

The Effect of Increase in the Number of Fishing Trips on the Economic Efficiency of 9.82 m and 11 m Fishing Trawlers Along Kerala Coast

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Cost benefit analysis of a 9.82 m and 11 m fishing trawlers based on the number of fishing trips is presented. The number of fishing trips per year determines the profit and loss of the trawler. With the increase in the number of fishing trips, the profit also increase for both the sizes of trawlers. The minimum quantity of prawn and fish to be landed for 0-20% profit for varying number of fishing trips are worked out. The break-even for 9.82 and 11 m trawlers was observed to be 185 and 210 fishing trips respectively during 1980-81.

Mechanisation of fishing boats was a major break through in the development of fisheries in Kerala. In 1957, there were hardly a dozen mechanised fishing boats operating along Kerala coast. Fishing trawlers of length 9.82 m (32 ft) and 11 m (36 ft) built as per the design of Central Institute of Fisheries Technology, are in operation in large numbers along the coast. Presently there are about 2900 mechanised boats in Kerala, of which, 84% are trawlers. Consequent on the increase in trawlers, year after year, the return over capital showed a decreasing trend mainly due to declining catch and the soaring cost of operations. Entrepreneurs and fishery experts doubted whether trawling in inshore waters is profitable. In this background, the authors have made a case study to examine whether fishing operations are economical, to identify the relationship, if any, between the number of fishing trips and the economic efficiency of the trawlers and to assess the minimum quantity of prawn and fish to be landed by a trawler of 9.82 m and 11 m length for a reasonable profit. The findings of the study are reported in this paper.

Materials and Methods

Data from 100 trawlers, 50 of 9.82 m and 50 of 11 m built as per CIFT design and operating along Kerala coast were collected.

The data on capital investment including cost of hull, engine, gear, accessories, total catch, sale proceeds, fuel cost, wages and commissions, cost of repairs and maintenance, insurance charges were collected for each boat during 1980-81.

For working out the economics of operation, the model developed by Iyer *et al.* (1982) was used. The percentage profit on total expenditure was worked out for 9.82 m and 11 m trawlers for varying number of fishing trips and are presented in Tables 1 and 2 respectively. The method to workout the fixed cost and variable cost was the same as reported by Iyer *et al.* (1982). Also, for different levels of profit, the minimum receipt to be obtained per trip was worked out by solving Y from the equation.

$$\frac{Y - [F + x + i + 0.35 (Y - x)]}{F + x + i + 0.35 (Y - x)} = \infty$$

Where, Y - Total receipt (Rs.)
F - Fixed cost "
x - Fuel cost "
i - cost of ice "

and ∞ % profit on total expenditure.

Based on the return per trip and prawn to fish ratio in the total catch, the minimum quantity of prawn and fish to be landed for different levels of profit at varying number

Table 1. Cost and earnings of a 9.82 m fishing trawler during 1980-81 for varying number of fishing trips

No. of trips	Receipt (Rs)	Average receipt per trip (Rs)	Fixed cost (Rs)	Variable cost (Rs)	% profit cost total cost
180	1,30,283	724	56,700	76,850	- 2.45
185	1,36,540	738	56,700	79,852	0
200	1,56,169	781	56,700	89,159	+ 7.07
225	1,91,735	852	56,700	1,05,670	+ 18.08
250	2,30,867	923	56,700	1,23,428	+ 28.17

Table 2. Cost and earnings of a 11 m fishing trawler during 1980-81 for varying number of fishing trips

No. of trips	Receipt (Rs)	Average receipt per trip (Rs)	Fixed cost (Rs)	Variable cost (Rs)	% profit over total cost
180	1,46,389	813	77,150	90,228	-12.54
200	1,73,960	870	77,150	1,03,966	-3.95
210	1,88,593	898	77,150	1,11,142	+ 0.16
215	1,96,121	912	77,150	1,14,003	+ 2.60
225	2,11,602	940	77,150	1,22,275	+ 6.10
250	2,52,777	1011	77,150	1,41,822	+ 15.43

Table 3. Minimum quantity (tonnes) of prawn and fish to be landed by 9.82 m trawler at different levels of profitability

Profit	0%		5%		10%		15%		20%	
	Prawn	Fish	Prawn	Fish	Prawn	Fish	Prawn	Fish	Prawn	Fish
No. of fishing trips in a year										
180	10.3	8.9	11.4	9.9	12.0	10.3	12.9	11.1	13.9	12.0
185	10.4	9.0	11.5	10.0	12.1	10.4	13.0	11.2	14.0	12.1
200	10.7	9.2	11.8	10.3	12.4	10.7	13.4	11.5	14.4	12.4
225	11.2	9.6	12.1	10.6	13.0	11.2	14.0	12.1	15.0	13.0
250	11.6	10.0	12.6	10.8	13.5	11.7	14.6	12.6	15.7	13.5

Table 4. Minimum quantity (tonnes) of prawn and fish to be landed by a 11 m trawler at different levels of profitability

Profit	0%		5%		10%		15%		20%	
	Prawn	Fish	Prawn	Fish	Prawn	Fish	Prawn	Fish	Prawn	Fish
No. of fishing trips in a year										
180	13.6	11.8	14.7	12.7	15.8	13.7	17.0	14.7	18.3	15.8
200	14.1	12.2	15.2	13.1	16.4	14.0	17.6	15.3	19.0	16.3
210	14.3	12.4	15.5	13.3	16.7	14.4	17.9	15.5	19.3	16.6
215	14.4	12.5	15.6	13.5	16.8	14.5	18.1	15.6	19.5	16.7
225	14.7	12.6	15.9	13.6	17.1	14.7	18.4	15.8	19.8	17.0
250	15.3	13.2	16.5	14.3	17.8	15.4	19.2	16.5	20.6	17.7

of fishing trips in a year was worked out for 9.82 m and 11 m trawlers (at the average rate of Rs. 12,000 and Rs. 1,300 per tonne for prawn and fish respectively) and are presented in Tables 3 and 4 respectively.

Results and Discussion

Table 1 presents the cost and earnings of a 9.82 m fishing trawler. The profit increases with the increase in the number of fishing trips (a significant +ve correlation is observed between the number of fishing trips and the receipt per trip). The break-even chart of a 9.82 m trawler (Fig. 1) shows that the breakeven was at about 185 fishing trips per year. When the number of fishing trips were increased to 200, the profit also increased to 7.07% and at 225 and 250 fishing trips per year, the profit further increased to 18.08 and 28.17% respectively.

Table 2 gives the cost and earnings of a 11 m fishing trawler for varying number of fishing trips during 1980-81. In this case also, with the increase in the number of fishing trips, the profit showed an increasing trend. Fig. 2 shows that the breakeven of a trawler of this size is at about 210 fishing trips per year. When the number of trips were increased to 225, the profit also showed an increase of 6.10% and at 250 fishing trips, the profit touched 15.43%.

Table 3 gives the minimum quantity of prawn and fish to be landed by a 9.82 m trawler for different levels of profit at varying number of fishing trips in a year. It is evident from Table 3 that with the increase in the number of fishing trips, the prawn and fish to be landed for different levels of profit also increases in a season. For breakeven, it is estimated that a trawler of this size making 180 fishing trips has to land a minimum of 10.3 tonnes of prawn and 8.9 tonnes of fish and for 250 fishing trips 11.6 tonnes of prawn and 10 tonnes of fish per year. For 10% profit the prawn and fish to be landed were respectively 12.0 and 10.3 tonnes with 180 fishing trips and 13.5 and 11.7 tonnes with 250 fishing trips in a year.

Table 4 gives the minimum quantity of prawn and fish to be landed by a 11 m trawler at different levels of profit for varying number of fishing trips in a year. Here

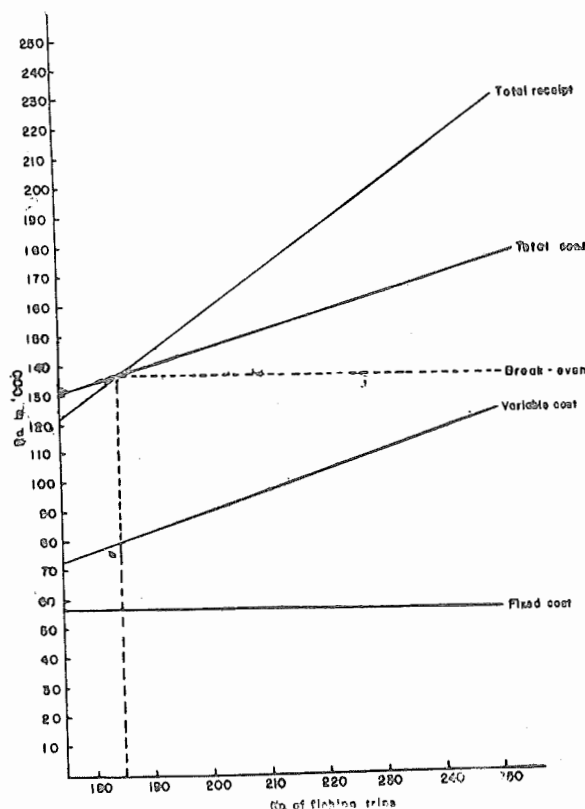


Fig. 1. Breakeven chart of 9.82 m trawler

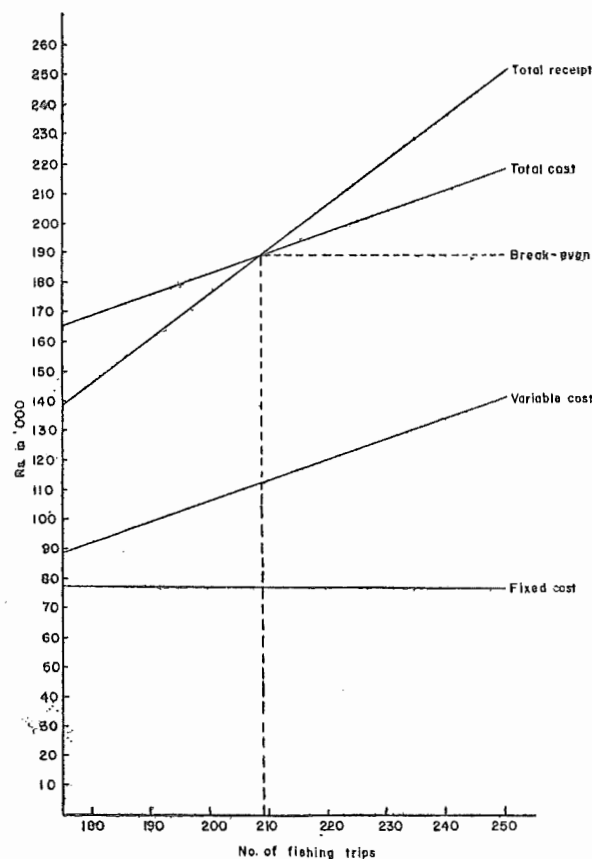


Fig. 2. Breakeven chart of 11 m trawler

also, with the increase in the number of fishing trips, the quantity of prawn and fish to be landed in a season increase. For breakeven, a trawler of this size has to land a minimum of 13.6 tonnes of prawn and 11.8 tonnes of fish in the course of 180 fishing trips and 15.3 tonnes (prawn) and 13.2 tonnes (fish) for 250 trips per year. For a reasonable profit of 10%, the minimum quantity of prawn and fish to be landed at 180 fishing trips per annum worked out to 15.8 and 13.7 tonnes respectively and at 250 fishing trips per year, these figures were 17.8 and 15.4 tonnes respectively.

Thus it follows that one of the possible ways of improving the economic efficiency of a trawler is to enhance the number of fishing trips in a season as the fixed cost

remains the same whether the boat is fishing or idle. The minimum catch to be obtained for different profit levels varies with the average price realised for prawn and fish in a season and can be worked out by using the formula cited in the text.

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Reference

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