

Survey on the Idle Capacity of Fish Processing (Freezing) Plants in India—I. West Coast

H. KRISHNA IYER, P. SRINIVASA RAO, G. R. UNNITHAN, A. K. KESAVAN NAIR
and R. G. NAIR

Central Institute of Fisheries Technology, Cochin-682 029

The extent of idle capacity in fish processing (freezing) plants estimated by stratified random sampling is reported. The estimates for 1978 and 1979 for the processing plants on the west coast of India were 76.9% and 73.2% respectively at the rate of 250 working days per annum and two shifts per day. The percentage error of estimates worked out to 6.04 for 1978 and 6.98 for 1979. Substantial under utilization of processing plants noticed in all the states accounts mainly to the non-availability of raw material (prawn), high cost of production and shortage of power.

Fish processing industry in India has registered remarkable growth during the last decade. Indian marine product export touched a record figure of 92.2 thousand tonnes during 1979 (Anon, 1979). The foreign exchange earning from marine products showed an impressive eight fold increase during 1969 to 1979, the figures being Rs. 330.7 million for 1969 and Rs. 2620.3 million for 1979 (Anon, 1979). The share of frozen prawns, lobster tails and froglegs contributed 87% in 1969 and 95% in 1979. The flourishing trend in the fish processing industry, over the years, attracted many new entrepreneurs to this field and consequently a number of prawn freezing plants with varying capacities sprang up along the coast. With the increase in fish processing factories, the total installed capacity also had increased considerably, and there were reasons to suspect large scale unutilized capacity in these plants at present due to the seasonality of the raw material. Since, large idle capacity of plants is not at all desirable for the economic functioning of any industry, especially the fish processing industry, the authors felt the need for conducting an all India survey in 1980 to estimate the extent of idle capacity in fish processing plants in India during the years 1978 and 1979, to identify the causes responsible for it and to suggest ways and means to reduce the same for the economic functioning of the plants. The findings of the survey for the different maritime states in the west coast of India are reported in this paper.

Materials and Methods

There were 275 fish processing (freezing) plants in India in 1979, processing frozen prawns, froglegs and lobster tails and occasionally squid and cuttle fish. Out of these, 181 were in the west and 94 were in the east coasts. They were stratified according to the installed capacity of 5 tonnes and below, 5 to 10 tonnes and above 10 tonnes per day. Fixing the sampling error at 20% on the total installed capacity, a sample of 93 plants were selected for the study. The technique adopted was that of stratified random sampling (Sukhatme & Sukhatme, 1970).

Data on installed capacity of the plants, actual production during the year, factors responsible for the under utilization of the plants, number of personnel employed, sources of raw material and ice and cold storage facilities available in the plants were collected from the sampled factories through personal interviews with the plant managers in each state for 1978 and 1979. The total idle capacity for each stratum was estimated using the formula,

$$\hat{Y}_h = \frac{N_h}{n_h} \sum_{i=1}^{n_h} Y_{hi}$$

where N_h is the total number of plants in the h^{th} stratum, n_h is the number of plants sampled from the h^{th} stratum and Y_{hi} is

the idle capacity of the i^{th} plant included in the sample from the h^{th} stratum. The strata estimates were pooled at the respective levels so as to get the estimates of idle capacity for each state, for east and west coasts and for India as a whole. For example, the total idle capacity for west coast as a whole was estimated as

$$\sum \hat{Y}_h$$

the summation running for all the strata in the west coast. Variance of the estimated total idle capacity of each stratum was estimated by

$$V(\hat{Y}_h) = \frac{N_h(N_h - n_h)}{n_h} \times \frac{1}{n_h - 1} \left(\sum_{i=1}^{n_h} Y_{hi}^2 - \frac{(\sum_{i=1}^{n_h} Y_{hi})^2}{n_h} \right)$$

The estimated variances separately for the states on the west and east coasts and the country as a whole were obtained by pooling the estimated strata variance at the respective levels.

The idle capacity of each sampled plant was worked out by taking the difference between the installed capacity and actual production during the year for single, double and triple shifts on a normal working day. For purposes of annual capacity estimates, a day with two shifts is considered as the normal working day with respect to many organised industries. In fish processing industry too, one with two shifts per day can be considered a normal working day. But this can be true only for plants having their own fishing boats. As all the plants do not possess their own boats, the authors have worked out the annual capacity on a single, double and triple shift basis for comparison. The number of normal working days in a year were taken to be 200 and 250, though under practical conditions, 250 days are normal with respect to many organised industries (Mensinkai, 1969). The remaining 100 days were sufficient to cover off season, work stoppages, holidays and repairs of the plants. However, considering the availability of raw material for processing and the processing practices existed in different states, the estimates of idle capacity were worked out by taking 200 and 250 normal working days in a year.

The percentage error of estimates for the states, west and east coasts and India as a whole were worked out using the formula,

$$\sqrt{\frac{\sum V(\hat{Y}_h)}{\sum \hat{Y}_h}} \times 100$$

the summation running over all the strata at the respective levels. The percentage idle capacity was worked out by taking the ratio of the underutilised capacity to the installed capacity for single, double and triple shifts.

Results and Discussion

The estimates of installed capacity, idle capacity and the percentage error of estimates worked out for the different states on the west coast are presented in Table 1, for all the three shifts and for 200 and 250 working days in a year for 1978 and 1979. The total installed capacity of all the plants with single, double and triple shifts for 250 working days were 110.4, 220.7 and 331.1 thousand tonnes in 1979 while the estimated total production during the year was 59.3 thousand tonnes (Table 1). The percentage idle capacity for the three shifts (250 days) were 54, 77 and 85 during 1978 as against 46, 73 and 82 during 1979. The percentage error of estimates of idle capacity in 1978 and 1979 for double shift with 250 working days were 6.04 and 6.98 respectively, indicating the reliability of the estimates. Table 2 gives the percentage idle capacity in different stratum for the west coast states in 1978 and 1979.

Kerala

Kerala, on the west coast has the maximum number of freezing factories and is the pioneer state to begin export of frozen prawns. The industry flourished here for quite a number of years. Kerala with a coast line of 560 km had 104 (57% of the total fish processing factories on the west coast) factories in 1979. Of these, 69 were

below 5 tonnes, 19 were between 5 to 10 tonnes and 16 over 10 tonnes of daily capacity. 16 plants were sampled for the study. The total installed capacity of all the plants in the state estimated were 56.1, 112.1 and 168.2 thousand tonnes respectively for single, double and triple shift for 250 working days in a year (Table 1). The total estimated production for all the plants was 27.5 thousand tonnes in 1978 and 29.1 thousand tonnes in 1979. The estimates of unutilised capacity of the plants in double shifts were 84 (for 1978) and 83 thousand tonnes (for 1979) for 250 working days. The percentage idle capacity worked out for the three shifts with 250 working days were 48.0, 74.0 and 82.7 respectively in 1979. It could be seen from Table 1 that only 26% of the installed capacity was utilised in this state during 1979 (250 working days with 2 shifts per day). The brake up figures in different strata (Table 2) showed that idle capacity was comparatively low in plants of 5 to 10 tonnes capacity for both the years. A majority of the plants in Kerala (66%) were under 5 tonnes, mostly of 2 to 2.5 tonnes per day. This small sector had to face strong competition in the procurement of raw material (prawn). The unsteady foreign markets and unsound financial position made them unable to compete with bigger entrepreneurs resulting in substantial under utilisation of plants under 5 tonnes capacity. Bigger plants (above 10 tonnes) were unable to procure sufficient raw material owing to its scarcity. The major factors responsible for the idle capacity of plants in Kerala as per the survey were nonavailability of raw material (prawn), high cost of production, labour problems and frequent power failures. The percentage error of estimates for double shifts with 250 working days in 1978 and 1979 were 8.70 and 8.65 respectively, indicating the reliability of the estimates.

Karnataka

Karnataka has a coast line of 270 km and there were 29 fish processing plants in 1979 (16% of the total on the west coast). Of these, 18 are below 5 tonnes, 9 are 5 to 10 tonnes and 2 are above 10 tonnes capacity. 10 plants were sampled for the study. The estimated annual installed capacity of these plants (Table 1) during 1979 for single, double and triple shift were 11.2

22.4 and 33.6 thousand tonnes for 200 working days and the corresponding figures for 250 working days were 14.0, 28.0 and 42.0 thousand tonnes. The estimated production during 1979 was 5.7 thousand tonnes. The estimates of idle capacity for the three shifts in 1978 were 9.3, 23.9 and 37.3 thousand tonnes and the corresponding figures in 1979 were 8.3, 22.3 and 36.3 thousand tonnes based on 250 working days. Compared to 1978 there was slight decrease of idle capacity in 1979. On the basis of double shift and 250 working days in a year, only 20% of the installed capacity was utilised in 1979. The percentage idle capacity in different strata (Table 2) showed that idle capacity was comparatively less in plants under 5 tonnes capacity for all the three shifts of 200 and 250 working days. The causes for under utilisation of the plants in this state as revealed by the survey were nonavailability of raw material and the high cost of production. The percentage error of estimates of idle capacity for 250 working days with double shift in 1978 and 1979 were 8.61 and 7.88 respectively.

Goa

There were 8 fish processing plants functioning along the 110 km coast line of Goa in 1979. 6 were under 5 tonnes and 2 were 5 to 10 tonnes capacity and 5 were sampled for the study. The estimated annual installed capacities for single, double and triple shift with 250 working days in 1979 were 3.7, 7.3 and 11.0 thousand tonnes while the total production was 2.7 thousand tonnes. The percentage idle capacities estimated for the 3 shifts were respectively 27.2, 63.6 and 75.7 (Table 1). Compared to other states on the west coast, idle capacity was less in Goa, because a part of the raw material for the plants were supported by the catches of Zuary and Mandhovi rivers. Among the plants in different strata (Table 2), plants below 5 tonnes had comparatively less idle capacity, 49.7% in 1978 and 50.2% in 1979 for double shift with 250 working days. Non availability of raw material and high cost of production were the major factors contributing to the idle capacity of plants in this region. The percentage error of estimates in 1978 and 1979 for double shift with 250 working days were

Table 1. Annual installed capacity and the rate of unutilised capacity (in thousand tonnes) in 1978 and 1979 for different states

	Single shift				Double shift				Triple shift			
	200 days		250 days		200 days		250 days		200 days		250 days	
	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979
Kerala												
a) Annual installed capacity	44.9	44.9	56.1	56.1	89.8	89.8	112.1	112.1	134.7	134.7	168.2	168.2
b) Estimated idle capacity	17.4	15.8	28.6	26.9	62.3	60.7	84.0	83.0	107.2	105.6	139.4	139.1
c) % idle capacity	38.8	35.1	50.9	48.0	69.4	67.6	74.9	74.0	79.6	78.4	82.9	82.7
d) % error of estimates	34.5	36.2	21.6	21.6	10.9	10.9	8.7	8.7	7.3	7.3	6.3	6.3
Karnataka												
a) Annual installed capacity	11.2	11.2	14.0	14.0	22.4	22.4	28.0	28.0	33.6	33.6	42.0	42.0
b) Estimated idle capacity	6.5	5.5	9.3	8.3	17.7	16.7	23.9	22.3	28.9	27.9	37.3	36.3
c) % idle capacity	58.4	49.2	66.8	59.3	79.2	74.6	85.3	79.7	86.1	83.1	88.9	86.4
d) % error of estimates	22.6	27.2	16.6	18.5	10.2	10.8	8.6	8.9	7.7	7.9	6.9	7.0
Goa												
a) Annual installed capacity	2.9	2.9	3.7	3.7	5.9	5.9	7.3	7.3	8.8	8.8	11.0	11.0
b) Estimated idle capacity	1.5	0.3	2.5	1.0	4.4	3.2	5.9	4.7	7.3	6.1	9.5	8.3
c) % idle capacity	49.7	9.0	67.7	27.2	74.9	54.5	79.9	63.6	83.3	69.6	86.5	75.7
d) % error of estimates	17.7	*	10.0	22.2	4.8	6.3	3.2	3.6	2.3	3.3	1.4	2.0
Maharashtra												
a) Annual installed capacity	22.1	22.1	27.8	27.8	44.3	44.3	55.5	55.5	66.6	66.6	83.2	83.2
b) Estimated idle capacity	7.9	4.4	14.5	10.1	29.9	26.6	41.0	37.8	52.0	48.9	68.5	65.6
c) % idle capacity	35.6	20.0	52.1	36.4	67.6	60.1	73.8	68.2	78.1	73.5	82.4	78.8
d) % error of estimates	40.8	*	24.4	52.9	18.5	25.4	16.8	20.9	15.9	18.6	15.1	16.8
Gujarat												
a) Annual installed capacity	7.1	7.1	8.9	8.9	14.2	14.2	17.8	17.8	21.3	21.3	26.6	26.6
b) Estimated idle capacity	3.9	3.0	5.7	4.8	11.0	10.1	14.5	13.6	18.1	17.2	23.4	22.5
c) % idle capacity	54.8	42.1	63.8	53.7	77.4	71.1	81.9	76.9	84.9	80.7	87.9	84.6
d) % error of estimates	—	—	—	—	—	—	—	—	—	—	—	—
West coast as a whole												
a) Annual installed capacity	88.2	88.2	110.4	110.4	176.4	176.4	220.7	220.7	264.6	264.6	331.1	331.1
b) Estimated idle capacity	37.1	28.9	59.3	51.1	125.3	117.1	169.7	161.4	213.5	205.3	280.0	271.8
c) % idle capacity	42.1	32.8	53.7	46.3	71.1	66.4	76.9	73.2	80.7	77.6	84.6	82.1
d) % error of estimates	18.8	27.0	12.3	17.9	7.1	7.7	6.0	7.0	5.4	5.6	4.9	5.3

* In some of the freezing plants, the actual production exceeded the installed capacity for single shift.

Table 2. *Statewise percentage idle capacity in different strata for 1978 and 1979*

	Shifts	1978						1979					
		200 days			250 days			200 days			250 days		
		U/5	5/10	10 up	U/5	5/10	10 up	U/5	5/10	10 up	U/5	5/10	10 up
Kerala	1	38.7	Nil	75.6	50.9	9.5	80.4	21.6	1.2	76.0	37.0	20.9	80.8
	2	69.4	43.1	87.8	74.1	54.7	90.2	60.8	50.7	88.0	68.6	60.4	90.4
	3	79.6	62.4	91.9	81.8	69.8	93.5	73.9	67.1	92.0	79.1	73.6	93.6
Karnataka	1	37.6	69.6	91.2	50.2	75.7	92.9	40.8	42.6	87.6	52.7	54.1	90.1
	2	68.8	84.8	95.7	79.2	87.9	96.5	70.4	71.3	93.8	76.3	77.0	95.1
	3	79.2	89.9	97.1	83.4	91.9	97.7	80.3	80.9	95.9	84.2	84.7	96.7
Goa	1	24.3	73.0	—	32.8	78.4	—	Nil	67.4	—	0.5	73.9	—
	2	45.5	86.5	—	49.7	89.2	—	37.8	83.7	—	50.2	87.0	—
	3	52.5	91.0	—	55.4	92.8	—	58.5	89.1	—	66.0	91.3	—
Maharashtra	1	46.0	24.8	37.4	56.8	56.9	49.5	47.3	7.9	18.6	57.9	26.3	35.5
	2	72.9	62.4	68.1	78.5	69.9	74.3	73.7	53.9	59.7	78.9	63.1	67.8
	3	81.9	75.0	78.4	85.7	79.9	82.6	82.4	69.3	73.1	85.9	75.4	78.5
Gujarat	1	—	70.6	50.4	—	76.5	60.3	—	44.2	41.5	—	55.4	53.2
	2	—	85.3	75.2	—	88.3	80.2	—	72.1	70.8	—	73.7	76.6
	3	—	90.2	83.5	—	92.2	86.8	—	81.4	80.5	—	85.1	84.4
West coast as a whole	1	39.1	20.4	57.9	51.2	36.4	66.4	24.7	16.3	49.4	39.7	33.1	59.6
	2	69.6	60.2	78.9	75.6	68.2	83.2	62.3	58.2	74.7	69.8	66.5	79.8
	3	79.7	73.5	86.0	83.7	78.8	88.8	74.8	72.1	83.1	79.9	77.7	86.6

respectively 3.23 and 3.63 indicating the reliability of the estimates.

Maharashtra

Maharashtra has a coast line of 600 km and there were 32 fish processing plants in the state during 1979. Out of these, 11 were under 5 tonnes, 10 were 5 to 10 tonnes and 11 were above 10 tonnes capacity and 9 were sampled for the study. The estimated installed capacity of all the plants for single, double and triple shifts during 1979 for 250 working days were 27.8, 55.5 and 83.2 thousand tonnes (Table 1) respectively while the production estimate for the year was 17.7 thousand tonnes. The estimates of idle capacity for the 3 shifts in 1979 were respectively 10.1, 37.8 and 65.6 thousand tonnes and the percentage idle capacity were 36.4, 68.2 and 78.8 respectively. Compared to 1978 (Table 1) there was an improvement in capacity utilisation in 1979 due to improved prawn landing in this state. Next to Goa, Maharashtra showed less percentage idle capacity in all the 3 shifts. Among different strata (Table 2), plants of 5 to 10 and above 10 tonnes showed less percentage idle capacity. The major factors contributing to the idle capacity of plants in this state were also nonavailability of raw material, high cost of production and power shortage. The percentage of estimates for 1978 and 1979 for double shift with 250 working days were 16.79 and 20.85 respectively.

Gujarat

Gujarat with maximum coast line of 1500 km had 8 fish processing plants in 1979 and all were surveyed for the study. Of the 8, three were 5 to 10 and 5 above 10 tonnes capacity. The installed capacity of all the plants during 1979 for the 3 shifts with 250 working days were 8.9, 17.8 and 26.6 thousand tonnes (Table 1) respectively while the production during the year was 4.1 thousand tonnes. The percentage idle capacity of the plants for the 3 shifts (250 days) were respectively, 53.7, 76.9 and 84.6 in 1979. Compared to 1978, there was a slight improvement in capacity utilisation in 1979, due to improved prawn catch during the year. The stratumwise figures (Table 2) of percentage idle capacity

showed that plants of above 10 tonnes had less idle capacity in all the shifts with 200 and 250 working days. The reasons for underutilization of plants in this state were nonavailability of raw material, shortage of power and shortage of potable water.

Table 3. *Factors responsible for under-utilisation of plants*

Factors	% of plants reported in the sample
Nonavailability of raw material	89.6
High cost of production	52.1
Frequent power failures/shortage	29.1
Labour troubles	16.7
Unsteady foreign markets	10.4
Shortage of potable water	10.4
Cut throat competition for procuring the raw material	8.3
Shortage of ice	8.3
Lack of transport facilities	8.3
Lack of cold storage facilities	6.3
Investment in holding the material upto shipment	2.1
Delay in getting the purchase order.	2.1

Thus it is evident that there existed considerable extent of idle capacity of fish processing plants in the west coast of India and it was 76.9% in 1978 and 73.2% in 1979 for double shift with 250 working days (Table 1). The slight improvement in the utilized capacity in 1979 was mainly due to the freezing of squids, cuttle fish and fresh fish by a few plants in this coast.

A list of factors responsible for the large idle capacity of the plants in the west coast were presented in Table 3. It is evident that nonavailability of raw material was the main contributing factor for the substantial underutilization of plants. High cost of production, shortage of power and frequent power failures were other major

factors. Based on the answers to the questionnaire furnished by the processors, the following are a few recommendations which may help to reduce the idle capacity of the fish processing plants in the west coast.

1. Promoting mass aqua culture of prawn to meet the raw material scarcity.
2. Diversification of products.
3. Subsidy to diesel oil for fishing boats.
4. Improvement in shipping facilities.
5. Liberalisation of bank loans for small processors.
6. A check on issuing licence to new entrepreneurs.
7. Abolition of purchase tax on raw material
8. Mesh regulation in trawl nets.

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