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Changing Pattern of Trawling along Chennai Coast

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Abstract

The annual trawl landings at Chennai increased from 29,130 tonnes in 1991 to 42,649 tonnes in 1994 and subsequently decreased to 34,069 tonnes in 1995. Consequent upon extension of operation upto Nizampatnam, the contribution by the multi-day trawlers increased from 35.4% of the total landings in 1991 to 52.5% in 1995. However, the catch rate of the trawlers decreased from 110.8 kg.h^{-1} (1991) to 48.3 kg.h^{-1} (1995). The trawling effort of daily and multi-day trawlers has to be reduced to obtain Maximum Sustainable Yield. The extended trawling activity of Chennai based trawlers has influenced the operational pattern of trawlers of south Andhra Pradesh coast. The catch, effort and catch composition of trawlers based at Krishnapatnam and Nizampatnam have also been analysed.

Introduction

Along the Chennai coast, small trawlers of 10-11 m OAL (engine power 65-90 hp) undertake daily voyages, are being gradually replacd by larger vessels of 13-15 m OAL (120 hp) with a sea endurance of 7 days. These larger trawlers are engaged in fishing off Nizampatnam (315 km north of Chennai) which was underexploited prior to the 1980s. The steep increase in fishing effort and intensive exploitation of hitherto underexploited areas pose a few important questions on the sustainability of the resources and on the competition among trawlers based at the major fishing harbours along the operational area (between Chennai and Nizampatnam) in sharing the stock. The long sea endurance of trawlers and changing pattern of trawling calls for close monitoring of the catch composition. In the present study, the effects of changing pattern of trawling of Chennai based vessels on the catch, CPUE and catch composition, on the sustainability of the resources and on the operation and performance of trawlers in the contiguous fisheries harbours in south Andhra Pradesh have been analysed.

Materials and Methods

Data on effort, catch and catch composition of trawlers in 3 major landing centres, *viz.*, Chennai, Krishnapatnam and Nizampatnam during 1991-1995 were collected from the National Marine Living Resources Data Centre (NMLRDC) of Central Marine Fisheries Research Institute (CMFRI) and analysed to estimate catch rate, maximum sustainable yield (MSY) and optimum effort. For the estimation of MSY and optimum effort , surplus yield model of Schaefer (1954) was followed.

Results and Discussion

The 700 trawlers in the 3 major fishing centres, *viz.*, Chennai, Krishnapatnam and Nizampatnam in the north Tamil Nadu-south Andhra Pradesh coast cover 4650 sq.km fishing area in the inshore waters between Pudupatnam and Nizampatnam (Table 1). Though the effort is distributed in the entire area upto 70 m depth, the concentration of trawling activity is maximum of Nizampatnam. The 300 large trawlers of Chennai, 70 of Krishnapatnam and 150 of Nizampatnam spend most of their effort off Nizampatnam and land the catch in the respective base harbours.

Chennai based trawlers:

The annual fishing effort steeply increased from 2,63,000 h in 1991 to 7,05,000 h in 1995. The substantial increase was due to 3.7 times increase in the fishing effort of multi-day trawlers during the 5 year period. The multi- day trawlers, which accounted for 38.8% of the total effort in 1991, formed 59.3% of the effort in 1995. The increase in the effort of multi-day trawlers was mainly due to increase in the fishing hours per unit operation rather than increase in number of trawlers or units. The average fishing effort increased from 24 h unit operation in 1991 to 40 h unit operation^{-1} in 1995. The area of operation^{-1} was off Krishnapatnam until 1993, and since then, extended upto Nizampatnam.

The annual landings increased from 29,130 tonnes in 1991 to 42,649 tonnes in 1994, and subsequently decreased to 34,069 tonnes in 1995. The contribution of multi-day trawlers, which was 35.4% of the total landings in 1991, increased to 52.5% in 1995. The disturbing aspect of the daily and multi-day trawlers of Chennai is the substantial decreasing trend in the catch rates. The catch rate of trawlers decreased from 110.8 kg.h^{-1} in 1991 to 48.3 kg.h^{-1} in 1995.

Krishnapatnam and Nizampatnam based trawlers:

Prior to the extension of fishing area by the Chennai based trawlers, the fishing grounds off Nizampatnam was exploited by the trawlers of Krishnapatnam and Nizampatnam. Consequent upon increase in fishing intensity in 1993/1994, the catch as well as the catch rate of trawlers of Krishnapatnam and Nizampatnam declined, resulting in drastic reduction in fishing effort. The combined annual trawl effort in both the

Table 1. Profile of trawlers based at 3 major centres in the study area; the values are average for the years 1991-1995

Parameters	Chennai (13°00'N)			Krishnapatnam (14°00'N)	Nizampatnam (15°40'N)	Total (13°00'N) to (15°40'N)
	Daily voyage	Multiday voyage	Total			
No. of trawlers	180	300	480	70	150	700
No. of units year $^{-1}$	37807	7850	45657	3921	15650	65228
Annual fishing effort (000h)	226	233	459	185	172	816
Fishing h.unit $^{-1}$	6.0	29.7	10.1	47.2	11.0	12.5
Fishing area	P. patnam to K. patnam	K. patnam to N. patnam		K.patnam to N. patnam	N.patnam to M. patnam	p.patnam to M. patnam
Depth of trawling (m)	10-70	10-70	10-70	10-50	10-50	10-70
Length of trawler (m)	10-11	12-14	10-14	10-14	10-14	10-14
Area under trawling (sq. km)						4650

centres decreased from 5,48,678 h in 1993 to 2,63,438 h in 1995. The catch and catch.h^{-1} also declined except in 1995. Most of the trawlers of Nizampatnam shifted their operation further north (off Machlipatnam) which may be the reason for higher catch.h^{-1} (71.7 kg.h^{-1}) in 1995.

Maximum sustainable yield and optimum effort

It is estimated that the MSY of the north Tamil Nadu - south Andhra Pradesh inshore area is 48,358 tonnes, which is higher than the annual catch during 1995 (43,318 tonnes) (Fig.1). To obtain the MSY, the optimum annual effort is 8,80,045 h and the effort during 1995 was higher by 87,955 h. Hence, the trawl effort has to be reduced by nearly 10% to obtain about 12% more yield.

To understand the status of the trawl fishery off Chennai, the MSY and optimum effort were estimated based on the annual effort, catch and catch.h of daily trawlers based at Chennai. The MSY off Chennai is 17,831 tonnes and the optimum effort is 2,23,862 h (Fig.1) or 29,848 unit operations. year^{-1}. During 1995, the yield and effort were 14,994 tonnes and 3,30,000 h (or 43,963 units), respectively. Hence, the trawl effort off Chennai has to be reduced by about 32% to obtain 2,837 tonnes more.

Catch composition

The trawl landings in Chennai Fisheries Harbour was dominated by silverbellies, threadfin breams and croakers. The 3 groups together formed 42.7% and 40.0% of the total landings of daily and multi-day trawlers, respectively. The penaeid prawns, the target group formed 9.0% of the daily as well as multi-day trawl landings.

There was considerable difference in the catch composition of trawl landings between the 3 fishing harbours. The landings of prawns, for instance, was high in Krishnapatnam (27% of the landings) and Nizampatnam (15%) than in Chennai (9%); cephalopods which formed only negligible percentage of the landings at Krishnapatnam and Nizampatnam, formed 5% and 10% of the landings of daily and multi-day trawlers of Chennai, respectively.

In the coastal waters of north Tamil Nadu-south Andhra Pradesh, the trawling grounds off Chennai is being well exploited during the past 3 decades. At present, 180 small trawlers of 10-11 m OAL are engaged in daily fishing off Chennai. The present study reveals that the effort of these trawlers has to be reduced by 32% to obtain MSY. To reduce the effort to the suggested level, (i) each of the 180 trawlers should operate for only 166 days.year^{-1}; or (ii) for effective usage of 250 days of fishing. year^{-1} only 120 trawlers should be permitted to operate, i.e., reduction of 60 trawlers. Since the smaller units are gradually phased out, it appears that the second option will materialise and there will be only 120 daily voyage trawlers in Chennai by 1998-1999.

Compared to the trawling activity off Chennai, the fishery opeations of Krishnapatnam and Nizampatnam were dependant upon indigenous craft and gears and trawling commenced much later and gained importance only in the late 1970s. Till the late 1980s, the area off Nizampatnam was relatively underexploited compared to the trawling grounds off Chennai.

The trawling ground off Nizampatnam has higher productivity. The river Krishna opens into sea on the northwestern side of Nizampatnam and forms a bay with a vast shallow water area , which is ideal for trawling. Also, there are many canals and tributaries of the river, which open at several points along the coast near Nizampatnam. Based on exploratory survey during 1973-1981, Vivekanandan and Krishnamoorthi (1985) identified the trawling grounds off Nizampatnam as the most productive area in the region for demersal fishes (estimated potential yield (EPY) 1.8-2.2 t.sq.km^{-1}) and prawns (EPY: 0.002- 0.004 t.sq.km^{-1}). Higher potential yield and underexploitation prompted the trawlers of Chennai to induct larger vessels and extend the fishing off Nizampatnam. Consequently, the fish stock is under severe pressure as evidenced from the decline in the Cph since 1993 in the entire

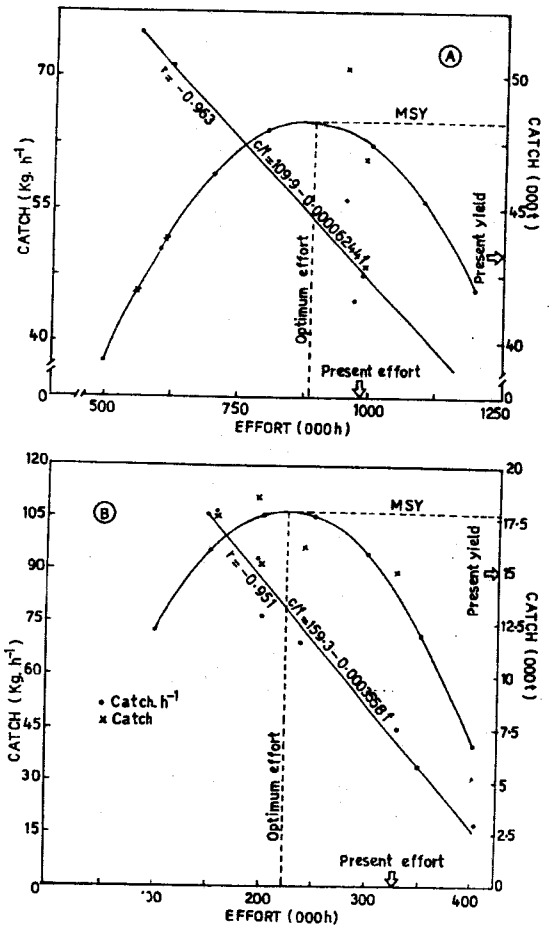

Fig. 1: Trends of catch and catch h^{-1} on trawl effort off north Tamil Nadu-south Andhra Pradesh coast (A) and Chennai (B) during the years 1991-1995

region, particularly in the areas of peak trawl activity, viz., off Nizampatnam and off Chennai.

It is clear from the present study that there is decline in the demersal fishery resources in the inshore waters of north Tamil Nadu-south Andhra Pradesh coast. As the fishing effort is restricted to the inshore waters (<70 m depth) and has not extended to deeper waters, the open access in sharing the stock in the limited inshore area leads to frequent and serious conflicts between the fishermen of these two contiguous maritime states. Implementation of a comprehensive fishery management policy for the coastal trawl fishery of the region is essential. Presently there is no effective policy for management of the fishery resources of this region. Devaraj *et al.,* (1996) suggested that the multi-day trawlers should be persuaded to undertake only one 5 day cruise in a period of 10 days. It is further suggested that these trawlers may be diversified as trawler-cum-longliner/ gillnetter as in the northwest coast to facilitate longlining/ gillnetting between two successive trawl voyages.

The fishing industry throughout the country is experiencing similar upgradation of trawl efficiency, resulting in multi-day fishing (for e.g., in the northwest coast: Vivekanandan *et al.,* 1994; in the south Kannada coast: Mohamed and Zacharia, 1995) and intensive exploitation of the coastal resources. A massive awareness building compaign among fisherfolk on the need for trawl fishery management and orienting them towards responsible fishing is urgently required.

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References

Devaraj, M., Paulraj, R., Vivekanandan, E., Balan, K., Sathiadhas, R. and Srinath, M., 1996. Coastal fisheries and aquaculture management in the east coast of India. *Mar.Fish.Infor.Serv.TandE Ser.*, 141: 1-9.

Mohamed, K.S. and Zacharia, P.U., 1995. Investment opportunities for deepsea trawling along Dakshina Kannada coast - a bioeconomic analysis. Seminar on investment opportunities in fisheries, Mangalore.

Schaefer, M., 1954. Some aspects of the dynamics of populations important to the management of the commercial marine fisheries. *Bull.I-ATTC.*,1: 25 - 26.

Vivekanandan, E., 1996. Status report on Madras Fisheries Harbour - 1995. *Mar.Fish.Infor.Serv.TandE Ser.,* 143: 19 - 23.

Vivekanandan, E. and Krishnamoorthy, B., 1985. Estimated resources of demersal fisheries off north Tamil Nadu-south Andhra coast based on exploratory surveys. Proceedings of Symposium on harvest and postharvest technology of fish., Society of Fisheries Technologists, Cochin, 69-76.

Vivekanandan, E., Philipose, K.K., Kurian, A., Thumber, B.P. and Dhokia, H.K., 1994. Changing pattern of trawl fishery in Veraval. *Indian J.Fish.*, 41: 45 - 50.