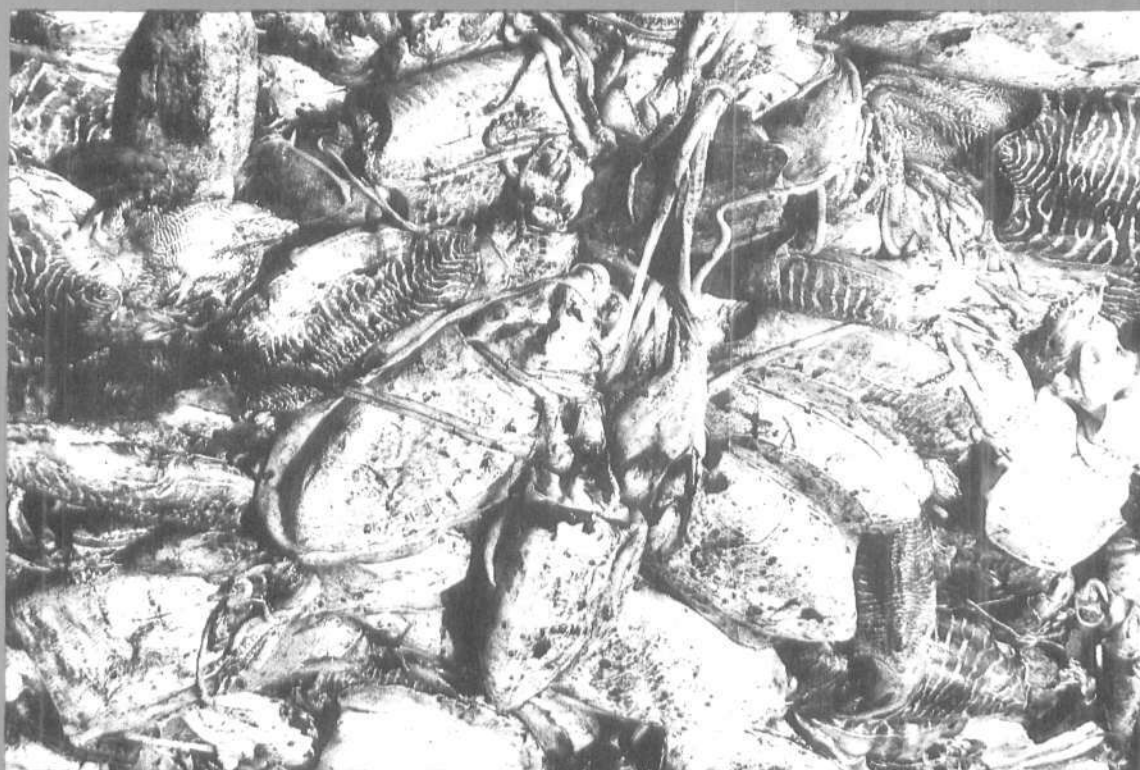




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# **SOCIO-ECONOMICS OF TRAWL FISHERY IN SAURASHTRA - A CASE STUDY**

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## **Introduction**

Among different gears operated in Indian waters, trawl net has drawn significant attention of fisherfolk. Trawlers are seen operating in all the maritime states. The trawl nets are designed mainly to catch prawns and commercially important species i. e. exportable species. According to marine fishermen census conducted by the Central Marine Fisheries Research Institute, Cochin, during 1980 the trawlers account for about 67% of total mechanised boats in India. Of the total mechanised boats in the state of Gujarat (2894) the trawlers formed 50%. In Gujarat, main concentration of trawlers was found in Junagadh District (64%). It is an important district from a capture fishery point of view in Saurashtra region. About 80% of total fish catch in Gujarat comes from mechanised units. The share of small and medium trawlers in mechanised catch, including that of power propulsion touches 50%. The trawl fishery employs a large number of fishermen in the state. For fishing operations, some trawl owners are employing labourers on contract basis whereas others employ them on daily wages. With the involvement of trawl catch in export, the infrastructure facilities have been developing and the expanding prawn fishery has given rise to employment opportunities in the coastal regions. Accordingly, men and women are finding different jobs especially in post-harvest operations. Capital-wise a good amount of money is invested in a trawl unit and the entrepreneurs are always caught in the waves of risk and uncertainty of production. With the large involvement of capital and manpower and with an increasing number of trawlers in almost all the maritime states of India it was felt important to analyse socio-economic characteristics of trawl fishery. The Central Marine Fisheries Research Institute, Cochin, conducted a survey at selected centres in the north-west coast of India during 1987-'88 with the main objective of evaluating socio-economic status of fishermen engaged in trawl fishery. This report highlights the socio-economics of trawl fishery at Porbandar in Saurashtra region of Gujarat.

## **Survey coverage**

There are two main landing centres at Porbandar. Cement-factory landing centre is used for landing trawlers and gillnetters whereas Subhash Nagar landing centre is confined to the units fitted with OBE. About 300 local trawlers with equal number of trawlers migrated from other parts of the state were landing at this centre and accordingly a sample of 30 trawl units was drawn giving due representation to small and medium trawlers. Three types of questionnaires were developed to collect information on the details of centre, boat & gear and cost & revenue of fishing operations. Catch, price, employment and cost details were collected by the enumerators engaged from fishermen community and trained for this purpose on ten systematic selected observation days every month for full fishing season during 1987 - '88. While details of input-output of trawl operations were collected through primary survey, the information on the infrastructure facilities available at landing centre were obtained from fishermen co-operative societies and the regional unit of State Fisheries Department, located at Porbandar.

## **General information about landing centre**

The number of fishermen families at Porbandar exceeds 1,000 with a population of 7 - 8 thousand. About 450 families are engaged in trawl fishing. Most of the fishermen come under the category of 'Economically Backward Communities'. The trawl landing centre is less than 1 km away from the city. Roadways, bus stand, main *mandi*, railway station, Block Development Office and Taluk Office are within the reach of 2 - 3 km from the landing centre. The landing centre is well connected with *pukka* road. The water and electric connections extend upto the landing centre. The general amenities could easily be graded as very good. Autorickshaw, hand-cart, tempo, cycles and head-loads are the common mode of fish transportation. There are about 30 ice factories in Porbandar area each with a capacity of 5 - 20 tonnes. Five cold storages

provide fish storing facilities near landing centre. There are 2 petrol/diesel bunks and one of the bunks is run by the fishermen co-operative society.

There are a number of other common facilities like post office, government dispensary, private clinic, library/reading room, club, theatre etc. The centre has a well maintained jetty. There is no boat building yard but 5 boat/engine service stations are available at Porbandar. The boats are bought either from Veraval or Mangrol. The number of fish processing companies at Porbandar is 3 which mainly buy prawns and other commercially important species from the fishermen. But, several buyers from different fish processing companies located in other parts of Saurashtra are involved in fish marketing at this centre.

### **Source of finance**

Some of the trawler owners have got loan from National Co-operative Development Corporation under group financing scheme. Also, a number of fishermen have availed loan from different nationalised banks for mechanisation. The rest of the fishermen took loan from fish traders, friends and relatives. The fishermen co-operative society is not providing any type of loan to fishermen. The interest charged by institutional agencies varied from 12 to 18 per cent whereas private loans carry a sort of hidden interest. The fish traders do not charge interest but buy the catch at a lower than the prevailing market rate. There is no standard rate of interest on the loan taken from friends and relatives. About 50% of the respondents availed loan from more than 2 agencies. The amount of loan taken ranged from Rs. 0.45 lakh to Rs. 3 lakhs per unit. A fisherman had a minimum of Rs. 40,000 and a maximum of Rs. 2 lakhs as his own money before taking loan for purchasing a trawler.

### **Boat and gear**

About 600 trawlers are operating at Porbandar. The length of the boat varies from 11 to 14 metres, breadth 3 to 4 metres and depth 1.5 to 2.5 metres. The boats have a carrying capacity of 9 - 10 tonnes. Majority of the trawlers was procured in seventies and the rest in eighties. Most of the boats are fitted with 4 cylinder Ashok Leyland engine. System of single ownership of craft and gear is prevailing at the centre barring

a few trawlers shared by a group of fishermen. A minimum of 4 and a maximum of 7 nets were found in each trawl unit. Majority of the nets measured 50 metres in length. The mesh size at cod end is less than a centimetre. The useful life of a net is not more than two years. As commonly found in other places the net is made up of nylon thread.

### **Fishing operation**

The trawl operation season started in 1st week of September, 1987 and stretched upto 4th week of May, 1988. The period of about nine months of active fishing (excluding monsoon) is referred to as 'fishing season' in this article. The first quarter includes the period from September to November, 1987, second, from December, 1987, to February, '88 and third, from March to May '88. Every month, 4 - 6 trips are observed. The duration of a trip is 4 - 5 days. On an average 45 trips are accounted for in a full fishing season for a unit.

Most of the trawlers fish upto 50 fathoms of depth. In the beginning of the fishing season the trawlers operate upto Miyani. For three months Okha and Dwarka waters are fished and during lean period fishing is carried out upto Kutch-Rupan, Jakhao, Lakpat etc. For some of the fishing grounds it takes one full day to reach from Porbandar. Generally, the quantity of catch per trip goes on decreasing from I to III quarter in a season.

### **Fish marketing**

Fresh prawns, lobsters and cephalopods are sold through auctioning to suppliers who take commission and sell the catch to fish processing companies. More than 10 companies based, mainly, at Veraval buy the commercial catch through suppliers. Other trawl catch is sold to retailers through auction. Dry fishes like ribbon fish, dhoma, clupeoids, bombay-duck, shark and cat fish are transported to Assam and NEH region of the country for marketing. Some of the suppliers advance money to the boat owners and in turn force the latter to sell catch to them with the result that the fishermen do not get a competitive price. Except this factor other parameters of marketing including transportation, preservation and allied facilities are worthwhile at this centre. The fishermen co-operative societies are not involved in fish marketing and their main role is to

supply fuel and fishing implements.

### Investment and fixed cost

An average amount of Rs. 4.04 lakhs is invested in procuring and making a trawler ready for operation. Hull and engine are main capital assets with an average investment of Rs. 2 lakhs and Rs. 1.5 lakhs respectively. Besides nets and nylon ropes (Rs. 17,000/-) other implements and accessories cost Rs. 37,000/- (Table 1).

TABLE 1. Capital investment of a trawl unit at Porbandar (1987-'88)

Items	Value (Rs)
a. Hull	2,00,000
b. Engine	1,50,000
c. Net & nylon rope	15,000 .2,000
d. Other accessories	
i) Main items (winch, wire-rope, otter-board, gallows, pulleys diesel tank, water barrel)	32,000
ii) Minor items (light arrangement, cooking vessels etc.	5,000
<b>Total</b>	<b>Rs. 4,04,000</b>

Treating the useful life of the boat and engine as 10 years the annual depreciation (@ 10% per annum) is calculated at Rs. 35,000/- (Table 2). Net and nylon ropes are depreciated @ 50% and the annual cost amounts to Rs. 8,500/-. The major accessories generally work for 5 years and thus, their annual cost is taken at Rs. 6,400/-. The other miscellaneous items are fully consumed in a fishing season, so, Rs. 5,000/- is treated as the annual cost towards these items.

TABLE 2. Annual fixed cost

Items	Fixed cost (Rs)	
	Annual	Per trip
<b>A. Depreciation</b>		
i) Hull & engine @ 10% p. a	35,000	778
ii) Net & nylon rope @ 50%	8,500	189
iii) Major accessories @ 20%	6,400	142
iv) Miscellaneous items @ 100%	5,000	111
Sub total =	54,900	1,220
<b>B. Interest on capital @ 15% p. a.</b>	60,600	1,347
<b>C. Insurance of trawler</b>	11,500	255
<b>Total fixed cost</b>	<b>1,27,000</b>	<b>2,822</b>

The rate of interest on capital investment varies from 12 to 18% so a mean value of 15% per annum is charged on the initial investment of Rs. 4.04 lakhs. The interest thus calculated amounts to Rs. 60,600 a year. A sum of Rs. 11,500 has been counted towards the premium paid for insurance of a trawler. Many boat owners insured their trawlers especially those who have availed institutional finance. The annual insurance premium is about a quarter and three per cent of assessed value of the trawler. The total annual fixed cost is calculated at Rs. 1.27 lakhs for a trawl unit.

### Operating expenses

The labour is one of the important cost items in trawl fishing. On a small trawler, 4 - 6 persons form the crew. On a big boat going for long trip 6 - 8 persons, including or excluding the owner of the trawler are accommodated. Each worker on boat is paid Rs. 700 - 1,200 depending upon his age, capacity of working and experience in fishing. Some of the workers, called *Khalasis*, are migrating from outside the area but most of them are from Porbandar taluk. For an average unit an amount of Rs. 54,500 is accounted for labour wages (Table 3). Besides this, expenses towards food and bata totals at Rs. 35,500 for the fishing season. The annual expenditure on ice and salt is found to be Rs. 30,600 per unit.

It requires 400 - 500 litres of diesel for up and down journey and about same amount for fishing operations in a trip. The fishermen

TABLE 3. Average operating expenses of a trawl unit

Items	Expenses (Rs)	
	Annual	Per trip
i. Labour charges (wages)	54,500	1,211
ii. Ice & salt	30,600	680
iii. Food & bata	35,500	789
iv. Fuel	1,42,650	3,170
v. Servicing, painting & repair charges	20,250	450
vi. Wharfage & other miscellaneous expenses	20,700	460
<b>Total</b>	<b>Rs. 3,04,200</b>	<b>Rs. 6,760</b>

Total annual cost (FC + VC) = Rs. 9,582

co-operative society was reported to provide diesel @ Rs. 3.30 per litre and mobile oil @ Rs. 17.5 per litre. On this subsidised rate there is a fixed quota of diesel to be supplied to each trawler in a fishing season and if more diesel is required it is to be procured at market rate. The fishermen feel the quota of diesel fixed per unit is not at all sufficient and they have to pay higher price to meet their full requirement. An average figure of Rs. 1,42,650 per unit is estimated towards fuel expenses in a fishing season.

Besides accidental repairs of boat, engine and nets the fishermen arrange for annual repairs, painting and servicing, generally, in the monsoon season. An average amount of Rs. 20,250 forms the annual expenditure towards this head for a trawl unit. Wharfage, licence fee, commission and other services and liabilities amount to Rs. 20,700 in a year.

The annual variable cost of trawl operations comes to Rs. 3,04,200. Accounting 45 trawl trips in a fishing season the average operating expenditure is calculated at Rs. 6,760 per trip. Total cost, including fixed and variable expenses, is found to be Rs. 9,582 for a trip of 5 - 6 days.

### Production

The trawl catch is divided into 12 species-groups as shown in Table 4. The species contributing a small portion of catch and fishes of low economic value including juveniles are clubbed together and put in the last row under miscellaneous catch. In first quarter an average of 1,711 kg of catch was available per trawl trip whereas in II and III quarters the corresponding figures was 1,495 and 1,313 kg respectively. The catch of prawns, croakers, perches and pomfrets was better in I quarter as compared to II and III quarters. About 38% of annual catch is contributed by the I quarter.

In an annual catch of 67,790 kg per unit the prawns contributed about 16%. Other important contributors were ribbon fish (13%), catfish (16%), cephalopods (5%), croakers (5%) and elasmobranchs (5%). Miscellaneous fishes and unsorted juveniles of different species form about  $\frac{1}{3}$  of the total catch. The average catch per trip is calculated at 1,506 kg.

### Revenue

As shown in Table 5, the gross revenue realised from the sale of catch averages Rs. 4,53,638

TABLE 4. Catch of a trawler at Probandar (1987-'88)

Species	Catch per trip (kg)			Annual catch (kg)
	I Quarter	II Quarter	III Quarter	
1. Prawns	406	184	109	10,499 (15.5)
2. Lobster	6	4	3	180 (0.3)
3. Cephalopods	39	75	105	3,285 (4.8)
4. Elasmobranchs	68	65	74	3,106 (4.6)
5. Croakers	84	68	70	3,330 (4.9)
6. Ribbonfish	200	221	158	8,682 (12.8)
7. Eels	43	28	22	1,397 (2.1)
8. Catfish	198	247	290	11,020 (16.3)
9. Perches	45	36	21	1,539 (2.3)
10. Pomfrets	30	23	7	898 (1.3)
11. Clupeoids	27	30	15	1,080 (1.6)
12. Miscellaneous catch	565	514	439	22,774 (33.6)
Total	1,711	1,495	1,313	67,790

Per trip = 1,506 kg

Note : Figures in parentheses indicate percentages.

for a trawl unit during the fishing season. The first quarter contributes about 46% of the annual revenue. On a trip fetching about Rs. 13,870 the prawns account for about 60%. In II and III quarters also prawns contribute about 48 and 34% of the quarterly revenue respectively. Other important groups are lobsters (5%), croakers (3%) ribbonfish (6%), catfish (10%), and pomfrets (5%). On an average, 50% of annual revenue is realised from the sale of prawns. Basically, the economics of trawl fishery is believed to be dependent on the quantity and quality of prawn catch. Comparison between the quarters shows that revenue realised from prawns, lobsters, croakers, eels, perches, pomfrets and other miscellaneous catch was

better in I quarter as compared to II or III quarters. Catfish, elasmobranchs and cephalopods performed better in III quarter. An average of Rs. 10,081 was earned per trip of a trawler at Porbandar during 1987 - '88.

TABLE 5. Revenue realised from the sale of trawl catch (1987 - '88)

Species-group	Revenue per trip (Rs)			Annual revenue (Rs.)
	I Quarter	II Quarter	III Quarter	
1. Prawns	8,413	4,309	2,536	2,28,870 (50.4)
2. Lobsters	600	446	424	22,049 (4.9)
3. Cephalopods	150	312	570	15,480 (3.4)
4. Elasmobranchs	193	198	260	9,766 (2.2)
5. Croakers	439	254	318	15,163 (3.4)
6. Ribbonfish	602	614	473	25,334 (5.6)
7. Eels	240	177	186	9,043 (2.0)
8. Catfish	893	770	1,250	43,696 (9.6)
9. Perches	278	254	206	11,070 (2.5)
10. Pomfrets	640	619	235	22,408 (4.9)
11. Clupeoids	123	129	90	5,128 (1.1)
12. Mice. catch	1,303	862	877	45,631 (10.0)
Total	13,874	8,944	7,425	4,53,638

Per trip = Rs. 10,081

### Income, profit and other efficiency measures

With an annual gross income of Rs. 4.5 lakhs a unit, the net income (income over operating expenditure) is calculated at about Rs. 1.5 lakhs, averaging Rs. 3,321 per trip (Table 6). To calculate net profit, the sum of variable cost, fixed cost and imputed charges of owner's labour are deducted from the gross income. An amount of Rs. 10,438 is found to be the net annual profit of a trawl unit, with an average of Rs. 232 per trip.

TABLE 6. Efficiency of capital investment

	Annual	Per trip
Value of catch	Rs. 4,53,638	10,081
Imputed value of owner's labour	12,000	267
Income over operating expenditure	1,49,445	3,321
Net profit	10,438	232
Return to owner's labour and Management	22,438	499
Return to capital	71,038	1,579
Rate of return on capital		17.6%
Payback period		6 Yrs.

The return to owner's labour and management is the profit of the owner of a trawler in hand after paying for variable and fixed items associated with trawl fishing. In a year, a trawler owner, on an average, is getting an amount of Rs. 22,438 towards his labour and management. Similarly, return to capital is calculated by adding net profit and interest already accounted for on capital investment. The amount, thus calculated, is about Rs. 71 thousand. The rate of return on capital comes to 17.6% which is more than the rate of interest taken for calculation of fixed cost (15%) in the present study.

The pay-back period which shows the number of years required to recover the initial investment out of earnings before any allowance for depreciation is computed at 6 years. Since a trawler can easily work for 10 years, the present rate of capital recovery is within the satisfactory limits.

Table 7 presents various other efficiency measures of trawl fishing. The production per man-trip is found to be 251 kg against per crew wage of Rs. 202 a trip. The productivity per man-day comes to 50 kg. The fuel cost is estimated at Rs. 2.10 per kg of fish production. The operating cost and total cost per kg of fish production is found to be Rs. 4.49 and Rs. 6.36 respectively. The average value of one kg of fish is Rs. 6.69, giving a profit-margin of Rs. 0.33 per kg over the total cost.

### Important observations

The mechanisation was fast increasing upto 1985 at this centre. During 1987 - '88 this intensity was found to be low and hardly 10 boats

TABLE 7. Productivity and other efficiency measures

i. Total catch per unit :	
Annual	67,790 kg
Per trip	1,506 kg
ii. Average number of trips in a year	45
iii. Production per man-trip	251 kg
iv. Average number in a crew	6
v. Average wage per trip	Rs. 202
vi. Average days in a trip	5
vii. Productivity per man-day	50 kg
viii. Fuel cost per kg of fish	Rs. 2.10
ix. Operating cost per kg of fish	Rs. 4.49
x. Total cost per kg of fish	Rs. 6.36
xi. Value of one kg of fish	Rs. 6.69
xii. Profit margin per kg of fish	Rs. 0.33

were fitted with IBM. One of the reasons of slow growth of mechanisation is reported to be non-availability of liberal loans from the government. Further, it may be due to non-profitability or comparatively less profitability of trawl operation that about 20 trawlers switched over to gillnetting. The fishermen were not complaining about the reduction in size of prawns. They did not feel any over-fishing also in the region but the need of mesh size regulation in near future by the government was pleaded as a precautionary measure.

There were instances of conflicts between Indian and Pakistani fishermen in recent past when Indians were fishing in Kutch region. Further, no incident of conflict between different types of fishermen at Porbandar is registered though there is good number of OBM (160), gillnetters (105) and non-mechanised boats (45). As practiced in other regions, the trawlers are fishing upto 50 fathoms of depth.

At Porbandar, women participation in fishery activities is not very common. Loading, unloading and other fishery allied activities are carried out by *Khalasis*. For getting loan from banks an amount of Rs. 20,000/- is deposited by fishermen as 'margin money' and then the loan is provided for the purchase of engine. To cover the risk of accident, most of the trawlers are insured at this centre. The trawlers fish in the waters of

Jakhao for about four months, Dwarka and Okha for 3 months and Dwarka to Porbandar in rest of the season. Most of the trawlers come under the category of 'medium trawlers' with the length of about 13 metres.

### Conclusion

Porbandar is a big landing centre where about 600 trawlers land their catch. Most of the trawlers are of medium size. At this centre 400-500 families are associated with trawl fishery. Most of the fishermen come under the category of OBC. The fishermen village is about 1.5 sq. km. in area. Common facilities like post office, bank, school, railway station, *mandi*, bus station, government dispensary, private clinic, library/reading room, club and theatre are available in plenty. The fishery infrastructure is also well developed with sufficient facility of jetty, ice, transportation, marketing, preservation and boat/engine repairs at this centre. Fuel is provided at subsidised rate from a diesel/petrol bunk run by fishermen co-operative society but a fixed quota system is maintained for diesel supply. The loan is commonly availed from banks and fish traders.

For trawlers observing voyage fishing, 4-6 days constitute a fishing trip. Generally, 5-8 persons form crew in different sizes of trawlers. Jakhao, Dwarka, Okha and Porbandar waters are fished by these units. Prawns, lobsters, cephalopods, elasmobranchs, croakers, ribbonfish, eels, catfish, perches, pomfrets and clupeoids formed about 90% of trawl catch during the study period. The first quarter (Sept-Nov. '87) accounted for about 38% of annual fish production and 46% of annual revenue. On an average 45 trips were observed in full fishing season of about 9 months excluding the period of monsoon (June-August, '87). The annual catch is calculated at 67,790 kg valued at Rs. 4,53,638. In a trip, catch of 1,506 kg prawns contributed 15.6%, cephalopods 4.8%, elasmobranchs 4.6%, croakers 4.9%, ribbonfish 12.8% and catfish 16.3%. The main contributors to the annual revenue include prawns (50.4%), catfish (9.6%), lobster (4.9%), ribbon fish (5.6%) and pomfrets (4.9%). A trawl trip fetched an average gross revenue of Rs. 10,081 during the study period.

An investment of Rs. 4.04 lakh in a trawl unit resulted in an annual fixed cost of Rs. 1.27 lakh. The major items of fixed cost were depreciation on hull & engine, interest on initial invest-

ment and insurance. Of the operating cost of Rs. 3.042 lakhs the fuel accounted for about 47% and labour 18%. Total cost is calculated at Rs. 9,582 per trip and the net profit of a unit is found to be Rs. 232. The rate of return on capital is computed at 17.6% against the accounted interest rate of 15%. Further, it requires a minimum of 6 years to recover the capital investment with the stated rate of net income. All the economic efficiency measures show that trawl operation at Porbandar

was profitable during 1987-'88. An owner of a trawler could earn a sum of Rs. 22,438 in a fishing season of about 9 months. Infrastructure facilities are moderate to good. The socio-economic status of trawl fishery at Porbandar can safely be marked as above average.

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