

## TRENDS IN THE CATCH OF SILVERBELLIES BY MECHANISED BOATS IN TAMIL NADU DURING 1971-75

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### ABSTRACT

Silverbellies form an important demersal fishery of India particularly on the coasts of southern maritime states, the annual average catch amounting to about 3% of the total marine fish catch in India. In Tamil Nadu, mechanised boats predominantly operate at Royapuram (Kasimedei), Cuddalore, Portonovo, Adirampattinam, Mandapam, Rameswaram and land considerable quantities of silverbellies. The catch trends of silverbellies landed by the mechanised boats in Tamil Nadu during the period 1971 to 1975 and the relation between the index of abundance and the total fishing effort both in respect of total landings and landings of silverbellies are dealt with in the present paper.

### INTRODUCTION

Silverbellies, one of the important demersal fisheries of India form good fishery along the coasts of Andhra Pradesh, Tamil Nadu and Kerala. Rao (1973) has studied the distribution pattern of silverbellies in India. In his study on the fishery resources of the Rameswaram Island, Krishnamoorthy (1957) has given an account of the silverbelly fisheries of the Rameswaram Island. Venkataraman and Badrudeen (1974) have studied the diurnal variation in the catches in Palk Bay. Silverbellies are generally caught by shore seines and boat seines. The mechanised boats operating in Tamil Nadu also land substantial quantities.

### MATERIAL AND METHODS

The estimates of marine fish production and fishing effort in India are made by the Fishery Resources Assessment Division of the Central Marine Fisheries Research Institute, on the basis of a suitable sampling design. (Banerji and Chakraborty 1973). The data used in the present study were collected from the various reports of the Institute and also from the available unpublished data. In this connection, the paper published by Dharama Raja and Prabhu (1975) on the sample survey for the estimation of marine fish landings by mechanised fishing crafts was very useful.

The data for the years 1971-75 were analysed both in respect of catch and fishing effort. The mechanised boats in Tamil Nadu generally operate in

Royapuram (Kasimedu), Cuddalore, Portonovo, Admirapatnam, Rameswaram and Mandapam zones where a good number of mechanised boats operate and land substantial quantities of silverbellies and the data on catch and effort were collected from these places on monthly basis. Some mechanised boats also operate in other centres like Nagapatnam, Kilakarai Tutioorin, Manapad, CapeComoiin and Colachel but the landings of silverbellies from them are not appreciable.

## RESULTS

*All-India landings of silverbellies*

Table 1 shows the all-India total landings and the landings of silverbellies for the years 1957-75. The catch which was of the order of 13,208 to 18,268 t in 1957-63 showed a substantial increase during the subsequent period of 1964-75, when the annual landings ranged from 27,213 t in 1965 to 51,240 t in 1974. Their percentage contribution to the total catch which was in the range of 1.75 to 2.84 during 1957-63 increased from 2.81 to 5.47 in 1964-75 period. This increase can be attributed to the introduction of increasing number of mechanised vessels since 1964.

TABLE 1. *All India total landings and landings of silverbellies during 1957 to 1975 (figures in tonnes).*

	All-India total landings	Landings of silverbellies	Percentage
1957	875,516	17,867	2.04
1958	755,994	13,208	1.75
1959	584,587	13,493	2.31
1960	879,681	16,394	1.86
1961	683,569	15,694	2.34
1962	644,244	18,268	2.84
1963	655,484	17,833	2.72
1964	859,582	28,336	3.30
1965	832,777	27,213	3.27
1966	890,311	38,020	4.27
1967	891,888	48,791	5.47
1968	934,611	38,044	4.07
1969	913,630	44,140	4.83
1970	1085,607	49,429	4.55
1971	1161,389	32,666	2.81
1972	980,049	32,392	3.31
1973	1220,240	48,168	3.95
1974	1217,797	51,240	4.21
1975	1422,693	40,237	2.83

*The catch of silverbellies in Tamil Nadu*

Tamil Nadu records higher landings of silverbellies. Table 2 shows the landings of silverbellies and total landings in Tamil Nadu for the years 1957 to 1975. The maximum landings were in 1970 (27,145 t) and the minimum in 1957 (4,720 t). Similarly, the highest percentage of silverbellies in the total catch in Tamil Nadu was recorded in 1970 (17.45) and the lowest in 1958 (4.46). During 1975, both the landings of silverbellies and their percentage declined.

TABLE 2. *Total landings and landings of silverbellies in Tamil Nadu during 1957 to 1975 (Figures in tonnes)*

	Tamil Nadu total landings	Landings of silverbellies in Tamil Nadu	Percentage
1967	79,684	4,720	5.92
1958	118,056	5,262	4.46
1959	103,497	5,128	4.95
1960	107,810	6,098	5.66
1961	123,501	6,415	5.19
1962	111,435	6,506	5.84
1963	109,482	7,008	6.40
1964	131,309	16,255	12.38
1965	99,018	9,991	10.09
1966	134,779	18,770	13.93
1967	152,497	24,107	15.81
1968	154,400	24,692	15.99
1969	151,876	22,883	15.07
1970	155,516	27,145	17.45
1971	160,619	18,918	11.78
1972	155,153	21,626	13.94
1973	182,419	22,167	12.15
1974	175,713	23,934	13.62
1975	221,215	20,171	9.12

*N.B.:* The figures for 1957 to 1964 include Pondicherry also as separate estimates for Tamil Nadu alone are not available.

*Landings of mechanised boats in Tamil Nadu*

The mechanised boats in Tamil Nadu mostly operate trawl nets and land demersal fishes like silverbellies, prawns, caphalopods etc, silverbellies being mostly the dominant catch. The landings of silverbellies and total landings by mechanised boats for the years 1971-75 in Tamil Nadu are shown in Table 3. Both the catch of silverbellies and the total catch have been fluctuating during

1971-1975 period. While the maximum total catch in mechanised boats was recorded in 1975, the minimum was in 1972. The maximum landings of silverbellies, however, was observed in 1973 the minimum being in 1974. The percentage of silverbellies was the highest in 1972 and the lowest in 1975. It is also seen that the percentage of silverbellies catch to the total catch has shown a decline from 1972 to 1975 after an increase from 1971 to 1972. This shows that the catch of silverbellies by mechanised boats in Tamil Nadu has not been uniformly increasing in proportion to the total catch.

TABLE 3. *Catch, effort and catch/effort (index of abundance) in respect of silverbellies and total landings from mechanised boats in Tamil Nadu during 1971 to 1975.*

	Silverbellies			Total mechanised landings		
	Catch, (tonnes)	Effort (man hrs.)	Catch/Effort (Kg)	Catch (tonnes)	Effort (man hrs.)	Catch/Effort (Kg)
1971	14,487 (50.48)	3365924	4.304	28,698	3365924	8.526
1972	13,854 (53.98)	2958903	4.682	25,663	2958903	8.673
1973	17,579 (53.31)	4116343	4.270	32,972	4116343	8.010
1974	13,821 (44.16)	4824429	2.864	31,297	4824429	6.487
1975	16,767 (31.55)	12159758	1.378	53,148	12159758	4.371

*N.B:* Figures in the bracket show the percentage of silverbellies to total mechanised catch.

The trends in the catch alone will not give any clear picture as the catch depends on fishing effort put in and other factors like salinity, temperature, availability of food and other environmental factors. The study on parameters of population characteristic may give some idea about the distribution pattern. For this, the fishing effort in man hours and the catch per unit effort (the index of abundance) were taken into consideration to find a relation between fishing effort and the index of abundance in respect of both total mechanised catch and the catch of silverbellies by mechanised boats in Tamil Nadu during the years 1971 to 1975. The man hours refer to the product of number of operations, trawling hours and the number of crew. The relation between fishing effort in 1000 man hours and the index of abundance (catch per unit effort in Kg) was found by using the equation of the form:

$$Y = ax^b$$

where x represents the fishing effort in 100 man hours and Y, the index of abundance in Kg.

The equations for the relation between fishing effort and the index of abundance in respect of both silverbellies and the total landings are:

$$\text{Silverbellies: } Y = 6300.6797 x^{-0.8958} \tag{1}$$

$$\text{Total landings: } Y = 512.2713 x^{-0.5072} \tag{2}$$

The relations between fishing effort and the index of abundance are shown in Fig. 1.

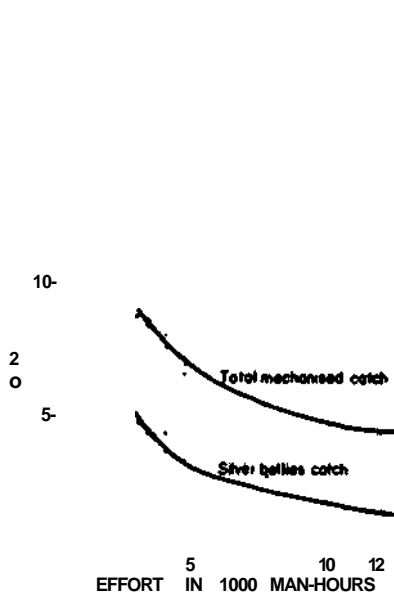


FIG. 1. The relation between effort and catch-per-unit effort of total and silverbellies landings from mechanised boats in Tamil Nahi during 1971 to 1975.

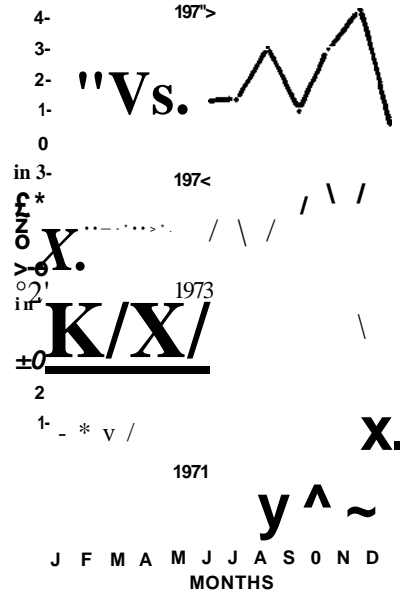


FIG 2. Monthly landings of silverbellies from mechanised boats in Royapuram (Kasimedu) zone during 1971 to 1976.

Table 3 shows the catch, effort (in man hours) and catch/effort in Kg in respect of silverbellies and total landings from mechanised boats in Tamil Nadu during 1971-75. It is seen that both catch and effort in respect of silverbellies and total landings have been fluctuating during 1971 to 1975. But the catch per unit effort has shown a steady decrease between 1972 and 1975 after a slight increase from 1971 to 1972 both in respect of silverbellies and total landings. From Fig. 1 it can be seen that the index of abundance has been steadily falling in spite of increase in the total fishing effort. From the 'b' values of the equation (1) and (2) above and from Fig. 1 it is further inferred that the fall of the slope of the curve is more steep in respect of silverbellies than in the case

of total landings. During 1975 (Table 3) in spite of the highest effort put in, both the total landings and the silverbellies recorded the lowest catch per unit effort. This shows that in spite of higher input of effort in the later years there has not been any corresponding increase in the catch of silverbellies.

LANDINGS OF SILVERBELLIES IN IMPORTANT ZONES IN TAMIL NADU

To study the monthly trends during 1971 to 1975 in the catch of silverbellies, data were collected from the important zones in Tamil Nadu, namely Royapuram (Kasimedu), Cuddalore, Porto Novo, Adirampatnam, Rameswaram and Mndapam zones where the maximum number of mechanised boats operate. The monthly catch trends for the above zones are shown in Figs. 2 to 7.

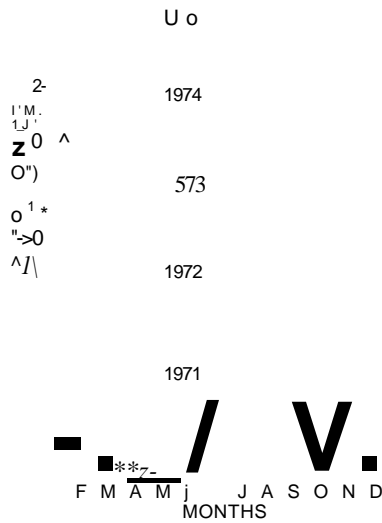


FIG. 3. Monthly landings of silverbellies from mechanised boats in Cuddalore zone during 1971 to 1975.

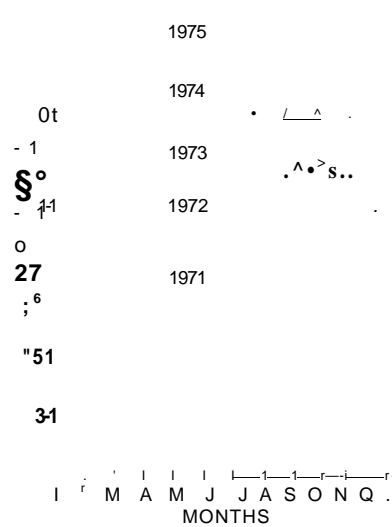


FIG. 4. Monthly landings of silverbellies from mechanised boats in Porto Novo during 1971 to 1975.

Royapuram kasimedu zone

Fig. 2 shows the monthly catch trends of silverbellies in Royapuram zone during 1971-1975. It is noticed that the maximum landings took place in this zone during September in 1971 and 1972, November in 1973 and 1975 and December in 1974, showing that the peak season for silverbellies in this zone is from September to December. But in 1972 and 1975, the landings were the lowest during December. The fishery, however, was better during November 1975 as compared to earlier years.

*Cuddalore zone*

Fig. 3 shows the monthly catch trends in Cuddalore zone during 1971-75. It is seen that there is no regular fishing season for silverbellies in this zone. During 1971, the maximum catch was obtained in July, while in 1972 to 1975 the highest landings were recorded in the months of December and January.

*Porto Novo zone*

The monthly catch trends in Porto Novo zone during 1971-75 are shown in Fig. 4. In this zone also no regular fishing season is seen for silverbelly fishery. While in 1971, the maximum landings were recorded in September, in other years (1972 to 1975) the highest catch was obtained in the months of December, October, September and March, respectively. After a record catch in September 1971, the landings have been steadily declining from 1971 to 1975.

*Adirampatnam zone*

The monthly catch trends at Adirampatnam during 1971-75 are shown in Fig. 5. Similar to Cuddalore and Porto Novo, no specific fishing season is noticed for silverbelly fishery in this zone. The maximum landings were obtained during the months of December in 1971, January in 1972, November in 1973,

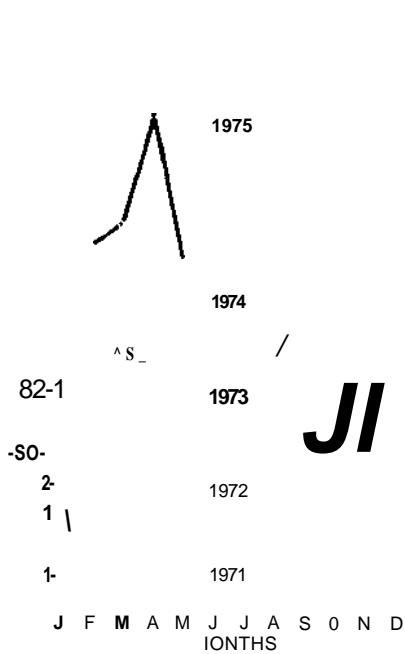


FIG. 5. Monthly landings of silverbellies from mechanised boats in Adirampatnam zone during 1971 to 1975.

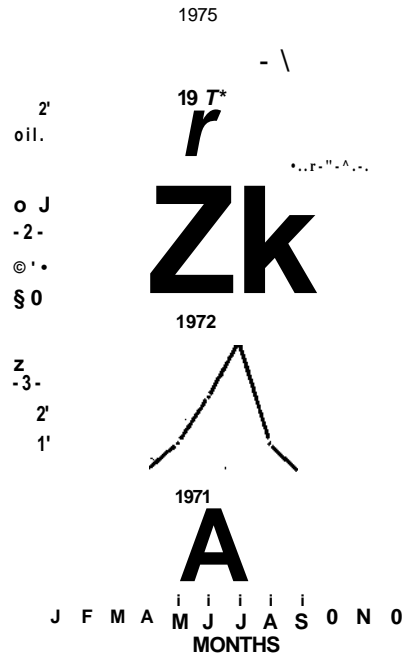


FIG. 6. Monthly landings of silverbellies from mechanised boats in Mamdapaim zone during 1971 to 1975.

September to December in 1974 and April in 1975. Unlike Royapuram, Cuddalore and Porto Novo, the intensity of landings of silverbellies in this zone was not only higher, but also the maximum, which was in 1975. This shows that a good silverbelly fishing grounds exists in this zone and there is scope for its further exploitation.

*Mandapam zone*

Fig. 6 shows the monthly catch trends of silverbellies in Mandapam zone during the years 1971-75. It is seen that the peak fishing season in the zone was in June and July. While the maximum landings were obtained in June during the years 1971 and 1973 to 1975, a bumper catch was recorded in July during 1972. The landings were fluctuating during the years 1971-1975, the lowest catch recorded being in 1975. From the trends of the catch it may be concluded that the diversification of mechanised boats for shrimp fishing at night may be one of the cause for the declining trend in the catches.

*Rameswaram zone*

The monthly catch trends of silverbellies in Rameswaram zone during the years 1971 to 1975 are shown in Fig. 7. It is noticed that after a steady increase

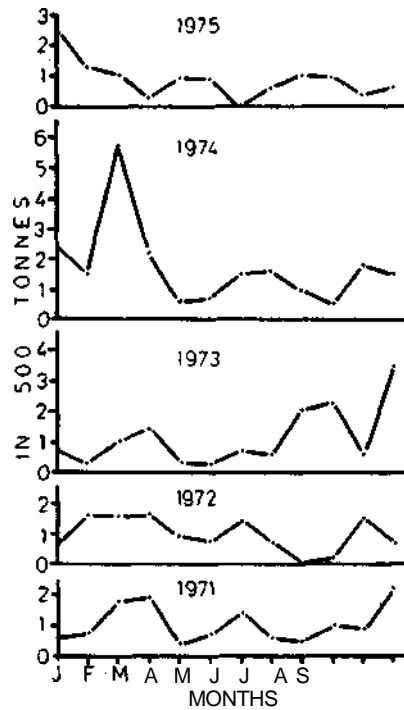


FIG. 7 Monthly landings of silverbellies from mechanised boats in Rameswaram zone during 1971 to 1975.



in the landings from 1971 to 1974, the catch declined sharply in 1975. There is no definite fishing season for this fishery in this zone. The maximum landings were obtained during the month of December in 1971. In other years, the same were obtained during the months of February to April in 1972, December in 1973, March in 1974 and January in 1975. An interesting phenomenon noticed is that after a record catch in 1974, the landings of silverbellies dwindled in 1975. This may be probably due to diversification of mechanised boats for shrimp fishing at night as is noticed in Mandapam zone.

#### CONCLUSION

Silverbellies contribute to about 3% of the total marine fish catch in India. They are landed by mechanised boats in Tamil Nadu in substantial quantities. The major mechanised-boat-operating zones are Royapuram (Kasimedu), Cuddalore, Portnovo, Adirampatnam, Mandapam and Rameswaram. The total landings of silverbellies and the corresponding effort have been fluctuating from 1971 to 1975. The relation between the index of abundance and the fishing effort reveals that the indices of abundance have fallen steadily, the fall in respect of silverbellies being sharper than the total landings. The analysis of monthly catch trend of silverbellies in the six zones reveal that excepting in Royapuram and Adirampatnam the catch declined sharply in all other zones. One of the possible reasons may be that the catch during night was generally less compared to day fishing as observed by Venkataraman and Badrudeen (1974) although higher catches of silverbellies were observed on full-moon nights than on new-moon nights.

#### ACKNOWLEDGEMENT

The authors are grateful to Dr. E. G. Silas, Director, C.M.F.R.I., Cochin and to Dr. M. S. Prabhu, and Dr. K. Alagaraja, Scientists, for their interest and encouragement in the preparation of this paper.

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