

TREND IN MARINE FISH LANDINGS OF GOA

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ABSTRACT

From the available data of last eleven years the present status of the exploited marine fishery resources of Goa has been reviewed here. To study the trends in important species orthogonal polynomial technique was used. Mackerel has shown an increasing trend till 1971 and then decreasing. Prawns, sciaenids and total catch has shown roughly an increasing trend while in the case of sardines slightly decreasing trend was observed.

Goa has a coastline of 104 km with sufficient number of creeks and estuaries providing good areas for fishing. The west coast produces nearly 75 percent of the total marine catch of the country. Like other areas of the west coast the Goa region is also sufficiently rich in fish resources (Prabhu and Dhawan, 1972; Rao and Dorairaj, 1968). Fish is a staple food of about 90 percent of the local population. According to 1971 figures the per capita availability of fish in Goa is 27 kg. With increasing mechanisation of fishing boats the quantity of marine products from India has increased by 52 percent from 1970 to 1976. The corresponding increase in the value was of the order of 255 percent (Fig. 1 and 2).

For Goa region, the data for the past 11 years, *i. e.*, from 1965 to 1975 (1975 provisional) were taken from the figures given by the Marine Products Export Development Authority, Cochin-16. For the other two years the data from the Directorate of Fisheries, Goa, were utilised. The only organisation in India which gives the production estimates of marine fish landings is Central Marine Fisheries Research Institute, Cochin. Though their estimates

are based on proper sampling technique and have low standard error for the annual estimates of the total landings of the country, the statewise figures should also be taken into account (Krishnan Kutty, Kesavan Nair and Qasim, 1973).

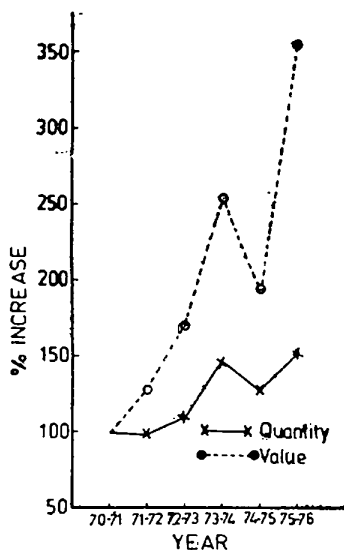


Fig. 1. Annual trends of marine products from India.

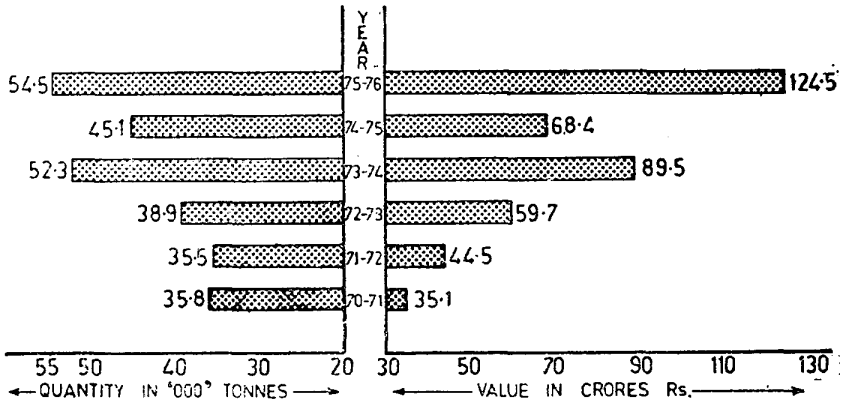


Fig. 2. Quantity and value of marine products export from India.

The percentage composition of the catch based on the average landings during the last 11 years period 1965-1975 was as follows:

TABLE I

	Average catch (in tonnes)	% concentration
1 Mackerel	13,005.27	55.0
2 Sardines	5,481.45	23.2
3 Prawns	740.82	3.1
4 Sciaenids	238.00	1.0
5 Others (Seer fish, Pomfrets, Kowals, Butter fish)	344.71	1.5
6 Miscellaneous	3,822.83	16.2

Since mackerel, sardines, prawns and sciaenids cover about 55, 23, 3 and 1 percent of the average total catch, the yearly data of these four groups along with the total catch were studied for the trend (Fig. 3).

The orthogonal polynomial technique for fitting the regressional curves was

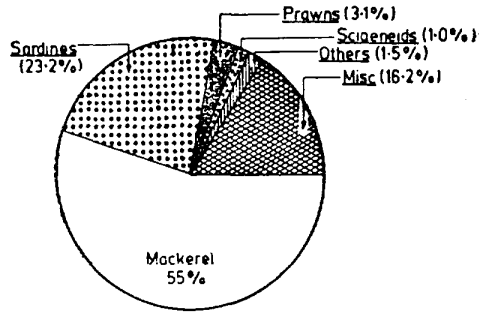


Fig. 3. Species-wise percentage composition (Goa)—based on last 11 year averages.

used. In this method if the polynomial curve is of the form

$$Y = a + bx + cx^2 + dx^3 + \dots$$

to a series of n observations at equal intervals of x , the fitted orthogonal polynomial is of the form

$$Y = A + BE'_1 + CE'_2 + DE'_3 + \dots,$$

where E'_1, E'_2 , etc are the polynomials of degree three.

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For the present study polynomial of third degree (or cubic curve) was considered for each group. The sum of squares (s.s.) for each degree of fitting were calculated and Analysis of Variance Tables were set up to decide the required polynomial. The first degree mean sum of squares (MSS) were tested against error MSS by F test. The second degree MSS were obtained by subtracting second degree SS from error SS and dividing the same by new error degrees of freedom. The method was continued for all the degrees of fitting. Significant F test has indicated the choice of degree curve as the best fit. The fitted curves are shown in Fig. 4.

Since none of the F test for first, second and third degrees were significant in the case of total catch and sardines only the first degree curves were fitted. In the case of total catch the rate of change of increase in '000 tonnes' was of the order of 0.96. The corresponding figure for sardines was -0.05 (i.e., slightly decreasing rate of change).

In the cases of the rests of the groups, viz., mackerel, prawns and sciaenids the test of significance of the quadratic curve came out to be significant at 10%, 5% and 2.5% level respectively. The F test for the third degree curve was insignificant in all the three cases hence second degree curves were considered to be the best fit. These second degree curves indicated that the rate of change in increase or decrease of catch was not constant.

It is interesting to note that the group mackerel which constitute more than half of the total marine production has shown an increasing trend up to 1971 and then decreasing trend. In the case of prawns and sciaenids the case is exactly

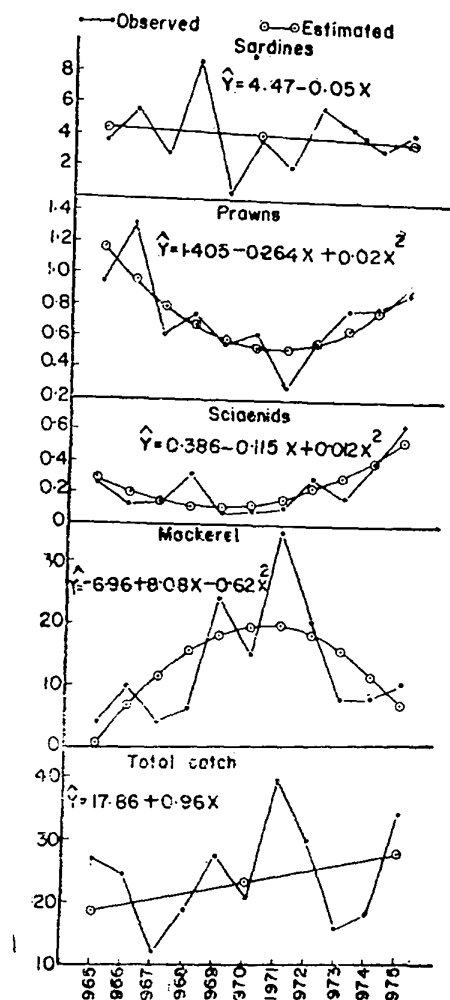


Fig. 4. Fittings of curves (figures in '000 tonnes).

reverse, i.e., decreasing trend in the beginning and then increasing. The results of sardines and total catch were insignificant. The extreme fluctuations and lack of sufficient number of years data might be the reasons for the same. Yet, it can be stated in broad sense that the

total catch has shown an increasing trend while sardines a slightly decreasing trend.

Generally, data for several years, both seasonal and monthly are required for studying the trend. Secondly, the fish catch is highly dependent on several factors such as fishing efforts and environmental condition. Hence, the basic need is the estimation of some of these parameters by

suitable sampling technique.

ACKNOWLEDGEMENT

I have great pleasure in expressing my deep sense of gratitude to Dr. S. Z. Qasim, Director, National Institute of Oceanography, Dona Paula, Goa for the constant encouragement and to Dr. M. J. George, Biology Division-Incharge, for the guidance.

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