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समुद्री मात्स्यिकी सूचना सेवा : समुद्री मात्स्यिकी पर आधारित अनुसंधान परिणामों को आयोजकों, मत्स्य उद्योगों और मत्स्य पालकों के बीच प्रसार करना और तकनोलजी का प्रयोगशाला से श्रमशाला 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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THE STRUCTURAL CHANGE IN KARNATAKA MARINE FISHERY AND ITS SOCIO-ECONOMIC IMPLICATIONS

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Introduction

Karnataka has a coast line of 270 km and a shelf area of 25,000 sq.km. The state contributes about 10% of the total marine fish production of the country. Marine fishing is almost confined to nearshore areas and the major contribution to the state's total landings is from oil sardine and mackerel. The fishermen population is estimated to be 1.25 lakhs inhabiting in about 150 fishing villages. Till the early seventies, fishing operation was mainly carried out by the traditional fishing units. The gears used were *rampani*, small shore-seines, gill- nets, drift-nets and hooks & line. The craft commonly used were *rampani* boats, dugout-canoes and out-rigger-boats. By mid-seventies, mechanised crafts and gears started dominating and as a result, rampani which used to contribute more than 60% of the total catch, almost disappeared from the Karnataka fishery. It has paved the way for a structural change in the socio-economic scenario of Karnataka fishery. These changes have been further influenced by the emergence of new type of encircling gear such as *mattubala*/ ring-seine (mini purse-seine) which appears to be an offshoot of the introduction of motorisation of country craft during the mid-eighties. The present paper is an attempt to study the socio-economic implications of these changes.

Data base

The data on cost and earnings of different fishing units and the socio-economic aspects of Karnataka marine fishery have been collected through special surveys conducted by CMFRI from time to time. Catch and effort and other relevant data utilised for this study have been obtained through marine fish landing survey regularly conducted by the Institute covering the entire coast line of the country.

Phases of marine fishery development

The two decades of fishery in Karnataka from 1970 to 1990 can be divided into three phases. The first phase upto the mid-seventies was dominated by traditional fishery and during this period the major gear under operation was *rampani*. The second phase starting from mid-seventies and extending upto mid-eighties was characterised by the dominaton of mechanised fishing, particularly by purse-seine. The third phase witnessed the emergence of motorisation of country crafts which resulted in the introduction of more efficient artisanal gear like *mattubala*/ ring-seine.

Fishing techniques and fish landings

Before mid-seventies marine fishery of Karnataka was dominated by traditional fishing methods particularly using *rampani*. It is one of the traditional gears having great catching power. A large number of fishermen families were depending on *rampani* fishing for their livelihood till the large-scale introduction of commercial purse- seining by 1978. After mid-seventies *rampani* fishing dwindled very fast, causing serious hardship to the coastal fisherfolk. There were about 160 *rampani* units operating along Karnataka coast in 1976, which used to account for about 60 per cent of the total fish landings of the state. *Rampani* is a shore-seine of exceptionally large size having a length of about 2,000 m. The net requires about 100 persons for operation. *Rampani* fishing was mainly a village-based venture. Most of the villages along the coast were having 2 to 5 *rampani* units. The ownership of one unit was shared by about 100 families and all of them were actively involved in the operation. When a shoal of fish is located near the shore one end of the net is fixed at the shore and the other end is steered around the shoal by the *rampani* boat bringing the catch ashore or kept impounded in water near the shore and marketed in stages according to the demand.

The average cost and earnings of a *rampani* unit worked out on the basis of its performance during mid-seventies indicated that the annual

revenue per unit came about Rs. 2.7 lakhs. The per capita annual revenue of a *rampani* fisherman worked out at Rs. 3,370 in 1976-'77.

Considering the employment pattern just before mid-seventies, about 15,000 persons (including women) were employed in *rampani* fishing which was mostly confined to rural areas. During this period the annual landings of the state were estimated at 35,000 to 90,000 tonnes and the only mechanised fishing unit under operation at that time was trawler, the contribution of which to the total landings of the state was not significant.

TABLE 1. *Estimated marine fish landings (tonnes)*

Year	India	Karnataka	Contribution by Karnataka (%)
1975	14,22,693	87,494	6.2
1976	13,52,855	95,283	7.0
1977	12,59,782	97,152	7.7
1978	14,03,607	1,52,860	10.9
1979	13,88,380	1,26,384	9.1
1980	12,49,837	1,15,322	9.2
1981	13,78,457	1,53,349	11.1
1982	14,20,624	1,54,836	10.9
1983	15,48,475	1,11,598	7.2
1984	16,30,678	1,26,996	7.8
1985	15,34,726	1,18,844	7.7
1986	16,93,377	1,89,276	11.2
1987	16,62,550	2,20,576	13.3
1988	18,03,817	2,12,409	11.8
1989	22,30,225	2,51,012	11.3
1990	21,62,270	1,78,334	8.3

From 1976 onwards the marine fishery along Karnataka coast was dominated by purse-seining. During this year purse-seining was introduced but the intensive commercial-scale operations started only by 1978 with the introduction of about 120 purse-seine units. The number steadily increased and touched the level of 350 by the end of 1982 but further the increase was only marginal, remaining at 390-400 by 1990. Purse-seine is an encircling gear. Since the catch composition of both purse-seine and *rampani* was the same, the two gears became competitive and the more efficient one namely the purse- seine, was preferred and this resulted in the gradual reduction in operation of *rampani* and the substantial depletion in its catch after 1978.

With the introduction of purse-seining, the total landings in Karnataka increased from 87,000 t in 1975 to 1,53,000 t in 1978. With some annual fluctuations, the total landings crossed 2 lakh tonnes in 1987 reaching 2.5 lakhs tonnes 1989. Contribution of purse-seine catch to total landings increased from 56% in 1978 to 77% in 1985 but declined to 53% in 1988. However, in 1989 due to unprecedented heavy landings of mackerel the total landings as well as purse-seine contribution have increased.

Due to the increased tempo of purse-seine operation during this period there was a structural change in the socio-economic framework of the Karnataka fishery. Before the introduction of purse-seining, the village economy was mainly depending on fishing income created in coastal rural areas. Fishing mainly by *rampani* was a subsistence level of operation. But after the introduction of purse-seining, marine fishing activity had been concentrated in urban areas, and by the middle of eighties about 75% of the state's fish landings was from six urban landing centres, namely, Mangalore, Malpe, Ganguli, Bhatkal, Tadri and Karwar. This indicates a clear shift in fishing activities from rural to urban area which has very much adversely affected the coastal rural economy.

The large-scale introduction of purse-seining could enhance the fish production of the state, help in the developement of supporting industries like ice manufacturing, boat building, net making etc., generating more employment opportunities. But such a development has taken place mainly around the above mentioned urban centres and did not have a direct bearing on the *rampani* fishermen in villages whose income from fishing has been considerably reduced due to the introduction of purse-seining. The village fishermen were forced to go to the nearest town as wage earners in purse-seiners. However, among the unemployed fishermen who lost their employment due to the disappearance of *rampani*, only youngsters were willing to move out of the village to work in purse-seiners.

During 1989-'90, a wage earner working in a purse-seine unit used to earn about Rs.75 per day of operation. It was much higher than what was earned by a worker in any other mechanised or traditional fishing unit.

The problem faced by a fisherman family in the village is that eventhough the head of the

family gets a higher income as compared to what he used to get from the traditional *rampani* fishing, other members of his family are not at all employed. Since *rampani* fishing is a village-based venture, the entire family is fully engaged in the fishing activity eventhough some of them are in disguised enemployment or under-employment.

TABLE 2. *Annual average cost and earnings of a purse-seine unit in Karnataka during 1989*

A. Initial investment		
Craft	Rs	4,50,000
Net	"	3,00,000
Other accessories	"	20,000
Total	"	7,70,000
B. Catch (tonnes)		428
C. Revenue	Rs	8,77,400
D. Operating costs		
Fuel	"	1,56,750
Wages	"	2,03,034
Auction 5%	"	43,870
Rent for carrier boat	"	35,000
Repairing & maintenance	"	60,000
Jetty rent	"	3,000
E. Fixed costs		
Depreciation	"	1,14,167
Interst 15%	"	1,15,500
Insurance	"	12,000
Total	"	2,41,667
F. Total cost	"	7,43,231
G. Net returns	"	1,34,169
H. Net income over operating cost	"	3,75,836
I. Rate of returns (%)		32

Purse-seine is considered as a highly destructive gear, because of its operational efficiency. During mid-seventies when the purse seine was introduced along Karnataka coast, it was apprehended that large-scale purse seining would result in the depletion of the pelagic fishes like oil sardine and mackerel. However, with the increased number of purse-seiners from 120 in 1978 to 390 in 1989, the total landings of the state also increased from 1.5 lakh tonnes to an all-time peak of 2.5 lakh tonnes during the same period indicating that the destructive nature of the gear was not reflected in the catch even after a decade of continuous purse-seine operation.

Economics of purse-seine operation

The annual average cost and earnings of a purse-seine unit during the year 1989 are given in Table 2. The annual average revenue per unit worked out at Rs. 8.8 lakhs. Out of this, an amount of Rs. 5 lakhs was spent as operating cost. The major components of operating cost were wages and expenditure on fuel. Wages came to about Rs. 2 Lakhs and fuel expenditure to Rs. 1.5 lakhs. Operating cost included rent for carrier boat also. In Karnataka the purse-seine operators usually engage carrier boats on rental basis. After deducting the operating cost and all fixed costs such as depreciation, interest and insurance from the annual average revenue, the annual net profit per unit worked out at about Rs. 1.3 lakhs. During the year, the rate of return worked out at 32% indicating the high profitability of purse-seine operation.

The annual average catch per unit in 1978 was 572 t which continuously declined to the level of 137 t in 1983, further increased and touched the level of 428 t in 1989. Similar trend was observed for revenue also upto 1983 and after 1985 there was continuous increase in annual revenue reaching an all-time record of Rs. 8.8 lakhs in 1989. The total value of purse-seine catch increased from Rs. 73 million in 1978 to Rs. 347 million in 1989. The total cost also increased from Rs.50 million to Rs. 262 million during the same period.

The third phase of fishery development has been characterised by the large-scale motorisation of country craft, by mid-eighties, which resulted in the emergence of *mattubala* and also the increase in the number of gill-net units. The traditional sector, which has been almost shattered by the onslaught of purse-seining, revived its activities with the introduction of motorisation. During this period, the dominance of purse-seine gradually came down. In 1985 the purse-seine catch was 77% of the total landings and it came

TABLE 3. *Average annual landing (tonnes) at important fishing centres in Karnataka*

Centres	Average landings during 1981-'84	Percentage contribution to the state landings
Mangalore Bunder	41,230	30.2
Malpe	14,780	18.1
Ganguli Bunder	12,677	9.3
Bhatkal	2,932	2.1
Tadri	6,397	4.7
Karwar	11,682	8.5
Total	99,698	72.9

down to 45% in 1987, the lowest during this decade, and in 1990 it was about 57%. There was no significant increase in the number of purse-seine units during this period, almost stagnating around 390 units.

Another development during this phase was the increase in catch and effort of trawlers. During seventies trawlers contributed only less than 10% of the total landings which increased to about 30% in 1990. There has been a considerable increase in the number of trawlers, as well as the size of the vessel and H.P. of engine. Recently trawlers have started night fishing also which enhanced the revenue as well as net profit. During the year 1990 the total landings of the state was estimated at 1.8 lakh tonnes of which trawlers contributed 52,000 t and purse-seiners 1 lakh tonnes. The contribution of non-mechanised craft, wihout either inboard or outboard engines to the state's landings has been reduced to 3%.

Even in the third phase the contribution of purse-seine to the total fish catch was about 60%. Because of its huge investment requirement, which at present comes to about Rs.12 lakhs, it is beyond the financial means of most of the fisherman families. The recently introduced *mattubala* and ring-seine are becoming popular, among fishermen. Hence there is every chance that these mini replace the big purse-seine within two to three years.

Recently there has been a tendency to use both trawl units and purse-siene by the same craft depending upon the seasonal variations of the marine fishery.

With all these new developments, the marine fishing is becoming more and more capital intensive. The total investment in fishing equipments in the beginning of seventies was estimated at about Rs.10 crores and it increased to about Rs 75 crores by 1990.

Fish marketing

The structure of fish marketing system has also been considerably changed during the last two decades. In the beginning of seventies, when about 70% of the catch was contributed only by *rampani*, the marketing was mostly done at the village level where fish used to be impounded and disposed of according to the demand. Purchasers were mostly headload vendors.

With the introduction of purse-seines, the Karnataka Government took rehabilitation measures by providing loans to the unemployed *rampani* operators through Karnataka Fish Marketing Federation which helped them to purchase purse-seines. The Federation took the responsibility of marketing the landings by all such purse-seine units. About one-third of the purse-seine units is under the control of the Federation which is a co-operative organisation. This has resulted in a remarkable improvement in the fish marketing system of the state which helps the fishermen to get better price for their product. At present a number of trucks are daily engaged at all major landing centres which carry fish to interior places, all major towns and even to neighbouring states. Thus the increase in fish production and improvement in marketing have taken place side by side since both are complementary.

Conclusion

Marine fishery of Karnataka had undergone a structural change during the last two decades effecting remarkable transformation in its socio-economic framework. The dominance of *rampani* operation came to an end by mid-seventies with the emergence of large scale purse-seine operation. Cosequently the marine fishing activity had almost shifted from rural area to urban centres resulting in large scale unemployment in the rural area. Further increase in the number of purse-seine mainly aimed at the rehabilitation of unemployed rural fishermen, culminated in the dominance of purse-seiners. Together with the increased tempo of purse-seine operation, the total landings of the state had also increased. It has paved the way for the development of auxiliary industries such as ice factories, processing units, boat building yards and net making factories. Hence the introduction of purse-seining has created more employment opportunities and this has benefitted those who are in and around the urban landing centres, rather than unemployed *rampani* fishermen in the farflung villages. However, large scale motorisation of country craft which started in the mid-eighties has resulted in the revival of traditional fishing with the increased tempo of gill-net operation and the emergence of new gears like *mattubala*. Thus the village landing centres, after remaining idle for about a decade have become busy again. Together with this, the increased number of trawlers during this period slightly reduced the dominance of purse-seiners. It is

expected that the ring-seine with its advantage of lower level of investment requirement, as compared to purse-seine, would replace purse-seine within two to three years.

Due to these developments in the production sector, the fish marketing system of the state has also developed to an appreciable level, mainly with the introduction of co-operative system in the sector.

The authors are thankful to Dr. A. Regunathan for his valuable suggestions.

LONG-LINING, SPECIFICALLY FOR SHARKS, PRACTISED AT THOOTHOOR

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Introduction

For many years now, the dynamic fishermen of Thoothoor, a fishing village on the western coast of Kanyakumari district of Tamil Nadu, have been venturing into the deep waters exclusively for sharks. As the dried shark fins have become a money spinner in the export market, the activities of these fishermen have also widened considerably. They now operate from many centres along the west coast from Kanyakumari to Gujarat with Thoothoor as their main centre of activity for fishing, procurement of shark fins, drying them and arranging for export.

The main fishing method is long-lining from mechanised boats, which is almost perennial in this village except for a few weeks when the sea is rough due to monsoon winds. The peak shark fishing season in this area is from september to December. During slack season many fishermen migrate to centres in other maritime states mainly of the west coast, where berthing facilities are available. The fishing harbour at Chinnamuttom, a few kilometers north of Kanyakumari, is a boon for them, particularly during inclement weather conditions (front cover photo).

Among various elasmobranchs (sharks, skates and rays) and teleosts (bony fishes), the common species are *Carcharhinus* spp., *Galeocerdo* sp., *Sphyrna* spp., *Aetobatus* sp., *Epinephelus* spp. and *Pristipomoides* sp. All the items other than sharks and skates are considered bycatch only.

The fishery survey data collected for the Fishery Resources Assessment Division of the Central Marine Fisheries Research Institute from 1986 to 1991 and the observations made by the authors during the same period have been utilised here to prepare the account. The cost of material and products referred to in the report pertains to the end of the year 1992 unless specified otherwise. As far as possible alphabetical indexing is followed while listing out names or groups of fishes and hence the same would not denote abundance of any qroup or species.

Fishing method

Boats with a length range of 9-12 m, fitted with engines varying from 30 to 90 HP, are engaged in operating long-lines with hooks commonly of number 000 (pronounced 'three zero') or rarely 00 and 0000. The number of boats varies considerably during different months of the year reaching upto about 200 at peak season. The fishing method is locally called *mattu*, considering the large-sized hooks used exclusively. The long-line is made of segments of 20 m long nylon ropes in a series. At the junction of two such ropes, another 1.5-m long wire made of steel wires, wriggled with one another, is attached from the mid point of which is hung a 0.75-m long wriggled steel wire with the hook. The steel wire linkage in the line is intended to prevent the shark from biting the line in its attempt to escape from hooking. The number of hooks in a line, with one hook for every 20-m piece, is variable but usually around 250. The ropes used as line are treated in a concoction prepared by boiling husks of

tamarind seed in water. It is said to give the ropes ample strength and a colouration that could easily match with the colour of the adjacent water at night. The cost for fabricating a long-line with 250 hooks would be about Rs. 30,000.

A boat with 6-8 fishermen leaves the shore at dawn. Enroute they go ahead with the first part of their work, ie. the bait collection. The flesh of dolphin is the most preferred bait. So, dolphin hunting is carried out using a harpoon. The harpoon connected to a rope with the free end of the rope held by the fisherman, is thrown at the dolphin. The harpooned dolphin is then hauled into the boat. In the absence of dolphin, flesh of fishes like *Lethrinus* spp., *Lutjanus* spp./tuna etc., caught by hooks-and-line is also used. After bait collection the crew reach the fishing ground 40-70 km away from the shore at 100-200 m depth and set the long-line with baited hooks at dusk since night time is most ideal for hooking sharks. The gear is hauled in by next morning and if the catch is satisfactory the fishermen return to the shore; otherwise, they stay back and hunt for bait for the next operation.

Catch

Based on data collected for five years from 1986 to 1989 and 1991, average monthly catch details have been worked out, which are presented in Fig. 1. The average monthly catch was 171 t, with the annual average catch of 2,048 t. April, May and August to December were the

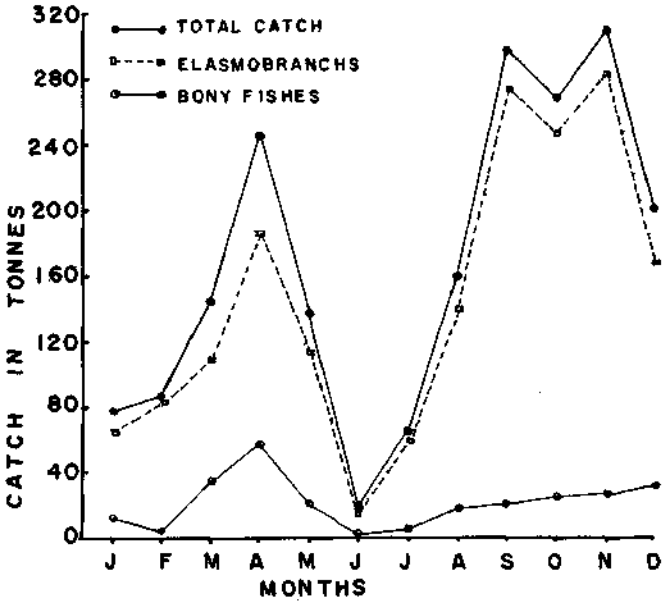

Fig. 1. Average monthly long line landings in tonnes during 1986 to 1989 and 1991.

months of good catch by longliners operated from this centre. The maximum catch per trip recorded was 1,870 kg. The average catch per trip was highest in November with 778 kg and lowest in March with 273 kg. The fishing trips per month ranged from 50 in June to 538 in March, with the annual average of 3,840 trips. On an average, sharks contributed 85.2% to the year's total catch followed by bony fishes (13.5%) and rays and skates (1.3%).

Of the total shark landings, 49.9% was constituted by species of *Carcharhinus* and *Isurus* (commonly *C. dussumieri C. limbatus, C. melanopterus, C. sorrah* and *I. oxyrinchus*, 26.6% by the tiger shark *Galeocerdo cuvier*, 19.9% by hammerheads *Eusphyra* and *Sphyrna* (commonly *E. blochii, S. lewini* and *S. zygaena*), and the rest (3.6%) by species of other sharks (mostly species of *Echinorhinus, Prionace, Rhizoprionodon, Scoliodon* and *Stegostoma* and rarely, *Alopias* and *Centrophorus*). Of these, *Echinorhinus brucus* formed 3.2% of the total shark catch. This species, so far known to be rare (Silas and Selvaraj, *J. mar. biol. Ass. India*, **14** (1) : 395-401, 1972; Somasekharan Nair and Thulasidas, *Mar. Fish. Infor. Serv., T & E Ser.*, **60**, 1984) is commonly landed here and is known by the local name, *aattu vaalai*. The squalids, *Centrophorus granulosus*, recently recorded from Indian Seas (*Mar. Fish. Infor. Serv., T & E Ser.*, **113**, 1991) and *C. uyato* are also landed here occasionally. The rays and skates include species of *Aetobatus, Dasyatis, Himantura, Urogymnus, Rhinobatus* and *Rhynchobatus*.

Of the bony fishes which contributed 13.2% of the total catch, the lutjanid *Pristipomoides typus* and the serranids *Cephalopholis* and *Epinephelus* dominated, followed by tunas and carangids.

Marketing and disposal

The catches are auctioned singly or *en masse* to the merchants (Fig. 2). The required fins are removed and the shark is cut open to remove the liver for oil extraction and the flesh is cut into strips for salting. The bony fishes caught are usually salted onboard to avoid putrification and then auctioned at the shore.

Usually the first dorsal, pectorals and the lower lobe of the caudal fin are highly esteemed in the foreign market. In the case of skates, the two dorsals and the whole caudal fin are preferred. Fins of certain varieties of skates are

considered as superior quality fetching more value than the fins of sharks. The fins which do not roll while being sundried are regarded as very good, and the merchants who are able to identify sharks with such fins are cautious about it while taking sharks in auction.

Fig. 2. Serranids and sharks for auction at the landing centre.

The fins of certain sharks like *Alopias*, *Centrophorus* and *Echinorhinus* are not of any value at all. But either the flesh or liver oil, or in some cases both, are made use of.

Yield of dried fins per shark may be roughly around 2.5 kg, though it may vary from 0.5 kg to 4 kg depending on the size of the fins. The price of fins may vary from Rs. 1,800 to Rs. 2,200 per kg for average quality and upto Rs. 3,500 per kg for the superior quality. Large patches of fins being sundried are a common sight at Thoothoor (back cover photo) during peak period of their landings.

The salted shark flesh is then diverted mainly to markets in Kerala and sold at the rate of Rs. 20 per kg.

The yield and value of liver oil differ considerably from species to species and depending on the quality the price may range from Rs. 150 to Rs. 225 per 15 kg. The liver oil that does not suit to pharmaceutical standards is used for smearing on country craft to repel marine foulers.

Extent of fishing operation

About 250 boats from this village are engaged in long-line shark fishing in different areas of India. Resident fishermen of Thoothoor operate during December to April off Kanyakumari, Tuticorin and Manapad (southeastern part of Tamil Nadu) and land their catches either at Thoothoor or at Chinnamuttom. For fishing off Thoothoor, May to November is considered to be the best season. Fishermen of this village also operate from Vizhinjam and Neendakara in Kerala and from Chinnamuttom and transport the catches in trucks to Thoothoor. The shark merchants of this place employ agents at many places, particularly at Cochin, to gather shark catches from different places for fins and then to pool the stock for export.

Other major areas covered by Thoothoor fishermen are Pallikkal (Kerala), Malpe and Karwar (Karnataka), Goa, Ratnagiri (Maharastra) and Veraval (Gujarat). They fish mainly during September to April in these centres and dispose of the catches there itself.

Biological observation

During the course of the present study a 262-cm long (total length) specimen of the bramble shark, *Echinorhinus brucus*, (Fig. 3) was found to contain a record number of 52 embryos (Fig. 4) against the maximum number of 24 embryos reported by Campagno (*FAO Fish. Synop.* (**125**) Vol. 4, Pt. 1:26, 1984).

Fig. 3. A 262 cm long female of bramble shark, *Echinorhinus brucus*.

Fig. 4. The record number of 52 embryos found in the female bramble shark shown in Fig. 3.

Remarks

A society called "Meen Pidikkum Thozhilalar Sangam", functioning at Thoothoor for the welfare of the fishermen of this village, maintains records of the income of long-liners owned by its members. According to the actual trip-wise gross income of these boats during May 1988 to September 1989, the daily average yield per trip ranged from Rs. 860 to Rs. 16,810. Between these two extremes, the average income per trip ranged from Rs. 1434 to Rs. 6,344. While calculating the income for a fisherman per trip, it becomes clear that each one gets only a paltry sum for his hard work. When a modest income of Rs. 5,000 per trip is considered on an average, an amount of Rs. 2,000 is deducted first towards operational cost. The net profit of Rs. 3,000 is then shared by boat owner (40%), the gear owner who is usually the boat owner himself (20%) and the crew members (40%). When 40% of net profit is shared among eight crew members each one gets only Rs. 150, which is the return for hard work spread over two days and a night. No doubt at times they may get more, but when the share falls still lower, their plight is only imaginable.

Fishermen of Kanyakumari district are skilled, hard working and adventurous and their characteristic seaworthiness has been, of late, recorded by Sivadas (*Mar. Fish. Infor. Serv., T & E Ser.*, **113**, 1991). Under many odds, what obviously keeps them on the move, enterprisingly, is their dynamism coupled with positive thinking for a better future through better catches.

BENEFITS OF CO-OPERATIVE EFFORTS IN FISHING AND CATCH DISPOSAL SYSTEM AT VERSOVA, MAHARASHTRA*

Versova is a major centre of fishery activities in the district of Greater Bombay in Maharashtra and it is the largest among 23 fishing villages of the district. One characteristic feature of the fisher folks of the village is their high degree of mutual co-operation and help which has resulted in the development of a unique system of fish catch disposal.

A careful study of the fish catch disposal system at Versova revealed the following benefits:

i) Conservation of fuel and savings in the fuel cost;

ii) Best utilization of human resources;

iii) Quick and proper disposal of catch in fresh condition and

iv) Freedom from the clutches of money lenders, merchants and middle men.

The co-operation among the fishermen starts even before the fish is caught and continues till the catch is disposed of in the market. The following case study of *dol* net will reveal how their co-operation works for the benefit of the whole society.

The *dol* net is the main fishing gear of the Versova fishermen and is operated throughout the fishing season which commences from mid-September and lasts upto June. This is a bag net of fixed type and is operated with the help of a boat utilising tidal force as well as trained manual labour. The operation is carried out at different depths varying from about 9 to 36 m.

The *dol* fishermen form groups to operate at three to four stations at different depths, and throughout the year these groups stay together. Normally each group has four boats with it.

Baskets of different groups bear different markings and can be identified easily (Fig. 1). After 24 hours of fishing one boat collects the catches from all the boats and brings them to the landing centre.

* Prepared by: S. G. Raje, V. V. Singh and J. D. Sarang Bombay Research Centre of Central Marine Fisheries Insiute, Bombay - 400 023.

TABLE 1. *Comparison of the savings by group fishing boats and single fishing botas from October 1991 to June 1992*

	October 1991	November 1991	December 1991	January 1992	February 1992	March 1992	April 1992	May 1992	June 1992	Total
(A) 40 ft. Group fishing boats (24 boats in 6 groups of 4 boats each)										
Total catch (kg.)	550950	229200	255151	262500	228032	187164	273064	228912	70872	2285845
Catch value (Rs)	1177500	654000	803933	86400	797160	70290	1129067	104880	273600	7457350
Fuel cost (Rs)	178200	204120	230640	252320	222376	271080	269004	300576	72720	2001036
Total profit (Rs)	999300	449880	573293	611680	574784	438210	860063	702624	200880	5410714
No. of hauls	2880	2880	2974	2880	2688	2592	2784	2880	576	23134
(A) 40 ft. Single fishing boats (24 boats operating separately)										
Total catch (kg)	347160	177570	153843	136620	96992	114912	128064	117744	45912	1318817
Catch value (Rs)	811500	424500	509640	557400	428680	474660	587347	616800	187200	4597727
Fuel cost (Rs)	201600	204120	230640	248760	219576	273780	265911	303792	72960	2021139
Total profit (Rs)	609900	220380	279000	308640	209104	200880	321436	313008	114240	2576588
No. of hauls	1440	1440	1488	1440	1344	1296	1392	1440	288	11568
Total profit of group fishing boats/total profit of single fishng boats =Rs. 5410714/Rs. 2576588= 2.10.										
The profits of group fishing boats are 2.10 times more than the single fishing boats.										
(B) 50 ft. Group fishing boats (24 boats in 6 groups of 4 boats each)										
Total catch (kg)	667350	391800	403785	378700	310072	283230	388445	519084	126096	3468562
Catch value (Rs)	1746000	1272000	1262733	120600	926800	1105920	1595000	1747200	460800	10237053
Fuel cost (Rs)	245700	231300	299336	353200	440160	437130	398924	441696	97128	2944574
Total profit (Rs)	1500300	1040700	963397	852800	486640	668790	1196076	1305504	363672	8377879
Nof of hauls	2880	2880	2976	2880	2688	2592	2784	2880	576	23136
(B) 50 ft. Single fishing boats (24 boats operating separately)										
Total catch (kg)	423990	260440	238039	231960	169624	161892	201531	300186	171864	2160116
Catch value (Rs.)	1242000	912000	865933	678000	565600	668250	792667	984000	249600	6958050
Fuel cost (Rs.)	245700	247200	331080	344960	440160	436320	398537	446256	97608	2987821
Total profit (Rs.)	996300	664800	534853	333040	125440	231930	394129	537744	151992	3970228
No. of hauls	1440	1440	1488	1440	1354	1296	1392	1440	288	11578
Total profit of group fishing boats/total profit of single fishing boats = Rs. 8377879/ Rs. 3970228 = 2.11.										
Total profit of group fishing boats are 2.11 times more than the single fishing boats.										

The members of the fisherman families identify their baskets by the markings and take their respective baskets either for drying the catch or to the market. The other boats of the group are sent back to the landing centre in rotation according to a scheduled programme and they return to the fishing station with requisite quantity of drinking water, food, oil and other necessary articles.

An evaluation of the profit by group fishing boats, compared to the individual boats, during a period of nine months was made at Versova based

on fuel cost and catch value. For comparison, six groups having four boats (40 ft and 50 ft) each were identified. Comparison was made with the profit of equal number of single fishing boats.

Results indicated that profit of the boats operating in groups was 2.10 and 2.11 times more for 40 ft and 50 ft boats respectively (Table 1). The reason for this double profit is the pooling of the human resources by the groups which enable them to take more number of hauls and also to save upon the fuel cost.

The system works even better on land. There are three transport societies now and these have

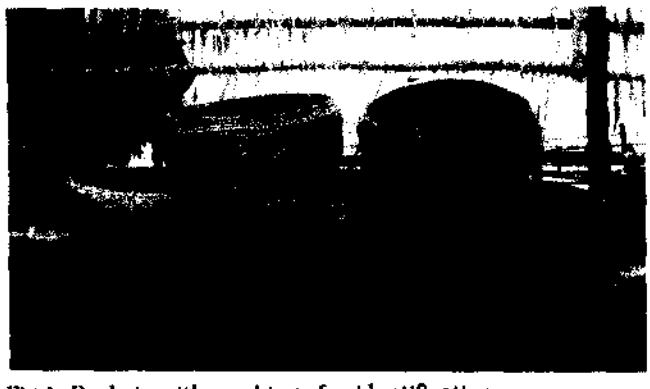

Fig 1. Baskets with markings for identification

changed the earlier scenario when the fishermen were vertually exploited by the middle men. As transportation charges were almost double in earlier days and vehicles were not moving from landing centre till they were full with the catch, the catch was not reaching wholesale or retail market in time and the fishermen were prone to exploitation. Since these societies have the facilities of cold storage and ice plant, it is ensured that no catch is lost even if there is a delay in transportation.

Marketing of the catch is done at the Shivaji Wholesale Market at Bombay through a fresh fish stall of the society. Complete account is maintained neatly even in the absence of the fishermen, and money due to the market basket is credited to the account of the respective basket owner.

In addition to this, some retailers are having some sort of understanding with fishser folk to collect their baskets with markings from the trucks and sell the catch on 10% commission basis. This saves the time of the fisher folk which they utilize mainly for the processing of other fishes.

The whole system is organised in a disciplined manner with the full co-operation of all its members; ultimately saving lot of their energy, time, fuel and money for increased profit.

AN UNUSUAL CATCH OF SHARKS IN A PURSE SEINE AT MALPE, KARNATAKA*

On 10-10-1990 a single purse seine boat landed approximately 3.5 tonnes of sharks together with the seerfish *Scomberomorous commerson*, (400 kg), catfish *Tachysurus serratus* (100 kg) and the kingfish *Rachycentron canadus* (100 kg) at Malpe on the Dakshina Kannada coast in Karnataka. The sharks were identified as the black-tip shark *Carcharhinus limbatus*. This catch was obtained in a single haul off Gangully (30 km north of Maple) at 50 m depth during morning hours. The sharks were auctioned at the rate of Rs. 9/kg, seerfish 25/kg, catfish Rs. 10/kg and kingfish Rs. 18/kg with a total revenue of Rs. 44,300 to the owner.

The sharks observed had a size range of 59-114 cm with the modal size of 85 cm. Some degree of sexual segregation were noticed in the population (sex ratio - M. 38 : F. 62). *C. limbatus* is known to occur in large schools at the surface (Compagno, 1984, *FAO Fish. Synop.*, 125) and therefore it is sometimes caught by purse seiners in large quantities. However, it is the first time that such a quantity has been caught in a single haul in this area. This species is primarily a fish-eater and its favourite food items include the catfish and Spanish mackeral. Therefore the present schooling of sharks might have taken place mainly for feeding purpose as they were caught along with seerfishes and catfishes.

*Prepared by : K. Sunilkumar Mohamed, Y. Muniyappa, R. A. Naik, S. Kemparaju and C. Purandara, Mangalore Research Centre of Central Marine Fisheries Research Institute, Mangalore - 575 001.

ON THE EGG-CASES OF ZEBRA SHARK (*STEGOSTOMA FACIATUM*) CAUGHT OFF TUTICORIN, GULF OF MANNAR*

Landings of zebra shark *Stegostoma faciatum* (Hermann), are not uncommon along the Indian coast. Occasionally they form one of the constituents of the elasmobranch catch exploited by hooks and line. On 22-8-91 two female zebra sharks measuring 157 and 165 cm in total length and weighing 30 and 34.5 kg respectively were landed at Tuticorin North landing centre which were caught from a depth of 40-50 m by hooks-and-line operated from Tuticorin type of mechanised boat. They were sold for Rs.170. When the sharks were cut open for salting, six egg-cases (capsules) were noticed in the larger shark (Fig. 1). Morphometric measurements of the egg cases are given in Table 1.

Fig 1. An egg case of zebra shark *Stegostoma faciatum*.

The tough, keratinous egg cases were more or less rectangular in shape, strongly convex on both the broader sides, and dull green in colour, having darker and thicker edges and angles. Thick coating of a white fatty material was noticed near marginal edges. Membrane was thick, coated externally with dull coloured longitudinal streaks. One longitudinal side of the egg-case possessed bunches of soft, long and delicate silky filaments which were not densely packed all along. The fibres along its upper free border were much more elongated than others and formed the anchoring cord.

All the egg-cases were obtained intact. The length of capsules ranged between 194 and 210 mm and the weight varied from 185 to 320 g. Contents of the egg cases varied between 100 and 160 g in weight and 90 ml and 110 in volume.

The content of the egg-cases was a viscous fluid of dull white colour with pale green tinge, and a semi-solid substance of pale green colour and gelatinous nature. When the content was mixed with water it turned into white like lime. Major portion was composed of fatty material. Volume of the fluid was more than the semisolid content in all egg capsules.

TABLE 1. *Morphometric measurements and other details of egg-cases of zebra shark* Stegostoma faciatum *from Tuticorin waters*

Particulars	Egg cases					
	1	2	3	4	5	6
Total length (mm)	195	195	195	198	210	194
Width at anterior, posterior and middle regions (mm)	65,23,110	68,25,111	64,23,109	70,27,115	73,30,120	66,23,110
Maximum thickness (mm)	53	52	52.5	55	60	52.5
Width of the cell membrane at the origin (mm)	180	183	185	190	205	182
Width of the cell membrane at the middle (mm)	160	158	155	160	172	158
Length of the anchoring core (mm)	400	410	405	412	417	405
Total weight (g)	185	260	270	320	275	290
Empty capsule weight (g)	85	120	135	160	155	155
Weight of contents in each egg capsule (g)	100	140	135	160	120	135
Volume of contents in each egg capsule (ml)	93	110	107	107.5	100	90
Volume of semisolid matter in each egg capsule (ml)	38	52.5	44	35	42	13
Volume of fluid in each egg capsule (ml)	55	57.5	63	72.5	58	77

*Prepared by : T. S. Balasubramanian, S. Rajapackiyam, H. Mohamed Kasim and K. M. S. Ameer Hamsa, Tuticorin Research Centre of Central Marine Fisheries Research Institute, Tuticorin - 628 001.

ON THE OCCURRENCE OF WHALE SHARK OFF SOUTH ANDHRA COAST*

The whale shark *Rhiniodon typus* known to occur in the Indian seas is occasionally caught by gill-nets, purse-seines and trawls. A male whale shark measuring 4.45 m in length caught in a trawlnet on 24-9-1992 at a depth of about 40m off Antherved Palli Palem, nearly 100 km south of Kakinada was landed at Kakinada on the next day (Fig. 1). The various body measurements taken are given below. On enquiry, the fishermen informed that some quantities of prawns, sciaenids, ribbonfish, goatfish and others were also caught in the net but due to severe damage caused to the net by the whale shark, the catch was lost. As there was also no demand for the meat or fins, the whale shark was discarded on the beach. The fish is locally called as *pamparameenu*.

Fig 1. Whale shark *Rhiniodon typus* landed at Kakkinada, Andhra Pradesh.

Details of the whale shark landed at Kakinada on 25-9-1992 :

1. Locality : Antharvedi Palli Palem
2. Time and method of capture : 18.00 hrs, by trawl net
3. Sex : Male
4. Weight : About 1,000 kg
5. Contents of stomach: Could not be examined
6. Gill parasites : Nil
7. External parasites : Nil
8. Measurements (cm)
   - a. Total length : 445
   - b. Standard length : 432
   - c. Head length : 130
   - d. Girth of body (maximum) : 275
   - e. Width of mouth from angle to angle : 80
   - f. Vertical height of :
     - i. First dorsal fin : 39
     - ii. Second dorsal fin : 17
     - iii. Anal fin : 16
   - g. Length of caudal fin along upper margin : 144
   - h. Snout to origin of :
     - i. First dorsal fin : 248
     - ii. Second dorsal fin : 364
     - iii. Pectoral fin : 135
     - iv. Pelvic fin : 310
     - v. Anal fin : 400
   - i. Inter space between :
     - i. First and Second dorsals : 122
     - ii. Anal and caudal : 75
     - iii. Pectoral and pelvic origins : 190
     - iv. Pelvic and anal origins : 80
   - j. Length of pectoral fin along outer margin : 100
   - k. Length of pelvic fin along outer margin : 40
   - l. Length of second dorsal : 27
   - m. Length of first dorsal : 58
   - n. Length of clasper : 15

There is only one earlier report on the landing of whale shark along Andhra coast. A 6.1m long specimen was landed at Visakhapatnam in May, 1965.

*Prepared by : P. Ramalingam, K. R. Somayajulu, K. Dhana Raju, N. Burayya, V. Abbulu, Ch. Ellithathyya and T. Nageswara Rao, Kakinada Research Centre of Central Marine Fisheries Research Institute, Kakinada - 533 004.

ON THE LANDING OF BRAMBLE SHARK (*ECHINORHINUS BRUCUS*) AT TUTICORIN*

The occurrence of the bramble shark, *Echinorhinus brucus* (Bonnaterre), along the continental slope of the west coast of India was first reported during the exploratory fishing cruises of *R. V. Varuna*. Subsequently the species was caught from the continental slope of the southwest coast of India and Gulf of Mannar at depths of 215 to 405 metres during the cruises of *R. V. Varuna*, *M. V. Blue Fin*, *M. V. Velameen* and *M. V. Klaus Sunnana*. Further reports on the occurrence of this species were made from Cochin and Kanyakumari.

The bramble shark is known to be a deep water species but also frequents the shallow waters and the continental slope areas at depths varying from 18 to 900 m. In recent years operation of deep sea trawlers off Tuticorin at a depth range between 200 and 400 m has become regular and consequently a wide variety of fishes, lobsters, prawns and crabs are being landed. During May 1991, eighteen bramble sharks (8 males and 10 females) were landed at Tuticorin Fishing Harbour by deep sea trawlers (Table 1).

When compared to the other species of sharks, bramble sharks are less priced, since their fins, flesh and liver are considered to be of low quality. However, the oil fetches good price since it is used for applying to country crafts to prevent settlement of borers and foulers.

The size range of male sharks varied from 190 to 295 cm weighing 40 to 140 kg; females ranged from 205 to 298 cm in length and from 60 to 150 kg in weight.

On enquiry, it was understood that one female shark measuring 272 cm in total length had about 40 well-developed embryos.

TABLE 1. *Particulars of bramble sharks* (Echinorhinus brucus) *landed at Tuticorin Fishing Harbour by deep sea trawlers during May 1991.*

Date	FEMALES				MALES			
	Number of sharks landed	Total length (cm)	Weight (kg)	Auction price (Rupees)	Number of sharks landed	Total length (cm)	Weight (kg)	Auction price (Rupees)
02-05-'91	—	—	—	—	1	231	70	200
04-05-'91	2	280 265	135 120	520	1	195	40	130
08-05-'91	1	215	60	150	1	245	115	215
10-05-'91	—	—	—	—	2	190 268	40 130	320
14-05-'91	3	240 235 270	120 80 145	— 675	1	295	140	250
18-05-'91	—	—	—	—	1	241	105	215
21-05-'91	2	ϕ 272 205	140 65	275	1	232	60	135
24-05-'91	2	298 282	150 150	600	—	—	—	—

ϕ Found with 40 developed embryos.

*Prepared by : T. S. Balasubramanian, S. Rajapackiyam, H. Mohamed Kasim and K. M. S. Ameer Hamsa, Tuticorin Research Centre of Central Marine Fisheries Research Institute, Tuticorin - 628 001.

ON THE LANDING OF GIANT-SIZED WHITE-SPOTTED SHOVEL NOSE RAY FROM TUTICORIN WATERS, GULF OF MANNAR*

Two shovel nose rays, *Rhyncobatus djiddensis* (Forskal) measuring 316 cm and 279 cm in total length were landed at Tuticorin North landing centre on 11-6-92 and 19-6-92 respectively (Fig. 1). They were caught by bottom-set gill-net *thirukai valai* (mesh size of 30-45 cm) at a depth of 20 - 25 m. Local fishermen call this ray as *paal uluvai*. The morphometric measurements are given in Table 1. The present record of *Rhyncobatus djiddensis* with a total length of 316 cm is the largest from Indian seas, the previous record being 297 cm (Setna and Sarangdhar, *Rec. Indian Mus*, XLVI, 1948).

Both the rays were females. They fetched a price of Rs. 4,620 and Rs. 4,625 in open auction. Since the fins of this species are valued very high in the international markets, the ray is sold at a high price even in local market in India. The fins are cut and sun-dried after applying lime powder on the cut ends. Fins measuring 30 - 40 cm and above fetch Rs. 3,500 - 3,700 per kg of dry weight and those below 30 cm get Rs. 900 per kg. Normally the first dorsal fin, second dorsal fin and the upper lobe of the caudal fin are sold for export. Fins of this species are called 'white fins', whereas the shark fins are called 'black fins'.

Fig. 1. *Rhyncobatus djiddensis* measuring 316 cm landed at Tuticorin.

TABLE 1. *Morphometric measurements (mm) of* Rhyncobatus djiddensis *landed at Tuticorin (Gulf of Mannar)*

Particulars	11-6-92	19-6-92
Total length	3,160	2,790
Approximate weight	200kg	150kg
Sex	Female	Female
Snout to first dorsal	1,450	1,330
Snout to second dorsal	2,155	1,970
Snout to anal	2,630	2,280
Snout to eye	455	450
First dorsal		
Height	530	500
Breadth	375	360
Curvature	450	420
Second dorsal		
Height	405	390
Breadth	290	260
Curvature	320	300
Caudal		
Height	530	510
Curvature	520	500
Eye diameter (horizontal)	30	28
" (vertical)	20	18
Inter-orbital distance	150	142
Spiracle length (horizontal)	60	53
" (vertical)	82	77
Body breadth at first dorsal	1,380	1,200
" at second dorsal	950	820
" at caudal	300	275

*Prepared by : S. Rajapackiyam, T. S. Balasubramanian, K. M. S. Ameer Hamsa and H. Mohamed Kasim, Tuticorin Research Centre of Central Marine Fisheries Research Institute, Tuticorin - 628 001.

ON A BUMPER CATCH OF CATFISH *TACHYSURUS SERRATUS* AT KARWAR, UTTARA KANNADA*

During January, 1991, a total of 210 units of purse-seines were operated from Karwar. The depth of the fishing ground ranged between 21 and 40 m. The mesh size of the purse-seine was 12-14 mm.

On 22nd January, 1991, one purse-seine unit landed exclusively 9 tonnes of catfish, *Tachysurus serratus* (Day) and another unit landed 5 tonnes of the same species on 26th January, 1991 (Fig. 1 & 2).

The length of the fish ranged from 90 cm to 107 cm and the weight from 10.5 kg to 11 kg. The dominant modal size was 100.5 cm, which accounted for 40% of the total catch.

The catch was disposed of at the rate of Rs. 50-60 per fish. The fish were iced immediately and transported to the interior markets.

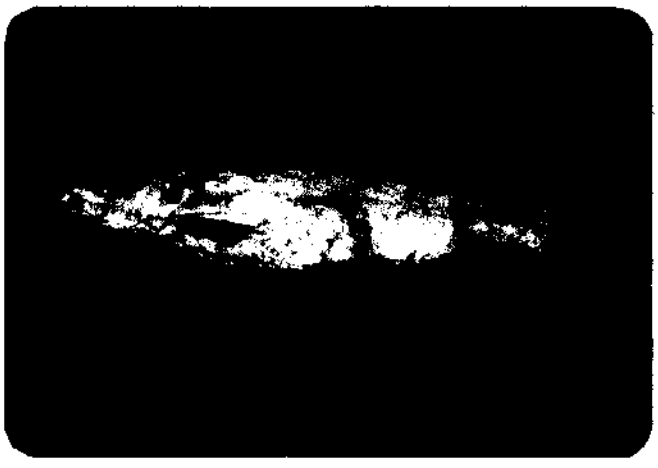

Fig 1. *Tachysurus serratus* (Day).

Fig 2. A portion of the catch of catfish.

*Prepared by : V. Gandhi, Karwar Research Centre of Central Marine Fisheries Research Institute, Karwar - 581 301.

REPORT ON THE SET BACK SUFFERED BY MARINE FISHING SECTOR ON DAKSHINA KANNADA COAST, KARNATAKA, DUE TO THE CYCLONE DURING NOVEMBER 1992*

Cyclones which are common along the east coast of India during October-December period, rarely occur along the west cost. However, the recent cyclone which hit the west coast in the third week of November, 1992 left a trail of damages and destruction to the fishing craft along the Dakshina Kannada coast of Karnataka. It originated in the southern Bay of Bengal and moved along Kerala towards Karnataka coast in a north-easterly direction. On 16th November, it centred about 60 km off Mangalore, and on 17th it crossed Honnavar in North Kanara District.

On 14-11-1992 a country craft (plank-built boat, 10.8 m long and 1.8 m broad) with 25 people onboard on a routine fishing trip (*kairampani* operation) hit against the sand dunes due to the high waves off Suratkal and was broken to pieces (Fig 1). The fishing crew, however, escaped unhurt. The total loss was estimated to be Rs 80,000.

One trawler of overall length 10.8 m and breadth 3.3 m fitted with 88 BHP engine was caught in the high waves and it hit against the sand bar of the bar mouth at Manglore and sank on 16-11-1992. Two of the five crew in the boat who

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Fig. 1. A country craft damaged due to the cyclone at Suratkal (*Udayavani*, dated : 15-11-1992).

were seriously injured died later. The other three persons onboard were rescued by the fishermen in the vicinity. Besides human life , the financial loss on the vessel, gear and fish catch was estimated at about Rs.7 lakhs. On the same day at Polipu, a fishing village about 50 km north of Mangalore, another trawler of the same type hit against rocks due to high waves and was broken to pieces. The loss in this case was about Rs. 5 lakhs.

Fig. 2. A view of the fishing boats anchored at Mangalore Bunder due to cyclone. (*Udayavani*, dated : 18-11-1992).

The total loss due to loss of fishing craft, gear and fish catch and due to non-fishing (Fig. 2) during the short period of 4 days along the Dakshina Kannada coast was estimated to be about Rs. 25 lakhs.

कर्नाटक की समुद्री मात्स्यिकी का संरचनात्मक परिवर्तन और समाज आर्थिक व्यवस्थिति

के. के. पी. पणिक्कर, आर. सत्यदास, केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान, कोचीन

प्रस्तावना

देश के कुल समुद्री मत्स्य उत्पादन का 10% कर्नाटक राज्य का योगदान है। यहाँ से प्राप्त मछलियों में तारली और बाँगडे प्रमुख हैं। यहाँ लगभग 1.25 लाख मछुए रहते हैं। 1970-79 तक की अवधि के आदि काल में यहाँ की मात्स्यिकी परंपरागत मत्स्यन रीतियों से चलती थी। लेकिन मध्यकाल आते आते परंपरागत गिअरों का स्थान यंत्रीकृत क्राफ्ट और गिअरों ने ले लिया। कर्नाटक मात्स्यिकी की समाज-आर्थिक स्थिति के संरचनात्मक परिवर्तन केलिए इन यंत्रीकृत क्राफ्टों ने रास्ता खोल दिया। यह लेख इन परिवर्तनों का अध्ययन प्रस्तुत करता है।

डाटा बेस

इस अध्ययन में विविध मत्स्यन एककों के मूल्य और अर्जन और कर्नाटक समुद्री मात्स्यिकी के समाज-आर्थिक पहलू और पकड व प्रयास की डाटा, सी एम एफ आर आइ द्वारा समय पर चलाए गए सर्वेक्षण से संगृहीत किया गया है।

समुद्री मात्स्यिकी का विकास

कर्नाटक मात्स्यिकी के 1970 से 1990 तक के काल को 3 भागों में विभाजित किया जा सकता है - जैसे परंपरागत मात्स्यिकी का काल जब रांपनी मुख्य गिअर था। दूसरा यंत्रीकृत गिअरों का काल जब कोष-संपाश मुख्य था। अब जो इसकी दूसरी अवस्था है, जहाँ देशी यानों का यंत्रीकरण और मत्तुबाला वलय-संपाश आदि खूब प्रभावी गिअरों का प्रस्तुतीकरण हुआ है।

मत्स्यन तरीकाएं और अवतरण

कर्नाटक मात्स्यिकी का नियंत्रण आदिकाल में परंपरागत मत्स्यन रीतियों पर आधारित था। इनमें प्रमुख रांपनी एकक था। यहाँ वर्ष 1976 में 160 रांपनी एककों का प्रचालन होता था जिससे राज्य की कुल मत्स्यन पकड का 60% प्राप्त होता था। यह एक तट-संपाश है जिसके प्रचालन केलिए 100 व्यक्तियों की आवश्यकता पडती है। एक रांपनी एकक द्वारा वार्षिक आय 2.7 लाख आकलित किया गया है। लगभग 15000 व्यक्ति इस में काम करते थे।

इसके बाद 1976 से कर्नाटक की मात्स्यिकी में कोष-संपाशों का प्रचालन आरंभ हुआ। 1982 तक इसकी संख्या 350 तक हो गई।

कोष संपाशों के प्रस्तुतीकरण से 1978 में कुल अवतरण 87,000 से 1,53,000 टन और 1989 में 2.5 लाख तक हो गया।

कर्नाटक के गाँवों की अर्थव्यवस्था मुख्यतः मत्स्यन से प्राप्त आय पर आधारित थी। मत्स्यन का मुख्य गिअर रांपनी था। लेकिन कोष-संपाशों के आगमन से मत्स्यन कार्य गाँवों को छोडकर मँगलूर, माल्पे, गँगुली, भटकल, ताद्री और कारवार आदि नगर प्रान्तों में केन्द्रीकृत होने लगा। गाँव की अर्थव्यवस्था पर इसका असर बहुत बुरा निकला।

कोष संपाशों के बडे पैमाने में प्रस्तुति, नगर प्रान्तों में मछली उत्पादन बढाने और सहायक उद्योगों को विकसित करके रोज़गार बढाने केलिए उपयुक्त होगी। लेकिन गाँव के धीवरों केलिए यह एक अभिशाप है। रोज़गार केलिए उन्हें शहर जाना पडता है। गाँव में तो कुटुम्ब के सारे सदस्य मत्स्यन करके खूब कमा सकते हैं लेकिन शहर में काम केलिए सब नहीं जा सकते और इसका असर आय में भी पडता है।

कोष संपाश प्रचालन की आर्थिक व्यवस्था

वार्षिक औसत आय 8.8 लाख आकलित की गयी। वेतन और ईधन केलिए क्रमशः 2 लाख और 1.5 लाख रुपये खर्च हो गया। इसके साथ अन्य प्रचालन लागतों की कटौती के बाद लाभ 1.3 लाख आकलित किया गया।

मात्स्यिकी विकास की दूसरी अवस्था देशी यानों का यंत्रीकरण था जिसके फलस्वरूप मत्तुबाला/वलय-संपाश आदि छोटे कोष संपाशों और गिलजाल एककों की संख्या बढ गयी। इस यंत्रीकरण की प्रस्तुति से कोष संपाश के आगमन से बिखरे परंपरागत सेक्टर फिर से कार्यकलाप शुरू करने लगे। देशी यानों के यंत्रीकरण के बाद कोष संपाशों का प्रभाव कम होने लगा।

तीसरी अवस्था का और एक विकास ट्रालरों की पकड व प्रयास की बढती थी। ट्रालरों की संख्या एवं पोत और एच पी इंजनों के आकार में हुई वृद्धि विचारणीय है। वर्ष 1990 के दौरान राज्य का कुल अवतरण 1.8 लाख आकलित किया जिस में 52,000 टन ट्रालरों का और 1 लाख टन कोष-संपाशों का योगदान था।

कोष-संपाश के भारी निवेश जो अब 12 लाख रु. तक आता है, के कारण यह, धीवरों के पहूँच के परे है। मत्तुबाला/वलय संपाश जो छोटे कोष-संपाश के समान है, धीवरों के बीच मशहूर होता जा रहा है। अतः दो या तीन सालों के अन्तर ये छोटे कोष-संपाश बडे कोष संपाशों का स्थान ज़रूर ले लेंगे।

इस प्रकार समुद्री मात्स्यिकी विकास की ओर जा रही है। 1970-79 की अवधि में मत्स्यन उपकरणों के लिए कुल निवेश 10 करोड रुपये था तो 1990 तक आते आते यह 75 करोड तक बढ गया।

मत्स्य विपणन

मत्स्य विपणन प्रक्रियाओं में भी गणीनय परिवर्तन स्पष्ट है। 1970-79 की अवधि के शुरु में 70% पकड रांपनी का योगदान था। इसका विपणन अधिकतः गाँवों में हुआ करता था। लेकिन कोष संपाशों की प्रस्तुति के बाद कर्नाटक सरकार ने रोज़गार रहित रांपनी प्रचालकों को कर्नाटक फिश मारकेटिंग फेडरेशन द्वारा कोष-संपाशों की खरीदी केलिए उधार देकर उनकी स्थिति सुधारने का कार्य आरंभ किया। इस प्रकार खरीद किए गए सभी कोष-संपाशों के विपणन का दायित्व फेडरेशन का है। लगभग 1/3 कोष संपाश एकक फेडरेशन के नियंत्रण में है। इससे मत्स्य विपणन की प्रगति बढती है और धीवरों को अपने उत्पाद केलिए अच्छा मूल्य भी प्राप्त होता है। इस प्रकार उत्पाद सेक्टर के विकास के कारण मत्स्य विपणन प्रणाली भी सहकरण प्रणाली की सहायता के साथ एक सराहनीय हद तक विकसित हो गयी है।

तूत्तूर में लंबी डोर के ज़रिए सुराओं का मत्स्यन

जेकब जेरोल्ड जोइल, केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान का विषिंजम अनुसंधान केन्द्र और आइ. पी. इबनेजेर, केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान का कन्याकुमारी क्षेत्र केन्द्र

भूमिका

तूत्तूर तमिलनाडु के कन्याकुमारी जिला में स्थित एक मत्स्यन ग्राम है। पिछले कुछ वर्षों से यह गाँव लंबी डोर के ज़रिए सुराओं के मत्स्यन करने में अधिक चाव दिखाया जा रहा है। इसका कारण सूखे सुरा पखों की बढती माँग और निर्यात साध्यताएं हैं।

सुराओं का मत्स्यन इस गाँव में पूरे वर्ष में कोई रुकावट के बिना चलता है लेकिन प्रतिकूल मौसम में पत्तन की सुविधायुक्त समुद्रवर्ती राज्यों में मछुए जाते हैं जहाँ मत्स्यन आसानी से कर सकते हैं।

मत्स्यन रीति

काँटायुक्त लंबी डोरों के परिचालन केलिए 9-12 मी

लंबाई और 30 से 90 हार्स पावर के बोटों का इस्तेमाल करते हैं। बोटों की संख्या मौसम के अनुसार बढायी या कटायी जाती है, अनुकूल मौसम में 200 बोटों तक का परिचालन होता हैं। लंबी डोर का निर्माण नाइलोन धागा से किया है जिसकी लंबाई 20 मी होगी। प्रत्येक धागा में एक एक काँटा होंगे और लंबी डोर के काँटों की संख्या 250 के निकट होंगी। इस प्रकार के करीब 250 काँटों के साथ डोर का निर्माण व्यय 30000 रु के निकट होता है।

डोर में चारे के रूप में डॉल्फिन मांस या इसकी कमी पर *लेथ्रिनस लूटजानस* जातियों की मछली या ट्यूनाओं के इस्तेमाल करते हैं। चारे को भाला फेंक कर घायल करके पकडना है और आवश्यक मात्रा में चारा मिलने पर तट से 40-70 कि मी दूरी पर 100-200 मी की गहराई के समुद्र में मत्स्यन शुरु करता है। रात से सबेरे तक गिअर का परिचालन करता है।

पकड

पकड संबंधी डाटा 1986 से लेकर पाँच वर्ष की पकड स्थिति के आधार पर तैयार की है। इस अवधि में प्रति यात्रा में मिली औसत उच्चतम पकड 1870 कि ग्रा नवंबर में और निम्नतम मार्च में मिली थी। यह यथाक्रम 778 कि ग्रा और 273 कि ग्रा थी। वार्षिक पकड 2048 टन और माहिक पकड 174 टन थी। अनुकूल मौसम अप्रैल, मई व अगस्त और अगस्त से दिसंबर था। वार्षिक पकड का 85.2% सुराओं, 13.5% बोनी फिशों और 1.3% स्केटों का योगदान था।

तट में लाइ गई सुराओं में 49.9% *कारकारिनस* जाति की थी। 26.6% पुलि सुरा थी। 19.9 हामरहेड्स ईसफैरा और स्फिरिना जाति की और बाकी 3.6% अन्य सुराओं की थी। इन में *एकिनोरिनस ब्लूकस* प्रचुर मात्रा में उपलब्ध थी। यद्यपि सैलास व सेलवराज और सोमशेखरन नायर व तुलसी दास ने अपने लेखों में इसे अपूर्व जाति कही गयी है तथापि यह अपूर्व नहीं लगती क्योंकि *आट्टुवाले* नाम से पुकारे जानेवाली यह जाति यहाँ सर्वसाधारण बन गयी है। हाल ही में भारतीय समुद्र से पकडी गई *सेन्ट्रोफोरस ग्रानुलोसस* और *सी. युयाता* भी कभी कभी यहाँ से पकडी जाती है।

शंकुशों और स्केटों में *ओटोबाटस, टासियाटिस, हिमान्तुरा, उरगिमस* और *रिन्कोबाटस शामिल* है। बोनी फिशों में *प्रिस्टिपोमोइड्स टैपस* प्रमुख था, इसके बाद आते है सेरानिड्स ट्यूनायें और करंजिडे।

विपणन और निपटान

सुरा के आवश्यक पख काट कर और तेल केलिए इसका जिगर निकालकर मांस को छोटे छोटे भागों में काटकर नमक डालते है।

सूर्यताप में तपित करते वक्त जिसका पख नहीं मुडा जाता, इसे अच्छे माना जाता है। प्रति सुरा के सूखे पख का भार लगभग 2.5 कि ग्रा होगा। लेकिन पखों के आकार के अनुसार यह 0.5 कि ग्रा से 4 कि ग्रा के बीच बदलने की भी संभावना है। पख का प्रति कि ग्रा औसत मूल्य गुणता के आधार पर 1,800 रु. से 2,200 रुपये के बीच बदलता रहता है।

सुरा के मांस को केरल के बाज़ार में लाकर प्रति कि ग्रा को 20 रुपये में बेचता है। जिगर तेल की मात्रा और मूल्य हर जातियों में अलग अलग होता है। इसके अनुसार मूल्य प्रति 15 कि ग्रा 150 और 225 रुपये के बीच आता है जो तेल औषध निर्माण केलिए अनुयोज्य नहीं है, इसे देशी यानों के लेप के रूप में उपयोग करता है।

मत्स्यन क्रियाएं

इस गाँव के करीब 250 पोत लंबी डोर सुरा मत्स्यन में लगे हुए है। तूत्तूर के मछुए दिसंबर से अप्रैल तक की अवधि में कन्याकुमारी, टूटिकोरिन, मणप्पाड आदि स्थानों में प्रचालन करते हैं और पकड को तूत्तूर या चिन्नमुट्टम में लाते हैं। सुरा व्यापारी अपने एजेन्टों को विविध स्थानों में नियुक्त करते हैं, विशेषकर कोचीन में, ताकि वे निर्यात केलिए विविध स्थानों से सुरा इकट्ठा कर सके।

इसके अलावा तूत्तूर के धीवरों ने पल्लिक्कल (केरल), माल्प, कारवार (कर्नाटक) गोआ, रत्नगिरी (महाराष्ट्र), वेरावल (गुजरात) आदि मुख्य क्षेत्रों में भी मत्स्यन करते हैं। इन क्षेत्रों में मत्स्यन काल सितंबर से अप्रैल तक है और पकड का निपटान भी यहीं करते हैं।

जैविक निरीक्षण

इस अध्ययन के समय प्राप्त 262 से मी लंबाई (कुल लंबाई) के ब्राम्बिल सुरा *एकिनोराइनस ब्रूकस* में 52 भ्रूण देखे। यह एक रिकार्ड है।

अभ्युक्तियाँ

तूत्तूर गाँव के धीवरों के कल्याण केलिए "मीन पिडिक्कुम तोषिलार संघम" नामक एक सोसाइटी कार्यरत है।

वेरसोवा में मत्स्यन और निपटान में सहकारी श्रम और इसके लाभ *

गेटर बंबई जिला के वेरसोवा मत्स्यन क्रियाकलापों केलिए मशहूर है। यहाँ के मछुओं ने आपसी सहभाव से मत्स्यन कार्य व निपटान केलिए एक अनुयोज्य तरीका ढूढ निकाला है। इस तरीका या प्रणाली के लाभ ये हैं कि इस से कम ईंधन का प्रयोग होता है, मानवशक्ति का अच्छा उपयोग होता है, ताजे स्थिति में मछलियों का निपटान कर सकता है और मध्यवर्तियों, व्यापारियों व साहूकारों के जाल से बच सकता है।

वेरसोवा में प्रचालन करनेवाला महत्वपूर्ण मत्स्यन गिअर "डोल नेट" है। प्रस्तुत बात की स्थापना के अध्ययन केलिए इसे उदाहरणार्थ चुन लिया गया है।

डोल नेट का परिचालन तीन या चार गूपों में समुद्र की विविध गहराइयों में करता है। प्रत्येक क्षेत्र में परिचालन केलिए 4 बोट होंगे। मछलियों के संग्रहण केलिए अंकित टोकरियाँ होंगी। चार बोटों में से तीन बोट मछलियाँ पकडेंगे, एक बोट पकडी गई मछलियों को जल्दी से जल्दी तट पर लायेगा। अपने अपने नाम अंकन की गई टोकरियों को मछुए अपनी सुविधा के अनुसार न तो सुखायेंगे या बेच देंगे। नियमित कार्यक्रम और निर्धारित समय के अनुसार प्रत्येक झुंड के लान्डिंग बोट तट पर आयेंगे जिससे मछलियों की माँग ज्यादा होती है। ये लान्डिंग बोट सारे बोटों केलिए आवश्यक पेयजल, तेल, आहार और अन्य आवश्यक चीजें लेकर वापस जायेंगे। समूह मत्स्यन और एकलित मत्स्यन के बीच की तुलना करने पर यह देखा गया कि संयोजित मत्स्यन से मिलनेवाला लाभ दुगुना है। यह प्रणाली रोड यातायात में भी लागू की थी क्यों कि ठेके आधार पर पहली गाडी लेते वक्त ठेकेदार गाडी भरने तक खडा करता था जिससे मछलियाँ बिगाड जाती थी। समूह मत्स्यन शुरु करने के बाद माल तत्क्षण बाजार में पहूँचाने की और बाकी बचे माल अनुरक्षण करने की सुविधाएं बनायी गई।

पकडी गई मछलियों को बिकने केलिए इस संघ ने बंबई के 'शिवाजी मार्केट' में एक स्टॉल ले लिया। मछलियाँ बेचकर मालिक को रकम नियमित रूप से दिये जाने का प्रबन्ध यहाँ है। इसके अतिरिक्त 10% कमीशन पर भी कभी कभी माल बिकने का प्रबन्ध है। कुलमिलाकर कह जाएं तो यह प्रणाली बहुत लाभकारी है।

* केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान का बंबई अनुसंधान केन्द्र के एस. जी. राजे, वी. वी. सिंह, और जे. डी. सेराव

कर्नाटक के माल्प में कोश संपाश में सुराओं की असाधारण पकड *

माल्प में 1990 अक्तूबर को एक कोश संपाश में सुराओं की असाधारण पकड हुई। एक ही बोट से 3.5 टन सुरा मिले थे। *कारकारिनस लिंबाटस* जाति के इन सुराओं को प्रभात बेला में समुद्र की 50 मी गहराई से पकडे थे। नीलाम पर 44,300 रु. की आय मिली। पूर्वी रिपोर्टों के अनुसार बडे झुंडों में ये उपरी समुद्र तल में दिखाये पडे हैं। लेकिन इस प्रकार का अवतरण यहाँ पहली घटना है। इसका मुख्य आहार सीर मछली और शिंगटियाँ है। इसे खाने केलिए ये सुरायें आये हुये होंगे।

* केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान का मॉगलूर अनुसंधान केन्द्र के सुनिलकुमार मोहम्मद, वाई. मुनियप्पा, आर. ए. नाइक, एस. केम्पराज और सी. पुरन्धरा द्वारा तैयार किया लेख।

टूटिकोरिन से दूर मान्नार खाडी से पकडी जेब्रा सुरा *(स्टीगोस्टोमा फासियाटम)* के अंड संपुट *

भारतीय तट में जेब्रासुराओं का अवतरण असाधारण बात नहीं है। टूटिकोरिन के उत्तरी अवतरण केन्द्र में 22-8-91 को क्रमशः 157 और 165 से मी लंबाई और 30 और 34.5 कि ग्रा भार के दो मादा जेब्रासुराओं का अवतरण हुआ। इन्हें 170 रुपये में बेच गये। जब नमक डालने में इन नमूनों को काटे तो 165 से मी लंबाई वाली सुरा में छः अंडावरण देखे गए। इन किरैटिनी (Keratinous) अंडावरणों का आकार लगभग समकोणीय सा था, दोनों पार्श्व फीके हरे रंग के अवमुख के थे और कोणें काले और घने थे। उपांत धारों के पास एक श्वेत वसीय पदार्थ का घना आवरण देखा गया। झिल्ली घना था और फीके रंग के अनुदैर्ध्य रेखाओं से आवृत था। अंडावरण के पार्श्व भाग में नरम, लंबे और कोमल मुलायम तंतुएं थे।

अंडसंपुटों की लंबाई 194 मि मी और 210 मि मी के बीच और भार 185 ग्रा और 320 ग्रा के बीच देखे गए। अंडावरण के भीतर के पदार्थों के भार में 100 ग्रा और 160 ग्रा के बीच और मात्रा में 90 मि लि और 110 मि लि के बीच की विविधता दिखाई पडी।

अंडसंपुट के अंतर्वस्तु की अवस्था फीके श्वेत रंग के सेमिसॉलिड की थी। यह सेमिसॉलिड फीके हरे रंग का है और तरल पदार्थ लगभग क्रीम रंग का है। यह अंतर्वस्तु पानी में मिलाने पर चूने के समान श्वेत हो जाता है। इसके अधिकांश भाग वसीय वस्तुओं से भरा हुआ था। तरल पदार्थ का आयतन सेमिसॉलिड अंतर्वस्तुओं की तुलना में अधिक है।

* तैयारीः टी. एस. बालसुब्रमणियन, एस. राजपाकियम, एच. मोहम्मद कासिम और के. एम. एस. अमीर हंसा, केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान का टूटिकोरिन अनुसंधान केन्द्र, टूटिकोरिन

दक्षिण आन्ध्रा तट से तिमिंगल सुरा की पकड पर रिपोर्ट *

भारतीय समुद्रों में तिमिंगल सुरा *राइनियोडोन टाइपस स्मिथ* की उपस्थिति विरल होते हुए भी इसके कुछ नमूनों की पकड के बारे में रिपोर्ट है। इन नमूनों के वितरण, गति, मौसमी उपस्थिति आदि के बारे में समझने केलिए पकडे गए हर नमूने का निरीक्षण और इसका रिकार्ड करना अनिवार्य है। आन्तरवेदी पल्लि पालेम (काकिनाडा के लगभग 100 कि मी दक्षिण) में 24-9-1992 को समुद्र में 40 मी गहराई से 4.45 मी लंबाई के एक नर सुरा को ट्राल जाल के ज़रिए पकडा था। यह बहुत नाशकारी था कि मछुओं ने जाल खींचने के पहले ही उसको मारा। इसके साथ और कुछ मछली भी प्राप्त हुई लेकिन जाल को पडी भारी नाश के कारण ये मछलियाँ भी नष्ट हो गयी। इसकी कोई माँग नहीं थी। भारत में प्राप्त तिमिंगल सुराओं के विविध नमूनों की लंबाई 3 से 12.9 मी के बीच में रही और पकडे गए सुराओं में अधिकांश 5-6.9 मी की रेंच में थे। इनकी तुलना में वर्तमान नमूना छोटा है। आन्ध्रा तट से तिमिंगल सुरा पर केवल एक ही रिपोर्ट है। विशाखपट्टनम में मई 1965 को 6.1 मी लंबाई का एक सुरा का अवतरण हुआ था। उपलब्ध रिपोर्टों के अनुसार भारत के पूर्वी तट से जनवरी-मार्च, मई, जुलाई और अक्तूबर के दौरान तिमिंगल सुरा को पकडा गया था। सितंबर में इसकी प्राप्ति यह पहली बार है।

* तैयारीः पी. रामलिंगम, के. आर. सोमयाजुलू, के. धनराजु, एन. बुरय्या, वी. अब्बुलू एल्लितत्तय्या और टी. नागेश्वर राँव, केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान का काकिनाडा अनुसंधान केन्द्र, काकिनाडा - 533 004

टूटिकोरिन में ब्राम्बिल सुरा (*एकाइनोराइनस ब्रूकस*) का अवतरण *

ब्राम्बिल सुरा *एकाइनोराइनस ब्रूकस* गभीर-जल जाति है। फिर भी 18 से 900 मी तक के उथले जल में भी कभी कभी इसे देखा जाता है। आजकल टूटिकोरिन में 200 मी से 400 मी तक की गहराई में गभीर-जल ट्रालरों का प्रचालन नियमित रूप से होता रहता है और इसके फलस्वरूप विविध प्रकार की मछलियाँ, महाचिंगटें, झींगे, कर्कटें आदि का अवतरण भी। मई 1991 के दौरान सन्निकट 18 *एकाइनोराइनस* ब्रूकस, 10 मादा और 8 नर जाति, टूटिकोरिन मत्स्यन पोताश्रय में विविध तारीखों में अवतारित हुए।

इनके पख, माँस और यकृत् तेल की निम्न गुणता के कारण ब्राम्बिल सुराओं का मूल्य अन्य सुराओं की तुलना में कम है। लेकिन तेल देशी आनायकों के पेयिन्टिंग केलिए उपयोग करने के कारण एक अच्छा रकम पाता है।

नर सुराओं की लंबाई 190 से मी से 295 से मी के बीच और भार 40 कि ग्रा से 140 कि ग्रा के बीच देखा गया और मादा सुराओं की लंबाई 205 से मी और 298 से मी के बीच और भार 60 कि ग्रा और 150 कि ग्रा के बीच देखा गया।

* तैयारीः टी. एस. बालसुब्रमणियन, एस. राजपाकियम, एच. मोहम्मद कासिम और के. एम. एस. अमीर हंसा केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान का टूटिकोरिन अनुसंधान केन्द्र, टूटिकोरिन - 628 001

टूटिकोरिन (मान्नार खाडी) में श्वेत चित्तियोंवाले भीमाकार शंकुश *रिन्कोबाटस जिडेनसिस* (फोर्सकल) का अवतरण *

टूटिकोरिन के उत्तर अवतरण केन्द्र में 11-6-92 और 19-6-82 को क्रमशः 316 से मी और 279 से मी के दो शंकुशें *रिन्कोबाटस जिडेनसिस* अवतरित हुए थे। उन्हें 20-25 मी गहराई से बोटम सेट गिल जाल के ज़रिए पकडी थी। स्थानीय मछुए इस शंकुश को "पाल उलुवाय" कहते हैं। अभी तक के रिकार्ड के अनुसार, उपर्युक्त 3.16 मी के शंकुश अभी तक प्राप्त नमूनों में सबसे बडे हैं।

दोनों शंकुशें स्त्री जाती की थी। नीलाम में दोनों नमूनों को क्रमशः 4620 और 4625 रु. प्राप्त हुए। इन नमूनों के पखों का अन्तार्राष्ट्रीय बाज़ार में काफी अच्छा माँग है और इसका असर स्थानीय बाज़ारों में भी व्यक्त है। पखों को काटकर काटे गए अग्रों में चूना डालकर सूर्य ताप में सुखाता है। 30 से मी से 40 से मी तक या इससे अधिक लंबे पख को 3500 से 3700 रुपये तक मिलता है। इन शंकुशों के पखों को "श्वेत पख" और सुरा के पखों को "काला पख" कहा जाता है।

* तैयारीः एस. राजपाकियम, टी. एस. बालसुब्रमणियन, के. एम. एस. अमीर हंसा और एच. मोहम्मद कासिम, केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान का टूटिकोरिन अनुसंधान केन्द्र, टूटिकोरिन - 682 001

कारवार अवतरण केन्द्र (उत्तर कन्नड) में जनवरी 1991 के दौरान शिंगटी *टाचुस्यूरस सेराटस* की भारी पकड *

जनवरी, 1991 में कुल मिलाकर 210 कोष संपाशों का प्रचालन किया था। मत्स्यन तल की गहराई 21 और 40 मी के बीच में थी। जालाक्षियों का आकार 12-14 मि मी था।

एक कोष संपाश ने 22 जनवरी, 1991 को 9 टन शिंगटियों *टाचुस्यूरस सेराटस* का अवतरण किया था। इसी जाति के शिंगटियों के और एक पाँच टन का अवतरण 26 जनवरी, 1991 को भी हुआ।

मछलियों की लंबाई 90 से मी से 107 से मी के बीच और भार 10.5 और 11 कि. ग्रा के बीच था। इसमें मुख्य रूप से 100.5 से मी के बीच के नमूने थे, जो कुल पकड के 40% थे।

इसका निपटान प्रति मत्स्य 50-60 रुपये पर किया गया।

* केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान का कारवार अनुसंधान केन्द्र के वी. गाधी द्वारा तैयार की गई रिपोर्ट

कर्नाटक के दक्षिण कन्नड तट की मात्स्यिकी पर नवंबर 1992 में हुए चक्रवात के बुरे असर पर एक रिपोर्ट *

भारत के पूर्वी तटों में अक्तूबर दिसंबर के दौरान चक्रवात असाधारण घटना तो नहीं है। यद्यपि 1992 नवंबर में हुये चक्रवात ने कर्नाटक के दक्षिण कन्नड तट के धीवरों और मत्स्यन आनायकों को बडी भारी नष्ट पहूँचाया। बंगाल की दक्षिणी खाडी में उत्पन्न यह चक्रवात केरल से कर्नाटक तट की ओर उत्तर-पूर्वी दिशा में मंडराते हुए 17 नवंबर 1992 को उत्तर कर्नाटक जिला के होन्नवार तट पार कर दिया।

इस चक्रवात से सुराटकल से दूर समुद्र में उच्च तरंगों में पडकर एक देशी मत्स्यन पोत जिस में 25 मछुए थे बालू टिब्बा से टकराके टूट गया। लेकिन मछुए इस विपत्ति से बच गये। इससे कुल नष्ट 80,000 रु. आकलित किया गया।

इसके अतिरिक्त 'पावन गंगा' नामक एक यंत्रीकृत पोत भी 16-11-92 को बालू टिब्बा में टकराकर टूट गया। इसके पाँच कर्मचारियों में दो लोगों की मृत्यु हुई। वित्तीय नष्ट 7 लाख रुपये रिपोर्ट की गई। इसी दिन मौंगलूर से 50 कि मी उत्तर में पोलिपु नामक स्थान में 'महागणेश' नामक एक यंत्रीकृत ट्रालर का भी नाश हुआ और इसका आकलित वित्तीय नष्ट 5 लाख रु. हैं।

दक्षिण कर्नाटक तट में चार दिन की अवधि में मत्स्यन पोत, गिअर और मत्स्यन पकड के नाश से हुआ आकलित नष्ट लगभग 25 लाख रु. हैं।

* तैयारीः सी. पुरन्धरा, केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान का मौंगलूर अनुसंधान केन्द्र, मौंगलूर

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