



# MARINE FISHERIES INFORMATION SERVICE

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TECHNICAL AND  
EXTENSION SERIES

No.40  
July 1982

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE  
COCHIN, INDIA

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

# IMPACT OF PURSE SEINE OPERATIONS ON TRADITIONAL FISHERY WITH SPECIAL REFERENCE TO OIL SARDINE IN KERALA DURING 1980 AND 1981\*

## Introduction

There has been a marked decline in the landings of oil sardine in 1980, compared to the previous two years. A study was undertaken to examine the reasons for this decline and to determine whether the purse seine operations which started in 1979 has any influence on the traditional fishery. For this purpose the data on catch, effort, age and length composition of oil sardine collected by this Institute during 1978-81 period pertaining to indigenous gears and purse seines and the data on socio-economic aspects gathered through a special survey in 1981 in the coastal villages of Kerala were considered.

The purse seiners have started operations in Cochin area during the latter half of 1979 with about 10 units, which increased to about 40 and 60 in 1980 and 1981 respectively. The purse seiners operated are of about 13 m. in length with nets measuring 500-600 m in length and 50-60 m in depth with the meshes ranging from 13 to 20 mm in size.

## Catch and Effort

The estimates of marine fish landings, by purse seines and traditional gears during 1978 to '81 in the region Quilon to Manjeshwar where the impact of purse seining was reportedly experienced by the indigenous fishermen, are given in Table 1 along with the effort and the catch per unit effort (CPUE). As seen from the table the total landings by indigenous gears were about 1.9 lakh tonnes in 1978, 1.6 lakh tonnes in 1979, 0.9 lakh tonnes in 1980 and 1.7 lakh tonnes in 1981, thus showing a conspicuous drop in 1980. The CPUE and the effort also showed a decline in 1980. In the case of purse seines, the figures for 1979 are not comparable with those of 1980 and '81 since purse seiners started operating only in the latter half of 1979. The total landings of purse seines were about 15 thousand tonnes in 1980 against 18 thousand tonnes in 1981 thus showing a 20% increase. While the CPUE indicated a slight decline, the effort showed an increase.

In order to know the species which have registered a decline, the landings of oil sardine and mackerel were considered since these two are the largely exploited species by purse seines.

As regards oil sardine, catches by indigenous crafts were a little over one lakh tonnes during

both 1978 and '79 which declined almost to its half in 1980. However, the landings revived remarkably in 1981 recording 1.3 lakh tonnes. CPUE also showed almost a similar trend during this period. For purse seines, landings increased from about 10 thousand in 1980 to 12 thousand tonnes in 1981 while the CPUE remained more or less the same.

The mackerel landings by indigenous gears indicated a decline during the period 1978 to '80 with nominal improvement in 1981. CPUE also showed a similar trend. The purse seine landings during 1981 showed a marginal decrease while CPUE registered a decline of about 27% as compared to 1980.

The contribution from mackerel landings to the total was about 10% only during this period under report, whereas the share of oil sardine to the total was over 60% and the trend of the total catches is well reflected by that of oil sardine. Hence landings of oil sardine were alone considered for the analysis in this report.

## Age composition of oil sardine

Regarding length frequency distribution of oil sardine in purse seine catches in 1979 at Cochin, contributions of 0-year recruits (below 145 mm in total length) of the oil sardine was 80%. In 1980 and '81, however, they yielded about 71% indicating a decrease.

In the boat seine, Thanguvala the yield from the 0-year olds recorded a slight decrease in 1980 when compared to 1979 (Table 2). In the boat seine, Pattenkolli catch at Calicut, the contribution from the 0-year declined markedly in 1979 and 1980 compared to 1981. However, during 1981 the 0-year recruits recorded a remarkable increase coinciding with the improvement in the landings (Table 2).

## Economic aspects

A special survey was conducted covering 41 fish landing centres in the region Quilon to Manjeshwar

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**Table 1.** Contribution of purse seiners and indigenous crafts to the marine fish landings of the region Quilon to Manjeshwar in Kerala during 1978-1981.

| Years          |                    | 1978        |            | 1979        |            | 1980        |            | 1981        |            |
|----------------|--------------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|
| Species        | Gears              | Purse seine | Indigenous | Purse seine | Indigenous | Purse seine | Indigenous | Purse seine | Indigenous |
| 1. Oil sardine | Catch (tonnes)     | --          | 1,18,378   | 1,754       | 1,07,395   | 9,763       | 51,916     | 12,334      | 1,33,490   |
|                | CPUE (kg)          | --          | 94         | 3,213       | 112        | 1,842       | 68         | 1,825       | 150        |
| 2. Mackerel    | Catch (tonnes)     | -           | 24,256     | 48          | 13,891     | 4,221       | 8,470      | 3,932       | 10,195     |
|                | CPUE (kg)          | -           | 19         | 88          | 14         | 796         | 11         | 582         | 12         |
| Total          | Catch (tonnes)     | -           | 1,91,423   | 1,841       | 1,58,436   | 14,858      | 92,903     | 17,673      | 1,73,192   |
|                | CPUE (kg)          | --          | 152        | 3,372       | 165        | 2,803       | 122        | 2,614       | 195        |
|                | Effort (boat days) | -           | 12,61,652  | 546         | 9,58,720   | 5,301       | 7,62,119   | 6,760       | 8,87,707   |

**Table 2.** Age composition (%) of oil sardine at Cochin and Calicut during 1978-1981

| Year | Cochin           |      |              |                          |      |              | Calicut                       |      |              |
|------|------------------|------|--------------|--------------------------|------|--------------|-------------------------------|------|--------------|
|      | Purse seine      |      |              | Thangu vala (Boat seine) |      |              | Pattenkolli vala (Boat seine) |      |              |
|      | 0 Yr             | 1+Yr | 2+Yr & above | 0-Yr                     | 1+Yr | 2+Yr & above | 0 Yr                          | 1+Yr | 2+Yr & above |
| 1978 | No purse seining |      |              | 67.4                     | 27.4 | 5.2          | 81.3                          | 11.3 | 7.4          |
| 1979 | 79.6             | 12.8 | 7.6          | 79.4                     | 16.2 | 4.4          | 42.2                          | 37.4 | 20.4         |
| 1980 | 71.4             | 15.6 | 13.0         | 74.8                     | 22.7 | 2.5          | 43.5                          | 34.6 | 21.9         |
| 1981 | 71.0             | 15.2 | 13.8         | (No observation)         |      |              | 70.0                          | 18.8 | 11.2         |

during May 1981, to find out the impact of purse seine operations, if any on the indigenous fisheries. Data were collected from country craft owners on general aspects of fishing activities at the landing centres. The data obtained through this survey indicated that landings by purse seiners at Cochin and Mangalore, lifted by trucks, moved out to various parts of Kerala State and sold at competitive prices when compared to local prices. To avail this advantage the head load and bicycle vendors waited for these trucks on the road and did not go to the landing centres to collect the country craft catches which were irregular, undependable and low. The number of trucks that used to visit these landing centres was reduced to one third as they got

regularly full loads at places viz. Cochin and Mangalore. Before the introduction of purse seining, traditional fishermen were able to get higher price whenever the catch was less. Thus reduction in the quantity used to be compensated by higher price. But during 1980, even small catches of oil sardine failed to boost the prices at the landing centres because of the regular supply of purse seine catches. This is indicated by the average prices of 50 paise, 50 paise and 60 paise per Kg. ruled in 1979, '80 and '81 respectively. These factors would have played a major role in discouraging the indigenous crafts venturing in fishing in usual numbers. The aggregate revenue from the oil sardine landings by the indigenous crafts worked out to 5.4, 2.6



Fig. 1. Poor arrivals-hawkers in despair in 1980



Fig. 2. Auctioning of indigenous catches of oil sardine in 1981.



Fig.3 & 4. Bumper harvest of oil sardine in 1981.



Fig. 5. Purse-seiners and carrier boats at Fisheries Harbour, Cochin.



Fig. 6. Indigenous crafts auctioning catches

and 7.8 crores in 1979, '80 and '81 respectively, thus showing a steep fall in revenue during 1980. Fig. 7 shows the comparative value of the revenue per unit effort (Rupees per boat day) from oil sardine for the 3 years 1979 to 1981.

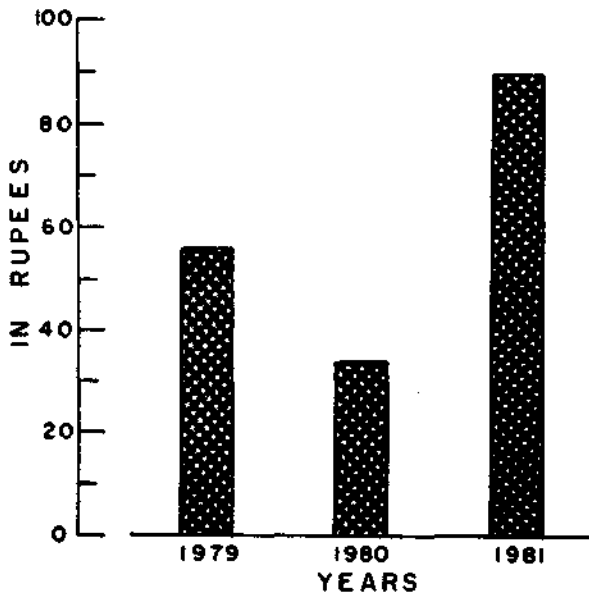


Fig. 7. Revenue from oil sardine per unit effort of indigenous craft (Rupees/boat day)

As per the data collected from country craft owners, during 1980 about 10 percent of the active fishermen have left fishing. Some of them were engaged in road repairing, rubble work, metalling and head load work, etc. At certain centres like Kannamali and Manasseri, a number of fishermen shifted from marine fishing to back water fishing at least temporarily. Even those who did marine fishing were mostly underem-

ployed. The annual average income of a fishermen family has been found reduced by about 50% in 1980 as compared to 1979. The survey further revealed that about 250 traditional fishermen were employed in purse seiners in Cochin Fisheries Harbour.

As stated earlier, in 1981 there has been a revival of oil sardine fishery. The better availability induced the fishermen to increase the effort which helped the indigenous crafts to provide regular supply. Besides, the motorisation of the indigenous crafts which picked up during the latter half of 1981 from Quilon to Munambam also helped in increasing the sardine catches to some extent. These increased landings attracted more traders towards the landing centres which resulted in the flourishing of marketing and related activities.

### Discussion

The oil sardine catches in purse seine and Thanguvala at Cochin indicated a greater contribution from 0-year class during 1979 when compared to 1980. This is reflected in the better catches in 1979 than in 1980. Manifestation of the purse seining impact, though noticed, was not on a large scale in 1980. The dwindled availability or decrease in the stock might have affected the catches of the artisanal gears operating in the nearshore waters. The diminished interest shown by artisanal fishermen due to reduced returns also might have brought about a reduction in the landings in 1980. However, in 1981 the oil sardine fishery improved remarkably consequent on better availability and increased effort. From the foregoing analysis it appears that the effect of purse seining, at the present level of exploitation and availability, is not tangibly felt on the indigenous fishery off Kerala coast.

