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PERFORMANCE OF MEDIUM AND SMALL TRAWLER IN ANDHRA COAST

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Introduction

In north-east coast of India, Visakhapatnam and Kakinada are the major fish landing centres situated in coastal region of Andhra Pradesh. At present about 50 thousand artisanal craft and about 2000 mechanised boats are under operation in the centre. Of mechanised boats more than 80% are trawlers of different sizes. There are about 800 small mechanised trawl units in operation along Andhra coast consisting mainly 3 types of boats known as *Sorrah*, *Pabblo* and *Roya*. Medium size boats which are known as *Sona*, operating trawl net, are recent addition to the state fishing fleet.

Initially two American trawlers were operating in north-east coast of India. In 1978 a few large Mexican trawlers were introduced. After 1985 there was a cruise of trawlers in this coast and at that time the catch per unit of effort was quite high which later significantly got reduced due to high fishing pressure.

Due to the introduction of mini-trawlers and large trawlers to the fishing fleet along with small and medium trawlers a heavy competition was developed in trawl fishing. Moreover, for all these vessels main concentration has been on prawn catch and the fishing grounds at Sandhead region are heavily exploited. This resulted in the economic loss in operation of some mini and large trawlers and continuous reduction in the profit margin of small and medium trawlers. Since the fishing pressure is increasing due to continuous increase in the number of small and medium trawlers, a situation may reach when these trawlers would also become uneconomic.

It is assessed that about 1/3rd of the capital investment in total mechanised fishing fleet in the state is accounted for small and medium trawlers. Hence it was felt necessary to study the economic performance of small and medium trawlers along Andhra coast.

The Central Marine Fisheries Research Institute, Cochin planned to conduct a study on the economic performance of trawl units operating in Andhra coast in 1991 and two centres namely Visakhapatnam and Kakinada were identified for the study. The study would provide the entrepreneur necessary information for decision making to invest in trawl fishing and help the planners to formulate fishery development programme for this region.

Survey procedures

A preliminary survey was conducted at Visakhapatnam and Kakinada trawl landing centres for collecting information on marine fishery characteristics along with the marketing infrastructure, employment opportunity and fishery related activities. Two schedules were formulated for collecting information from the selected trawl units. Schedule I contains details of craft, gear, engine, credit pattern, type of ownership, family labour, fishing duration, mode of disposal of catch, jetty rent etc. Schedule II was used to collect information on catch landings, price of fish, and operating costs. Schedule I was used to collect information from 20 units in each centre only once in a year. The information in schedule II were collected on 10 days in every month for one year (1991) from the 10 units randomly selected at each centre.

At both the centres, enumerators from fisherman community were selected and trained in economic data collection. To insure the accuracy of data, regular monitoring and surprise checking were done.

Fishing operation of different sizes of trawlers

At Visakhapatnam as well at Kakinada medium trawlers are mostly *Sona* boats which are 12 - 15 m long, about 3 m wide and 3 m deep. The wooden hull is fitted mainly with Ashok Leyland engine of about 100 HP. Most of the units are recently introduced and new additions come up every year.

Other units operating trawl nets include small boats such as *Roya*, *Pablo* and *Sorrah*. *Pablo* boat is 8 m in length and *Sorrah* is comparatively bigger with length of about 10 m. *Roya*'s size lies between *Pablo* and *Sorrah*. Majority of the small trawlers are fitted with Ashok Leyland, 60-90 HP engine. The carrying capacity of these boats varies from 8 to 15 tonnes.

The main concentration of fishing by these trawlers is observed in Sandhead area. Some of the trawlers are migratory in nature. The size and type of boats and the pattern of fishing are almost same at both the centres. All trawlers are being operated upto 80 m depth.

Investment pattern

The acquisition cost of a medium trawler is at Rs. 7.7 lakh during 1991 of which about Rs. 0.7 lakh is accounted for the gear. Among the small trawlers *Sorrah* costs Rs. 4.5 lakh, *Roya* Rs. 3.5 lakh and *Pablo* Rs. 3 lakh. Thus, the average value of new small trawler has been taken at Rs. 3.9 lakh for this study. This includes the value of nets at Rs. 0.4 lakh. The length of a trawl net is about 25 m for medium trawler and 18-23m for small trawler. The mesh size at code and is 40-45 m.

Fishing days

The medium trawlers operate for about 180 days in a year. Each fishing trip comprises

9-12 days. Depending on the size and capacity of the boat small trawlers observe a fishing trip of 3-7 days. These trawlers fish on an average of 190 days in a year. September-October, usually a period of cyclone, is supposed to be good for prawn availability. In general, trawling is closed in between mid of March and mid of June every year. Fishing trend is almost same at Kakinada and Visakhapatnam centres.

Catch and revenue

Medium trawler: All types of trawlers operate in 70-80 m depth. Per day availability of catch and revenue realised with the number of fishing days are given in Table 1. In Ist quarter (January-March) the medium trawler fished on an average for 50 days and got 40.6 kg of prawns and 272 kg of fish per fishing day. In IInd quarter (April-June) only 10 days were fished and the catch obtained per fishing day was calculated at 226.7 kg out of which prawn catch was about 8% only. During July-September period (IIIrd quarter) there was heavy catch and the contribution of prawn was about 15%. About 433 kg of catch per fishing day of operation was recorded at 437.3 kg. During III & IV quarters average number of fishing days was 60. During the year overall catch per day of operation was estimated at 390 kg and the shrimp contribution was about 13%. The annual catch of a medium trawler along Andhra coast in 1991 is worked out at about 70 tonnes.

TABLE 1. Catch & revenue of trawlers in Andhra coast during 1991

Quarter	No. of fishing days	Average per day of operation			Revenue(Rs)
		Shrimp	Fish & Cephalopods	Total	
Medium trawler:					
I	50	40.6	272.0	312.6	5348
II	10	19.1	207.6	226.7	3577
III	60	65.5	367.2	432.7	8219
IV	60	48.5	388.7	437.3	6612
Annual	180	50.4	339.1	389.5	6628
Small trawler:					
I	55	20.8	232.5	253.3	3130
II	12	13.2	155.6	168.8	2380
III	60	39.5	266.4	305.9	5136
IV	63	22.3	246.6	268.9	3336
Annual	190	26.7	243.0	269.7	3784.4

N B: *I quarter : January-March
II quarter : April-June

III quarter: July-Sept.
IV quarter: October-Dec.

The quarter-wise analysis of fishing income revealed that the maximum revenue in quarter III (Rs. 8,219) and the minimum in II quarter (Rs. 3577). The annual gross revenue of a medium trawler during 1991 is worked out at Rs. 11,93,040 with an average of Rs. 6,628 per day of fishing.

Small trawler: For a small trawler, in I quarter, fishing was observed for 55 days and the average per day catch was about 253 kg including 21 kg of prawns. In II quarter fishing was only for 12 days and per day catch was poor (196 kg). In III quarter there was good catch of prawn (39.5 kg/day) and fish (306 kg/day). In per day catch of 269 kg during IV quarter the prawn contributed about 8%. On an average the annual catch for a small trawler was worked out about 51 tonnes, with a quantity of 270 kg per day of operation.

As in the case of catch, the revenue per day fished was also maximum in III quarter (Rs. 5,136) and minimum in II quarter (Rs. 2,380). In other two quarters, the per day revenue was about rupees three thousand. The total average income earned by a small trawl unit in 1991 amounted to Rs. 7,19,038 with an average of Rs. 3,784.4 per day of fishing operation.

Fishing costs

Fixed cost: The fixed cost components mainly includes depreciation on craft, gear and engine, interest on initial investment, insurance and overhead costs. In case of medium trawlers the depreciation is worked out at Rs. 1,05,000 for craft (10%) and gear (59%). The interest was calculated at the rate of 15% which is an amount of Rs. 1,15,500 (Table 2). An amount of Rs. 17,500 was accounted for the insurance of craft. Including shore management expenditure which is fixed irrespective of fishing operation, the total annual fixed cost amounted to Rs. 2.62 lakh for a medium trawler.

TABLE 2. Fixed cost components

Particulars	Medium trawler (Rs)	Small trawler (Rs)
a. Depreciation:		
Hull & engine	70,000 (26.7%)	35,000 (24.6%)
Gears etc.	35,000 (13.4%)	20,000 (14.1%)
b. Interest	1,15,500 (44.1%)	58,500 (41.1%)
c. Insurance	17,500 (6.7%)	8,750 (6.1%)
d. Share management	24,000 (9.1%)	20,000 (14.1%)
Total	2,26,000 (100%)	1,42,250 (100%)

For a small trawler, total fixed cost worked out at Rs. 1,42,250 including depreciation of craft and gear (Rs. 55,000), interest on capital (Rs. 58,500), insurance (Rs. 8,750) and shore management (Rs. 20,000).

Overall expenses: Fuel is the major operating cost item (52-53%) followed by wage of crew, food and bata (31-34%), repair and maintenance (6-8%) and ice (6-7%) on both the types of trawl units (Table 3). Most of the trawlers give share in catch to the crew. Since these vessels do not have freezing facility the ice is an essential item to be taken on board for preserving prawns and commercially important fishes. Repair and maintenance as shown in the Table 3 include day to day as well as annual repairs and maintenance costs of the vessels.

TABLE 3. Operating cost (Rs) of trawlers in Andhra coast, 1991

Items	Medium trawler	Small trawler
a. Fuel	3,96,500 (52.8%)	2,59,500 (52%)
b. Wages	2,38,150 (31.7%)	1,69,950 (34%)
c. Ice	45,000 (5.9%)	34,600 (6.9%)
d. Repair & maintenance	59,500 (7.9%)	30,275 (6.1%)
e. Miscellaneous	12,500 (1.7%)	5,190 (1.0%)
Total (Rs)	7,51,650 (100%)	4,99,515 (100%)

For a medium type of trawler the annual operating costs worked out at Rs. 7,51,650 whereas for a small type of trawler it came to Rs. 4,99,515. Both the type of vessel operate for about 16 hours a day.

Total cost

For a medium trawler annual fishing cost worked out at Rs. 10,13,650 with the operating cost at 74% and fixed cost 26%. The total annual fishing cost for a small trawler worked out at Rs. 6,41,765, of which variable cost is 78% and fixed cost 22%.

Economic efficiency

The gross revenue earned by a medium trawler worked out on an average to Rs. 12 lakh and for a small trawler Rs. 7 lakh. Annual profit was about Rs. 1.79 lakh for a medium trawler and Rs. 0.77 lakh for a small trawler averaging Rs. 997 and Rs. 407 respectively per day. The labour efficiency was more for medium trawler as the catch per man day was 49 kg for medium trawler and 45 kg for a small trawler with the corresponding value at Rs. 829 and Rs. 631 whereas cost incurred per crew came to Rs. 165 and Rs. 149 respectively.

Regarding the fuel efficiency it is found that 1 litre of fuel could produce 1.19 kg of fish on a small trawler and 1.33 kg on a small trawler. Though the cost of one litre fuel is assessed at Rs. 6.75 the value of fish produced with one litre came to Rs. 18-20.

For calculating payback period, the profit without taking depreciation into account was worked out which on dividing the initial investment gives the number of years in which the capital can be recovered. In both the cases the capital recovery is possible within 3 years of time.

The rate of return to the capital is calculated on dividing the initial capital by the profit without taking interest into account. For medium trawlers the rate of return to capital is 38.3% whereas for small trawlers it is 34.8% against the prevalent rate of interest at 15% per annum.

TABLE 4. *Economic efficiency parameters*

Parameters	Medium trawlers	Small trawlers
a. Annual catch (kg)	10,110.00	51,243.00
b. Annual gross revenue (Rs)	11,93,040.00	7,19,038.00
c. Total fishing costs (Rs)	10,13,650.00	6,41,765.00
d. Annual profit (Rs)	1,79,390.00	77,273.00
e. No. of annual fishing days	180.00	190.00
f. Catch per fishing day (kg)	390.00	270.00
g. Revenue per fishing day (Rs)	6,628.00	3,784.00
h. Cost per fishing day (Rs)	5,631.00	337.00
i. Profit per fishing day (Rs)	997.00	407.00
j. No. of crew members	8.00	6.00
k. Catch per crew (kg)	49.00	45.00
l. Revenue per crew (Rs)	829.00	631.00
m. Coast per crew day (Rs)	165.00	149.00
n. Litres of fuel per years	58,741.00	38,444.00
o. Catch per litre of fuel (kg)	1.19.00	1.33.00
p. Revenue per litre of fuel (Rs)	20.31	18.70
q. Cost per kg of fish production	14.46	12.52
r. Revenue per kg of fish	17.02	14.03
s. Profit per kg of fish production	2.56	1.51
t. Pay back period (years)	2.71	2.95
u. Rate of return to capital (%)	38.30	34.80
v. Ratio of operational cost to gross revenue	0.63	0.69

Conclusion

In Andhra coast the medium trawler of 12-15 m length had an acquisition cost of about Rs. 7.7 lakh in 1991 which resulted in a fixed cost of Rs. 2.62 lakh per annum. The fixed cost of a small trawler of 8-10 m, which has an initial investment of about Rs. 3.9 lakh, is calculated at Rs. 1,42,250 per annum. For both the types of trawlers expenditures on fuel was the major operating cost (52-53%). The wages in cash and kind, food and bata accounted 32-34% of annual operating cost. The medium trawler operated on an average 180 days during 1991 incurring Rs. 7,51,650 on fishing. The operating cost of a small trawler was worked out at Rs. 4,99,515 for 190 days of fishing operation. The total annual fishing cost of a medium trawler was Rs. 10,13,650 and that of a small trawler Rs. 6,41,765.

Regarding the seasonality of fishing it was found that catch and revenue were higher in III and IV quarters. In II quarter, the number of fishing days and catch/revenue per day of operation are comparatively less. From mid of March to mid of June there is voluntary ban on trawling. Just after cyclone there is good availability of prawns every year. For a medium trawler per day revenue was maximum in III quarter (Rs. 8,219) and minimum in II quarter (Rs. 3,577). Average revenue per day of fishing during 1991 was Rs. 6,628 for the medium trawler. An average amount of Rs. 3,784.4 was earned by a small trawler. A maximum gross revenue of Rs. 5,136 per day fished was earned in III quarter and a minimum of Rs. 2,380 in II quarter. The gross revenue of a medium trawler for 180 days of fishing was about Rs. 11.9 lakh and for a small trawler for 190 days about Rs. 7.2 lakh.

The annual profit earned by a medium trawler was Rs. 1,79,390 and small trawler Rs. 77,273. The initial investment in both types of trawlers could be recovered within 3 years. The rate of return to the capital is worked out at 38.3% for medium trawler and 34.8% for small trawlers. Thus, based on various economic efficiency parameters it can be safely concluded that both types of trawlers under study were running in profit during 1991. However, the medium trawlers were found to be economically more efficient. In no case further addition to the fishing fleet is advised.