

A Statement of Cost Elements in Running Mechanised Trawlers in Kerala

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ABSTRACT: Economic viability or economic efficiency is equally an important aspect in fishing industry in addition to technical efficiency. Even if a fishing unit is technically efficient but economically not viable, it is not considered suitable for long running. Reduction in fleet size of mechanised trawlers since 2000 might be associated with the decreased economic viability of trawl units which would be resulted in termination of the units. An estimation of capital investment and annual expenditure, details of elements of each type of cost and a comparison of all these among different size category are the results described. Role of fuel cost in operational cost is also portrayed. Through the study, it is proved that capital cost and other annual expenditure are in linear relationship with the size of trawler. The capital investment of mechanised trawlers in Kerala found to be ranged from 0.45 to 13.74 million rupees depending on the size. Comparing the components of capital investment of wooden and steel trawlers, cost of vessel is the major contributor in steel vessels but in wooden trawlers, it is contributing less compared to trawl nets and accessories. Annual fixed cost of mechanised trawlers in Kerala ranged from 0.3 to 2.5 million rupees. It is higher in large and very large trawlers and decreasing with respect to size of the trawler. The contribution of trawlers towards insurance found to be negligible as Matsyafed is giving insurance to fishing vessels at a very low cost ranging from 250 to 350 rupees. Operational cost, which is the most significant economic factor in case of trawlers found to be increasing with size of trawlers depending on the rate of fuel consumption. Annual operational cost of trawlers in Kerala ranged from 1.21 to 14.52 million rupees during the study period. Among the components of operational cost, fuel cost found to be major contributor followed by fishermen share, repair and maintenance cost and other remaining costs. Operational cost found to be the major contributor in total annual cost of mechanised trawlers contributing 73 to 85% depending on their size.

KEYWORDS: Mechanised trawler, Kerala, Capital investment, Annual expenditure, Operational cost, Fuel cost

I. INTRODUCTION

India being a developing country depend heavily on marine fisheries for both livelihood and foreign exchange. Among the maritime states, Kerala posses a higher rank both in number of fishing units and landings. Commensurate with the technological complexity in the sector, volume of investment also got accelerated. Overcapitalization in association with increase in number of fishing vessels resulted in bio-economic unsustainability in marine fisheries sector of the state. At present various kinds of fishing vessels ranging from non-motorised country crafts to mechanised vessels which are fishing in deep sea areas are prevalent in the state. Advanced technologies have better access to resources which led to increment in cost of fishing. A fishery can be considered optimum or successful only if it lowers the production cost per fish landed or increase the productivity at the same cost. All these necessitate studying the economics of a fishing system without which a complete understanding of the system is not possible.

Pattern of investment and cost differ in various fishing techniques and even within a fishing system it varies based on the size of vessel and operational aspects. In addition to technical efficiency, economic efficiency also influences the sustainability of a fishing system and are equally important. Economics of trawlers operated along Indian coast was studied by Sathiadhas & Panikkar (1989), Sathiadhas et al. (1992), Senthilathiban et al. (1996), Senthilathiban et al. (1997), Sehara & Kanakkan (1993), Senthilathiban et al. (1999) and Kunjir et al. (2007). In Kerala marine fisheries sector, economics of trawlers have been analysed by Devaraj & Smita (1988), Sehara et al. (1991), Aswathy et al. (2011), Unnithan et al. (2005), Hassan & Sathiadhas (2009) and Shanis (2014).

II. MATERIAL AND METHODS

A survey conducted in major mechanised trawl landing centres of the state viz., Neendakara, Sakthikulangara, Cochin, Munambam, Beypore, Puthiyapa and Chombal during November, 2016 to June, 2017 is the method adopted for data collection. A minimum of 10 trawlers in each size category were surveyed from every selected centres. A structured survey schedule was prepared, pre-tested and used to collect data on initial investment, amount spent for insurance and interest on capital in a year and operational expenditure. The data has been collected from the register maintained onboard or by the boat owner using the questionnaire. Additionally, 40 trawlers from Cochin and Munambam harbours were selected and data regarding operational cost were collected for two consecutive years, from June, 2014 to May, 2016. Within the mechanised sector, cost incurred for fixed assets and operation varied widely according to the size of trawler, hence data were collected separately for different length class of trawlers.

III. RESULTS AND DISCUSSION

1. Capital Investment

Capital investment is the cost incurred for fixed assets; for purchasing vessel, engine, gear and other accessories. The cost for modifications just after purchase of vessel and gear is also comes under the head capital investment. Hence sub categories included in capital cost are cost of vessel, cost of engine, cost of gear and accessories and cost of modifications after purchase. The capital cost for trawlers in the state during the study period is given in Table 1. The distinguishing factor between small trawlers (single-day) and multi-day trawlers is material of construction, single-day trawlers are constructed with wood and multi-day trawlers are constructed using steel. Major share of the capital cost in multi-day steel trawlers is incurred for vessel construction followed by cost of engine, cost of trawl net and cost for modifications after purchase (Fig1). Wooden trawlers are an exception, where cost of trawl nets constitutes major share in capital investment, followed by cost of vessel, cost of engine and modifications (Fig2). Most of the wooden trawlers were more than 15-20 years old and only small trawlers comes under the category, hence cost of wooden trawlers are lesser than cost for a new set of trawl nets. However, the results are in accordance with the findings of Aswathy et al. (2011) who also reported that most of the single-day trawlers are constructed using wood. Cost of vessel were same as previous studies in case of wooden trawlers, but the cost of engine showed large hike since 2007 which resulted in an increment of capital investment. Hence

it can be concluded that there is almost 50 to 100% increase in capital cost of trawlers during the last decade.

2. Annual Fixed Cost

Fixed cost is calculated on annual basis which includes interest paid on capital, cost of insurance, and cost of depreciation. The annual fixed cost of mechanised trawlers in Kerala ranged from 0.3 to 2.5 million rupees. Average annual fixed cost of mechanised trawlers in the state is given in Table 2. The contribution of each component to the fixed cost of trawlers is given in figure 3. Interest on capital varied from 3 to 5% in different regions and the borrowed amount varied Rs.10 lakhs to Rs.50 lakhs. Most of the entrepreneurs in fishing sector is drawing loan either from private sector banks or from personnel who are associated with finance services. Amount of interest on capital varied from 0.18 to 1.04 million in different trawlers. One of the peculiarity noted during the study is, not a single trawler is insured with private sector insurance companies; as there are problems from both company and fishermen side. Companies are not providing insurance to fishing vessels, because if the dimension of damage is very high they cannot afford the cost. From the fishermen side, they are getting insurance with very low cost through Matsyafed hence they are in no need of other insurances. The cost of insurance provided by Matsyafed varied from 250 rupees to 350 rupees for a year depending on the size of the vessel. Hence the percentage contribution of insurance to the annual fixed cost is negligible. Cost of depreciation was estimated using straight line method in which it is calculated using cost of each item at the time of purchase, its salvage value (residual value) and its expected life in years. Results of the present study are in accordance with the findings of Aswathy et al. (2011), Unnithan et al. (1985), John (1996), Sehera & Kanakkan (1993) and Panikkar et al. (1991).

3. Operational Cost

Operational cost is the expense incurred for operational inputs which include cost of fuel, wages, daily allowance and food for fishermen, ice and baskets, lubrication oil, landing charges, auction charges, repair and maintenance and miscellaneous costs. On an average, operational expenditure of trawlers for a year is given in Table 3. Average contribution of each components to the operational cost of trawlers is depicted in Fig. 4.

3.1. Fuel Cost

Fuel cost is the major component in the operational cost of mechanised trawlers. Fuel cost varied among different length class of trawlers

depending on rate of fuel consumption and fishing time. Fuel cost contribute 47 to 55% of the operational cost with an average of 51%. Average annual fuel cost of trawlers is given Table 3. FAO (2007) has reported the greater role of fuel in fishing expenses in developing countries. In purse seine and gillnet fisheries, fuel cost is the second largest contributor to the operational cost after wages to crew (Lam et al., 2011). But in case of trawlers fuel cost accounted a major portion in operational expense higher than wages. It is also recognised as a major concern in the economic viability of fisheries and fishing community (Abernethy et al., 2010).

3.2. Fishermen Share

Fishermen share is the second largest contributor to the operational cost of mechanised trawlers in Kerala with a share of 27%. Components included in the fishermen share are wages, daily allowance and cost of food. The expense of mechanised trawlers in the form of fishermen share varied from 0.13 to 3.93 million rupees depending on the length overall of trawlers. Wages to fishermen varied from 5 to 10% of the revenue in various regions of the state. On an average annual cost incurred for wages to fishermen is 0.069 million rupees in small trawlers (single-day), 0.25 million rupees in small trawlers (multi-day), 0.64 million rupees in medium trawlers, 0.99 million rupees in large trawlers and 1.1 million rupees in very large trawlers. Cost incurred for daily allowance and food for fishermen contributes a considerable amount to the operational cost of trawlers. On an average, expense of mechanised trawlers in the state towards fishermen share in a year is given in Table 3.

3.3. Repair and Maintenance Cost

Repair and maintenance cost is the third largest contributor to the operational cost of trawlers after cost of fuel and fishermen share. It is the cost incurred for repair and maintenance of trawler, engine and trawl nets. Average repair and maintenance cost of mechanised trawlers in Kerala in a year is given in Table 3.

3.4. Cost Of Ice And Baskets, Lubrication Oil, Landing Charges, Auction Charge And Miscellaneous Costs

Cost of ice and baskets, lubrication oil, landing charges, auction charge and miscellaneous costs altogether constitutes 8.76% of operational cost of trawlers. Total cost incurred for all these elements together is detailed in Table 3.

4. Total Annual Cost

Total annual cost of trawlers is the sum of fixed cost and operational cost for one year. It ranged from 1.5 to 17.02 million rupees in mechanised trawlers of Kerala and has been described in Table 4. Fig .5 shows percentage contribution of fixed and operational costs to total annual cost.

IV. CONCLUSIONS

The study revealed that capital investment for mechanised trawlers in Kerala ranged from 0.45 to 13.74 million rupees. Fixed cost is estimated on annual basis which includes interest on capital, cost of insurance and cost of depreciation. It varied from 0.3 to 2.5 million rupees in different length class of trawlers. Operational cost ranged from 1.21 to 14.52 million and contribution of fuel cost to the operational cost of trawlers ranged from 47 to 55% with an average of 51%.

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Table 1. Average capital investment for mechanised trawlers in Kerala

Items	Small trawler (single-day)	Small trawler (multi-day)	Medium trawler	Large trawler	Very large trawler
Trawler (□)	120000	1240000	5350000	10060000	10625000
Engine (□)	100000	100000	1494500	2152375	2221560
Trawl net and accessories (□)	200000	30000	564000	403300	650500
Modifications (□)	25000	113500	49500	237800	243750
Total (□)	455000	1483500	7458000	12853475	13740810

Table2. Annual fixed cost of mechanised trawlers of Kerala

Items	Small trawler (single-day)	Small trawler (multi-day)	Medium trawler	Large trawler	Very large trawler
Interest on capital (□)	180000	258000	588000	1015200	1038000
Insurance (□)	250	250	350	350	350
Depreciation (□)	111333	763500	949667	1373953.333	1461542
Total (□)	303250	1021750	1538017	2389503	2499892

Table 3. Average annual operational cost of 662echanized trawlers in Kerala

Items	Small trawler (single-day)	Small trawler (multi-day)	Medium trawler	Large trawler	Very large trawler
Fuel (₹)	604691	1563981	3100266	4785103	7794430
Wages (₹)	69200	252637	637304	986978	1101832
Daily allowance and Food (₹)	57750	732640	1099070	2561268	2831362
Ice and Baskets (₹)	78100	109795	156840	453820	536305
Lubrication oil (₹)	2560	4660	7370	7984	7844
Landing charges (₹)	580	785	820	3965	3456
Auction fees(₹)	5700	8550	460875	598266	647585
Repair and maintenance (₹)	380000	159000	887250	601360	1482300
Other charges (₹)	11700	11920	28870	105206	119340
Total (₹)	1210281	2843968	6378665	10103949	14524454

Table 4. Total annual cost of mechanised trawlers in Kerala

Type of trawler	Total annual cost (₹)
Small trawler (single-day)	1513531
Small trawler (multi-day)	3865718
Medium trawler	7916682
Large trawler	12493452
Very large trawler	17024346

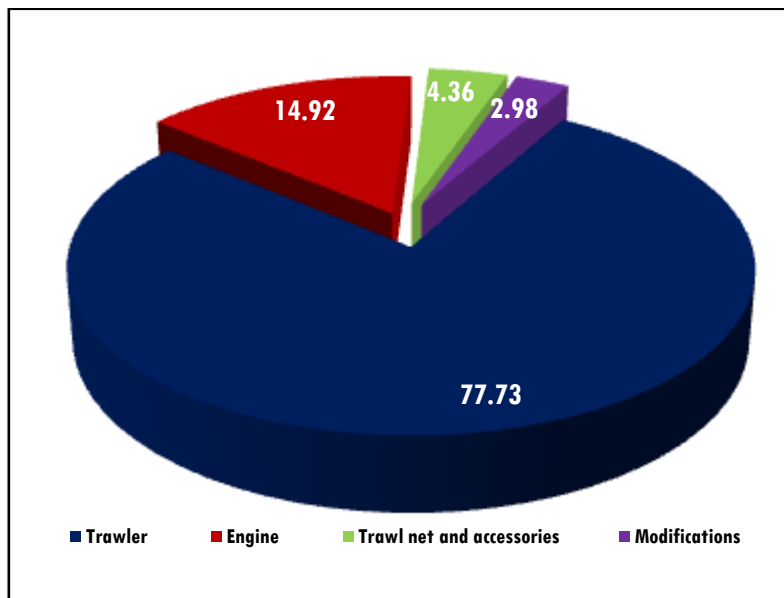


Figure. 1 Share of items of capital investment for mechanised trawlers (steel) in Kerala

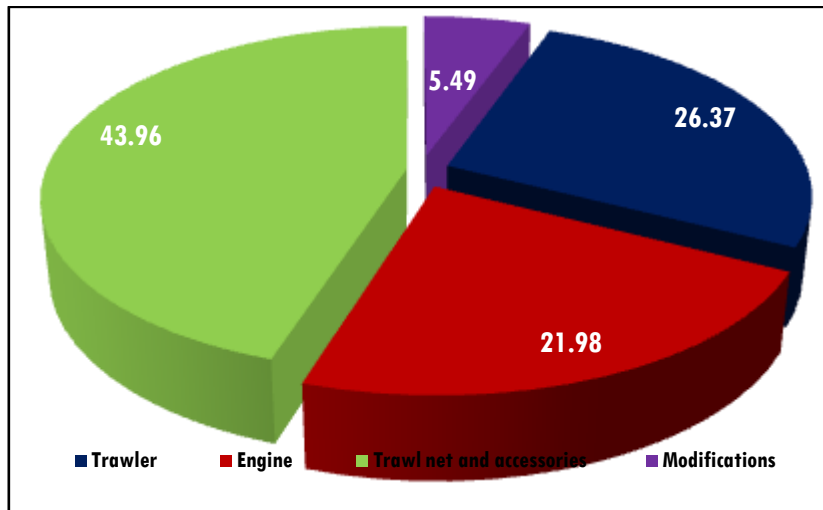


Figure. 2 Share of items of capital investment for mechanised trawlers (wood) in Kerala

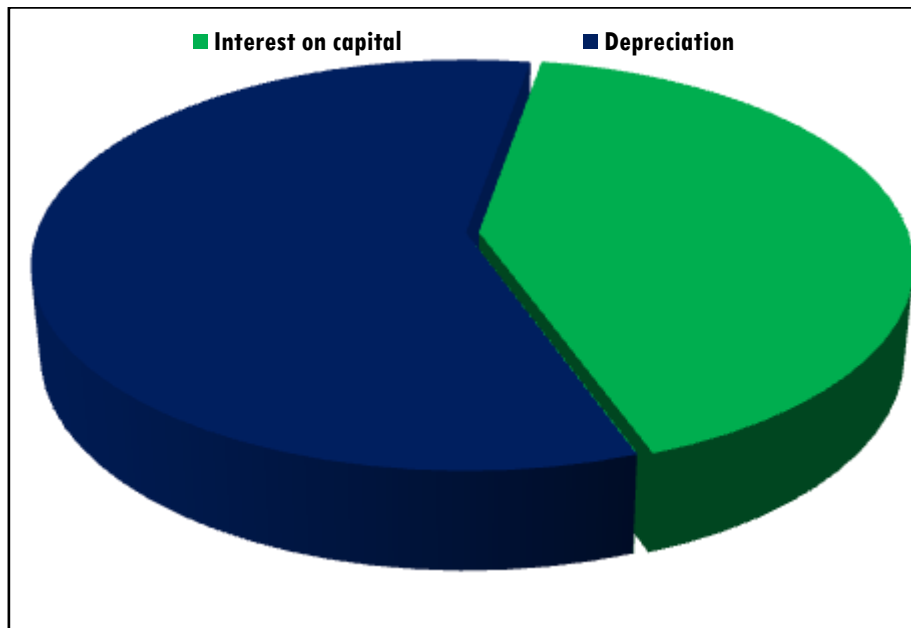


Figure.3 Percentage contribution of items to total fixed cost in mechanised trawlers in Kerala

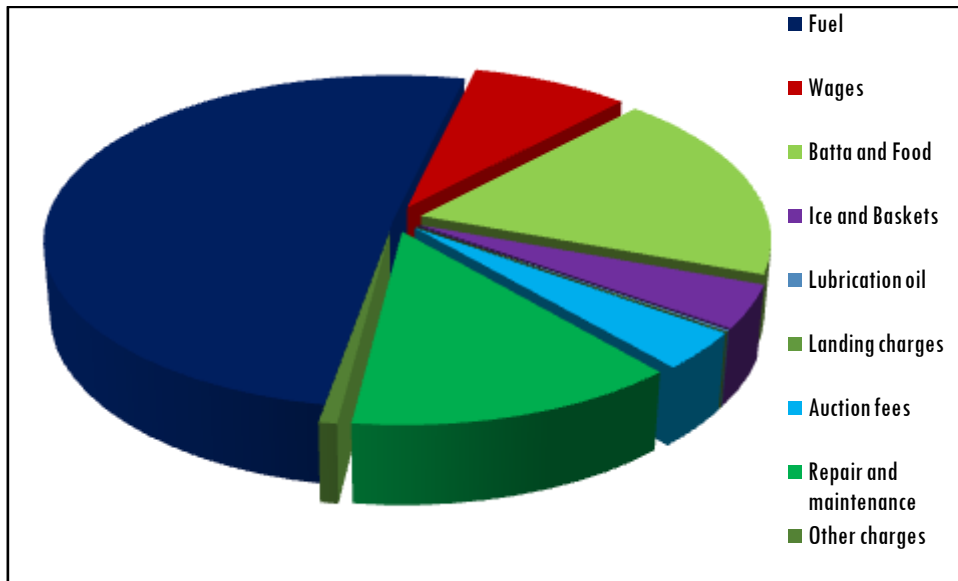


Figure.4 Contribution of components to the operational cost

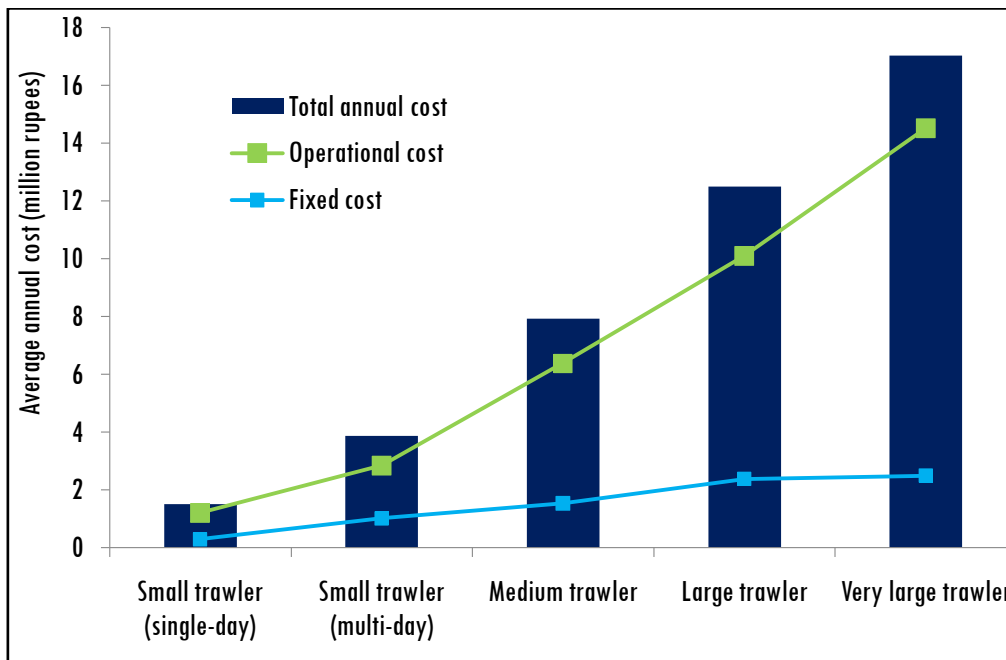


Figure.5. Contribution of fixed cost and operational cost to total annual cost of mechanised trawlers in Kerala