAT, life jackets, biometric cards etc,. Creation of infrastructure facilities like construction of jetties, fish landing ramps and other infrastructure facilities. Besides welfare schemes like insurance cover for fishermen, saving cum relief fund, housing scheme etc have been implemented for the welfare of the fishing community. The state government has geared up its activities towards sustainability by starting open sea cage culture and inland cage culture, thus increasing the fish production on scientific basis.

RESULTS AND DISCUSSION

The feedback given by canoe and trawler owners in the questionnaires were used for data analysis to arrive at the results and discussion given below:-

FINDINGS AND INTERPRETATION OF CANOE AND TRAWLER OWNERS:

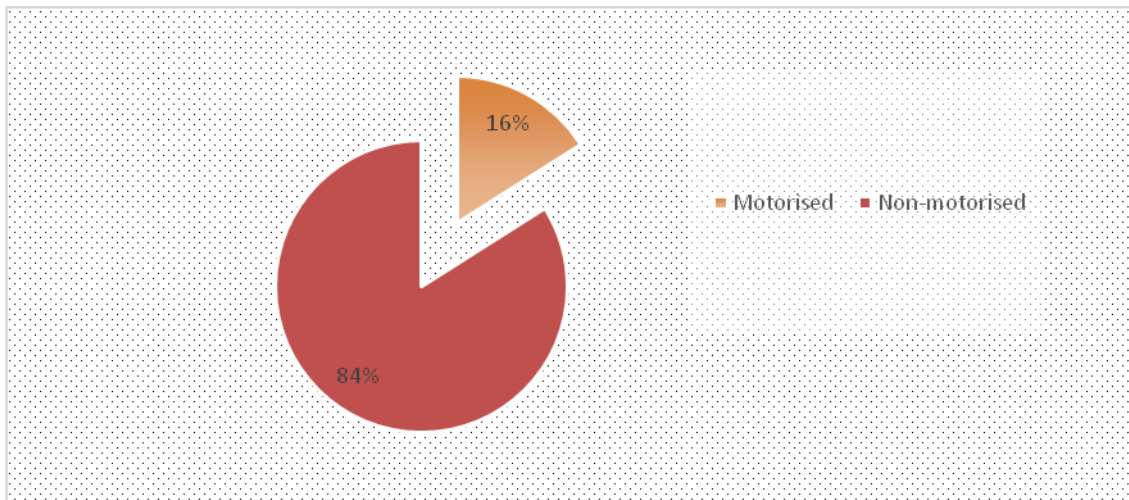
The survey revealed the following analysis:-

- Age of Canoe Owners: Majority of canoe owners in Goa belong to the age group of 35-45 years.
- Number of years involved in fishing business: Majority of the canoe owners want to continue their family business as they are experts in the fishing field.
- Type of canoe owned: Majority of canoe owners used non-motorised canoes.
- Type of boat used: Most of the canoe owners prefer to use fiberglass boats because fiber glass is light in weight.
- Normal fishing Trip: Majority of canoe owners spend 6 hours and above in fishing activity per day.
- Frequency and time for going out for fishing: For most of the canoe owners fishing is their everyday activity. They prefer day as well as night time to go out for fishing.



- Tonnes of fish catch per trip: Majority of canoe owners catch approximately 1-2 tonnes of fish catch in a particular trip.
- Cost of canoe/motorized canoe: Cost of non motorized canoes is below Rs 4,00,000 and the motorized canoes cost Rs6 lakhs.
- Labour employed: Majority of the canoe and trawler owners employ skilled and semi-skilled workers.
- Salary: The average salary paid by the trawler owners to their skilled employees is between Rs 25,000-30,000 per month whereas semiskilled employees are paid Rs 10,000- 15,000 per month.
- Seasonal fish catch: The study showed that fishermen catch very less fish during the month from Feb to April. In June and July there is fishing ban in Goa. There is highest fish catch from August to January.

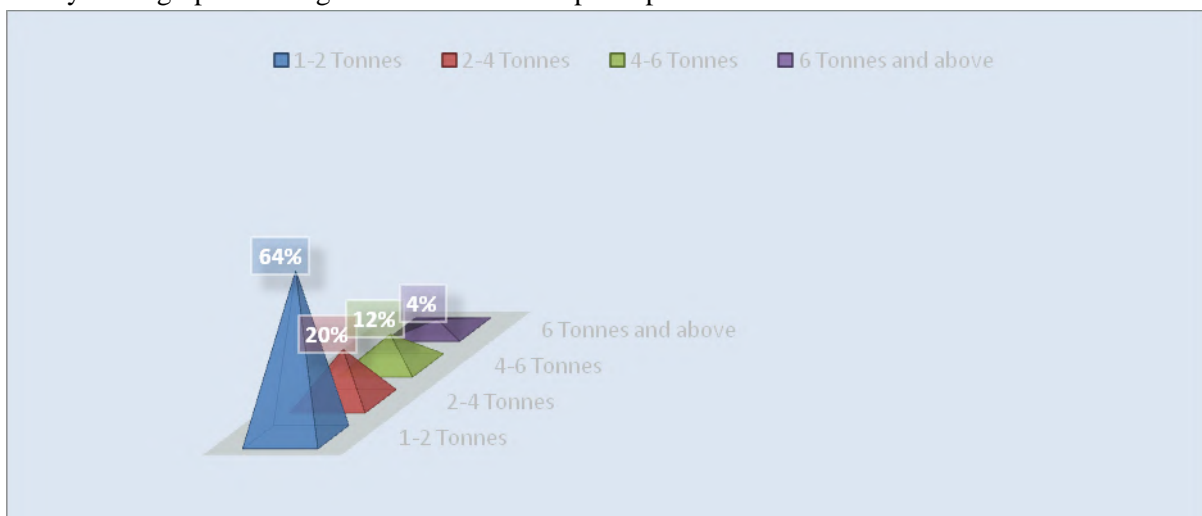
5.1 Percentage pie chart showing types of canoe owned



(Source: Primary data)

The above 5.1 percentage pie chart shows that 16% of canoe owners have non- motorized canoe and 84% of canoe owners have motorized canoes.

5.2 Pyramid graph showing tonnes of fish catch per trip

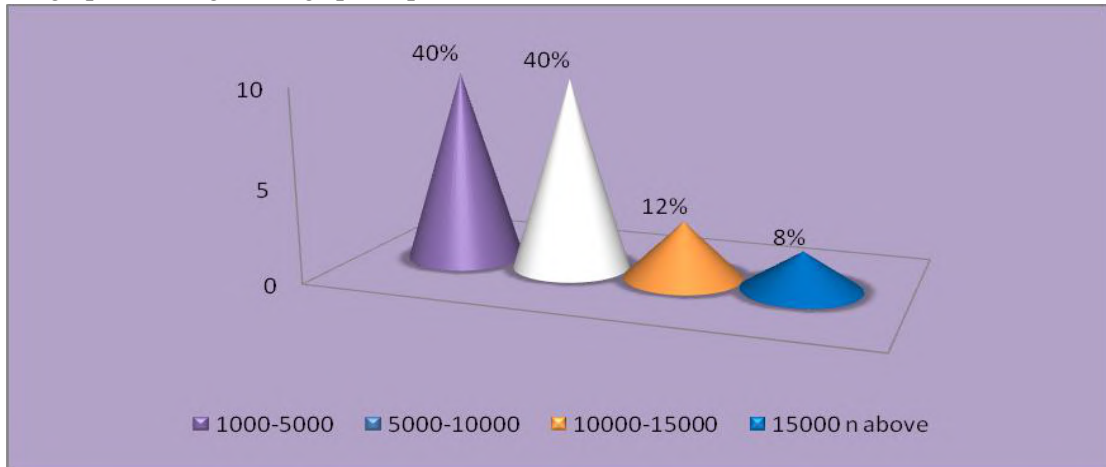


[Source: Primary data]



- ❖ 5.2 pyramid graph shows that 64% of canoe owners catch 1-2 tonnes of fish, 20% of fishermen catch 2-4 tonnes of fish, 12% catch 4-6 tonnes of fish and 4% of canoe owners catch 6 tonnes of fish and above per trip

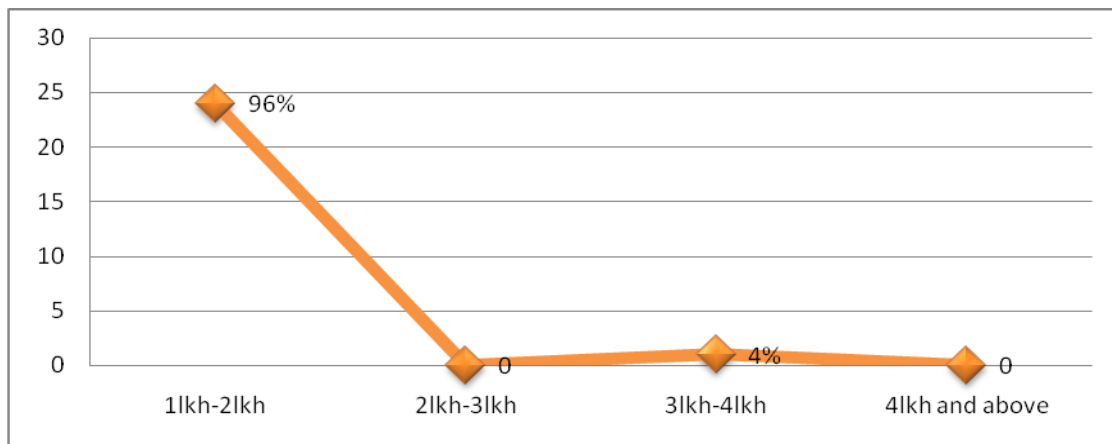
5.3 Conical graph showing earnings per trip of canoe



[Source: Primary data]

The study showed that 40% of canoe owners earn between Rs 1000-10000 per trip, 8% canoe owners earn Rs 15000 and above per trip and 12% canoe owners earn Rs 10000-15000 per trip

5.4 Line graph showing profit margin earned by canoe owners

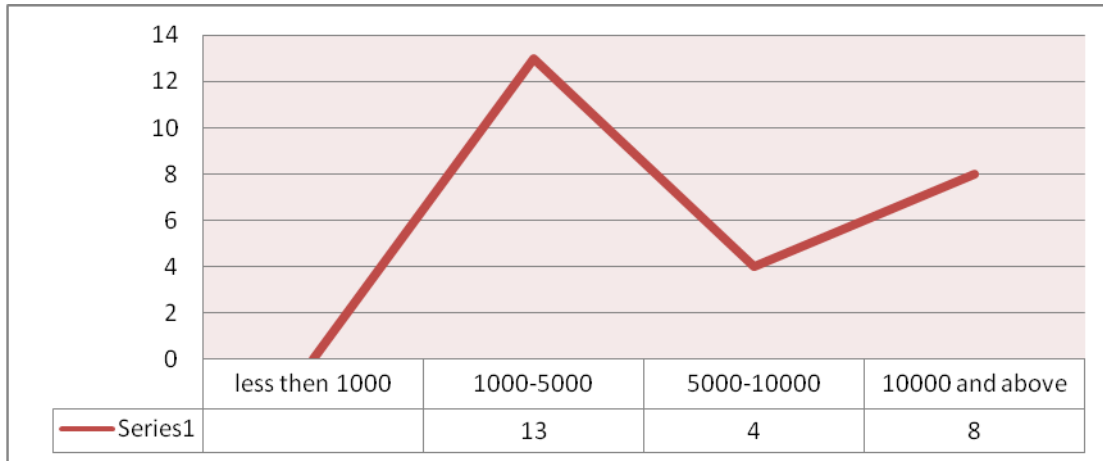


[Source: Primary data]

5.4 line graph shows that 96% of the canoe owners earn profit between Rs 1,00,000-2,00,000, 4% earn between Rs 3,00000 to 4,00,000, and none of the canoe owners earn above Rs 4,00,000 lakh per annum.



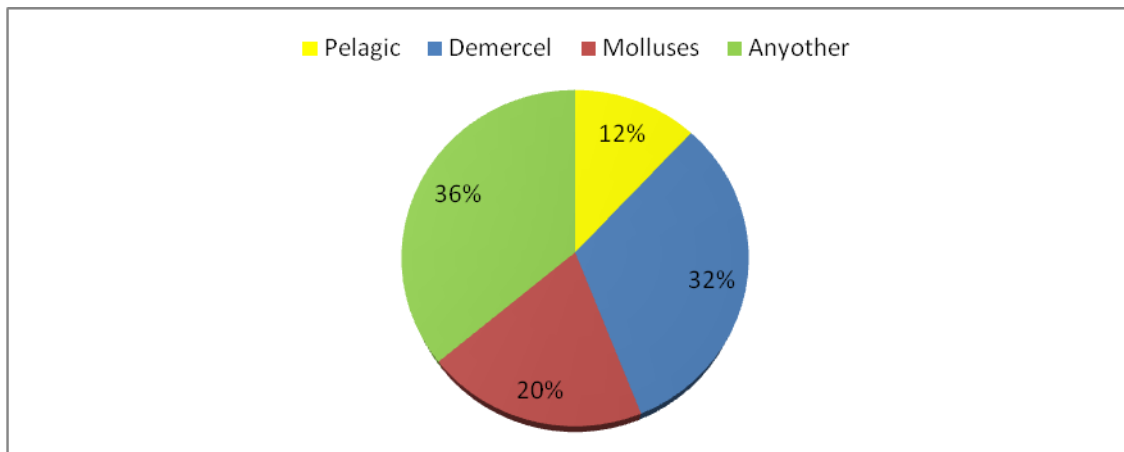
5.5 Line graph showing maintenance cost of canoe



(Source: Primary data)

5.5 line graph shows that most of the canoe owners spent between Rs 1,000 – 5,000 for maintenance cost of the canoe. None of the canoe owners incur maintenance cost below Rs 1000.

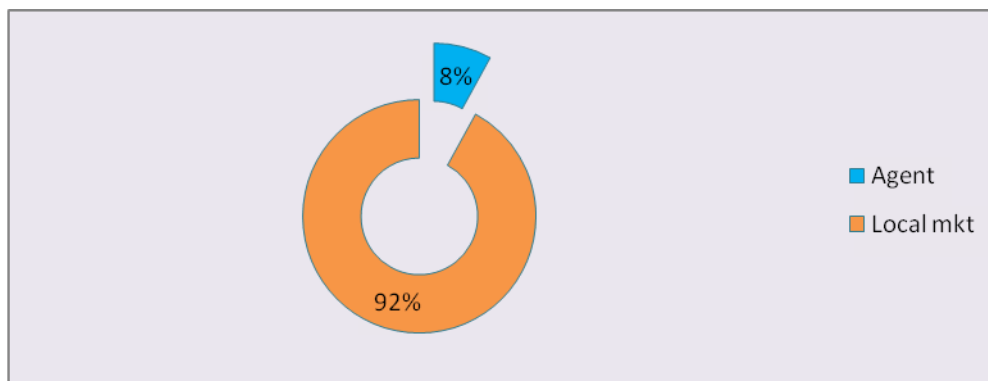
5.6 Percentage pie chart showing type of fish catch in Goa



[Source: Primary data]

5.6 pie chart depicts that demersal and any other type has the highest percentage of fish catch, followed by Molluscs, and pelagic in Goa.

5.7 Percentage chart showing buyers of fish catch



(Source: Primary data)

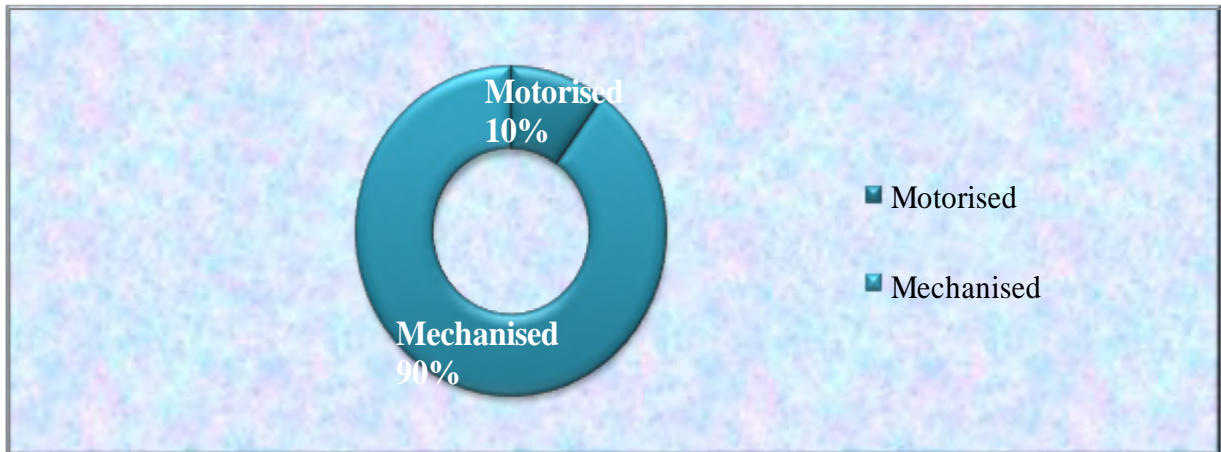


The above 5.7 pie chart shows that 8% of canoe owner sell their fish catch to agent and 92% sell in local market.

FINDINGS AND INTERPRETATION OF TRAWLER OWNERS

The following results were drawn in case of data analysis of 50 trawler owners

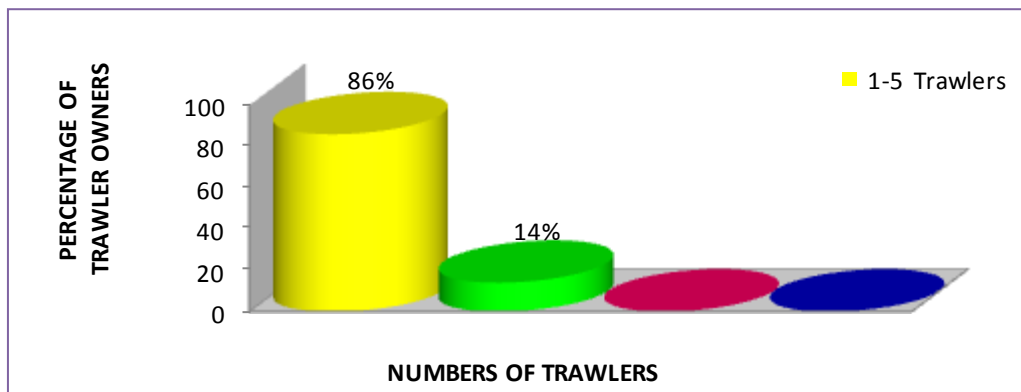
5.8 Percentage pie chart showing type of trawlers owned by the trawler owners



[Source: Primary data]

The 5.8 pie chart showed that 90% of the trawlers are mechanized whereas 10% are motorized.

5.9 Cylindrical graph showing number of trawlers owned by the trawler owners

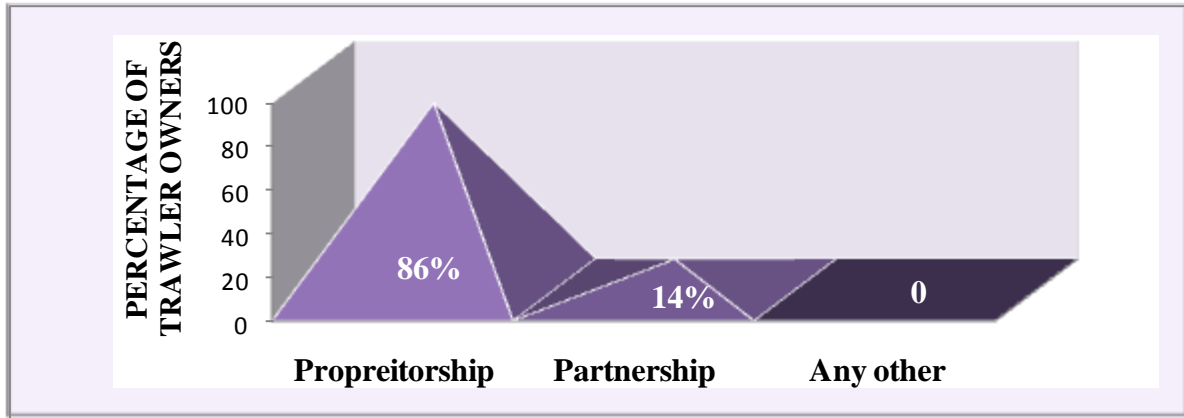


[Source: Primary data]

The above 5.9 cylindrical graph, highlights that 14% of trawlers owners own 5-10 trawlers and 86% of the trawler owners own 1-5 trawlers.



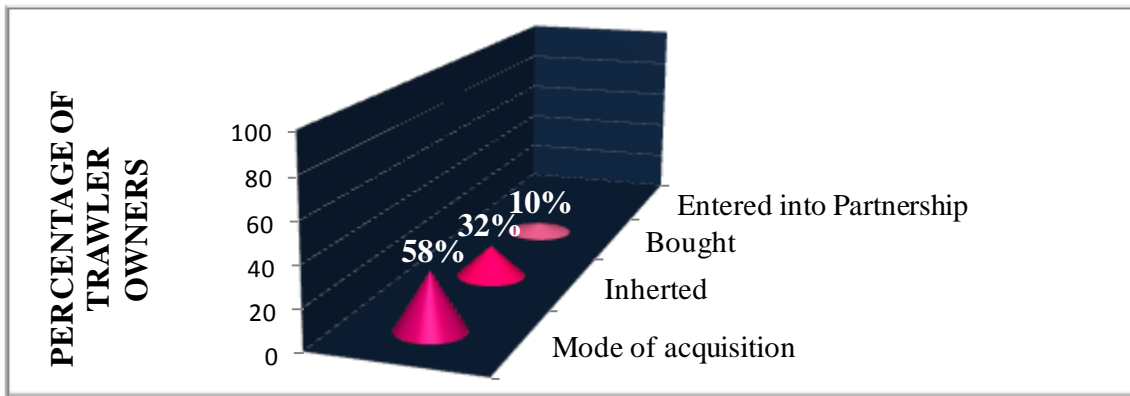
5.10 Triangular graph showing nature of ownership



[Source: Primary data]

As depicted in 5.10 triangular graph, 14% trawler owners have acquired their trawlers through a Partnership, 86% owned the trawlers by proprietorship.

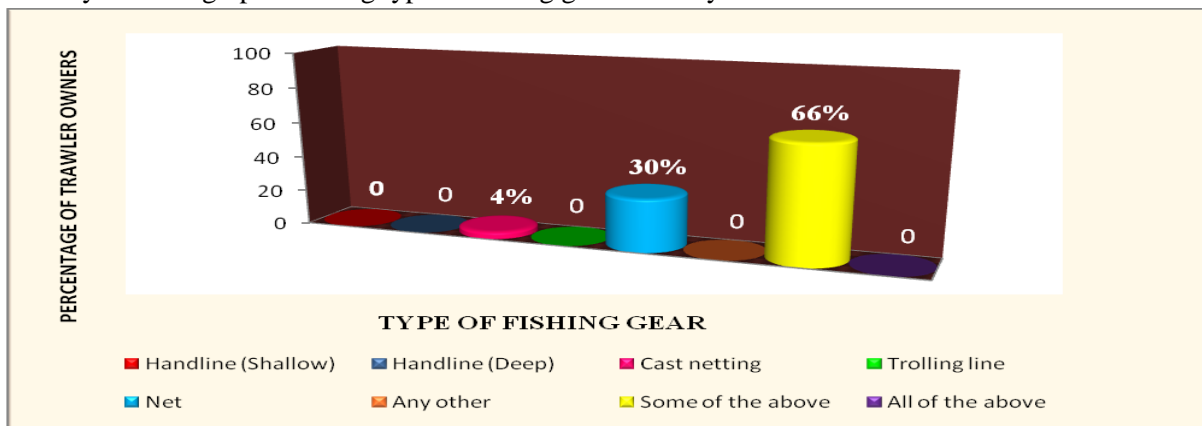
5.11 Conical graph showing acquisition of trawl boats



[Source: Primary data]

As depicted in 5.11 conical graph, depicts that 10% of the trawler owners have purchased their trawlers, 32% have inherited the trawlers from their ancestors, 58% trawler owners have acquired their trawlers by a mode of acquisition

5.12 Cylindrical graph showing type of fishing gears used by labourers



[Source: Primary data]

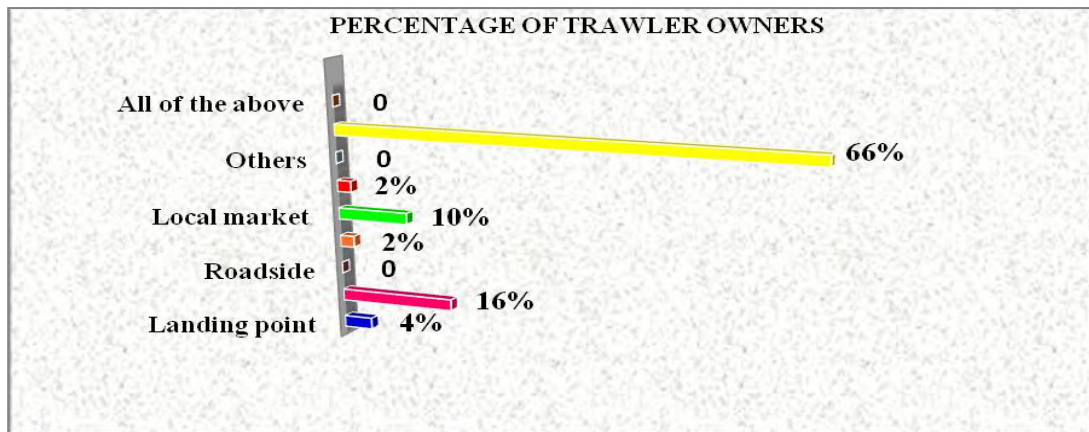


In the above 5.12 Cylindrical Graph, the X-axis depicts the type of fishing gears used by the labourers for fishing activities & Y-axis depicts the number of trawler owners using these gears.

The analysis is given below:

- 4% trawler owners make use of “Cast netting” for their fishing activities
- 30% of the selected trawler owners use only the “net” for their fishing activities.
- Majority i.e. 66% of the trawler owners use “some of the above”[which includes Handline(shallow), Handline(deep), Cast netting, Trolling line & Net] to carry out their fishing activities

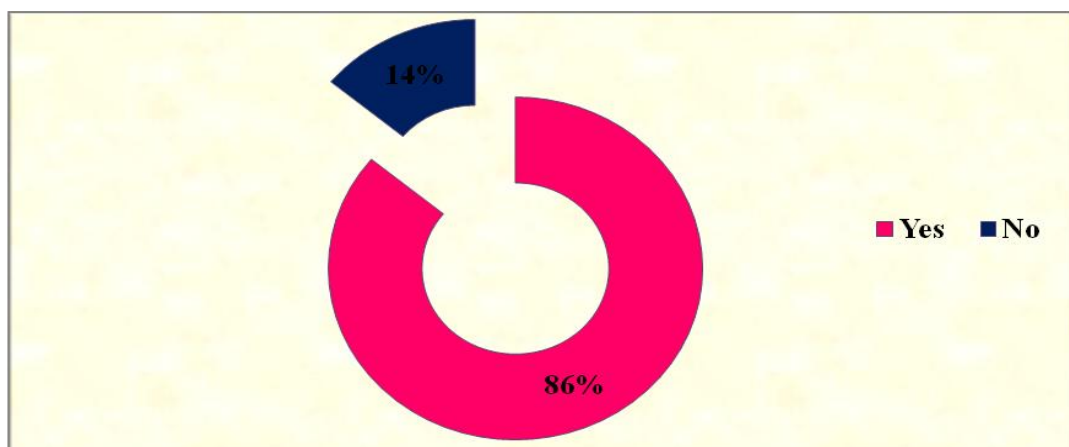
5.13 Bar graph showing fish catch sales



[Source: Primary data]

The above 5.13 bar graph shows that 2% of the trawler owners sell their catch both at the regional market & to a middle men, 4% of the trawler owners sell their catch directly at the landing point itself, 10% of the trawler owners sell their catch at local markets, Majority i.e.66% of the trawler owners use “some of the above” methods to sell their fish. The study showed that majority of the selected Trawler owners provides incentives to improve the efficiency & morale of their employees.

5.14 Pie chart showing profits earned & losses incurred in fishing business



[Source: Primary data]



The above 5.14 Pie Chart analysis depicts 14% of the trawler owners state that they are still aspiring for more profits in their business, 86% of the trawler owners have responded that they are pleased with their business as they have earned sufficient profits.

SUGGESTIONS PROPOSED FOR THE BENEFIT OF CANOE AND TRAWLER OWNERS

1. Majority of the canoe owners lack educational qualification, as a result of which they are not aware of the technologically advanced tools and equipments used for their fishing activities. If the fishermen use the new technology and latest techniques and methods of fishing they would get better fish catch and earn high profits in fishing business. So it is suggested that Government of Goa should conduct training programmes, seminars in every taluka so to make the fishermen aware about the new advancements in technology as regards fishing equipments and methods.

2. In Goa, there are many trawler owners who own less number of trawls, which is the most important disadvantage for them in expanding their business. So it is opined that the Government of Goa must take initiative in organizing seminars for the fishing community, provide more subsidies, conduct training programme and schemes like:

- Development of Marine Fisheries, Infrastructure and Post Harvest Operations.
- Development of Inland Fisheries and Aqua-culture.
- Strengthening of Database and Geographical Information System.
- National Scheme of Welfare of Fishermen.
- Assistance should be provided under various schemes administered by Marine Products Exports Authority (MPEDA).

3. In Goa, there are only a few number of trawler owners who export their fish to other countries and the ones who export their fish are big trawler owners having big fishing business. The rest trawler owners do not export because it is inconvenient for them to export as their fishing business is very small. So it is suggested that the Government of Goa must provide better infrastructure facilities, loan facilities to the fishing community so that they can purchase adequate trawlers and improve their business and standard of living. This step by the Government of Goa will be beneficial for both the trawler owners as well as for the economic development of the state of Goa.

4. Many people engaged in fishing business were not aware of the various schemes / subsidies and development training programmes made available to them by the Government of Goa. The Government of Goa must provide additional schemes and subsidies to the trawler owners which will help them to expand their fishing business.

5. The Government of Goa should introduce fishing training schools in different talukas of Goa so that the fishermen can develop their potential and this will in-turn help them in increasing their output of fish production.

CONCLUSION

Fish production today by traditional Goan fisherman is usually characterized by low individual catches within a limited coastal waterline, and a high instability of income. There have been plenty of government schemes to encourage fishing in the state, there have been very few takers in recent years. One such scheme offers subsidy of 50 per cent for purchase of new fishing vessels. But for the last couple of years, in spite of the incentives the industry has not seen any new players moving into it.



This paper would serve as a valuable guide to the new entrants in the fishing industry. It will be useful to the community of different masses who are interested to get an insight of fisheries knowledge .

REFERENCES

1. D. B. S. Sehara, A. Kanakkan and K. P. Salini,(1994), *Economics of trawling on Goan Coast*, CMFRI, Cochin.
2. D.B.S. Sehara, (1998), Economic sustainability and management issues of trawl fishing in Gujarat, Central Marine Fisheries Research Institute, Cochin.
3. Chakravartty, P., Sharma, S., (2013), *Different types of fishing gears used by the fishermen in Nalbari district of Assam*, International Journal of Social Science & Interdisciplinary Research ,IJSSIR, Vol. 2 (3), ISSN 2277 3630.
4. Economic Survey (2013-14), Government Printing Press, Panjim, Goa.
5. Goan Fish Trails Vol.-II-2015, An Overview of Department of Fisheries of Goa
6. K..N.Selvaraj,N. Swaminathan,K.R. Sundaravaradarajan and N. Aswathy ,(1994), *Economics of Mechanised and non –mechanised marine fishing –some implications*, Dept of Agricultural Economics, Tamilnadu Agricultural University, Coimbatore.
7. Kemparaju, (1994), *Drift gillnet fishery of Goa*, Mar. Fish. Infor. Serv., T&E Ser., No.128, pp.5-8.
8. Narayanakumar, R. Sathiadhas and N. Aswathy , (2009), *Economic performance of marine fishing methods in India*, Marine Fisheries Information Service T&E Ser., No. 200
9. Panikkar, K.K.P., & Salim, K.P., (1993), *Economic performance of small and medium trawlers along Andhra coast*, : CMFRI , Cochin
10. R. Geetha, R. Narayanakumar, Shyam. s. Salim, N. Aswathy,S. Chandrasekar, V. Srinivasa Raghavan and Indira Divipala, (2014), *Economic efficiency of mechanised fishing in Tamil Nadu – A case study in Chennai*, Indian Journal of Fish., 61(4) : 31-35
11. R.Senthiladeban, M. Rajakumar, B.S. Viswanathan,(2015), *Production economics of non mechanised fishing in the selected fish landing centres of Thoothukudi*, Tamil Nadu, CMFRI
12. Sreekanth., G. B., Lekshmi, M.N., and Singh, N.P.,(2015), *Catch Trends in Major Marine Fisheries Resources of Goa* ,Indian Council of Agricultural Research, Technical Bulletin No. 49, Ela Old Goa.
13. Sehara, D.B.S., Kanakkan, A, (1993), *Cost and Earnings of Trawlers in Kerala – A Case study*, (CMFRI), Cochin