

## ECONOMICS OF CATAMARAN FISHING ALONG THE MADRAS COAST\*

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### ABSTRACT

The present paper deals with the findings of a socio-economic investigation carried out during April 1984 to March 1985 at Thiruvottiyoor kuppam and Pudumanikuppam fishing villages along the Madras Coast with special emphasis on economics of catamaran fishing. The study reveals that the average initial investment of a small catamaran unit (logs of 2½ to 5 metre length with 1 or 2 type of nets) amounts to Rs. 3,860 and bigger unit (logs of 6 to 6.5 metre length with 3 to 5 type of nets) Rs. 13,357. The average annual catch of a small unit is 2,300 kg valued at Rs. 11,940 whereas for bigger unit annual catch is 4,999 kg realising a gross return of Rs. 26,720. Annual net income of the owner of a small unit works out at Rs. 7,460 and big unit, Rs. 16,175. The net income includes the wages of family labourer also. The net profit of a small unit is Rs. 1,412 as against Rs. 3,975 for big unit. The average number of fishing days for small units during the year is 177 as against 276 for big units. Since the initial investment for different units showed considerable variation the effect of the same on gross returns has been analysed which indicates that the catamaran owners can enhance their earnings by increasing the size of craft as well as number of gears.

The poor economic condition coupled with scant availability of finance from the institutional agencies force the fishermen to sustain with the less equipped fishing equipments which in turn results in lesser returns entangling them in a vicious circle of poverty. Supply of credit to fishermen on easy terms and conditions, controlling the cost escalation of catamaran logs by providing it through co-operatives by Forest Department, regulation of area of fishing or period of operation for mechanised and non-mechanised boats and fitting of outboard engines on catamarans are some of the suggestions given to improve the earnings of catamaran fishermen.

### INTRODUCTION

DESPITE the increased tempo of mechanisation of fishing boats during the last two decades, marine fishery sector in India is still dominated by the traditional way of fishing. About 1.4 lakh country craft are engaged in marine fishing in our country, of which 50% are catamarans. Though fishermen have been engaged in catamaran fishing for a long time sufficient attention has not been paid to improve their socio-economic conditions. In spite of their incessant effort, dexterity and skill in fishing operations, their income, on the whole is still at a lower level when compared to the

workers in other sectors. Probably the earnings of fishermen are very low due to their immobility and lack of alternate opportunities. The catamaran is the predominant indigenous craft operating in Tamil Nadu Coast. Out of 43,000 non-mechanised boats operating along this coast, 32,000 (73%) are catamarans. This is because of its suitability for the heavy beach surf conditions and comparatively low investment requirements. The present account deals with the findings of an investigation on economics of catamaran fishing carried out at Thiruvottiyoor kuppam fishing village situated near Madras in Tamil Nadu.

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#### MATERIALS AND METHODS

The fixed cost details of 100 catamaran fishing units operating at Thiruvottiyoor kuppam landing centre have been collected. A sub-sample of 20 units representing different size and having 1 to 5 type of gears viz., *thattukavalai valai*, *mathavalai*, *ravalai*, *thoorinet*, *kavalai valai* were randomly selected for regular observation for all the seasons spreading over a year. Data regarding operational cost and returns on sample days were collected from the selected units for the period from April 1984 to March 1985. Enumerators were engaged from the village itself to ensure maximum accuracy in data collection. To study the effect of the factors of production namely initial investment, operational cost and number of days fished on the gross returns, a Cobb-Douglas type of production function was fitted to the annual data of the selected units.

#### RESULTS AND DISCUSSION

##### *Cost and returns of catamaran units*

The initial investment of a catamaran unit depends on the size of craft and the number of gears owned. To analyse the costs and returns of catamaran fishing units at Thiruvottiyoor kuppam, the sample units have been classified into two groups, viz. Small units having logs with a length of 2.5 to 5.0 metres and operating 1 or 2 nets and Big units with logs 6.0 to 6.5 metre length and operating 3 to 5 gears. The annual depreciation for craft and gear was calculated by straight line method. The life expectancy was assumed as 7 years for the catamaran logs and 3 years for the nets. Annual

interest for investment was worked out at the rate of 15%.

Initial investment of a catamaran unit ranged from Rs. 3,860 to 13,357, the average being Rs. 9,474. The average price of catamaran logs worked out at Rs. 1.830 for small units and Rs. 5,500 for big units. The average value of nets worked out at Rs. 2,030 for small units and Rs. 7,857 for big units. The actual number of fishing days varied from 177 for small units to 276 for big units (Table 1).

The small units are mostly operated by family members. These units usually engage hired labourers, sometimes along with nets, only during peak season. The average annual catch of a small catamaran was 2,300 kg fetching an annual gross return of Rs. 11,940. The operational cost per annum worked out at Rs. 9,011, of which labour cost accounted for 76%, maintenance and repair 2%, auction charges 8%, and other expenses 14%. The imputed annual wages of a family labourer was Rs. 4,531. The net income over operating cost of the owner of a small unit worked out at Rs. 7,460 including his wages. The net profit of the unit was calculated at Rs. 1,412. The pay back period of the small units worked out at about 1 year and 8 months and the rate of return to the capital 76%.

The average annual catch of a big unit was 4,999 kg fetching a gross return of Rs. 26,720. The annual operational cost worked out at Rs. 17,338 covering the charges of repairing and maintenance (1.5%), auctioning of fish (9.0%), labour (75.5%) and other items (14.0%). The net income over operational cost (excluding family labour) of a big unit worked out at Rs. 16,175. The net profit of the unit came about Rs. 3,975. The pay back period was about 1 year and 10 months and the rate of return worked out at 70%.

The actual number of fishing days per year for small units was 177 with maximum of 62

days during April-June and minimum of 27 days during January-March periods. Bigger units operated for 276 days with the maximum of 73 days during January-March and minimum of 63 days during July-September periods. For small units, the catch as well as gross returns was maximum during July-September

for different quarters (Table 2). The average daily operational expenses for small units amounting to Rs. 25 per day ranging from 8 to Rs. 68 for different seasons. The gross revenue per day worked out at Rs. 67, with a minimum of Rs. 24 during October-December and a maximum of Rs. 100 during July-September.

TABLE 1. *Annual average income and expenditure statement of catamaran units in Thiruvottiyor kuppam, Madras (1984-85)*

		Small units	Big units
<b>1. Initial investment (Rs.)</b>			
(i) Catamaran	..	1,830	5,500
(ii) Gears	..	2,030	7,857
<b>Total</b>	..	3,860	13,357
<b>2. Annual fixed cost (Rs.)</b>			
(i) Depreciation :			
(a) Craft @ (14.3%)	..	262	787
(b) Gear @ (33.3%)	..	676	2,616
(ii) Interest @ (15%)	..	579	2,004
<b>Total</b>	..	1,517	5,407
<b>3. Operational cost (Rs.)</b>			
(i) Maintenance and repair	..	178	259
(ii) Auction charges	..	757	1,585
(iii) Labour cost :			
(a) Hired labour	..	2,303	6,298
(b) Family labour	..	4,531	6,793
(iv) Other expenses	..	1,242	2,403
<b>Total</b>	..	9,011	17,338
<b>4. Revenue</b>			
(i) Average annual catch (kg)	..	2,300	4,999
(ii) Sales value (Rs.)	..	11,940	26,720
(iii) Net income (including family labour) 4 (ii)—(3 - 3 (iii) b)	..	7,460	16,175
<b>5. Profit of the unit (4 (ii)—(2 + 3)</b>	..	1,412	3,975
<b>6. Pay back period</b>	..	1.64 years	1.81 years
<b>7. Rate of return</b>	..	76%	70%

(1,162 kg valued Rs. 5,880), followed by April-June (720 kg valued Rs. 3,084), October-December (285 kg valued Rs. 1,714) and January-March (133 kg valued Rs. 1,262). The catch per day of operation for small units was 13 kg, which ranged from 5 kg to 33 kg

The average catch of bigger units is comparatively higher than small units in all the quarters. For bigger units maximum catch of 2,405 kg was obtained during July-September followed by 1,500 kg during April-June, 639 kg during October-December and 455 kg

during January-March. The gross revenue realised in each quarter ranged from Rs. 3,235 during October-December to Rs. 10,126 during July-September. The average catch per operating day for bigger units was 18 kg realising a revenue of Rs. 97. The net income over operating expenses worked out at Rs. 59 per day of operation ranging from Rs. 26 during January-March to Rs. 97 during April-June.

and initial investment ( $x_1$ ), operational cost ( $x_2$ ) and number of fishing days ( $x_3$ ) as independent variables. The functional form is

$$Y = a X_1^{b1} X_2^{b2} X_3^{b3}$$

As the effect of number of fishing days was not found significant the factor was dropped in final analysis. Since initial investment varied from Rs. 2,000 to 16,000 it is essential

TABLE 2. *Details of quarterwise average operational cost and returns of small and big catamaran units (1984-85)*

Item	April-June		July-Sept.		Oct.-Dec.		Jan.-March		Annual	
	Small	Big	Small	Big	Small	Big	Small	Big	Small	Big
Average No. of fishing days ..	62	68	35	63	53	72	27	73	177	276
Gross catch per unit (kg)	720	1,500	1,162	2,405	285	639	133	455	2,300	4,999
Gross revenue per unit (Rs.) ..	3,084	9,180	5,880	10,126	1,714	3,235	1,262	4,179	11,940	26,720
Labour cost (Rs.) ..	948	1,538	1,253	2,330	102	782	—	1,648	2,303	6,298
Operational cost (Rs.)	1,490	2,593	2,375	4,476	413	1,223	202	2,254	4,480	10,546
Average daily catch (kg)	12	22	33	38	5	9	5	6	13	18
Average daily gross revenue (Rs.) ..	50	135	168	161	32	45	47	57	67	97
Average daily operational expenses (Rs.) ..	24	38	68	71	8	17	8	31	25	38
Average net income over operational expenses per day (Rs.) ..	26	97	100	90	24	28	39	26	42	59

In view of its low level of initial investment the small catamaran unit is found to be profitable as a family enterprise, in terms of pay back period and rate of returns. But in terms of gross returns and net earnings of a catamaran owner and hired labourers the big units are economically more efficient. The higher investment for these units leads to higher catch, better gross returns, more employment and fishing days.

#### *Input-output relationship*

A Cobb-Douglas type of production function was fitted with gross income (Y) as dependent

for investment decisions to find out whether a higher level of investment will be beneficial to the fishermen. The fitted function is

$$Y = 36.2759 x_1^{0.151547^*} x_2^{0.605701^*}$$

$$(0.054) \quad (0.094)$$

$$R^2 = 89.72. (\%)$$

\*Significant at 5% level.

$R^2$  value is about 90% which indicates that about 90% of variation in gross returns is explained by the initial investment and operational costs.

From the above equation the marginal returns of initial investment at the mean level is

$$MPx_1 = b_1 \frac{\bar{y}}{\bar{x}} = 0.151547 \times \frac{17617}{8302} = 0.32.$$

In the above equation the marginal returns at the mean level is 0.32. Since the sum of depreciation and rate of interest on additional investment is less than  $MPx_1$  a higher initial investment will be desirable.

The marginal value product of  $x_2$  (operational cost)

$$= MPx_2 = b_2 \frac{\bar{y}}{\bar{x}_2} = 605701 \times \frac{17617}{2848} = 3.75.$$

This indicates that one rupee increase in operational cost at the mean level leads to an increase of Rs. 3.75 in gross income. Operational cost mainly includes the repairing and maintenance of craft and gear and cost on baits.

There are certain limitations in this analysis. Both inputs and outputs are expressed in terms of value. Hence the relationship is true only for given prices of output and inputs.

#### *Recommendations*

1. The initial investment which depends on the size of catamaran and number of gears used, is the most important determining factor for the net returns of fishermen. Most of the fishermen are equipped with small sized catamarans and one or two types of nets which can not be operated economically throughout the year. The poor economic condition coupled with the less availability of finance from the institutional agencies compell them to sustain with less equipped fishing implements which in turn result in lesser returns entangling them in a vicious circle of poverty. The commercial banks and

co-operative organisations and Tamil Nadu Fisheries Development Corporation (TNFDC) can formulate some schemes to supply credit to fishermen on easy terms and conditions. TNFDC can also play a vital role in supplying craft and gear to fishermen.

2. The cost escalation of catamaran logs was considerable during the last few years. The manifold increase in price was mainly due to the involvement of middlemen. The State Fisheries Department in consultation with Forest Department can think of supplying through fishermen co-operative at reasonable price at least those logs available in the government owned forests. This will not only help to reduce the prices of catamaran logs, but also make it available to fishermen at the time and place of their requirement.

3. It was reported that due to bad weather the fishermen could not reach either the fishing ground or the landing centre in time for profitable marketing on several occasions. The mobility of the catamaran units can be increased and the strain of fishing can be reduced by fitting outboard motors.

4. The occasional abundance in catch usually does not help the fishermen as it brings down the price to a very low level. The flexibility of demand and supply can be considerably controlled by developing adequate storage facilities and fixing minimum price for different species of fish to avoid monopoly of fish traders. It will further help to maintain steady supply of fish to the consumers.

5. The damaging of nets operated by traditional fishermen by the mechanised boats is a general complaint. There must be proper implementation of regulation of the area of operation or period of operation of traditional and mechanised units.