



Full Length Research Article

AN ECONOMIC ANALYSIS ON THE DIFFERENT TYPES OF FISHING CRAFTS IN TAMILNADU

*Prabakar, C.

Asst Professor, Department of Agricultural Economics, Faculty of Agriculture, Annamalai University

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ABSTRACT

This paper attempts to probe into the comparative economics of motorization of traditional crafts and the constraints prevailing for adoption of motorization by traditional fisherman families in Tamilnadu. The comparative cost and return and efficiency analysis confirm that there is proportionate increase in gross and net returns for the increased cost/investment due to motorization coupled with higher labour productivity. The analysis on reasons for non-adoption reveals that lack of access to institutional credit due to the inability to fulfill security formalities is the prime reason followed by prejudiced fear on increased operational expenditure, lack of expertise in operation and maintenance and reluctance to take up a financial risk. To overcome these constraints the paper suggests that the Government by policy should extend the SHG concept to traditional fisherman community aiming at group lending without securities through co-operative societies, combined with an effective extension drive embedded with trainings and counselings so that the standard of living of traditional fishermen would get a lift who till now occupies the category of under privileged for generations together.

Key words: Motorized craft, Non-motorized craft, cost and returns, efficiency indicators.

INTRODUCTION

Fishery is regarded as a powerful income and employment generator which drives rural economic growth and development. This is also an exchange earner besides providing balanced protein food to all classes of people. The Indian export of marine fish and fish products has jumped from a mere sum of four crore rupees in 1960-61 to about 6,647 crore rupees in 2004-05, out of which 2,068 crores (31 per cent) was contributed by Tamil Nadu, which is one among the prominent maritime states of India. The total fish production of Tamil Nadu for the year 2004-05 was 3,07,693 tonnes, contributed by various types of fishing crafts *viz.* mechanized, motorized and non-motorized. Out of 47,497 fishing crafts operated by Tamil Nadu fishermen, 11 per cent are mechanized, 39 per cent are motorized and 50 per cent are non-motorized. The motorized and non-motorized crafts together constitutes the small scale fishery sector.

Motorization of Traditional Crafts: Introduction of out board engines in the mid eighties for propulsion was one of the significant technological changes which was considered as a boon for fishermen of all states including Tamilnadu. But a very close observation would reveal that although motorization of traditional crafts was lauded to be an highly appreciable technology both technically and economically and

Government of Tamilnadu by policy is encouraging motorization, still 50 per cent of fisher folk of Tamilnadu have not motorized their crafts. The reason behind this lag is needed to be addressed since motorization is the easiest and fairest option available to enhance the standard of living of nearly 24,000 fishermen families of Tamilnadu who are economically and socially backward for generations together. Under this background this study was undertaken with an overall objective to probe into the comparative economics of motorization specific to Tamilnadu scenario and constraints prevailing for adoption of motorization by traditional fishermen.

The specific objectives are

- to analyze the comparative economic performance of motorized and non-motorized crafts.
- To identify the reasons for non-adoption of motorization.

Sampling Design: A multistage stratified random sampling technique was adopted for selecting the respondents with Tamilnadu state as the universe, the coastal districts of Tamilnadu as the first stage unit, fishing villages in the coastal district as the second stage unit and individual fisherman household in the finishing villages as the third and ultimate unit of sampling. The thirteen coastal districts were arranged in descending order of magnitude based on the total number of small scale fishing crafts which includes both motorized and non-motorized fishing crafts operating in the district. The top five districts in the order which possess comparatively more number of small scale fishing crafts namely Kanyakumari,

*Corresponding author: Prabakar, C.,

Asst Professor, Department of Agricultural Economics, Faculty of Agriculture, Annamalai University.

Ramanathapuram, Nagapattinam, Kanchipuram and Tuticorin were selected. As the second stage of sampling, from each of the five coastal districts selected, one fishing village was selected purposively by arranging the fishing villages possessing a minimum of 60 crafts in each category *viz.* motorized and non-motorized, in descending order. The fishing village falling in the top of the order was selected as the sample village in each of the five districts selected. As the third and ultimate stage of sampling sixty fisherman respondents @ thirty motorized fisherman and thirty non-motorized fisherman were selected randomly from each of the five fishing villages selected. The village wise distribution of sample is presented in Table 1.

Period of Study: All the required primary data were collected between June 2006 and May 2007. The reference period for the primary data collected pertained to the year 2006-07. The data collected from the published sources pertained to the latest year of the availability of data.

Tools of Analysis: The comparative economic performance was analyzed by assessing cost and returns of motorized and non-motorized fishing crafts separately along with some key efficiency indicators as listed below.

Economic efficiency

Operating ratio	-	Operating cost / Gross returns
Fixed ratio	-	Fixed cost / Gross returns
Gross ratio	-	Total cost / Gross returns

(Lower the ratio, higher the economic efficiency)

Capital efficiency

Capital turnover ratio - Net income / Investment

(Higher the ratio, higher the capital efficiency)

Labour efficiency

Value of production / worker / trip =

$$\frac{\text{Value of fish catch / trip}}{\text{no. of workers}}$$

(Higher the value, higher the labour efficiency)

The reasons for non-adoption of motorization were analysed using percentage analysis and Garrette ranking technique.

RESULTS AND DISCUSSION

I Comparative Economics of the Crafts

Costs and Returns: The cost and returns were worked out separately for motorized and non-motorized fishermen, (Table 2). The cost and returns were worked out on annual basis since the number fishing trips per annum is one of the major factors influencing the income level of the fishermen. The cost incurred by both the categories of fishermen is discussed under there subheads *viz.* capital investment, fixed cost and variable cost.

Capital investment: Like any other business ventures small scale fishing also requires a capital investment.

Capital investment of a small scale fishermen normally includes the expenses incurred on purchase of hull, engine (if motorized), gears, sail and accessories *viz.* ice box, wires, oars, anchor and lighting equipment. As presented in Table 2, capital investment required for motorized and non-motorized fishing crafts were Rs. 1,99,360/- and Rs. 41,460/- respectively. With regard to motorized fishing craft, the major cost incurred was towards purchase of hull which worked out to 42.91 per cent (Rs. 85, 550/-) of total investment followed by fishing gears (30.35 per cent), engine (22.87 per cent), sail (1.28 per cent) and other accessories (2.58 per cent). With regard to non-motorized fishing crafts the major expense was on fishing gears which worked out to 48.96 per cent (Rs. 20,300/-) of total investment followed by hull (41.49 per cent), sail (5.45 per cent) and other accessories (4.1 per cent). As far as the capital investment is concerned it should be noted that, in absolute monetary terms, the investment made on motorized craft is approximately five times higher than that of the investment on non-motorized craft.

The fixed cost: The fixed cost worked out to Rs. 57,697/- and Rs. 16,310/- for motorized and non-motorized crafts respectively. The interest on investment worked out to Rs.17,942/- and Rs. 3,731/- for the motorized and non-motorized crafts respectively. The depreciation for capital goods were worked out by straight line method with appropriate depreciation rates considering their respective average life span. The depreciation was worked out @ 10 per cent for hull and engine, @ 50 per cent for gears, @ 20 per cent for sail, @ 33 per cent for other accessories like ice box, oars, anchor, wires and lighting equipment. The cumulative value of depreciation worked out to Rs. 33,774/- and Rs. 11,335/- for motorized and non-motorized crafts respectively. The accounting revealed that depreciation on gears is the major burden thrust on fishermen's shoulders which were 52.43 per cent and 62.23 per cent of total fixed cost of motorized and non-motorized fishermen respectively. The other important fixed cost was insurance which was worked out @ 3 per cent of capital investment. It worked out to Rs. 5,981/- and Rs. 1,244/- for motorized and non-motorized crafts respectively.

Operating cost: The total annual operating cost incurred by motorized fishing craft was Rs 1,65,012/- out of which the labour wage occupied a major share of 49.35 per cent (Rs. 81, 440/-) followed by fuel cost (36.67 per cent), repair and maintenance cost (6.39 per cent), lighting oil / battery cost (2.57 per cent), lubricant cost (2.06 per cent), cost of ice (1.55 per cent) and others like auction charges, contribution to cooperative societies (1.41 per cent). The total annual operating cost incurred by non-motorized fishing craft was Rs. 25,153/- out of which the labour wage occupied a major share of 84.28 per cent (Rs. 21, 200/-) followed by expenses on repair and maintenance (5.22 per cent), expenses on lighting oil / battery (5.17 per cent), cost of ice (2.94 per cent) and others like auction charges and contribution to cooperative societies (2.39 per cent). The expenses on fuel and lubricants donot arise for non-motorized crafts.

Returns: The average gross returns per trip and number of fishing trips per annum were Rs. 1,477/- and 232 trips for motorized crafts and the same for non-motorized crafts were Rs. 330/- and 202 trips respectively. By taking into account both the

Table 1. Distribution of Sample Selected for the Study

Sl.No.	Name of District	Name of Fishing Village	Type of Craft	
			Motorized (nos.)	Non-Motorized (nos.)
1.	Kanyakumari	Enayam	30	30
2.	Ramanathapuram	Nambuthalai	30	30
3.	Nagapattinam	Arcottuthurai	30	30
4.	Kancheepuram	Pannaiyurkuppam	30	30
5.	Tuticorin	Periyatalai	30	30
		Total	150	150

Table 2. Cost and Return of Fishing Crafts

Sl. No.	Particulars	Type of crafts		
		Motorized (Rs.)	Non-Motorized (Rs.)	
1.	Capital investment	Hull	85,550 (42.91)	17,200 (41.49)
		Engine	45,600 (22.87)	-
		Fishing gears	60,500 (30.35)	20,300 (48.96)
		Sail with accessories	2,560 (1.28)	2,260 (5.45)
		Other (Ice box, wires, oar, anchor, lighting equipment)	5,150 (2.58)	1,700 (4.1)
		Total	1,99,360	41,460
		2.	Annual fixed cost	Interest on initial investment @ 9% per annum
i. Depreciation on hull and engine @ 10 per cent per annum	1,312 (2.27)			172 (1.05)
ii. Depreciation on gears @ 50 per cent per annum	30,250 (52.43)			10,150 (62.23)
iii. Depreciation on sail with accessories @ 20 per cent per annum	512 (0.89)			452 (2.77)
iv. Depreciation on other accessories (Ice box, oars, wire, anchor and lighting equipment @ 33 per cent per annum	1,700 (2.95)			561 (3.44)
Sub total (i to iv)	33,774 (58.54)			11,335 (69.49)
Others (Insurance @ 3 per cent of capital investment per annum)	5,891 (10.37)			1,244 (7.63)
Total	57,697			16,310
3.	Annual operating cost	Fuel	60,502 (36.67)	-
		Lubricants	3,400 (2.06)	-
		Labour wage	81,440 (49.35)	21,200 (84.28)
		Lighting oil / Battery	4,250 (2.57)	1,300 (5.17)
		Repair & maintenance	10,550 (6.39)	1,313 (5.22)
		Ice	2,550 (1.55)	740 (2.94)
		Others (Auction commission charges, contribution to co-operative societies)	2320 (1.41)	600 (2.39)
		Total	1,65,012	25,153
4.	Returns	Average gross return from single fishing trip	1,477	330
		Average no. of fishing trips in one year (nos.)	232	202
		Gross annual return	3,42,664	66,660
		Net annual return	1,19,955	25,197

Table 3. Comparison of Efficiency Indicators of Motorized and Non-Motorized Fishing Crafts

Sl.No.	Particulars	Type of craft	
		Motorized	Non-Motorized
1.	Economic Efficiency (Input/output)		
	• Operating ratio (operating cost / Gross returns)	0.48	0.37
	• Fixed ratio (Fixed cost / Gross Return)	0.16	0.24
	• Gross ratio (Total cost / Gross Return)	0.64	0.62
2.	Capital Efficiency	0.60	0.61
	• Capital Turnover ratio (Net income / Investment)		
3.	Labour Efficiency		
	• Average no. of workers	4.3	2.2
	• Value of production per worker per trip (Rs.)	343	150

Table 4. Causative Factors of the Various Reasons Quoted for Non-adoption of Motorization

Sl. No.	Reason	Causative Factor	Garret mean score	Rank
1.	Lack of access to institutional finance (82 per cent)*	Inability to fulfil the loan security formalities	65.57	I
		Procedural complexities in obtaining loan	52.24	II
		Lack of awareness on credit schemes	43.7	III
		Reluctant to approach a bank	38.49	IV
2.	Increased operational expenditure (60.7 per cent)*	Increasing fuel price	65.01	I
		Increased labour cost	54.6	II
		Increased expenditure on gears due to frequent damage / loss	45.47	III
		Increased repair/maintenance cost of craft and engine	34.91	IV
		Lack of expertise in operation and maintenance of motorized craft	63.3	I
3.	Operational complexities (50.0 per cent)*	Cannot keep the craft idle/needs more fishing efforts	52.84	II
		Inadequate availability of experienced crew	46.45	III
		Non-availability of repair & maintenance facilities	35.4	IV
		Reluctant to take up a financial risk	64.28	I
4.	Complacent attitude (27.0 per cent)*	Involves high physical risk	57.9	II
		Reluctant to take up new technology	39.0	III
		Old age	38.8	IV

* Refers to the percentage of respondents who mentioned the particular constraint as one among the reason for non-adoption of motorization.

average number of trips / annum, and average gross return per trip, the gross annual income worked out to Rs. 3,42,664/- and Rs. 66,660/- for motorized and non-motorized crafts respectively. It is obvious that returns are higher with motorized fishing craft. The motorized fishing crafts accounted an annual net income of Rs. 1,19,955/- whereas it is only Rs. 25,197/- for non-motorized fishing crafts. Though the total cost incurred by motorized fisherman (Rs. 2,22,709/-) is higher than the total cost incurred by non-motorized fisherman (Rs. 41,463), the motorized fisherman is able to get a reasonably higher gross returns (Rs. 3,42,664) than the non-motorized fisherman (Rs. 66,660) in tune with the magnitude of difference in total cost between the two groups which could never be possible if not motorized.

Comparison of Efficiency Indicators

Economic and capital efficiency indicators: The economic efficiency indicators *viz.* operating ratio, fixed ratio and gross ratio for motorized fishing crafts were 0.48, 0.16 and 0.64 respectively and the same for non-motorized fishing crafts were 0.37, 0.24 and 0.62 respectively (Table 3). The operating ratio is on the advantageous side for non-motorized crafts when compared to motorized crafts whereas the situation is reverse with regard to the fixed ratio.

The gross ratio is approximately equal for both categories of crafts. The value of ratios reveal that the economic efficiency of inputs and output are almost same for both motorized and non-motorized crafts. The capital efficiency of both groups of crafts were also same as indicated by the value of capital turn over ratio *viz.* 0.60 and 0.61 for motorized and non-motorized crafts respectively and hence with these economic and capital efficiency indicators one could not draw any conclusive remarks. But a hidden merit on motorization could be inferred with these efficiency indicators. Eventhough there was a five fold increase in total cost due to motorization, the motorized crafts were able to fetch back a proportionate increase in returns, as revealed by the value of efficiency ratios which in absolute monetary terms is highly appreciable. The annual gross and net returns for motorized fishing craft were Rs.3,42,664/- and Rs. 1,19,955/- respectively whereas it were only Rs. 66,660/- and Rs. 25,197/- for non-motorized fishing

craft (Table 2) and the important point to be considered is that achieving this level of increase in returns could never be possible unless the crafts are motorized.

Labour efficiency indicator: Average number of workers engaged in motorized fishing craft and non-motorized fishing craft were 4.3 and 2.2 respectively. The value of production per worker per trip in motorized and non-motorized fishing craft were Rs. 343/- and Rs. 150/- respectively (Table 3), which reveals that the labour efficiency is very much higher with motorized crafts than non-motorized crafts. Hence motorization is an activity which is labour intensive coupled with higher efficiency. It could be inferred that motorization has an added advantage of generating more employment opportunities for the fellow fishermen apart from fetching higher income to the owner of the craft.

Reasons for Non-adoption of Motorization: The four major reasons identified for non-adoption of motorization were *viz.* Lack of access to institutional finance, increased operational expenditure, operational complexities and complacent attitude, as listed in table 4, and their relative degree of influence was analyzed through a percentage analysis. It could be seen from the table that 82 per cent of non-motorized fisherman had expressed that lack of access to institutional finance was one among the reasons for the non-adoption of motorization and there by it is revealed that this is the prime reason which hinders the adoption of motorization technology followed by increased operational expenditure (60.7 per cent), operational complexities (50 per cent) and complacent attitude (26.7 per cent). The analysis was still extended further in order to probe the real causative factors of all the four quoted reasons and rank them (Table 4).

Lack of access to institutional finance: Among the four causative factors listed, the inability to fulfill the loan security formalities ranked first followed by procedural complexities, lack of awareness and reluctance to approach a bank. The causative factor which has come first is needed to be addressed with due concern. Normally, the fixed assets only are eligible to fulfill the security formalities for bank loans. But as a matter of fact fixed asset position of fishermen are

very low, causing problems in obtaining a loan even for genuine fishermen. This seems to be a very serious hindrance in the progress of a small scale fisherman. To overcome this bottle neck, one of the best options available is extending the glowing SHG concept to the fishing venture too. SHGs, with genuine and interested fishermen may be formed and they may be funded through cooperative societies. A better control on repayments could be achieved if fish sales is also made under co-operative society's supervision. A fixed proportion of value of fish sale after every fishing trip could be taken as repayment for the loan. The other three causative factors *viz.* procedural complexity, lack of awareness and reluctance to approach a bank are not much complicated issues like that of the first factor, and these factors could be set right by dedicated extension officials duely motivated in the right direction.

Increased operational expenditure: This reason, the increased operational expenditure occupies the second position among the four reasons quoted for non-adoption. Among the four causative factors listed under this reason, the increased fuel price and increased labour cost appeared to be more influencing. The cumulative fuel and labour cost comes to about Rs. 1,41,942/- per annum (86 per cent of total operating cost). But, incurring this much expenditure may not be taken as irrational because motorized fishing has the capacity to fetch back a proportionate increased income coupled with higher labour productivity. A prejudiced negative mindset of non-motorized fishermen on operational expenditure could also be set right easily by an effective extension drive.

Operational complexities and complacent attitude: Operational complexities and complacent attitude are the reasons which occupied the third and last positions respectively among the four reasons quoted for non-adoption of motorization. Among the various causative factors listed under these reasons, the factors which coined the first rank under each reason *viz.* Lack of expertise in operation and maintenance of motorized craft and reluctance to take up a financial risk seem to be more important. The above said two problems could be solved if motorization is taken as a group activity / SHG activity so that expertise could be gained from fellow crews in due course and financial risk is reduced if borrowed as a group.

Conclusion

The comparative cost and return and efficiency analysis on motorization confirm that there is a proportionate increase in gross and net returns for the increased costs / investment coupled with higher labour productivity. Motorization also has the potential for engaging more number of labours than non motorized crafts.

These facts inevitably impose that motorization could be encouraged since it would improve the income level, there by the standard of living of traditional fishermen. It has also an added advantage that it would generate new employment opportunities for fellow fishermen who donot own a craft. The analysis of reasons for non-adoption reveals that lack of access to institutional credit due to the inability to fulfil security formalities is the prime reason for non-adoption of motorization. To overcome this constraint the Government by policy should extend the SHG concept to traditional fishermen community aiming at group lending without securities through co-operative societies. Effective control over repayment could be achieved by routing the fish sale through co-operative societies. The second constraint identified was the prejudiced negative mind set of fishermen on the increased operational expenditure especially on labour and fuel. The traditional fisherman may be duely educated on the rational behind higher expenditure and reasonable proportionate pay backs by motorized crafts through an effective extension drive. Other two more constraints identified were *viz* lack of expertise in operation and maintenance of motorized crafts and reluctance to take up a financial risk. These two problems could also be solved if motorization is taken as a group activity as like an SHG so that expertise could be gained from any one of the fellow crews in due course and financial risk is also shared since borrowed as a group.

Note:

Non-motorized craft: It includes dugout canoes, catamarans, plank built boats and fiber glass boats with overall length <12 m and which are operated manually. The terms "Traditional craft" and "Artisanal craft" are synonyms to non-motorized craft. Motorized craft: It includes traditional crafts with overall length <12m and operated without board motors with capacity <15 H.P.

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