

# Economic efficiency of inboard ring seine fishery of Ernakulam District, Kerala

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## Abstract

The economic sustainability of marine fishing and livelihood security of fishers largely depend on the economic viability of fishing operations. The inboard ring seiners are one of the major fishing gears employed by the traditional fishermen for harvesting small pelagic fishes in Kerala. An economic analysis of the inboard ring seine operations in Ernakulam District revealed that although the gross revenue earned by these fishing units increased in nominal terms during 2014-2018 period, there was downward trend in the economic efficiency. The net operating income per fishing trip declined from ₹59,936 in 2014 to ₹33,527 in 2018 with pronounced rise in fishing costs from ₹88,806 in 2014 to ₹1,28,749 in 2018. The increase in the size of craft, gear and engine horse power contributed to enhanced fishing capacity and fuel costs and it is highly imperative to standardise the capacity of these fishing units to achieve optimal input use efficiency.

*Keywords:* inboard ring seiners, economic efficiency, Kerala

## Introduction

Ring seine is the most important gear employed for harvesting small pelagic fishes like sardines, mackerels and anchovies along the Kerala coast. Ring seine, an encircling net, was first introduced in Alappuzha District in Kerala during 1985 as a technologically improved version of the traditional boat seine (*thanguvala*) (Sathiadhas *et al.*, 1993). There has been a trend of increasing the capacity of the craft, gear and engine over the years and many of the inboard ring seiners (IBRS) currently operate with engines of capacities more than 400 HP. Medium sized boats (*vallom*), fitted with OB engines of 25 hp and above are being used as carrier vessels by these fishing units (Abdussamad *et al.*, 2015). The dwindling catches of many of the marine fishes coupled with increasing fishing costs are serious issues of concern in the marine fishing sector of Kerala. The catch of inboard ring seiners in Kerala declined from 73194 t in 2014 to 52471 t in 2016 and then increased to 1.65 lakh t in 2018 as per the fish

landings estimated annually by the Fishery Resources Assessment Division of ICAR-CMFRI. The economic efficiency of fishing units decide the sustainability of the fishing operations and livelihood security of fishers. Hence, based on the data collected during 2014-2018 period an analysis of economic efficiency of inboard ring seiners in Ernakulam District was conducted.

The landings of inboard ring seiners in Ernakulam District declined from 13,531 t in 2014 to 6,153 t in 2015 and then increased to 14,293 t in 2018 (FRAD, CMFRI). Ninety units of inboard ring seiners are operated in Ernakulam District, of which 60 units operated from Kalamukku Fisheries Harbour and the others from Munambam Fisheries Harbour (Marine Fisheries Census 2010). Secondary data on species wise annual catch and fishing effort data of IBRS operating in Ernakulam District for the period 2014-18 were obtained from the National Marine Fishery Resources Data Centre (NMFDC) of ICAR-Central Marine Fisheries Research Institute (ICAR-CMFRI). Data on operational costs, fixed costs and

revenue realized were collected at fortnightly intervals from 20 inboard fishing units operated in Ernakulam District. The operational costs included fuel cost, food, auction charges, crew share, crew 'bata' or allowance, repair and maintenance costs of craft, gears and engine. The fuel costs comprised diesel cost for inboard ring seiners, kerosene cost for the carrier boats as well as cost of starter oil. The different economic indicators like net operating income, operating ratio and input-output ratio were used for assessing the economic efficiency.

**Catch composition of inboard ring seiners:** Among the different resources landed by inboard ring seiners in Ernakulam District in 2014, more than 90% of the landings were of oil sardine and Indian mackerel. The landings of oil sardine drastically declined from 10028 t in 2014 to 4410 t in 2018 while tuna (*E.affinis*) also considerably reduced during this period. Even though the landings of oil sardine drastically declined in 2018, it was compensated by the increased volumes of Indian mackerel, croakers and penaeid prawns landed (Fig. 1).

**Economic efficiency of inboard ring seiners:** The inboard ring seiners in the study area were predominantly owned by the traditional fishermen groups. The horse power of the engines ranged from 160-260 hp for the indigenous Leyland engines to more than 400 hp for the Chinese

and other imported engines. The investment cost of a new IBRS unit at present ranges between ₹80 lakhs and over ₹1crore including craft, gears, engine and carrier unit. The average capital investment of the sampled fishing units indicated that the hull and accessories are costing ₹37.5 lakhs, engine ₹12.82 lakhs and gear and other accessories at ₹21.38 lakhs totalling ₹71,71,667 lakhs.

Analysis of operational costs and revenues per fishing trip revealed that the gross revenue declined from ₹1,48,742 in 2014 to ₹1,01,041 in 2016 and then rose to ₹1,62,276 in 2018. However the net operating income declined from ₹59,936 in 2014 to ₹33,527 in 2018 with upward trend in fishing costs from ₹88,806 in 2014 to ₹1,28,749 in 2018. The operating ratio increased from 0.60 in 2014 to 0.79 in 2018 and the input-output ratio increased from 0.2 to 0.37 during this period. The higher the operating ratio, the lower the capital productivity. The high operating ratio and input-output ratio indicate low economic efficiency of the fishing units. The high cost of diesel and kerosene along with reduction in the supply of subsidised kerosene to the carrier boats contributed to the rise in fishing costs. The share of fuel cost to total operational costs increased from 18% to 37% during 2014-2018 (Table 1).

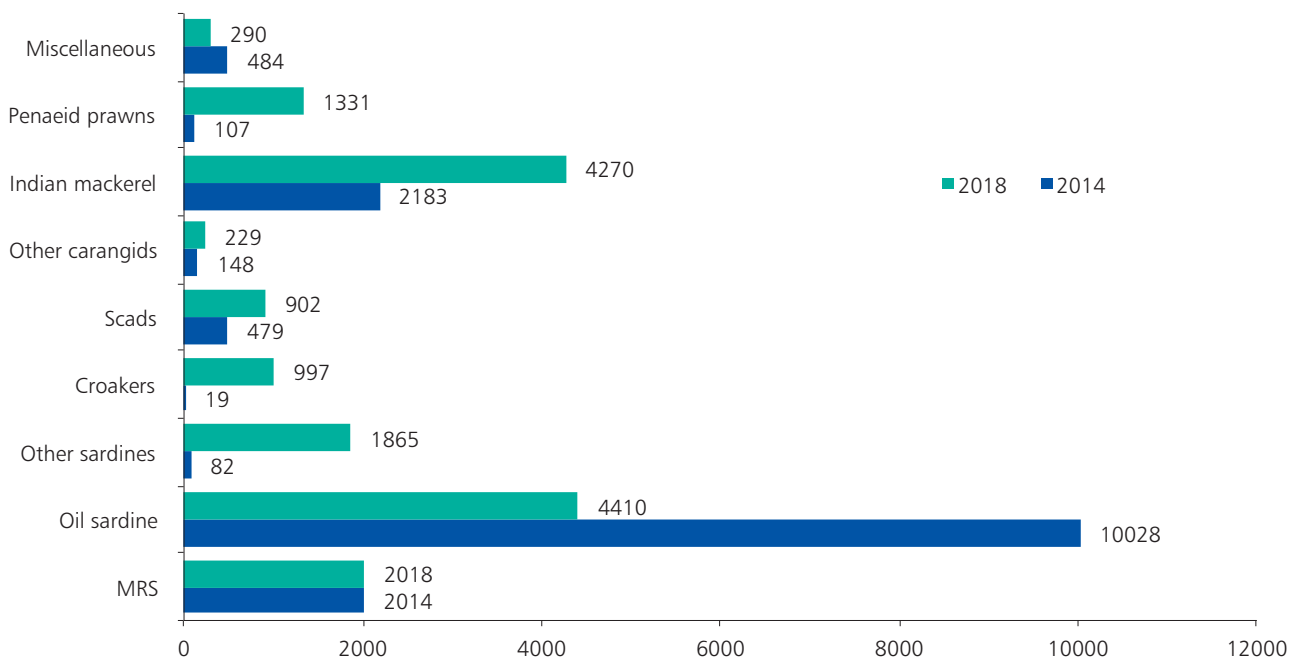


Fig.1. Species composition (in tonnes) of IBRS landings during 2014 and 2018

Table 1. Costs and returns (₹ per fishing trip) of inboard ring seiners

Particulars	2014	2015	2016	2017	2018
Fuel cost	16107 (0.18)	15177 (0.20)	23552 (0.31)	36799 (0.32)	48242 (0.37)
Crew wage	59482 (0.67)	50220 (0.65)	41785 (0.55)	66045 (0.57)	68420 (0.53)
Other expenses	13217 (0.15)	11664 (0.15)	11100 (0.15)	13918 (0.12)	12087 (0.09)
Total Operating Cost(OC)	88806	77061	76437	116762	128749
Gross revenue(TR)	148742	110773	101041	147149	162276
Net operating income (TR-OC)	59936	33712	24604	30387	33527
Capital productivity (Operating ratio) (OC/TR)	0.60	0.70	0.76	0.79	0.79
Input -output ratio (Input costs/TR)	0.20	0.24	0.34	0.34	0.37

Note: Figures in parenthesis indicate percentage to total operating cost

## Conclusions

The analysis indicated that though the inboard ring seine units in Ernakulam District are economically viable, with rise in fishing costs, there was a downward trend in the economic efficiency over the years. The fishers reported major constraints in inboard ring seine fishing in the recent years as rise in price of fishing accessories such as nets, engines owing to implementation of GST, cut in kerosene subsidies and high fuel cost. A study on the impact of GST on the marine fishing sector of Kerala by ICAR- CMFRI reported that the fishing equipments including fishing rods and fishing twines are taxable at 12% and fishing ropes and hooks are taxable at 5% under GST. All these fishing gears were exempted from tax under the VAT (Value Added Tax) regime (CMFRI, 2018). The enhanced fishing capacity of IBRS units as a result of increase in the size of craft, gears and engine horsepower has resulted in huge fishing pressure on the

pelagic resources caught by these units (Abdussamad *et al.*, 2015). Coupled with fluctuations in landings of the major resources targeted by these fishing units due to climate change impacts it raises concern about the sustainability of these fishing units. Hence regulating the fishing capacity to achieve optimal input use efficiency, effective utilisation of potential fishing zone (PFZ) advisories and adequate management strategies to curb the excess fishing pressure are essential for ensuring the economic sustainability of these fishing units.

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