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Economics of OBM Gill Netters along the Jaleshwar Coast, Veraval, Gujarat, India

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A B S T R A C T

The study was envisaged to know the cost and earnings of gillnetters operating from Jaleshwar village; Veraval (Dist. Junagadh), Gujarat and the economic viability of gillnet fishing. The study was carried out from October, 2008 to September, 2009. The maximum revenue was fetched by Silver pomfret, with (35.24%) share of the total revenue generated during the study period. Month wise, August was the most productive month in terms of revenue generation (17.38%) for OBM gillnetters. Among seasons, winter was more productive with (39.09%) contribution of the total fish catch. Among seasons, winter was more productive with (37.67%) of total revenue contribution. The capital investment of a single OBM gillnetter was Rs. 3,33,379. Similar was the case with variable cost. It was Rs. 1,07,568.41. Fixed cost inclusive of depreciation was Rs. 59,848.2. Total expenditure and revenue of OBM gillnetter was Rs. 1,67,416.41 and Rs. 1,52,778.43 respectively. The annual loss of rupees -14,638.2 was incurred considering the initial investment in terms of capital cost at the end of first year, however second year onwards the OBM gillnetters were profitable.

Introduction

Gillnet is a highly selective fishing gear and is one of the most suitable fish catching method from conservation and stock regulation point of view (Thomas, 2003). Gujarat is a frontline maritime state of India located in the extreme west of the country (20.1° to 24.7° North and 68.4° to 74.4° East). Gujarat with about 20% (1600km) of the country's coastline, 33% of the continental shelf area (1, 64,000 km^2) and over 2, 00,000 km^2 of EEZ ranks first among the maritime states in marine capture fish production[1]. Gujarat with about 20% of the country's coastline (1600 kms.), 33% of the continental shelf area (1, 64,000 km^2) and over 2, 00,000 km^2 of EEZ (Exclusive

economic zone) ranks first among the maritime states in marine capture fish production with 7.17 lakh tonnes (CMFRI, 2014).

Out Board gillnetters play an important role as it contribute about 15.83% overall fish production in Gujarat. There has been continuous increase in the number of mechanized boats in the fishing fleet of state since last decade. Presently, more than 31,370 boats are active in fishing operation, out of which more than 20,359 are mechanized boats and 2,316 are gillnetters operating in coastal waters of Gujarat (Anon., 2009).

Jaleshwar village is located between Lat-20°54' N and Lon- 79°22'E, which is 4 km far from the main fishing port of Veraval. There are160 FRP (Fibre Reinforced Plastic) canoes in the Jaleshwar village, out of which only 60 are active in fishing. Most of the population of this village depends upon fishing activities as the main source of occuption (Anon., 2009). The fishermen of Jaleshwar operate only gillnet throughout the year. The most notable fact about Jaleshwar village is that it was first village in the Gujarat state where motorized boats were first operated (Somashekar *et al.,* 2003). The objective of the present study was to estimate cost and earnings of gillnetters operating off Jaleshwar Coast, Veraval.

Materials and Methods

The present work was undertaken to study the cost and earnings of the gillnetters operating gilln*et al*ong the of Jaleshwar coast Veraval. The study was carried out for a period of one year from October 2008 to September 2009. Total 60 OBM gillnetters were randomly sampled. The periodical random sampling method was adopted for sampling of gillnetters as per (Marked, 2004). Economic analysis was done by calculating capital cost, total variable cost, total project cost, total fixed cost, total cost, total revenue, and finally annual profit was calculated as per the Markad (2004).

Total revenue will be calculated after personal inquiring of prices of fish per kilogram at the landing centre and multiplying it with the quantity of catch landed by a gillnetter.. The data obtained for all the weeks in the month was pooled and presented as monthly samples. The data was also analysed season wise viz. June to September (Monsoon season), October to January (winter season) and February to May (summer season) to know the dominant cost and earnings over different months and season. The results are expressed as mean ± std. error for all the collected data.

Results and Discussion

The total catch composition of the gill nets was 236.36 kg. on an average during eleven months, the paper was published by author in International Journal of Ecology Environment and Conservation 20 (Suppl.): 2014; pp. (S39-S43).

Details of species wise revenue according to month from October 2008 to September 2009 are given in table 1. The revenue generated from 14 different fish varieties landed by OBM gillnetters along Jaleshwar coast, Veraval, showed that the Silver pomfret contributed maximum revenue (35.24%) among all groups. This was followed by other Indian mackeral (25.49`%), Ribbon fish (16.84%), Hilsa (12.09%), Wolf herring (3.28%), Croaker (2.64%), Lesser sardine (1.32%), Seer fish (1.13%), Horse mackeral (1.05%), Catfishes (0.38%), Eel (0.26%), Other horse mackerel (0.15%), Barracuda (0.09%) and Black pomfret (0.03%). Minimum revenue was recorded during June, 2009 (4.04%). In August, 2009 maximum revenue was generated (17.38%). Out of two groups, pelagic fishes shared (61.44%), and demersal fishes (38.56%) of the total revenue. Revenue was found high in August, 2009 (17.38%) followed by September, 2009 (15.52%). Month of October, 2008 contributed (10.34%) revenue, but in November, 2008 revenue slightly increased to (12.11%). In the month of December, 2008 revenue drastically decreased (6.45%); however in the month of January, 2009 there was a slight increase in the revenue (8.78%). Revenue again decreased (5.92%) in February, 2009, but in the case of March, 2009, the revenue slightly increased (7.66%). The revenue in April, 2009, was (4.71%). In

May, 2009 it increased to (7.10%), but again the revenue decreased in the month of June, 2009 (4.04%). Sehara and Karbhari (1989a) studied catch composition of mechanised gillnetters operated along the Maharashtra coast and reported almost similar results. Authors reported October as the most productive month at Khar-Danda and Satpati. Further they reported that pomfret and seerfish were the major species which generated the maximum revenue. Markad (2004) reported that revenue fetched by Indian mackerel was maximum with 45.97% in case of OBM gillnetter whereas seerfish generated the maximum revenue (71.15%) for IBM gillnetters.

The species wise revenue according to season is presented in table 2. The winter was most productive with contribution of (37.67%), followed by Monsoon (36.93%) and summer (25.39%). Indian mackerel in winter shared total revenue (26.83%), summer (40.34%) and in monsoon month Silver pomfret produced maximum revenue (35.24%). The comparison between different seasons gave an idea of share of Indian mackerel in seasonal revenue which was highest in summer (44.41%) and lowest in monsoon (40.65%). Similar findings were also reported by Sehara and Karbhari (1989a) at selected centres along the Maharashtra coast. They reported that the post-monsoon quarter (September-November) were most productive with the seerfish as maximum contributor to gill net fishing. Silas *et al*. (1984) reported April and July to October months as more productive in the year 1981 and the productive months during the year 1982 were April, May and July-October. Sathiadhas and Panikkar (1988) reported monsoon as the most productive season along the Trivendrum coast, whereas, Koya and Vivekanandan (1992) reported maximum landings in the September. Markad, (2004) reported peak landings along Ratnagiri coast in the October month.

Economics

Economic analysis was carried out for OBM gillnetter units. Capital cost, variable cost, fixed cost, total expenditure, revenue and net profit were the major components considered for economic analysis. The economic analysis is shown in table 3.

Capital cost

Cost of vessel, cost of engine, cost of net and other miscellaneous items with more than one year life span were included to calculate the average capital cost of a gillnetter. The capital investment was Rs. 3,33,379 for OBM gillnetters. In OBM unit, engine cost alone contributed 23.43% of the total capital cost. Vessel cost of OBM was 22.40%. Net cost contributed 46.51%. In case of gear accessories (rope, buoys, floats, anchor and sinkers) cost, which shared 7.66% for OBM respectively. (Sathiadhas *et al*., 1991), Rs. 10,000 to Rs. 50,000for in West Bengal during year 1983-84 (Datta and Dan, 1992), Rs. 25,400 and Rs. 52,480 for motorised *catamarans* and motorised *navas* in Kanyakumari district of Tamil Nadu State (Annamalai and Kandoran, 1993), Rs. 1,05,000 to Rs. 1,23,000 for the gillnetters operated from Cochin fishing harbour during the year 1990 (Iyer, 1993) and Rs. 58,000 and Rs. 1,60,00 for the gillnetters operated from Kerala (Panikkar *et al*., 1993), Rs. 3,01,000 to Rs. 4,00,000 for gillnetters operated along Chennai coast during 1991-92 (Luther *et al*., 1997) and Rs. 1,48,414 for OBM gillnetters (Markad, 2004).

During the present study, the capital cost of OBM gillnetter was high as compared to many authors Markad, (2004). The difference in capital cost recorded on higher side in the present study may be attributed the increase in price of raw material.

Table.1 Details of species wise mean fish landings (kg) of OBM gillnetters from October 2008 to September 2009

Sr. No.	SPECIES	Oct, 2008	Nov, 2008	Dec, 2008	Jan, 2009	Feb, 2009	Mar, 2009	Apr, 2009	May, 2009	June, 2009	July, 2009	Aug, 2009	Sept, 2009	Total
Pelagic fishes														
1	*Lepturacanthus savala*	2.85 (± 0.46)	4.38 (± 0.56)	2.58 (± 0.51)	1.74 (± 0.37)	2.22 (±0.43)	4.58 (±0.67)	1.7 (± 0.37)	2.7 (± 0.43)	4.17 (± 0.95)		4.1 (± 0.68)	5.2 (± 0.73)	36.22
2	*Scomberomorus commerson*	0.2 (± 0.14)	0	0	0.67 (± 0.13)	0.19 (± 0.13)	0	0	0	0		0	0.02 (± 0.02)	1.08
3	*Rastrelilliger Kanagurta*	10.05 (± 1.21)	12.9 (± 0.88)	12.62 (± 1.17)	3.65 (± 0.63)	6.24 (± 1.06)	11.84 (± 0.89)	9.65 (± 0.88)	12.67 (± 1.03)	14.78 (± 1.81)		3.04 (± 0.44)	12.17 (± 1.15)	109.61
4	*Megalalapsis cordyla)*	3.48 (± 0.76)	0.68 (± 0.17)	0.03 (± 0.03)	2.93 (± 1.01)	1.67 (± 0.33)	0.66 (± 0.18)	0.07 (± 0.05)	0.03 (± 0.02)	0.34 (± 0.16)		0	0.77 (± 0.22)	10.66
5	*Hilsa toli*	1.9 (± 0.34)	2.58 (± 0.33)	1.99 (± 0.28)	3.46 (± 0.69)	1.5 (± 0.26)	2.42 (± 0.33)	1.97 (± 0.25)	2.88 (± 0.30)	2.52 (± 0.48)		0.14 (± 0.09)	2.27 (± 0.44)	23.63
6	*Chirocentrus dorab*	2.69 (± 0.46)	2.7 (± 0.29)	2.79 (± 0.23)	3.94 (± 0.62)	3.22 (± 0.51)	2.63 (± 0.31)	1.6 (± 0.24)	1.89 (± 0.22)	1.72 (± 0.33)	No catch due to Monsoon ban	0	1 (± 0.23)	24.18
7	*Scomberoides lysan*	0.16 (± 0.09)	0	0	0.36 (± 0.20)	0.59 (± 0.23)	0	0	0	0		0	0	1.11
8	*Sphyraena jello*	0	0.02 (± 0.02)	0	0.4 (± 0.10)	0	0.03 (± 0.03)	0	0	0		0	0	0.45
9	*Dussumieria acuta*	3.05 (± 0.53)	2.77 (± 0.43)	2.05 (± 0.23)	1.09 (± 0.22)	4.29 (± 1.00)	3.09 (± 0.48)	1.92 (± 0.21)	2.08 (± 0.25)	1.41 (± 0.55)		0	2.63 (± 0.92)	24.38
Demersal fishes														
10	*Pampus argenteus*	1.89 (□ 0.16)	1.25 (□ 0.13)	0.15 (□ 0.04)	0.93 (□ 0.14)	0.55 (□ 0.09)	0.01 (□ 0.01)	0.1 (□ 0.03)	0.05 (□ 0.02)	0.39 (□ 0.08)	No catch due to Monsoon ban	9.76 (□ 0.59)	3.95 (□ 0.28)	19.03
11	*Parastromateus niger*	0.01 (± 0.01)	0	0	0	0.02 (± 0.02)	0	0	0	0		0	0.01 (± 0.01)	0.04
12	*Batrachocephalus mino*	0.12 (± 0.07)	0 (±0.00)	0.37 (± 0.19)	0.14 (± 0.05)	0.39 (± 0.32)	0 (± 0.00)	0.17 (± 0.12)	0.19 (± 0.13)	0.25 (± 0.19)		0	0.27 (± 0.15)	1.9
13	*Muraenesox talabonoides*	1.22 (□ 0.36)	0	0	0.02 (□ 0.02)	0	0	0	0	0		0	0	1.24
14	*Johnius sp.*	1.35 (± 0.25)	0.33 (± 0.13)	1.47 (± 0.24)	2.99 (± 0.42)	1.2 (± 0.22)	0.07 (± 0.06)	0.3 (± 0.17)	0.35 (± 0.16)	0.51 (± 0.32)		0	1.26 (± 0.28)	9.83
Total		**28.97**	**27.61**	**24.05**	**22.32**	**22.08**	**25.33**	**17.48**	**22.84**	**26.09**		**17.04**	**29.55**	**263.36**

Values in parenthesis are S.E of mean; (S.E. in some cases could not be estimated due to less number of landing values)

Table.2 Details of species wise revenue (Rs.) of OBM gillnetters according to season

Sr. No.	Species	Season (Revenue in Rs.)			Total (Revenue Rs.)
		Monsoon	**Winter**	**Summer**	
	Pelagic fishes				
1	Ribbonfish *Lepturacanthus savala*	226226	281190	264446	771862
2	Seerfish *Scomberomorus commerson*	920	42504	8280	51704
3	Indian mackerel *Rastrelilliger Kanagurta*	235710	463320	469485	1168515
4	Horse mackerel *Megalalapsis cordyla*	4050	33102	10836	47988
5	Hilsa *Hilsa toli*	83616	253440	217248	554304
6	Wolf herring *Chirocentrus dorab*	11150	79575	59450	150175
7	Other Horse mackerel *Scomberoides lysan*	0	3350	3550	6900
8	Barracuda *Sphyraena jello*	0	4060	245	4305
9	Lesser sardine *Dussumieria acuta*	8010	23500	28830	60340
	Demersal fishes				
10	Silver pomfret *Pampus argenteus*	1100800	444800	69600	1615200
11	Black pomfret *Parastromateus niger*	300	300	900	1500
12	Cat fishes *Batrachocephalus mino*	3800	6400	7400	17600
13	Eel *Muraenesox talabonoides*	0	11960	0	11960
14	Croaker *Johnius sp.*	18200	79200	23600	121000
	Total	1692782	1726701	1163870	**4583353**

Values in parenthesis are S.E of mean
(S.E. in some cases could not be estimated due to less number of landing values)

Table.3 Economics of OBM gillnetters operated from Jaleshwar Coast, Veraval, during 2008-09

		Items	Amount (Rs.)
A		**Capital cost**	
	1	Vessel	74,700
	2	Engine (two cylinder)	78,100
	3	Net 408 kg @Rs.380 /-kg	1,55,040
	4	Rope 117 kg @Rs.120 /-kg	14,040
	5	Indicator buoys 6 numbers. @ Rs.90 /-per buoy	540
	6	Floats 316 numbers @ Rs.10 /- per float	31,60
	7	Stone sinker 1007 numbers @ Rs.7/-sinker	7,049
	8	Anchor 15 kg.@ Rs.50 /-kg	750
Total capital cost			**3,33,379**
B		**Variable cost**	
	1	Fish holding vessel (tagara) 5 numbers @ Rs.50 /- per tagara	250
	2	Paint 2 litres @ Rs.130 /- per litre	260
	3	Maintaince of gill net	5,080
	4	Maintaince of engine(three times in a year)	13,377
	5	License fee, @ Rs.505/-per year	505
	6	Kerosene total 2131 litres @ Rs.9 /-per litre for 1485 litres and Rs. 35/-litre for 645 litre	35,940
	7	Oil 147 litres @ 150/- per litre	22,050
	8	Petrol 291 litres @ Rs.50/-per litre	14,550
	9	Crew salary	15,556.41
Total variable cost			**1,07568.41**
C	**Total project cost (A+B)**		**1,40,947.41**
D		**Fixed cost**	
		Depreciation	
	1	Vessel and engine, at 10 percent	15,280
	2	Net, at 25 per cent	38,760
	3	Ropes, at 25 per cent	3,510
	4	Indicator buoys, floats, sinkers and anchor at 20 per cent	2,298.2
Total fixed cost			**5,9848.2**
E	**Total cost (B+D)**		**1,67,416.61**
F	**Total revenue (Rupees)**		**1,52,778.43**
G	**Profit or Loss**		**-14,638.2**

Variable cost

Total variable cost was estimated by considering expenses on fuel, lubricant, wages, fees and repairing and maintenance. The estimated annual variable cost was Rs. 1,07,568.41 for OBM gillnetters. Expenditure on kerosene, oil and petrol had major share 68.47% in the total expenditure. Maintenance of net and engine contributed 17.16% for OBM units respectively. Crew salary was found to be other major item of expenditure. Sharing system was followed to calculate the crew salary which contributed 14.46%. Fees and other items such as fish holding utensils (tagara) and paint together formed 0.94% for OBM gillnetters. Silas *et al*. (1984) reported the variable cost at Rs. 66,337/- in the year 1981-82 whereas the variable cost by other workers ranged from Rs. 88,643 to Rs.

1,13,837 (Sehara and Karbhari, 1989a) during the year 1986-87, Rs. 1,81,190 to Rs. 3,33,200 (Rao and Pandey, 1990) in the year 1985-86 as compared to above studies the variable cost of the present studies were higher.

Total project cost

The estimated project cost for OBM gillnetter was Rs. 1, 40,947.41.

Fixed cost

Depreciation was included in the fixed cost. The fixed cost was estimated at Rs. 59,848.2 for OBM unit. Average life of 10 years was considered to work out the depreciation of vessels and engine whereas, with regard to net, the life expectancy was considered as four years. Depreciation of other items was calculated on the basis of expected life. Depreciation accounted four years for ropes and five years for indicator buoys, floats, sinkers and anchor. It was similar to the average life considered by Markad, (2004). Sehara and Karbhari (1989b) also considered the same life expectancy in case of vessel but considered expected life of 20 years for engine. The fixed cost reported by Sehara and Karbhari (1989b) ranged from Rs. 47,090 to Rs. 54,110 whereas Rs. 23,675 to Rs. 81,700 by Rao and Pandey (1990) at the Versova during 1985-86, Rs. 17,128 by Sathiadhas *et al..* (1991) along the Tuticorin during 1987, Rs. 8,820 to Rs. 19,500 for plank built boats by Sathiadhas *et al*., (1993), Rs. 82,750 to Rs. 1,04,666 for 12 m vessels operated along the Tuticorin coast.

Total expenditure and revenue

The total expenditure i.e. total cost per year was calculated by adding the total fixed cost and total variable cost which came to Rs. 1,67,416.61. Whereas total revenue was

calculated at Rs. 1,52,778.43 for OBM gillnetters.

Profit

The annual loss of rupees -14,638.2 was incurred considering the initial investment in terms of capital cost at the end of first year however second year onwards the OBM gillnetters were profitable. Markad (2004) reported that the annual profit of the OBM gillnetter was Rs. 47,727 and for IBM gillnetters it was Rs. 1,26,758. Dave (2004) reported that the annual profit of the owner was Rs. 31,025.71 for OBM gillnetters. The result of the present study shows that fishermen of Jaleshwar village incurred annual loss rather than profits at the end of first year of fishing operation. However in the subsequent years, they achieved profits. The major problems faced by the Jaleshwar fishermen were lesser availability of fish, and higher fuel cost.

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