

Performance of Inboard Diesel Engine Fitted Canoes Operating Ring Seine along Kerala Coast

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The performance of the recently introduced Inboard Engine (IBE) fitted crafts operating ring seine is reported. 153 units were enumerated from 8 districts of Kerala. The total landing from IBE canoes was found to be 11745 tonnes, with an average catch per unit effort of 1826 kg and average catch per hour 555 kg. The operation cost and revenue generated from ring seine operated by Out Board Motor canoes and IBE canoes are compared.

Key words : Inboard fitted craft, ring seine fishery, economics of operation.

Marine fisheries sector of Kerala witnessed so many technological innovations during the past decades. Recent introduction is a new class of craft made of huge planks, /fibre glass/steel, and fitted with diesel engine for the operation of large seines. Out board motor (OBM) ring seine fishery has been subjected to several studies (Achari & Thankappan, 1987; Anon, 1981; Anon, 1991; Anon, 1992; Rajan, 1993; Achari, 1993, Alagaraja *et al.*, 1994; Balan & Andrews, 1995; Edwin & Hridayanathan, 1996). However, no attempt was made till date to conduct a detailed study on the operation, performance and economic viability of Inboard Engine (IBE) fitted crafts using ring seines along the Kerala coast. In this paper, the numerical strength and fishery of IBE crafts in Kerala are discussed and an attempt is made to compare it with OBM in terms of initial investment, economics of operation and catch composition.

Materials and methods

The data for the present study was collected during 2000-2002 as part of the project of Ban on monsoon trawling along the Kerala coast and its impact on the fishery resources. The landing data from all the fishing harbours were collected at

weekly intervals and the selection of IBE units for detailed observation was done following Alagaraja (1984). Landing was observed from 6 am to 6 pm. Data on craft and gear details such as length, width, mesh size, recurring expenditures such as fuel cost, auction charges, incidental etc. were collected on the basis of physical observation while information on fishing area and depth, haul details, duration of fishing, duration of the voyage, etc. were recorded through interviews. The data so compiled were entered in the pre-tested questionnaire. The craft building yards of IBE units were also visited for compiling data on capital investments, material costs and engine details. Besides, information gathered from agencies like Matsyafed and Fishermen Welfare Co-operative Societies were also utilized. Comparison of initial investments, operational costs and rate of returns of both type of crafts were made following standard methods (Sehara and Kanakkan, 1993). For economic analysis of both IBE and OBM ring seines, random samples of 10 units each were selected from Chellanam fishing belt, Ernakulam District to compare the initial investment, operational costs and rate of returns. The data was processed with the help of Microsoft

excel package developed at the School of Industrial Fisheries.

Results & Discussion

The size of the crafts made of planks, fibre glass, reinforced plastic or steel varied from 22 to 27m. The displacement capacity varied from 15-25 t and these huge crafts had all facilities of mechanized fishing boats barring a permanent wheelhouse. These crafts were fitted with 370/ 400/ 402-model diesel turbo engine depending on the size of the craft. The hull is arranged into different tiers and the diesel engine is accommodated in the central portion of the lower tier while the remaining portion is divided into various compartments to function as fish holds. During peak fishing months each craft deploys two carrier boats for the transportation of the catch to the nearest harbour. The ring seine used in inboard canoes varied in length from 800-1700m with a depth ranging from 60-90m and a mesh size of 10-14 mm at the bunt and 16-18 mm at the body. Majority of these crafts were fitted with 402 models presumably due to its high fuel efficiency. The carrier boats are fitted with OBM of 25 or 40 Hp. Hauling of the net is done by mechanised winch. Regular crew size is 40-50 per craft, however, during the trawl ban period the number goes up to 60. The average fishing duration is around 10 h inclusive of cruising time for reaching the ground and return. Only one trip is performed on a daily basis and the fishing ground extends to 50m in the inshore waters.

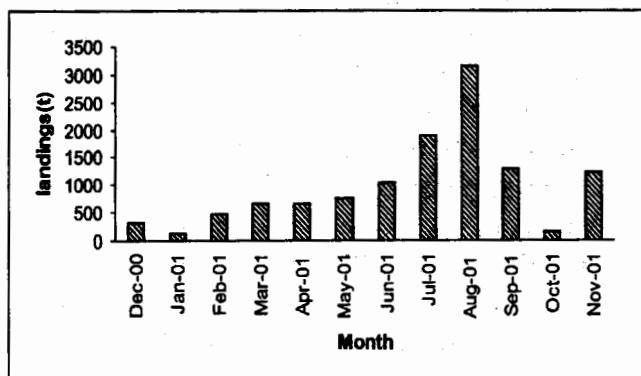


Fig. 1. Month wise landings of In Board ring seines in Kerala during Dec-00 to Nov-01

Annual landing from inboard fitted crafts operating ring seine from Kerala during 2000-01 is given in Fig.1. The landing showed an increasing trend from March, attained its peak in August and thereafter decreased till October and then showed a gradual increase. The highest catch per unit effort (CPUE) was recorded in August-2001 while it was lowest in January-2001 (Fig.2). The average annual CPUE of inboard fitted canoes was worked out to be 1826 kg, which showed variation from 400 kg in January-01 to 4250 kg in August-01. The catch per hour in ring seines operated from inboard fitted canoes varied from 180 kg in January-01 and 891 kg in August-01 (Fig.2) with an annual average of 555 kg. The catch from the ring seine comprised mainly of oil sardines, mackerel, scads, lesser sardines, pomfrets, carangids, *Metapenaeus dobsoni*, *Penaeus indicus* and *Parapenaeopsis stylifera*. A total of 153 units of inboard crafts were recorded from eight coastal districts of Kerala during the study period, and among them the highest number of units was encountered in Ernakulam district with lowest units in Malappuram district (Table 1).

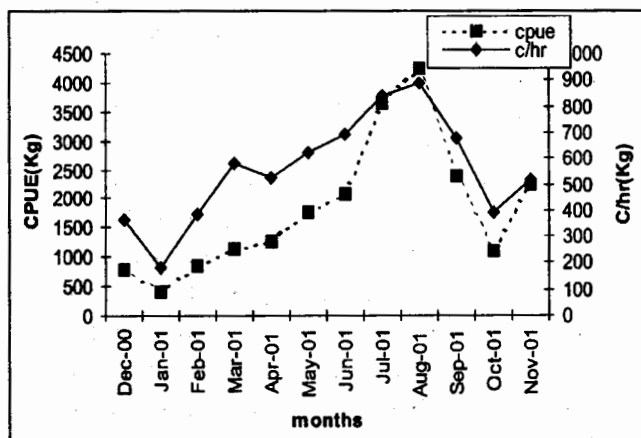


Fig. 2. Catch/hr and CPUE of In board Ring seines in Kerala during Dec-00 to Nov-01

The average fixed investments of OBM and inboard canoes are given in Table 2. The total investment of a 65 foot OBM fitted ring seine unit comes to around 16 lakhs with an apportioning of Rs. 4,50,000 for craft, Rs. 7,50,000 for gear, 4,50,000 for OBM engines and the remaining for the diesel operated

Table 1. In board ring seines at various districts of Kerala

District	No. of IBE fitted ring seine units
Kollam	5
Alappuzha	10
Ernakulam	105
Thrissur	7
Malappuram	5
Kozhikkode	6
Kannur	15
Total	153

winch and other accessories. In respect of an IBM craft the initial cost was worked out, to be around Rs. 18,00,000 and this heavy investment was due to the larger size of the

mother craft and the bigger size of the ring seine. The results of the survey also revealed that this huge investment requirement is met jointly by 40 or more traditional fishermen mobilising funds from public sector banks, fishermen welfare co-operative societies and private moneylenders. The operational cost and revenue of OBM and Inboard canoes operating ring seines were compared and the results are summarised in Table 3. In the case of OBM canoes, the average daily revenue was computed at Rs. 11660, of which 53% was spent towards fuel charges while another 20% was posted as other operational costs. The profit thus worked out to be only around 25%. On the contrary, in IBE canoes, the fuel cost comes to only 12% of the revenue and the total operational cost comes to only 22% of the revenue obtained. The

Table 2. Capital investment of outboard and inboard engine fitted canoes

Plank built Canoe-OBM			Plank built Canoe-IBE		
Initial Investment					
1. Craft	(Mother vessel)	Rs	1. Craft (Mother vessel)		Rs
(65ft*7ft)	a) Wood-(300Cubic)	165,000	a) Wood-(600Cubic)		335,000
	b) Copper nails, Coir	10,000	b) Copper nails, Iron rods		35000
	c) Sardine oil	50000	c) Fiber coating		50,000
	d) Labour cost (45 days)	50000	d) Labour cost (75 days)		90000
		275,000			510,000
2. Carriers			2. Carriers		
(40*3ft)	a) Wood	35000	a) Wood		35000
	b) Rope and other accessories	12000	b) Rope and other accessories		12000
		47000			47000
	c) Labour cost	18000	c) Labour cost		18000
		65000			65000
		x2=			x2=
		130,000			130,000
3. Engine			3. Engine		
	Main craft		Main craft		
	a) 40Hp	113,000	a) 40Hp Engine & gear box		350,000
	b) 25Hp	86000	b) Propeller shaft (10ft) 55mm		75000
	c) Winch-25Hp	86000	c) Rubbr bush, propeller root		
			d) Sea cork		
	Carrier craft		e) Nuts and other accessories		
	25Hp (2 Nos.)	172,000	f) Winch and power take		75000
		457,000			500,000
	Total (1+2+3)	8,62000			11,40,000

Table 3. Fuel consumption and total revenue of OBM and IBE units for a single day operation

OBM engine		Inboard Diesel Engine	
a) Kerosene (1 Day)	1568.00	a) Diesel (1 Day)	1718.08
40Hp-16Litre/hour (Rs. 14/L)		402Hp-13Litre/hr (Rs. 18.88/L)	
25Hp-12Litre/hour	3528.00	For Carriers	672
		b) Kerosene	
168x3 Nos.		25Hp-8Litre/hr	
b) Petrol (1 Day)	279.00	71.04x2 Nos.	
40Hp-9Litre (Rs. 31/L)		c) Lubricating oil	42
25Hp-7Litre	651.00	250ml (Rs. 106/L)	
7x3 Nos.		d) Petrol	434
c) Lubricating oil	42.00	Total fuel cost (IBE	2866.08
250 ml (Rs.106/L)		unit + carriers)	
d) Winch (if used)	168.00		
25Hp			
	1140.00		
A. Total Fuel cost (OBM)	6236.00		
b. Auction charge @ 8%	932.00		932.00
c. Food allowance	1000.00		1000.00
d. Other expenses	500.00		500.00
A. Total Operational Costs	8668.00		5298.08
Catch		Catch	
<i>Sardinella longiceps</i> 250 kg	2500.00	<i>Parapaeneopsis stylifera</i>	18300.00
(Rs. 10/kg)		366kg (50/kg)	
<i>Metapenaeus dobsoni</i> 140 kg	7000.00	<i>Penaeus indicus</i>	4500.00
(Rs. 50/kg)		33kg (Rs. 140/kg)	
<i>Anchovilla commersoni</i> 270 kg	2160.00	<i>Sardinella longiceps</i>	700.00
(Rs. 8/kg)		70kg	
		<i>Rastrelliger kanagurta</i>	400.00
		10 kg (40/kg)	
B. Total catch (value)	11660.00		23900.00
Total revenue (A-B)	2992.00		18601.92

revenue generated from the inboard canoes was apparently high due to high-priced fish catch. On an average around 70% of the revenue obtained from these units were found as profit barring the amount to be paid as interest and loan repayment. So it can be assumed that the IBE canoes are highly profit making because of high fuel efficiency and the capability to exploit high priced preferred species.

The ring seine units operated from Cochin are found using even up to 4 OBM engines with a horsepower of one 40Hp and three 25Hp for a single unit, comprising of one mother craft and two carriers. In the

motorised ring seine sector alone the annual investment is Rs. 86.69 crores which works out to be 54% of the total investment (Rajan, 1993). According to Edwin (1997) there is a seven-fold increase in capital investment in the motorised sector since 1988-89. However, this increase in the capital investment has not improved the net returns. Vivekanandan (1993) reported that around Rs. 35 crores were spent on fuel alone for OBM operations in Kerala in 1991. According to Rajan (1993) the annual kerosene consumption of OBM ring seine in the state in 1991 accounted for 65% of the annual total consumption by all motorised crafts. The higher fuel consumption, high propeller speed coupled with low

propeller efficiency, high incidence of wear and tear due to use of kerosene, high maintenance cost together with non availability of imported spare parts, have collectively added to the woes of the fishermen, who are operating OBM based ring seines. It is against this background that the diesel fuelled IBE canoes introduced in the marine fisheries sector of Kerala assumed significance. Comparison of the CPUE and the catch per hour clearly point to the superior fishing efficiency of ring seines operated from IBE canoes when compared to OBM fitted canoes. The size and age groups constituting the fishery in the landing from the ring seine operated from inboard units showed close similarity as reported by Edwin & Hridayanathan (1996).

The results of the present study establish that inboard fitted canoes are having many advantages over OBM fitted crafts as the former type of fishing is more economically viable and profitable, with the distinct advantage of venturing in to distant waters for fishing so that the fishing pressures in the traditional fishing grounds is minimised. These crafts can also spend more time for fishing as fuel availability in the canoe is not acting as a limiting factor.

The Kerala Marine Fisheries Regulation Act stipulates the permitted and prohibited types of crafts and gears for marine fishing, demarcation of fishing boundary for traditional and mechanised types of fishing, statutory mesh of gears etc (Anon, 1981). It is imperative to examine whether the recently introduced IBE craft with ring seine combination comes under legal framework of the above act. Hitherto, no effort has been made from any quarters to classify this craft under either traditional or mechanised categories. Unlike OBM crafts, the IBE crafts require port facilities for landing and therefore, it is not known whether the regulations prescribed by the port for the fishing crafts using harbour facilities are

binding on this type of crafts also. This is another issue to be tackled on a priority basis.

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