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समुद्री मात्स्यकी सूचना सेवा : समुद्री मात्स्यकी पर आधारित अनुसंधान परिणामों को आयोजकों, मत्स्य उद्योगों और मत्स्य पालकों के बीच प्रसार करना और तकनीकी का प्रयोगशाला से भ्रमशाला तक हस्तांतरित करना इस तकनीकी और विस्तार अंकावली का लक्ष्य है ।

THE MARINE FISHERIES INFORMATION SERVICE : Technical and Extension Series envisages dissemination of information on marine fishery resources based on research results to the planners, industry and fish farmers and transfer of technology from laboratory to field.

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Front cover photo:

Long lining, introduced recently at Malpe for deep sea sharks is found to be remunerative.

मुख आवरण चित्र:

माल्पे में गभीर सागर सुरा के मत्स्यन केलिये हाल ही में प्रस्तावित फ़ायदेमन्द लंबी डोर ।

Back cover photo:

A dense forest of mangrove vegetation (*Rizophora* sp. and *Avicennia* sp.) at Krusadai Island near Mandapam, Tamil Nadu. Found rising up from the ground are the breathing roots.

पृष्ठ आवरण चित्र:

तमिलनाडु के मण्डपम के निकटवर्ती द्वीप क्रूसडी में मेंग्रेव वनस्पति (राइजोफोरा जाति और अवीनिया जाति) का घना जंगल । तल से ऊपर दिखाई पडने वाले, श्वसन मूल हैं ।

ECONOMICS OF GILL NET FISHING BY OBM UNITS AT SELECTED CENTRES IN NORTHWEST COAST

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There has been an increase in the trend of mechanisation in fishery in northwest coast of India in recent years. More than two-third of fish catch both in Maharashtra and Gujarat is contributed by mechanised sector. About half of the crafts in both the states are fitted either with in-board or out-board engines. The capital investment on boat fitted with in-board engine is very heavy and it is beyond the reach of common fishermen to procure it without getting financial help from institutional agencies or private money lenders. It is noted that the fishermen prefer OBM units wherever feasible to operate since the capital investment is of lesser magnitude and profit investment ratio is supposed to be higher. In northwest coast fitting of outboard engines to dugout canoes has been getting popularity. These units mainly operate gill nets. Three to five persons including owner of the boat form the crew.

The Central Marine Fisheries Research Institute, Cochin has undertaken a study to measure the economic efficiency of OBM units operating gill nets in northwest coast. An effort has been made to assess the profitability of these units and to compare the income levels of owner of the boat and the labourers forming crew on these units.

After the preliminary survey of gill net landing centres in northwest coast, Kochra-Nivti in Sindhudurg district of Maharashtra and Dhamlej in Junagadh district of Gujarat were selected for costs and returns study of gill net operation by OBM units. Kochra-Nivti is a backward fishing village with meagre fishing infrastructure facilities whereas Dhamlej has comparatively better infrastructure developments. A sample of 20 units was selected at each centre giving proper representation to the different sizes of units. The data collection was confined to five systematically selected days in each month for a period from September, 1986 to August, 1987. The data were collected with the help of two schedules, one containing details of craft, gear,

labour, infrastructure, credit, marketing and preservation of catch and the other containing details of fixed cost, operating expenditure, catch composition and price of fish. The income of a unit was taken as the sum total of catch value based on landing centre fish prices. The year of observation was divided into four equal quarters, referred hereafter as monsoon (June-August), pre-monsoon (March-May), post-monsoon (September-November) and winter (December-February). The data were analysed quarterwise and pooled together to obtain the results for the year 1986-'87.

General information about selected villages/centres

The fishing is an occupation of 'kolis' (Metar caste) a backward community in Kochra-Nivti, a village about 20 km away from Kudal, district headquarter of Sindhudurg. It is a small village having about 160 fishermen families with a population of about 1,500. In Dhamlej, about 300 Hindu families (*Kharwas, Ghoghallas and Kolts*) and 30 Muslim families (*Machhiaras*) with a total population of about 3,000 are engaged in fishing and fishery allied activities. The village is about 37 km from Veraval Taluk headquarter. It is connected with the coastal highway by *pucca* road. Both the villages have limited fishery infrastructure facilities. A fishermen co-operative society is functioning in each of these villages.

Craft and gear

The boats, used to fit the outboard engines (OBE) are dugout canoes at both the centres. About 100 units fitted with OBE at Kochra-Nivti and 150 at Dhamlej are operating surface and bottom-set gill nets. The boats are comparatively smaller at Kochra-Nivti (5.5-8.5 x 0.6 x 0.9 m) and given additional support by wooden log frames (out-rigger) to avoid overturning during rough sea conditions. At Dhamlej, about 30 per cent of the boats are 32 footer and the rest 22-28 footer. In some of the boats, planks are fitted all

around the sides to make them more spacious. Majority of the boats at both the centres are fitted with 8 HP Yamaha engine.

At Kochra-Nivti, both surface-set gill nets (locally called *nahl jal*) and bottom-set gill nets (locally known as *budl jal*) are operated but former are more in number. The bottom-set gill nets are usually damaged by trawlers during night. In winter and pre-monsoon season fishing operations take place in the areas 15–30 km away from the shore whereas in post-monsoon season it is upto 15 km. The *vagul jal* measuring about 45 x 3 m and having mesh size of about 30 cm is used for shark fishing during January–May. Each piece costs about Rs. 250 and 10–12 such pieces make one gill net unit. Sometimes rays and skates also get entangled in *vagul jal*. Another type of bottom-set gill net is called *tiyani* or *kandali* and operated from January to April. The net made up of monofilament, measures about 55 m in length and 2.5 m in height and costs about Rs. 300. Its mesh size is about 5 cm and used for entangling carangids, clupeoids, ribbon fish etc. To make one net ready for operation 20–25 pieces are joined together. The surface gill net called *nahl* or *wavri* is generally used in post-monsoon season. It is about 55 m in length and 9–10.5 m in height with mesh size of about 12 cm. Each piece costs about Rs. 800 and one full gill net comprises 15–20 pieces. *Nahl* is used for gilling seer fish, ghol and silverbar. *Dhangla*, another surface-set gill net with 15 cm mesh size, is used in post-monsoon season for catching bigger sized seer fish. It is made up of three plier garfil filament (nylon) and measures 36 x 9 m. Single piece costs about Rs. 1,000 and 8–10 pieces are put together for fishing operations. Third type of surface gill net is known as *pasa jal* which is used for gilling pomfret and cat fish. It varies from 55 to 60 m in length and 9 to 10.5 m in height and costs about Rs. 900. It is operated from December to May and 15–20 pieces form one net. During April–May casual catch of lobster is obtained in *shavand jal* which is prepared by using old surface-set gill nets and operated in an area within 2–3 km from the shore.

Similarly, many types of surface and bottom set gill nets are used at Dhamlej landing centre. Big boats use *zada jal* both as surface and bottom set gill nets. While operating, 70 pieces are joined together, each piece being 33 m in length and 6.6 m in height, with a mesh size of 16 cm. Smaller boats use *zina jal* (also termed as *thobdi jal*) with a mesh size of 9 cm and *pakha jal* with a mesh size of 16 cm. *Thobdi jal* is used to gill seer fish, clupeoids, carangids, croakers and *Hilsa*, whereas *pakha jal* is mainly used for pomfret.

The catch of *zada jal* mainly comprises ghol, threadfins, big sized seer fish, cat fish, and carangids. Fabrication cost of the gill net comes to Rs. 425 for *zada jal*, Rs. 350 for *pakha jal* and Rs. 400 for *thobdi jal*, the last two nets being owned by almost all the units.

Marketing of catch

In Kochra-Nivti there is only one trader purchasing pomfret and other costly fishes. The catch is iced and transported to Goa and Ratnagiri to sell it to the fish processing plants. Rest of the catch, mostly in fresh condition, is sold locally by fisherwomen or taken to sell in Kudal market. In case of heavy landings the cheaper varieties of fish are salted or sundried. There is a fishermen co-operative society, the activities being confined to twine selling to its 400 odd members.

The catch at Dhamlej is sold to private fish traders who advance money to the fishermen. Small portion of the catch is sold locally by fisherwomen. About 25 per cent of the boats sell their catch to Gujarat Fisheries Central Co-operative Association Ltd. (GFCCA) which in turn finances the boat owners. The selling of the catch and financing are arranged through primary fishermen co-operative society at the centre. The society charges two per cent commission on the catch sold to GFCCA. Also, the society is providing fishing requisites to its members.

Results and discussion

a) *Details of catch, fishing days and revenue:* In the northwest coast, gill net catch mainly includes pomfret, seer fish, cat fish, sharks, *Hilsa*, croakers, silverbar, perches and ribbon fish. Besides this, lobster in post-monsoon at Dhamlej and prawns in monsoon at Kochra-Nivti are landed as commercially important species of gill net fishing, though for a short period. Catch composition at both the centres is presented in Table 1 for different quarters. In post-monsoon quarter important contributors towards catch were seer fish (27.3%), cat fish (17.8%), croakers (14.9%) and silverbar (14.0%) at Kochra-Nivti and pomfret (22.3%), sharks (15.8%), seer fish (14.3%) and cat fish (13.3%) at Dhamlej. At Kochra-Nivti the percentage contribution of pomfret, cat fish, shark, *Hilsa* and ribbon fish increased in winter whereas in case of seer fish, croakers and silverbar it decreased. The species/groups, contributing more than 10% of the catch in winter at Dhamlej, included seer fish, sharks, croakers and silverbar. In pre-monsoon quarter, pomfret (16.0%), seer fish (12.3%), cat fish (12.8%) and shark (13.7%) at Dhamlej and croakers (15.7%), silverbar (12.4%) and ribbon fish (14.0%) at Kochra-Nivti

were the main components of the catch. During monsoon there is no fishing at Dhamlej centre. At Kochra-Nivti about 20% of the boats are going for prawn fishing. On an average 110 kg of prawn (white) was caught per boat during monsoon at this centre.

The annual catch per unit was calculated at 14,773 kg at Kochra-Nivti and 16,947 kg at Dhamlej. The major varieties/groups of fishes in annual catch were, seer fish (16.5%), cat fish (16.8%), shark (11.5%), silverbar (10.8%), *Hilsa* (11.5%) and croakers (12.5%) at Kochra-Nivti and pomfret (16.8%), seer fish (12.6%), cat fish (12.2%), sharks (14.2%) and croakers (10.4%) at Dhamlej. The miscellaneous catch including threadfin, carangids, prawns and lobster accounted for 10-11% of annual catch at selected centres. Of the total catch at Kochra-Nivti, 45.6% was contributed by post-monsoon quarter, 24.8% by winter, 29.6% by pre-monsoon and monsoon. At Dhamlej the catch contribution was more in post-monsoon quarter (43.6%) as compared to winter and pre-monsoon quarters which contributed almost equally (28%) towards annual catch.

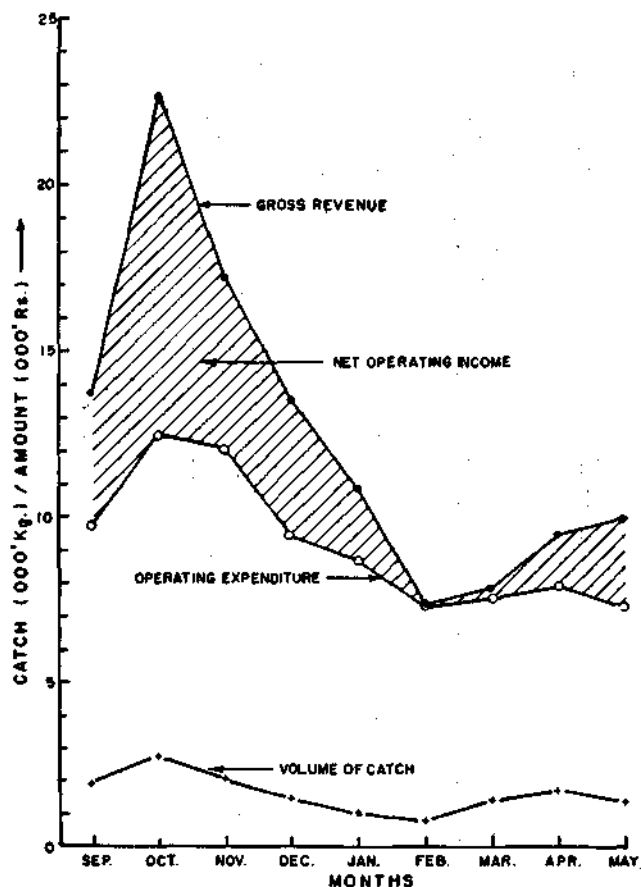


Fig. 1. Monthly volume and value of catch of OBM gill nets at Kochra-Nivti (1986-87).

The number of fishing days at Kochra-Nivti was 64 in post-monsoon quarter, 73 in winter, 70 in pre-monsoon and 21 in monsoon, totalling 228 during 1986-87. The number of annual fishing days worked out at Dhamlej (212 days) was comparatively less since there was no fishing in monsoon. Post-monsoon, winter and pre-monsoon, accounted for 67, 72 and 73 fishing days respectively. In general, the fishing starts in the second week of September and ends in the last week of May every year. The number of fishing days lost each month depends on the occurrence of festival, poor catch and bad weather conditions.

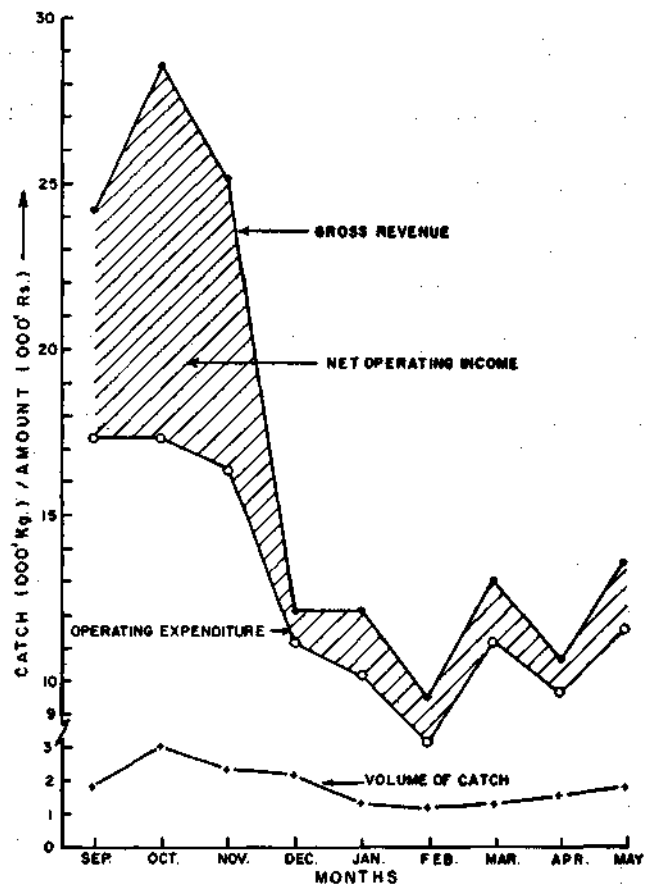


Fig. 2. Monthly volume and value of catch of OBM gill nets at Dhamlej (1986-87).

The details of income realized from sale proceeds of different varieties of fish in each quarter are given in Table 2. Comparing the performance of four quarters, it was observed that about 46% of revenue was obtained in post-monsoon quarter, 27.2% in winter, 23.2% in pre-monsoon and 3.6% in monsoon at Kochra-Nivti. Though the quantity of catch was lesser in winter as compared to pre-monsoon quarter the percentage contribution of winter towards annual revenue was more since commercially important varieties had higher share in catch during winter. The species sharing

Table 1. Catch composition (%) of OBM gill net unit (1986-'87)

Name of species/groups	I Quarter		II Quarter		III Quarter		Annual	
	Kochra-Nivti	Dhamlej	Kochra-Nivti	Dhamlej	Kochra-Nivti	Dhamlej	Kochra-Nivti	Dhamlej
Pomfret	6.1	22.3	9.3	9.1	2.8	16.0	5.8	16.8
Seer fish	27.3	14.3	11.8	10.1	4.1	12.3	16.5	12.5
Cat fish	17.8	13.3	26.9	10.0	7.5	12.8	16.8	12.2
Shark	8.7	15.8	19.2	12.1	9.9	13.7	11.5	14.2
Hilsa	1.6	7.5	8.5	9.0	9.5	6.7	5.6	7.7
Croakers	14.9	9.5	4.4	13.4	15.7	8.8	12.5	10.4
Silverbar	14.0	3.8	3.1	11.1	12.4	9.1	10.8	7.4
Perches	2.1	1.5	2.1	5.5	7.6	5.1	3.7	3.6
Ribbon fish	2.0	4.6	5.4	6.1	14.0	3.5	6.4	4.7
Misc. (threadfin, carangids, prawn, lobster etc.)	5.5	7.4	9.3	13.6	16.5	12.0	9.6 0.8*	10.5
Total catch (kg)	6,736 (100)	7,399 (100)	3,519 (100)	4,747 (100)	4,408 (100)	4,808 (100)	14,773 (100)	16,947 (100)

* Prawn catch in monsoon quarter.

I Quarter = Post-monsoon. II Quarter = Winter. III Quarter = Pre-monsoon.

Table 2. Contribution of different varieties of fish towards revenue of OBM gill net unit (1986-'87)

Name of species/group	Kochra-Nivti				Dhamlej			
	I Qr.	II Qr.	III Qr.	Annual	I Qr.	II Qr.	III Qr.	Annual
Pomfret	10,713 (19.9)	10,819 (34.0)	3,991 (15.6)	25,523 (21.8)	30,300 (38.8)	9,004 (26.6)	14,489 (38.7)	53,793 (36.0)
Seer fish	19,867 (37.0)	6,924 (21.7)	2,215 (8.0)	29,006 (24.8)	10,696 (13.7)	3,900 (11.6)	5,970 (15.9)	20,566 (13.8)
Cat fish	4,276 (7.9)	3,534 (11.1)	1,324 (4.9)	9,128 (7.8)	2,936 (3.7)	1,820 (5.4)	2,145 (5.7)	6,901 (4.6)
Shark	2,598 (4.8)	3,380 (10.6)	1,244 (4.5)	7,222 (6.2)	2,507 (3.2)	1,640 (4.9)	2,207 (5.9)	6,354 (4.3)
Hilsa	706 (1.3)	1,848 (5.8)	2,014 (7.3)	4,568 (3.9)	2,775 (3.6)	1,962 (5.8)	1,703 (4.6)	6,440 (4.3)
Croakers	8,367 (15.6)	1,495 (4.7)	5,688 (20.8)	15,550 (13.3)	5,237 (6.7)	4,700 (13.9)	3,807 (10.2)	13,744 (9.2)
Silverbar	4,444 (8.3)	510 (1.6)	2,230 (8.1)	7,184 (6.2)	1,405 (1.8)	2,655 (7.9)	1,614 (4.3)	5,674 (3.8)
Perches	865 (1.6)	660 (2.1)	2,680 (9.7)	4,205 (3.6)	1,110 (1.4)	1,600 (4.7)	2,005 (5.4)	4,715 (3.2)
Ribbon fish	591 (1.2)	771 (2.5)	1,691 (6.1)	3,053 (2.6)	1,023 (1.3)	870 (2.6)	504 (1.3)	2,397 (1.6)
Misc. (threadfin, carangid, lobster prawn etc.)	1,280 (2.4)	1,898 (5.9)	4,136 (15.0)	7,314 (9.8) +4,179*	20,024 (25.8)	5,628 (16.6)	3,020 (8.0)	28,672 (19.2)
Total revenue (Rs.)	53,701 (100)	31,839 (100)	27,213 (100)	1,16,932 (100)	78,013 (100)	33,779 (100)	37,464 (100)	1,49,256 (100)

Note: Figures in paranthesis show percentages of revenue.

* Revenue obtained from sale proceeds of prawn caught during monsoon.

more than 10% of revenue included pomfret, seer fish and croakers in post-monsoon, pomfret, seer fish, cat fish and shark in winter and pomfret and croakers in pre-monsoon. In monsoon fishing was carried out only for prawn catch. The constituents of catch having major share in annual revenue at Kochra-Nivti were pomfret (21.8%), seer fish (24.8%) and croakers (13.3%).

The revenue in post-monsoon quarter at Dhamlej was mainly earned by the sale proceeds of pomfret (38.8%), seer fish (13.7%), croakers (6.7%) and miscellaneous catch (threadfin, carangids and lobster 25.8%). In winter, majority of the revenue was obtained from pomfret (26.6%), seer fish (11.6%), croakers (13.9%), silverbar (7.9%) and miscellaneous catch (16.6%). The maximum catch value in pre-monsoon quarter was observed for pomfret (38.7%) followed by seer fish (15.9%) and croakers (10.2%) and minimum for ribbon fish (1.3%). More than half of the annual revenue accrued from the catch of post-monsoon quarter. The percentage contribution of winter and pre-monsoon quarter towards the total revenue for 1986-87 accounted for 22.6 and 25.1% respectively. The maximum contribution towards annual revenue (Rs. 1,49,256/-) was made by pomfret (36.0%) followed by seer fish (13.8%) and croakers (9.2%). The sale proceeds of threadfin, carangids and lobsters contributed considerably (19.2%).

b) *Fixed cost:* The components of fixed cost included depreciation on boat, engine, net and other fishing equipments, licence fee and insurance of craft and gears (Table 3). The average estimated cost of a boat at Kochra-Nivti was calculated at Rs. 28,000. The investment on engine, gill nets and other equipments was assessed at Rs. 17,000, 24,000 and 8,000 respectively. The total investment on a gill net unit worked out at Rs. 77,000. Taking 10% depreciation on boat, 20% on engine, 33.3% on nets and 50% on other fishing implements the annual depreciation amounted to Rs. 18,200. An average amount of Rs. 50 per year was taken for the insurance and fees. All the boats are not insured. The boats for which institutional loan had been availed were insured. The opportunity cost of the investment was assessed at Rs. 9,240, taking 12% interest.

At Dhamlej, the dugout canoes are comparatively bigger in size with additional support of wooden planks. The average cost of a boat was calculated at Rs. 36,000, the depreciation being Rs. 3,600 per annum. The annual depreciation for an outboard engine comes to Rs. 3,400. The fishermen were found to own several small pieces of gill nets. The average investment of Rs. 27,000 on nets resulted in an annual depreciation of Rs. 9,000 per

Table 3. Initial investment and components of fixed cost of an OBM gill net unit

I. Initial investment (Rs.)	Kochra-Nivti	Dhamlej
a) Boat	28,000	36,000
b) Out-board engine	17,000	17,000
c) Gill nets	24,000	27,000
d) Other implements	8,000	11,000
Total (a to d)	77,000	91,000
II. Annual depreciation (Rs.)		
a) Boat (10)	2,800	3,600
b) Out-board engine (20%)	3,400	3,400
c) Gill net (33.3 %)	8,000	9,000
d) Other implements (50%)	4,000	5,500
Total (a to d)	18,200	21,500
III. Insurance and other fees (Rs.)	50	60
IV. Total fixed cost (II & III) (Rs.)	18,250	21,560
V. Opportunity cost of capital (12%)	9,240	Rs. 10,920

unit. The depreciation on other fishing implements amounted to Rs. 5,500 per annum. The annual fixed cost for an OBM unit including insurance and other annual fees was pooled up to Rs. 21,560. The opportunity cost of the investment was assessed at Rs. 10,920.

c) *Operating cost:* The operating expenditure was divided into five heads. The costs of kerosene, petrol, lubricant and mobile oil were included in fuel cost. Under labour charges, the wages of active fishermen (in cash and/or kind) and charges of loading/unloading of catch were included. Cost of preservation (ice, salt), marketing (commission, marketing charges etc.) and transportation (from landing centre to auction place or market) were put under one category. Repairing charges comprised the amount spent on the repair and maintenance of boat, engine, net and other fishing implements. Other expenditure such as purchase of baskets, buckets, ropes, lantern, poles and floats were put under miscellaneous expenditure.

Quarter-wise analysis of the operating expenditure (Table 4) revealed that 38.6% of annual operating expenditure (Rs. 88,643) incurred in post-monsoon quarter, 28.8% in winter, 26.8% in pre-monsoon quarter and 5.8% in monsoon at Kochra-Nivti. The variable cost per operating day was maximum in post-monsoon quarter (Rs. 535) and minimum in monsoon quarter

Table 4. Operating expenditure (Rs) of an OBM unit (1986-'87)

Operating expenditure (Rs.)	Kochra-Nivti					Dhamlej			
	I qr.	II qr.	III qr.	IV qr.	Annual	I qr.	II qr.	III qr.	Annual
a) Fuel	3,625 (10.6)	4,593 (18.0)	4,700 (19.8)	630 (12.2)	13,548 (15.3)	5,480 (10.7)	6,283 (20.8)	6,607 (20.3)	18,370 (16.1)
b) Labour	23,670 (69.1)	16,270 (63.8)	13,680 (57.7)	2,010 (39.1)	55,630 (62.8)	34,725 (67.9)	14,900 (49.4)	15,160 (46.5)	64,785 (56.9)
c) Preservation, transportation and marketing	3,565 (10.4)	2,425 (9.5)	2,505 (10.5)	210 (4.1)	8,705 (9.8)	5,590 (10.9)	5,725 (19.0)	6,090 (18.7)	17,405 (15.3)
d) Repairs	2,035 (5.9)	1,190 (4.6)	1,700 (7.2)	2,000 (38.8)	6,925 (7.8)	3,610 (7.1)	2,010 (6.7)	3,345 (10.3)	8,965 (7.9)
e) Misc. items (baskets, ropes etc.)	1,360 (4.0)	1,035 (4.1)	1,140 (4.8)	300 (5.8)	3,835 (4.3)	1,707 (3.4)	1,220 (4.1)	1,385 (4.2)	4,312 (3.8)
Total (a to e)	34,255 (100)	25,513 (100)	23,725 (100)	5,150 (100)	88,643 (100)	51,122 (100)	30,138 (100)	32,587 (100)	1,13,837 (100)
No. of fishing days	64	73	70	21	228	67	72	73	212
Expenditure per fishing day (Rs.)	535	349	339	245	389	763	419	446	537

Figures in paranthesis show the percentages

(Rs. 245). The fuel consumption was more in pre-monsoon quarter (Rs. 4,700) as compared to post-monsoon (Rs. 3,625) and winter (Rs. 4,593). In pre-monsoon quarter the fishermen operate gill nets in deeper waters which results in higher consumption of fuel. Labour engagement was found positively correlating with the fishing intensity and catch availability. Similarly, preservation, marketing and transportation charges were maximum in post-monsoon (Rs. 3,565) and minimum in winter (Rs. 2,425). Fishing was conducted for 228 days during 1986-'87 and the average operating expenditure per day was calculated at Rs. 389. Of annual expenditure, 15.3% incurred on fuel, 62.8% on labour, 9.8% combinedly on preservation, marketing and transportation, 7.8% on repairs and 9.3% on miscellaneous items. Since, most of the costly varieties of fish were purchased by a local trader, the annual expenditure on preservation, marketing and transportation was Rs. 8,705 only.

At Dhamlej centre, maximum operating expenditure of Rs. 51,112 was noted in post-monsoon quarter, and minimum of Rs. 30,138 in winter. The annual operating expenditure worked out at Rs. 1,13,837, the average expenditure being Rs. 537 per fishing day. The fuel cost varied from Rs. 5,480 in post-monsoon quarter to Rs. 6,607 in pre-monsoon quarter. The labour charges in post-monsoon quarter (Rs. 34,775) were more than double the charges of winter and pre-monsoon

quarter. An amount of Rs. 5,000 - 6,000 incurred on preservation, marketing and transportation. The repairing charges ranged from Rs. 2,010 in winter to Rs. 3,610 in post-monsoon quarter. Of annual recurring expenditure, 16.1% incurred on fuel, 56.9% on labour, 15.3% jointly on preservation, marketing and transportation, 7.9% on repairs and maintenance and 3.8% on miscellaneous items.

d) *Income of gill net unit:* The annual gross income of an OBM gill net unit at Kochra-Nivti worked out at Rs. 1,16,932 (Table 5). A boat owner earned Rs. 28,289 during the referred year after deducting operational charges (Rs. 88,643) from the gross income. Thus, the net operational income was 24.2% of the gross income. The residual income of a unit, which was derived on deducting variable and fixed cost from the total revenue, amounted to Rs. 10,039, averaging Rs. 44 per fishing day. On comparing the residual income with the opportunity cost of the capital (Rs. 9,240) an annual profit of Rs. 799 was found for the owner of the unit.

For a fishing season of 212 days the gross income of an OBM gill net unit was Rs. 1,49,256 at Dhamlej. The income over operating expenditure was calculated at Rs. 35,419 which accounted for 23.7% of the gross income. On subtracting the total cost (fixed + variable cost) from the gross revenue the residual income amounted to Rs. 13,859 (9.3% of gross income). The owners'

net profit as calculated on deducting opportunity cost of the capital from the residual income, worked out at Rs. 2,939, accounting for about two per cent of the gross income.

The labour charges, shown in the Table 4, include the share of owner of the boat since he also joins the crew for fishing. The share of the owner for his labour worked out at Rs. 13,908 at Kochra-Nivti and Rs. 12,957 at Dhamlej. The returns to labour and management of the owner was calculated at Rs. 14,707 at Kochra-Nivti and Rs. 15,896 at Dhamlej.

To have an assessment of recovery time of the capital investment, the payback period was calculated on dividing the initial investment by the sum of depreciation and net profit. The payback period of an OBM unit comes to about four years at both the centres. Returns to investment is another indicator for judging the economic efficiency of the capital investment. It was calculated on dividing the sum of net profit and opportunity cost of capital by the investment amount. The return to investment worked out at about 13.0% for Kochra-Nivti and 15.2% for Dhamlej.

Findings

Majority of the boats are fitted with 8 HP Yamaha outboard engine and operate surface and bottom set gill nets at both the centres. The boats vary from 5.5 to 8.5 m in length at Kochra-Nivti and 6.6 to 10 m at Dhamlej. The capital investment of an OBM unit ranged from Rs. 77,000 to 91,000. The catch mainly comprised pomfret, seer fish, cat fish, shark, *Hilsa*, croakers, silverbar and ribbon fish. Availability of lobster in post-monsoon quarter at Dhamlej and prawns in monsoon at Kochra-Nivti are the important features of catch at these centres. Most of the catch is sold fresh to private fish traders who advance money to the boat owners and compel to sell the catch at lower than the prevailing rates to them as an obligation of financing. About 30 boats were found to sell their catch to GFCCA through primary fishermen co-operative society at Dhamlej. The activities of the society at Kochra-Nivti are very limited.

More than one-third of the quantity of catch was obtained in post-monsoon quarter at both the centres. There was no fishing in monsoon at Dhamlej. Lean fishing season was observed in winter at Kochra-Nivti whereas winter and pre-monsoon were at par in term of catch availability at Dhamlej. Quarterly distribution of fishing days, except in monsoon, was almost similar at the selected centres and the number of annual fishing

Table 5. Parameters of economic efficiency of OBM gill net unit

Items	Kochra-Nivti	Dhamlej
a) Gross annual income (Rs.)	1,16,932	1,49,256
b) Gross income per fishing day (Rs.)	513	704
c) Annual fixed cost (Rs.)	18,250	21,560
d) Annual operating expenditure (Rs.)	88,643	1,13,837
e) Per day operating expenditure (Rs.)	389	537
f) Operating cost as % of gross income	75.8	76.3
g) Annual net operating income (Rs.)	28,289	35,419
h) Income per fishing day (Rs.)	124	167
i) Net operating income as % of gross income	24.2	23.7
j) Residual annual income (Rs.)	10,039	13,859
k) Residual income per fishing day (Rs.)	44	65
l) Residual income as % of gross income	8.6	9.3
m) Annual net profit (Rs.)	799	2,939
n) Profit per operating day (Rs.)	4	14
o) Annual income of a labourer (Rs.)	13,908	12,957
p) Per day income of a labourer (Rs.)	61.0	61.1
q) Annual returns to labour and management of owner (Rs.)	14,707	15,896
r) Per day returns to labour and management of owner (Rs.)	65	75
s) Owners returns as % of gross income	12.6	10.6
t) Pay back period (yrs.)	4.0	3.7
u) Returns to investment (%)	13.0	15.2

days varied from 212 to 228. The annual catch of a gill net unit ranged from 14,773 to 16,547 kg. The major contribution towards annual revenue was made by post-monsoon quarter (46-52%). Winter contributed 22-27% and pre-monsoon 23-25% towards the total revenue.

The gross income of an OBM gill net unit ranged from Rs. 1.17 lakhs to 1.49 lakhs in the selected villages. The annual operating expenditure of a unit averaged 1,13,837 at Dhamlej and Rs. 88,643 at Kochra-Nivti. The per day operating expenditure was maximum in post-monsoon quarter (Rs. 535) and minimum in monsoon (Rs. 245) at Kochra-Nivti. At Dhamlej, the per day operational expenditure ranged from Rs. 418 to 764 in different quarters. Of variable cost, 57-63% accounted for labour, 15-16% for fuel, 10-15% for marketing, preservation and transportation, 8% for repairs and 4-9% for miscellaneous items.

The net annual operational income of a unit was 24.2% of the gross income at Kochra-Nivti and 23.7% at Dhamlej, the net profit at these centres being Rs. 799 and 2,939 respectively. Each crew member earned an annual income of Rs. 13-14 thousand in gill net unit. The returns to labour and management of the boat owner amounted to Rs. 15-16 thousand. The payback period

of an OBM gill net unit at selected centres was assessed at about four years. The returns to investment worked out at 13-15%. Based on various economic parameters the gill net fishing by dugout canoe fitted with out-board engine was found to be profitable in northwest coast during 1986-'87.



A NOTE ON THE PROCESSING OF THE JELLY FISH AT ALAMBARAIKUPPAM NEAR MAHABALIPURAM*

Jelly fish, a marine resource are being exploited in India on a small scale since a few years. Govindan (*Sea food Export Jour.*, 16 (7) : 9-11, 1984), Santhana-krishnan (*Sea food Export Jour.*, 16 (7) : 23-26, 1984) and Chidambaram (*Mar. Fish. Infor. Serv., T & E Ser.*, 60: 11-12) have given accounts of the various stages of processing and the export potential of jelly fish. Morikawa (*Infofish*, 1/84: 37-39, 1984) has dealt with the various stages of jelly fish, their processing methods, demand and supply and import prices in Japan. James *et al.* (*J. mar. biol. Ass. India*, 27 (1 & 2): 170-174, 1985) have suggested how jelly fish which are a menace off Madras coast can be processed and exported. They have also made passing reference to the processing done at Alambaraikuppam located about 50 km south of Mahabalipuram.

Interest in processing jelly fish for export is of recent origin in India. In 1984 processing was done at Thirumullaivasal. In 1986 processing was done near Marakanam beach and at Ekkikuppam for three months from July. August and September are the best months for collection and processing jelly fish. In 1984 processing was done near Pondicherry also.

Cambionella stuhlmanni is a common jelly fish occurring gregariously along the Tamil Nadu coast. Off Madras maximum numbers are seen in July and again in February. They often hamper fishing operations. The species mentioned as *Rhizostoma* sp. by

Chidambaram (*op. cit*) from Pondicherry refers to the species mentioned above.

For the processing and utilization of the commonly occurring jelly fish along Madras coast, one of the entrepreneurs erected in July, 1988 a huge thatched shed (Fig. 1) on the beach at Alambaraikuppam (Fig. 2). In the processing shed six improvised tables were arranged where about 25 women worked (Fig. 3). The top of the

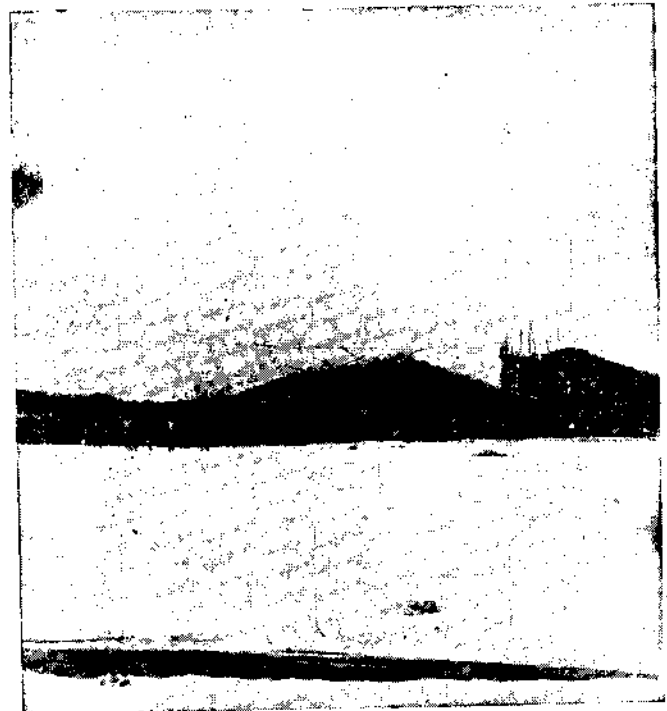


Fig. 1. Sheds where processing of jelly fish was carried out.

* Prepared by M.D.K. Kuthalingam, D.B. James, R. Sarvesan, P. Devadoss, S. Manivasagam and P. Thirumilu, Madras Research Centre of CMFRI, Madras.

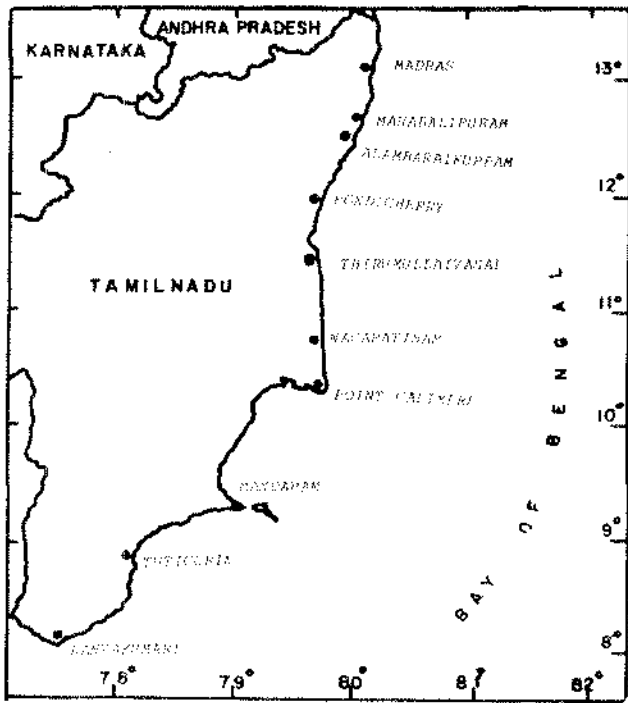


Fig. 2. Map of Tamil Nadu coast showing centres where jelly fish are abundant.

table was covered with black polythene sheets. The actual processing started on 10-7-'87 and lasted till the end of September, 1987.

The jelly fish are collected by a scoop net (Fig. 4) locally known as *Nandu katcha*. The diameter of the scoop net is 50-58 cm. The mesh size of the net is 9.5 cm. The scoop net has a wooden handle. The length of the handle is 64 cm. The fishermen start at 0600 hrs for gathering the jelly fish and return by 1400

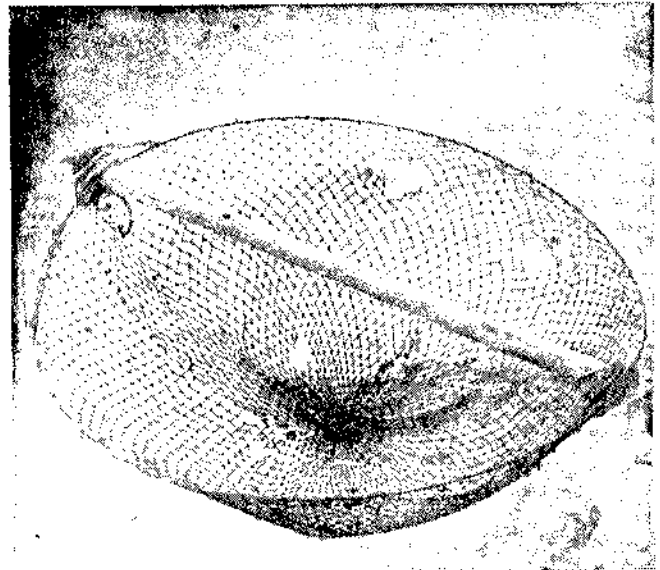


Fig. 4. A scoop net used for catching jelly fish from the sea.



Fig. 3. Women workers engaged in jelly fish processing.

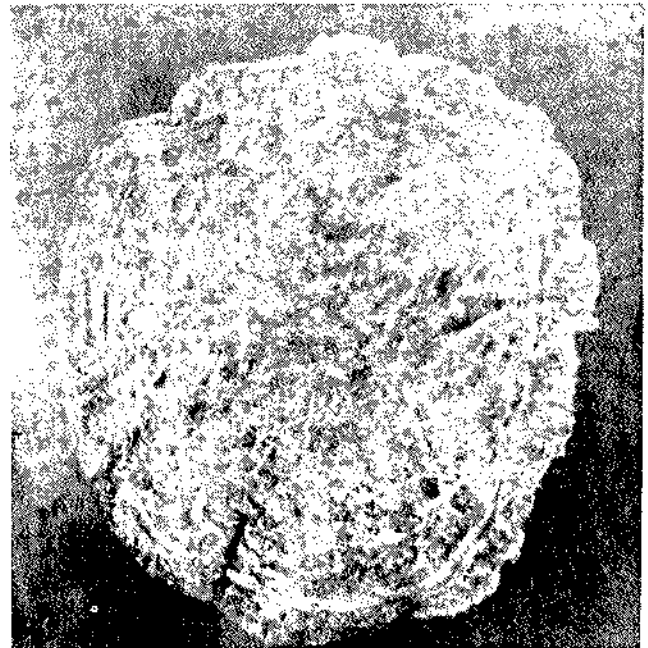


Fig. 5. The processed final product of jelly fish.

hrs. Three men go in a catamaran and bring on an average 300 jelly fish per day. On days when wind is favourable they collect as many as 13,000 jelly fish while on some days no jelly fish was obtained. The fishermen make one or two trips per day depending on the availability of the jelly fish. They go five kilometres from the shore, where the depth is about 18 metres. The fishermen collect normally 300-1,000 jelly fish per day and the processor pays them 25 paise/ jelly fish.

Processing of jelly fish has been described by Santhanakrishnan (*op. cit*) and Chidambaram (*op. cit*). The jelly fish which are collected from the sea are brought in baskets and put on a slanting table. They slide down into a tank containing sea water, salt and chemicals. In good season 2,000 to 3,000 jelly fish are processed per day. At first the tentacles are removed by hand and then the projections on the ventral side are cut off from the disc with a knife to make the product look like a disc. The edges of the umbrella are scraped. The umbrella of jelly fish are soaked for one day in sea water along with the tentacles and the duration of processing is 14-21 days. Processing is carried out in tanks of size 3 x 1.5 x 0.75 m lined by polythene sheets. The final product (Fig. 5) is disc like, spongy and known as *Hatchphi* in Chinese. The diameter varies from 13 to 18 cm and the weight from 68 to 152 g.

Two companies at Madras, M/s. Haniff Associates and Evershine Exporters processed and exported jelly

fish to Singapore. The details of exports in weight and value for the years 1984-'88 are as follows*.

Year	Weight (Tonnes)	Value (Rupees)
1984	17.9	2,55,000
1985	10.9	92,872
1986	17.3	1,89,912
1987	Nil	Nil
1988 (upto October)	10.0	1,65,670

Apart from Mahabalipuram coast, jelly fish are very common in several areas along Tamil Nadu like Madras, Ennore, Kalpakkam, Pondicherry and Tuticorin. As jelly fish have export potential, it is suggested that they could be processed and exported on a large scale in Tamil Nadu during August and September when they are abundant in coastal waters. The jelly fish not only hamper the fishing operations of indigenous as well as mechanised vessels but also obstruct the work of the Madras Atomic power plant at Kalpakkam by blocking the sea water inlet pipes of the cooling systems of the power station. A jelly fish processing unit could be established at Kalpakkam to make use of the jelly fish available in the area and avert the menace caused to the power station.



LONG LINING FOR DEEP SEA SHARKS AT MALPE — A LUCRATIVE FISHERY*

Introduction

Recent introduction of long lining for deep sea sharks at Malpe Kolam by some enterprising fishermen from Kerala (mostly from Trivandrum District) met with considerable success. This is particularly significant at a time when there is no scope for further expansion of trawl or purse seine fishery along this coast. Moreover, this diversification of fishing effort for the exploitation of the unexploited resources of the deep

sea sharks of the inshore and offshore waters of the South Kanara coast is a new development. Around 100 long liners are operating from Malpe Kolam landing centre and in each unit 5-7 fishermen are engaged. The present account deals with some of the aspects of this potential new resources.

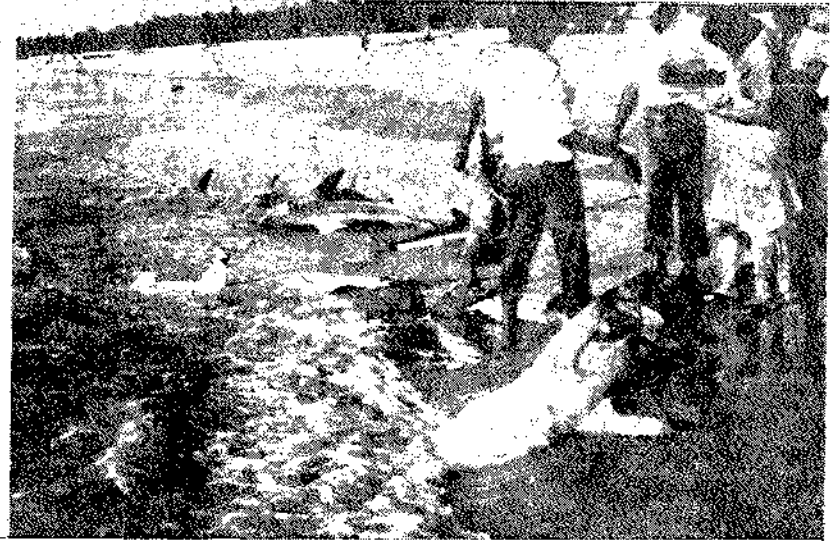
Craft and gear employed

Plank built boats of 30 feet length fitted with 47 HP engine are generally employed in long lining. A few larger boats are also used. The fishing gear involves a long length of line (made of thick nylon rope), often a few kilometres, to which shorter length of line carrying

* Prepared by K. K. Sukumaran, K. Sunilkumar Mohamed, K. Chandran, Alli C. Gupta, Uma S. Bhat and S. Kemparaju, Mangalore Research Centre of CMFRI, Mangalore.



1. A long line kept ready on board to set out for fishing. A hook is shown to indicate the size.



2. A long line catch brought ashore for auctioning.



3. *Carcharinus sorrah*-measuring 273 cm in total length (the largest specimen ever measured) landed on 3-11-1988 at Malpe Kolam.



4. *Sphyrna lewini* - measuring 205 cm in total length.

baited hooks are attached every 20-25 metres. There will be 200-250 hooks in a line. The hooks made of steel are single barbed (No. 30) (Photograph 1). Apart from the boat, the total expenditure involved in fabricating a long line may be around Rs. 25,000/-

Mode of operation

Generally, each unit may set out for fishing in the evening on a particular day and returns on the following day with the catch. If a unit fails to get any catch, it may continue to stay in the fishing ground for a day or two until it gets some catch. Fishing is done mostly during night at a depth of above 100 m off Malpe.

The fish are attracted by the bait (tuna and dolphin are cut into small pieces and used as bait) and hooked. Catches are generally brought aboard the boat before they leave the fishing ground. On reaching the landing centre all the fishes are tied together and left in the sea near the shore until they are auctioned (Photographs 2-3).

The season starts in September and lasts till May with peak catches obtaining during November-December.

Catch details

Month-wise catch details are not available. However, it is roughly estimated that around 2,000 t of deep sea sharks have been landed during 1987-'88 with peak catches during November-December.

Important species caught

The catch mainly consisted of the following species:

- i) *Carcharinus sorrah* - Spot tail shark
- ii) *Carcharinus melanopterus* - Black tip reef shark
- iii) *Sphyrna lewini* - Scalloped hammerhead

Among them, *Carcharinus sorrah* is the most common species followed by *Sphyrna lewini*. *Carcharinus melanopterus* occurred in stray numbers. The length measurements taken on 28-10-1988 and 3-11-'88 are given in Table 1.

Return

If the catches are good, the return per trip goes up to Rs. 30,000 per unit.

Table 1. The size measurements (in cm) of different species identified along with the maximum size recorded.

Species	Male (cm)	Female (cm)	Maximum size previous record (cm) (FAO)
<i>Carcharinus sorrah</i>	139 (25)	248 (90)	150
	134 (25)	161 (35)	probably 230
	136 (25)	161 (35)	
	238 (65)	215 (50)	
		220 (50)	
	229 (60)		
	199 (50)		
	273 (100)		
<i>C. melanopterus</i>		199 (50)	attains 200
<i>Sphyrna lewini</i>	205 (45)	215 (50)	420
	185 (60)	255 (70)	common
			360
		227 (75)	
		225 (75)	

Approximate weight in kg is given in bracket.

Largest specimen measured underlined.

Utilization

Generally each shark is auctioned separately on the beach. A shark of about 100 kg may fetch anywhere around Rs. 800. The fish is salted and sent to Kerala where it is sold at Rs. 15-20 per kg. The liver of the shark is boiled in large iron trays on the beach itself for extracting oil. The liver from a shark weighing 50 kg may yield 2-3 litres of oil. The oil extracted from the liver is supplied to some pharmaceutical firms at Kottayam, Alleppey and Alwaye in Kerala. The oil may fetch around Rs. 16/- per litre. Fins are dried and exported to Japan. It may fetch an exorbitant price of Rs. 500-800 per kg.

Problems and prospects

Since most of the commercially important resources like prawns, oil sardine, mackerel etc. of the inshore areas are over-exploited, there is no further scope for increasing the effort in this area. Additional production could be achieved only by extending the fishing effort

ON THE LANDING OF A LARGE SAW FISH AT MADRAS*

Landing of saw fish is rare besides being seasonal. A female saw fish *Pristis microdon* of 705 cm total length landed at Kasimedu fish landing centre of Madras city on 24 March, 1988, is by far the largest recorded. The species normally ranges in the size from 3 to 4 m. The earlier maximum size of 4,575 mm (15 feet) was recorded by Day (*The fishes of India*, 1878) off the coast of Orissa.

The specimen which measured 7,050 mm in total length was a female. It was caught in a trawl net operated by a small mechanised boat at a depth of 40-50 m about one hundred kilometres northeast of Madras. The saw fish weighed approximately 1.5 tonnes and fetched a price of Rs. 8,750.

The morphometric measurements along with percentages are given in Table 1.

The stomach contained only the digested food. The saw contained 22 pairs of rostral teeth, its base one fifth in length. A distinct lower caudal fin lobe was present. Colour was uniformly olive green above and creamy white below.

*Reported by P.Devadoss, J.C.Gnanamuttu, S.Srinivasarangan and S.Subramani, Madras Research Centre of CMFRI, Madras.

Table 1. Morphometric measurements of saw fish

	Measurements (in cm)	Percentage in TL
Total length	705	100.0
Disc length	368	51.2
Tip of rostrum to origin of caudal	592	83.9
" origin of I dorsal	370	52.5
" origin of II dorsal	510	72.3
" ant. end of orbit	165	23.4
" ant. end of spiracle	183	26.0
First dorsal base	66	9.3
Second dorsal base	45	6.4
Interdorsal space	76	10.8
Second dorsal origin to upper caudal	80	11.3
Width of mouth	43	6.1
Between inner ends of nostrils	13	1.8
Horizontal diameter of orbit	8	1.1
Distance between orbits	34	4.8
Length of spiracle	13	1.8
Distance between spiracles	32	5.4
Tip of rostrum to origin of pelvic	420	59.6
Caudal origin to tip upper lobe	115	16.3



ON UNUSUAL HEAVY LANDING OF CAT FISH *TACHYSURUS DUSSUMIERI* (VALENCIENNES) AT KASIMEDU, MADRAS*

During the course of routine observations on the fish landings at Kasimedu, Madras, an unusual catch of about 20 t of cat fishes was recorded from 'Eda valai' (Bag net) netters on 18th August, 1988. Out of that, 14 t was netted in a single haul by 'Eda valai' operated by a catamaran at a depth of 10-15 m. 'Eda valai' is a traditional boat seine usually operated in shallow coastal areas with an extremely wide rectangular mouth or nearly square, measuring 20 m to catch pelagic shoals. The fishes were caught off about 15 km north of Pulicat along the Madras coast (Fig. 1). The remaining catches of 6 t were contributed by six units on the same day (Fig. 2). The cat fishes comprised of only one species namely *Tachysurus dussumieri* (Valenciennes).

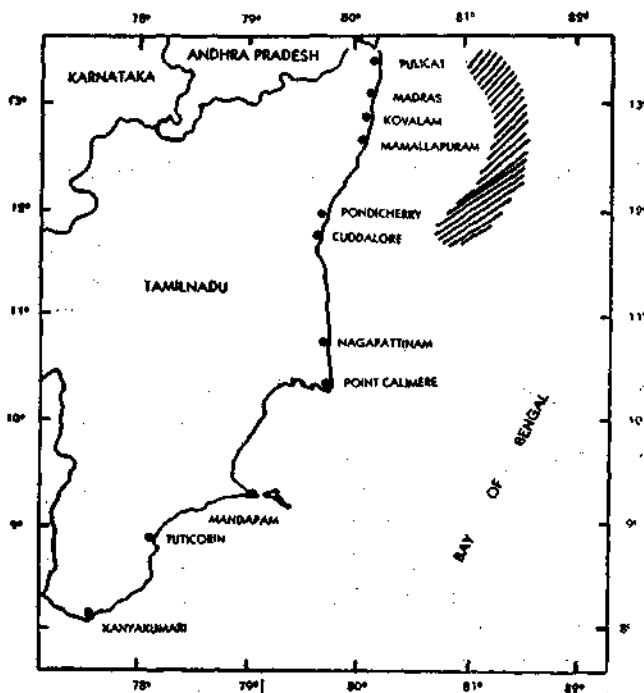


Fig. 1. Map showing Tamilnadu coast and area of fishing at Madras.

The catch of cat fishes was unloaded by carrier boats on the same day evening. About 18 t of the catch was iced and transported to markets at Calicut and Mangalore. The remaining 2 t of fish were sold locally @ Rs. 15 per kg. The fishes weighed 3 to 5 kg each and a total

* Reported by P.Nammalwar, G. Mohanraj, J. C. Gnanamuthu, N. S. Radhakrishnan, R. Sarvesan, V. Thangaraj Subramanian, S. Subramani and P. Thirumilu, Madras Research Centre of CMFRI, Madras.

number of 5,000 was estimated in the catches. A random sample of 80 cat fishes showed that the size range was from 580-790 mm with a single mode at 710 mm. The females were mostly in spent condition and the males at the maturity stages I & II. The stomachs were found to be empty in the case of males and full in spent females with bivalves as the main food item.

In this context, it may be noted that significant heavy catches of cat fish *Tachysurus dussumieri* (Valenciennes) from 'Mada valai' (Bag net) were noticed by the senior reporter between Cuddalore and Pondicherry along the Tamil Nadu coast from 11th-13th August, 1988. About 820 numbers of cat fishes caught by a single unit of this gear off 10 km south of Pondicherry on 11th August, 1988 and another heavy catch of about 5,000 fishes as revealed by personal enquiries caught by



Fig. 2. Heavy landings of cat fishes by catamarans at Kasimedu, Madras.

several units from the same location landed at Pondicherry on the same day. Further, another shoal of about 8,000 fishes were also caught off Pondicherry on 12th August, 1988. Slight shifting in area of occurrence towards north on the second day and absence of any such catches of cat fishes around this date off Cuddalore in the south therefore suggest a northerly movement of the shoal. The turbidity of the coastal waters was significant during the period of observation. The cat fishes landed at Cuddalore belonged to the size range 600-850 mm and each fish weighed 3-5 kg.

SQUALLY WEATHER DISRUPTED FISHING ACTIVITIES ALONG MAHARASHTRA COAST IN SEPTEMBER, 1988*

The fishing activities along the Maharashtra coast were severely disrupted when sudden fury of the sea caught several fishermen in the sea with wind speeds up to 55 kmph on September 23rd, 1988, off many fishing villages of Greater Bombay, Bassein, Satpati and Arnala. The weather experts attributed the phenomenon to a pressure gradient becoming 'Steep' and moving into a well marked low pressure area causing strong winds to blow.

Though 131 fishermen on board eight crafts were feared to be missing in the beginning, returned safely. Four fishermen lost their lives. The timely rescue operations by the Indian Navy saved many lives or otherwise the death toll could have been much more.

Lives lost, endangered and rescued

One young fisherman of Worli died when his 'toni' overturned in the sea off Napean Sea Road. Three other bodies, possibly of fishermen from Gujarat were washed ashore off Carter Road, Bandra on 26th September. A fisherman and his three sons suffered injuries when their boat was buffeted in the rough seas off Worli. Two other fishermen of Koliwada village were drifted three km away when their 'toni' overturned but were washed ashore near Seacock Hotel.

Naval personnel responding to distress call rescued at least 30 people from the sea and a helicopter made several sorties in search-and-rescue operation. Four fishermen were rescued by another vessel from the sunken boat 'Mahamanorama'.

Prepared by V.V. Singh and S.G. Raje, Bombay Research Centre of CMFRI, Bombay.

Loss of property

The estimated loss of property was about Rupees one crore. At least six boats sank and many were badly damaged. Some boats returned safely but lost their gear.

Prominent among the sunken boats was the trawler 'Mahamanorama' which was operating from Sassoon Docks. It sank 25 km off Nurud. Three boats sank near Mudh resulting in heavy financial losses. A customs boat 'Angohsia' sank near Vasai creek. The trawler 'Dnyaneshwari Prasad' also sank.

Fishermen demand change in weather warning system

The course of storm was monitored by the Colaba Weather Bureau and fishermen warning was in force since September 21 for the entire Maharashtra coast. Local cautionary signal number three was hoisted at all parts of the Maharashtra coast at 12.30 p.m. on September 23. The warning to fishermen continued on September 24 also. The warning was broadcast over radio.

The fishermen of Maharashtra demands a more effective warning system in the emergency situation because they go out at sea normally for three to five days of fishing. They also ask for the establishment of a district level machinery to save lives at sea during rough weather.

Relief measures

The State Administration extended immediate help to the fishermen in distress through various agencies and a total sum of Rs. 21,000 was announced for the families of the deceased Maharashtra fishermen.



ON THE ACCIDENTAL CATCH OF THE SPINNER DOLPHIN FROM GULF OF MANNAR, MANDAPAM*

Among the marine mammals, Dolphins are represented by four species along the Indian coasts. Of these, the accidental catch/stranding of three common species namely *Dolphinus delphis*, *Tursiops aduncus* and *Sousa*

chinensis have already been reported from the Mandapam area. The occurrence of the species *Stenella longirostris* (Spinner dolphin) has so far not recorded from Mandapam in Gulf of Mannar.

*Reported by S. Krishna pillai, M. Bose and R. Subramanian, Regional Centre of CMFRI, Mandapam Camp.

On 29-9-1989, a spinner dolphin measuring 150 cm in total length and 28 kg in weight was caught accidentally

in a gill net, while operating just opposite to Ayyanar Kovil near Mandapam at a depth of 4 m in the Gulf of Mannar. The colour of the species was dark grey to black dorsally and white ventrally. The number of teeth (on one side) on the upper jaw was 44 and 46 on lower jaw. The measurements taken (in cm) are as follows:

Total length	150
Length from the tip of the snout to blow hole	30
Length from the tip of the snout to centre of eye	28
Length from the tip of the snout to anterior insertion of flipper	42

Length from the tip of the snout to origin of dorsal fin	67.5
Length from notch of fluke to posterior end of dorsal fin	62
Length of flipper from anterior insertion to tip	28.5
Length of lower jaw	26
Total number of teeth on one side of upper jaw	44
Total number of teeth on one side of lower jaw	46
Depth of body at the origin of dorsal fin	62
Total weight	28 kg.
Sex	Female



उत्तर पश्चिमी तटों के चुने हुये केन्द्रों में अन्दरूनी इंजनों से सज्जित यानों के ज़रिये करनेवाले गिलनेट मत्स्यन का अर्थशास्त्र*

हाल ही में भारत के उत्तर-पश्चिमी तटों के मत्स्यन में यंत्रिकरण की प्रगति बढ जा रही है। गुजरात और महाराष्ट्र से पकड़ी गयी मात्स्यकी के 2/3 से अधिक भाग यंत्रिकृत सेक्टर का योगदान है। दोनों राज्यों के आधे से अधिक मत्स्यन यानों अन्दरूनी या बाहरूनी इंजनों से सज्जित है। बाहरूनी इंजनों की तुलना में अन्दरूनी इंजनों की कीमत अधिक होने के कारण यहाँ के मछुए बाहरूनी इंजनों से फिट किये मत्स्यन यानों का ज्यादा इस्तेमाल करते हैं। ऐसे यानों में मुख्यतः गिलनेट का उपयोग किया जाता है।

बाहरूनी इंजनों से सज्जित यूनिटों के बारे में अध्ययन चलाने को महाराष्ट्र और गुजरात से एक एक केन्द्र चुन लिये गये। प्रत्येक केन्द्र के बीस बीस यूनिट भी डाटा संकलन केलिये पहचान किये गये। डाटा संकलन दो अनुसूचियों में किया गया। पहली अनुसूची में यान, गियर, श्रम, अवसंरचना, क्रेडिट, विपणन और परिरक्षण आदि के बारे में और दूसरी अनुसूची में नियत कीमत, परिचालन व्यय, पकड़ रचना और मछली का दाम आदि के विवरण थे। निरीक्षण के वर्ष 1986-87 को मौसम के आधार पर चार तुल्य तिमाही में विभाजित किये माने मानसून काल, मानसून-पूर्वकाल, मानसूनोत्तर काल और शीत काल।

महाराष्ट्र के कोन्ना-निवति और गुजरात के धमलेज इस विषय के अध्ययन केलिये चुन लिये गये। दोनों गाँवों की मुख्य पेशा मत्स्यन

*डि. बी. एस. सेहरा और जे. पी. करबारी, सी. एम. एफ. आर. आइ. कोचिन द्वारा तैयारित

है। कोन्ना-निवति में करीब 1500 मछुए और धमलेज में 3000 मछुए बसते हैं।

फ्राफ्ट व गियर

दोनों केन्द्रों में बाहरूनी इंजनों से फिट किये नाँव और गिलनेट का उपयोग किया जाता है। दोनों केन्द्र के अधिकांश बोटों में 8 एच. पी. यमहा इंजन का इस्तेमाल किया जाता है। कोन्ना-निवति में दोनों तलस्थ और निचलस्थ गिल जाल का उपयोग करते हैं। शीत काल और पूर्व-मानसून काल में तट से 15-30 कि. मी. की दूरी पर और मनसूनोत्तर काल में 15 कि. मी. दूरी पर मत्स्यन किया जाता है। बून-मई के दौरान घुरा के मत्स्यन केलिये बगुल जली का इस्तेमाल किया जाता है। कभी कभी रे व स्केट इस में फँस जाते हैं। जनवरी से एप्रैल तक कन्डाली नामक गिल नेट का उपयोग किया जाता है। इस से करजिड, कलुपिड्स, फीता मीन आदि को पकड़े जाते हैं। तलस्थ गिलनेट, जो नाह्वा या वेवरी नाम से पुकारा जाता है, का उपयोग मानसूनोत्तर काल में किया जाता है। इस से घुरा मीन, गोल और सिलवर बार पकड़े जाते हैं। मनसूनोत्तर काल में धांगला नामक तलस्थ गिल नेट से बड़े घुरा मीनों को पकड़ते हैं। पासा जालि नामक तलस्थ गिलनेट से पाम्पेटों और शिंगटियों को पकड़ते हैं।

इस प्रकार धमलेज में भी कई प्रकार के तलस्थ और निचलस्थ गिल जालों का उपयोग करते हैं। यहाँ बड़े बोट ज़ादा जाल का और छोटे बोट जीना जाल और पक्का जाल का इस्तेमाल करते हैं। ज़ीना जाल

से सीर फिश, क्लुपेइडस, करजिडस क्रोकर्स व हिलसा मिलती हैं। पक्का जाल से मुख्यतः पाम्फ्रेट मिलता है ज़ादा जाल से गोल, प्रोडॉफन ग्रीम, सुरा मीन, शिंगटी और करजिडे प्राप्त होते हैं।

विपणन

कोच्चा-निवृत्ति में मत्स्यों को शीतीकृत करके गोवा और रत्नगिरि में स्थित संसाधन प्लांटों में भेज देते हैं। बाकी मछली कूडल मार्केट में बेच दी जाती है। अधिक मछली का स्थलन होने पर नमक डालकर सुखाती है। धमलेज में पकड़नेवाली मछली निजी मछली व्यापारियों जो मछुओं को वित्तीय सहायता देते हैं, बेचती हैं। बोटों से पकड़नेवाली 25% मछली बोट-मालिकों की सहायता करनेवाले गुजरात मात्स्यिकी के केन्द्रीय सहकारी संघ को बेचती है।

पकड़ सम्बन्धी विवरण:

कोच्चा-निवृत्ति का वार्षिक पकड़ यूनिट 14,773 कि. ग्राम और धमलेज का 16,947 कि. ग्राम है। कोच्चा-निवृत्ति से पकड़ी गयी मुख्य मछली सुरामीन (16.5%), शिंगटी (16%), सुरा (11.5%), सिलवर बार (10.8%), हिलसा (11.5%) और क्रोकर्स (12.5%) आदि जाति की है। धमलेज से पाम्फ्रेट (16.8%), सुरा मीन (12.6%), शिंगटी (12.2%) आदि जाति की पकड़ मिली। कोच्चा-निवृत्ति से पकड़ी गयी मात्स्यिकी का 45.6% मानसूनोत्तर तिमाही, 24.8% शीत-काल और 29.6% मानसूनपूर्व और मानसून तिमाही में प्राप्त हुई। धमलेज में सब से अधिक पकड़ मानसूनोत्तर तिमाही (3.6%) में मिली।

मत्स्ययन दिवस: कोच्चा-निवृत्ति के कुल मत्स्ययन दिवस 228 और धमलेज के 212 हैं।

आय: सब से अधिक आय मानसूनोत्तर तिमाही में प्राप्त हुआ। (46%) शीत काल, पूर्व-मानसून और मानसून के तिमाहियों में यथाक्रम 27.2%, 23.2% और 3.6% आय प्राप्त हुआ। आय के मुख्य योगदातायें पाम्फ्रेट (36%), सुरा मीन (13.8%) और क्रोकर्स हैं।

संघटकों केलिये स्थिर-खर्च

बोट, इंजन, जाल और अन्य मत्स्ययन उपस्कर, लाइसेंस फीस और फ़्लोट और गियर की बीमा आदि केलिये स्थिर लागत होता है। कोच्चा-निवृत्ति के बोट का औसत व्यय 28,000/- रु है। इंजन गिलनेट और

अन्य उपस्कर केलिए यथाक्रम 17,000, 24,000 और 8,000 रु खर्च करना पड़ता है। इस प्रकार एक गिलनेट यूनिट का अनुमानित धन लागत 77,000 रु है। इसका वार्षिक मूल्य हास 18,200 रु और अवसर 9,240 रु आँका गया है।

धमलेज में प्रत्येक बोट का औसत वार्षिक व्यय 36,000 रु और मूल्यहास 3,600 रु आँका गया। गिलनेटों केलिए निक्षेप 27,000 रु और मूल्यहास 9,000 रु आँका गया। प्रत्येक यूनिट का वार्षिक कुल स्थिर लागत 21,500 रु और अवसर लागत 10,920 रु. प्राकृतित किया गया।

परिचालन परिव्यय

इस व्यय को पाँच शीर्षों में बँट दिया है। पहले शीर्ष में इंधन जैसे मिथी का तेल, पेट्रोल और लूत्रिकन्टस है। दूसरे शीर्ष में मछुओं और श्रमिकों का श्रम-व्यय है। तीसरे में परिरक्षण विपणन और परिवहन आते हैं चौथे में पुनर्निर्माण और पाँचवें शीर्ष में फुडकर व्यय शामिल है। कोच्चा-निवृत्ति में वार्षिक परिव्यय के 15.3% इंधन, 62.8% श्रम, 9.8% परिरक्षण विपणन और परिवहन, 7.8% पुनर्निर्माण और 9.3% विविध वस्तुओं केलिए खर्च किये गये। धमलेज में वार्षिक परिव्यय के 16.1% इंधन, 5.69%, श्रम 15.7% परिरक्षण विपणन और परिवहन, 7.9% पुनर्निर्माण और 3.8% विविध वस्तुओं केलिये खर्च किये गये।

गिलनेट यूनिट से आय: कोच्चा-निवृत्ति में बाह्ररुनी गिलनेट यूनिट से प्राप्त वार्षिक कुल आय 1,16,932 रु आँका गया है। परिचालन व्यय घटाने के बाद का शुद्ध आय 28,289 रु. है। प्रत्येक यूनिट का अवशेष आय जो आमदनी से स्थिर और अस्थिर लागत घटा करने पर मिलता है, 10,039 रु है। मूलधन का अवसर आय से अवशेष आय की तुलना करने पर प्रत्येक यूनिट का वार्षिक लाभ 799 रु निकला।

धमलेज में अन्दरुनी गिलनेट यूनिट से प्राप्त वार्षिक कुल आय 1,49,556 रु. है। कुल परिचालन व्यय 1,49,256 रु. है। प्रत्येक यूनिट का अवशेष आय 13,869 रु है और मालिक का वार्षिक शुद्ध लाभ 2,939 रु है।

कुलमिलाकर कह जायें तो बाह्ररुनी इंजन से फिट किये यानों में गिलनेट के जरिये मत्स्ययन करने पर प्रत्येक मछुओं को प्रतिवर्ष 14,000-15,000 रु का लाभ मिलता है। अतः बाह्ररुनी इंजन से फिट किये यानों में गिलनेट के जरिये किये जानेवाला मत्स्ययन लाभदायक है।



महाबलिपुरम के अलम्बारैकुप्पम में जेली फिश के संसाधन के बारे में एक रिपोर्ट*

भारत में पिछले कुछ वर्षों से समुद्री-संपदा जेली फिश का समुपयोजन हो रहा है। गोविन्दन (1984) शान्ताकृष्णन, (1984) चिदम्बरम, (1984) जेम्स (1985) ने इसका संसाधन और निर्यात साध्यताओं के बारे में

*मद्रास अनुसंधान केन्द्र के एम. डी. के. कुतलैंगम, बी. बी. जेम्स, भार. सरवेशन, पी. देवदास, एस. मनिवासगम और पी. तिरुमिलु द्वारा तैयारित

रिपोर्ट की है। इन लोगों ने अलम्बारैकुप्पम में किये जानेवाले संसाधन रीति के बारे में विशेष संकेत किया है।

पकड़: जेली फिश को स्कूप नेट के जरिये पकड़ती है। साधारणतः 300-1000 जेली फिश पकड़ी जाती है।

संसाधन रीति: पकड़ी गयी जेली फिशों को तिरुच्छीनावस्था में रखे मेज़ में डालती है। ये जेली फिश नमक और रसायनिक डाले हुये समुद्री पानी से भरी टैंकी में आ गिरती हैं। हाथ से इसका टेंटकल या

स्पर्शिका निकालती है। फिर इसके अवर बिम्ब में उभाड़े हुये भागों को चाकू से निकालते हैं। छत्र के अग्र भाग छीलकर साफ करते हैं। जेली फिश के छत्र और स्पर्शिका पूरे एक दिन समुद्र-जल में पूर्णतया भिगोने देते हैं। इसका संसाधन 3 x 1.5 x 0.75 मीटर आकारवाली टैंकियों में किया जाता है। संसाधन की अवधि 14-21 दिवस है। संसाधित वस्तु बिम्ब के समान आकारवाली और स्वयंजी होगी। चीन में इस उत्पाद को हाइकूपी कहा जाता है। इसको 13 से 18 से. मी. व्यास और 68 से 152 ग्राम भार होंगी।

निर्यात

मद्रास के दो कम्पनियों ने मेसर्स हनीफ असोसियेट्स और एक्सरशेन एक्सपोर्टर्स जेली फिश का संसाधन और निर्यात किया।

महाबलिपुरम के अलावा मद्रास मजोर, कलपाकम, पोंडिच्चेरी और टूटिकोरिन में ज्यादा मात्रा के जेली फिश प्राप्त होती है। इसकी निर्यात साध्यताओं को मानकर इसके संसाधन की ओर विशेष ध्यान देना चाहिये।



माल्पे में लंबी रज्जु द्वारा गभीर सागरी सुरा की पकड़*

हाल ही में लंबी रज्जु द्वारा अभी तक समुपयोजित नहीं की गयी गभीर सागरी सुराओं को पकड़ना आसान देख लिया गया है। मस्यन केलिये नैलोन वाग से निर्मित कई कि. मी. लंबाई के रज्जु का उपयोग करता है। प्रत्येक 20-25 मी. के बीच बड़िया बाँधता है। एक रज्जु में 200-250 बड़िया होते हैं। बोट के अलावा इस प्रकार के एक रज्जु का दाम 25,000 रु के निकट है।

*मॉंगलूर अनुसंधान केन्द्र के श्री. के. के. सुकुमारन, के. सुनिलकुमार मोहम्मद, के. चन्द्रन, अल्लो सी. गुप्ता, उमा एस. भट और एस. कम्पराजु द्वारा तैयारित

मद्रास में एक बड़ा आरामीन का स्थलन*

मद्रास में 24 मार्च 1988 के दौरान एक बड़ा आरामीन टूलनेट से परिचालित यंत्रिकृत बोटों के ज़रिये पकड़ा गया। स्त्रीजाति के इस मीन का आकार 7050 मि. मी. और भार 1.5 टन था। यह मीन अब तक पकड़े गये आरामीनों में से बड़ा था।

*मद्रास केन्द्र के पी. देवदास, जे. सी. ज्ञानमुस्तु, एस. श्रीनिवास रंगन और एस. सुब्रमणी की रिपोर्ट



मद्रास के काशिमेट्टु में शिंगटो टैकीस्थूरस डसुमेरी का असाधारण स्थलन*

हमारे देश के कुल समुद्री मस्य स्थलन में 4-6% देन शिंगटियों का होता है। इन्हें मुख्यतः तलीय आनायों, सेट बैग नेट, अपवाही जाल और फ़ंटा बोर के ज़रिए पकड़े जाते हैं। मद्रास के तटीय जलों से प्राप्त पकड़ की 1-2% हिस्सा इसका होता है। 18 अगस्त 1988 को "इडा बलै" के ज़रिए शिंगटियों के 20 टन की असाधारण पकड़ प्राप्त हुई। "इडा बलै" उथला तटीय क्षेत्रों से वेलापवर्ती बर्ग की मछलियों को पकड़ने के लिए उपयोग करनेवाला परंपरागत नाव संपादा है।

*संवाददातायें—मद्रास अनुसंधान केन्द्र के पी. नम्मलमार, जी. मोहनराज, जे. सी. ज्ञानमुस्तु, एन. एस. राधाकृष्णन, आर. सरवेशन, वि. तन्कराज सुब्रमणियन, एस. सुब्रमणि और पि. तिरुमिळु



महाराष्ट्र के तटों में सितम्बर 1988 के दौरान हुये प्रक्षुब्ध मौसम से मत्स्यन में बाधा*

23 सितंबर 1988 को महाराष्ट्र के तटों के मत्स्यन क्रियाकलाप समुद्र की प्रक्षुब्धता से निरचल हो गये। इस दुर्घटना में 4 मछुए मर गये। इस समय 8 यानों में 131 मछुए समुद्र पर थे सौभाग्यवश ये यान सुरक्षित रूप से वापस पहुँच गये। इस समय नौसेना के लोगों ने कम से कम 30 लोगों की रक्षा की। इस दुर्घटना से करीब एक

*वी. वी. सिंह और एस. जी. राज, सी. एम. एफ. आर. आइ. के बंबई अनुसंधान केन्द्र द्वारा तैयारित

करोड़ रु. नष्ट हुये है। मौसमी विशेषज्ञों के अनुसार यह परिघटना निम्न दाब से हुई है। यद्यपि मौसम व्यूरो ने इसकी सूचना पहले दे दी थी तथापि यहाँ के मछुओं ने इस प्रकार के आपत्कालीन स्थितियों से बचने को इस से अधिक प्रभावी प्रबोधन प्रणाली की माँग की। क्यों कि उन्हें चार या पाँच दिन तक समुद्र में मत्स्यन केलिये रहने पड़ते है। प्रतिकूल मौसम में मत्स्यन करने पर जीवन खतरे में पड जाना स्वाभाविक है। इस स्थिति को मानकर जिला तल पर सुरक्षा सन्नाह की स्थापना करना उनका एक डिमान्ड था।



मान्जार की खाड़ी, मण्डपम में स्पिन्नर डॉलफिन की आकस्मिक पकड*

समुद्री स्तनियों में, डॉलफिन्स का प्रतिनिधित्व भारत के तटों में चार नमूनों से किये जाते है। मण्डपम से इन में डोलफिन्स डेलफिस, टरसियेप्स अडनकस और सौसा चिनेनसिस आदि तीन साधारण जातियों की आकस्मिक पकड या समुद्र तट में धँस होने के बारे में रिपोर्ट मिल चुकी है। लेकिन स्टेनेल्ला लॉगिरोस्टिस (स्पिन्नर डॉलफिन) की उपस्थिति अभी तक रिकॉर्ड नहीं की गयी है।

*सी. एम. एफ. आर. आइ. के मण्डपम क्षेत्रीय केन्द्र से एस. कृष्ण पिल्लै, एम. बोस और आर. सुब्रह्मण्यन द्वारा तैयारित

मण्डपम के निकट, अय्यन्नूर कोविल के सामने मान्जार खाड़ी में 4 मी. की गहराई से गिल नेट प्रचालन के वक्त 150 सी. एम. लंबाई और 28 कि. ग्रा. भार के एक स्पिन्नर डॉलफिन पकडी गयी। गहरी धूसरी रंगवाले डॉलफिन का पृष्ठ भाग और उदर भाग यथाक्रम काला और श्वेत थे। इसके ऊर्ध्व हनु में 44 और अधो हनु में 46 दाँत थे।



GUIDE TO CONTRIBUTORS

The articles intended for publication in the MFIS should be based on actual research findings on long-term or short-term projects of the CMFRI and should be in a language comprehensible to the layman. Elaborate perspectives, material and methods, taxonomy, keys to species and genera, statistical methods and models, elaborate tables, references and such, being only useful to specialists, are to be avoided. Field keys that may be of help to fishermen or industry are acceptable. Self-speaking photographs may be profusely included, but histograms should be carefully selected for easy understanding to the non-technical eye. The write-up should not be in the format of a scientific paper. Unlike in journals, suggestions and advices based on tested research results intended for fishing industry, fishery managers and planners can be given in definitive terms. Whereas only cost benefit ratios and indices worked out based on observed costs and values are acceptable in a journal, the observed costs and values, inspite of their transitionality, are more appropriate for MFIS. Any article intended for MFIS should not exceed 15 pages typed in double space on foolscap paper.