



Research Article

Export performance of chilled pomfret from India

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ARTICLE CHRONICLE :

Received:
06.08.2012;

Revised :
15.08.2012;

Accepted:
16.09.2012

SUMMARY : Chilled seafood is preferred by consumers over frozen products as they are being the closest in freshness and quality to landed catch. Chilled pomfret is an important export product of 'chilled items', one of the 12 major export item groups of marine products exported from India. The export performance of chilled pomfret was analysed by studying the graphical trend, percentage contribution, compound growth rate analysis, instability index, and direction of trade. Singapore was the major buyer in terms of export quantity taking more than half the average production (57%), followed by Malaysia (21%) and Kuwait (11%). The growth rate of chilled pomfret in export quantity to Singapore was negative (-7.40%) and was significant. The instability index of export quantity and real value was moderate to high among the major countries. Direction of trade analysis revealed that only Kuwait had a high probability of retention of previous market share (0.7234). There appeared to be diversion of raw material to newer products. Measures must be taken to increase chilled pomfret exports by regaining Singapore market and exploring new markets.

How to cite this article : David, J. and Nayak, V.N. (2012). Export performance of chilled pomfret from India. *Agric. Update*, 7(3&4): 258-265.

KEY WORDS:

Export performance,
Chilled pomfret,
Growth rate,
Instability index,
Direction of trade

BACKGROUND AND OBJECTIVES

Fresh and chilled seafood became commonly available at distant markets starting from the 1990's with the advent of liberalization and is synonymous with air shipped cargo. Developments in the aviation industry coupled with improvements in packaging and transportation of fish increased the movement of chilled seafood worldwide. The advent of lower cost wet-lock boxes and gel ice enabled attainment of better safety and quality standards in chilled seafood transport. The establishment of cold chain facilities for transshipment and holding facilitated maintenance of quality. Individual major airlines now carry hundred of thousands of tons of seafood every month, and each airline and country has developed their own standards and regulations for seafood cargo transport. The time lines for shipping fresh/ chilled seafood are narrow and tight schedules must be maintained from landing fish catch to packing to shipment in order to maintain prompt delivery and quality.

Chilled seafoods are the natural second preference, after fresh sea food, of consumers in

all countries. These products are closest in freshness and quality to landed catch. They are also the lowest by way of cost of production. Generally, pre-chilled (0°C) fish are packed in insulated wet-lock 3.8 inch styrofoam boxes with gel ice packs to maintain quality and temperature for a minimum of 21 hrs. Wet ice and dry ice may also be used if permitted by the carrier. Fish are sometimes frozen and then packed in ice to arrive in chilled condition. Boxes and products during shipment are to be held in low temperature (below + 5°C only). The fish may be re-iced after receiving to maintain temperature and quality. But their method of packing and holding calls for dispatch by the fastest transport, which generally means air transport. Air freight is the costliest, thereby adding to the final cost of product. Fortunately, the profusion of airlines with high frequency of passenger-cargo flights to diverse locations - many of them non-stop, the resulting competition, and the realization that chilled seafood is a profitable cargo has made rates and distances economical. Individual guidelines and regulations of the carriers and importing countries have to be adhered to, such as detailed in various

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publications, for example in APEC (1999). In India, the Export Council of India (EIC) is the official export certification body which issues the guidelines and regulations and a certificate from its arm - the Export Inspection Agency (EIA) is a requirement for shipment (EIC, 2012 a, EIC, 2012 b, and EIC, 2012 c). Chilled Items from India have wide appeal and are despatched from India to markets such as Canada and U.S.A. to the west countries, to Hong Kong and Japan in the east, Russia in the north, and to Australia in the south. Within the EU, some of the regular buyers of Chilled Items are U.K., Spain, France and Germany.

Pomfrets is a general name given to a large group of fishes belonging to several families found in the coastal waters off the America, Western Africa and Indo-Pacific. They are prized for their low fishy odour, white flesh and soft 'buttery' texture and are commonly marketed as butterfishes. Pomfrets are export quality food fishes, contributing on an average 1.7 to 3.5% annually to the all-India marine fish landings but support a lucrative and commercially important fishery along the coasts of India (Sivakami *et al.*, 2003). Pomfrets as a group are among a handful of very high value fishes caught in India.

Chilled pomfret is one of India's main marine export items among the products of the major export item group of chilled items and was recorded only from 1995. Keeping this background in view, the export performance of chilled pomfret in the post liberalisation period 1995-2008 was analysed by studying the graphical trend, percentage contribution, compound growth rate analysis, instability index, and direction of trade.

RESOURCES AND METHODS

Secondary data was used in the analysis. The data on destination wise export quantity and value of chilled pomfret was compiled from the (yearbook) publication "Statistics of Marine Products Exports" for several years, published by the Marine Products Export Development Authority (MPEDA), (Ministry of Commerce and Industry, Government of India) Kochi. The export real values were obtained by deflating nominal values with the Wholesale Price Index. Data was available for the post liberalisation period 1995-2008. The following analysis was carried out:

Graphical trend in export quantity and export value:

A graphical plot of the export quantity and export value against time (years) for the leading countries was used to ascertain the general trend in export of chilled pomfret. The trend of chilled pomfret against the parent major export item group of chilled items was also examined.

Percentage contribution to export quantity and export value:

The simple average of the export quantity and value for the time periods considered for chilled pomfret was used to

get the share percentage of the leading countries exported to. The total period 1995-2008 was considered as post lib period and the period 2004-2008 as the recent period. The percentage contribution of chilled pomfret to the parent major export item group of chilled items was also examined.

Compound growth rate in export quantity and export value:

The growth of exports to the 12 major export item groups was analyzed using the exponential growth function of the form,

$$Y = ab^t e^u \quad \dots(1)$$

where, y = dependent variable for which growth rate is to be estimated (quantity exported and value realized)

a = intercept, b = regression coefficient, t = time variable, e = error coefficient, and u = disturbance term

The compound growth rate was obtained from the logarithmic form of the equation (1) as follows:

$$\text{Log } y = \text{Log } a + t \text{ Log } b \quad \dots(2)$$

Thus, the per cent compound growth rate (g) was computed using the relationship:

$$g = (\text{Antilog of } b - 1) \times 100 \quad \dots(3)$$

A total of 29 countries had a record of purchase of chilled pomfret from India during 1995-2008. Of these only seven countries were identified to be major and regular buyers and were selected for analysis.

Instability index in export quantity and export value:

In order to study the variability in the export quantity and export value of chilled pomfret exported over the years, an index of instability was developed as a measure of variability. The formula suggested by Cuddy and Della Valle (1978) was used to compute the degree of variation around the trend, *i.e.*, the coefficient of variation was multiplied by the square root of the difference between the unity and coefficient of multiple determinations (R^2) to obtain the Instability Index.

$$\text{Index instability} = \frac{\text{Standard deviation } (\dagger)}{\text{Mean } (X)} \times 100 \times \sqrt{1-R^2} \quad \dots(4)$$

where, R^2 = Co-efficient of determination

A high degree of instability index signifies large variations in the export of chilled pomfret. The seven countries identified to be major and regular buyers were selected for analysis.

Direction of trade in export quantity for the period 2004-2008:

In the present study, the changes in the export of chilled pomfret to different countries were analyzed by employing a first order finite Markov chain model which captures the net effect in changes in the export of the marine product over a

period of time. Markov chain analysis involves developing a transitional probability matrix 'P' which is central to the method. The matrix has elements, P_{ij} , which indicate the probability of exports switching from country 'i' to country 'j' over time. The diagonal element P_{ij} , where, $i=j$, measures the probability of a country retaining its market share or in other words, the loyalty of an importing country to a particular country's exports.

The assumption was that the average export of chilled pomfret from India amongst importing countries in any period depends only on the export in the previous period and this dependence is same among all the periods. This is algebraically expressed as:

$$E_{jt} = \sum_{i=1}^n [E_{it} - 1]P_{ij} + e_{jt} \quad \dots(5)$$

where,

E_{jt} = exports from India to the jth country during the year t.

E_{it-1} = exports to ith country during the period t-1.

P_{ij} = probability that the exports will shift from ith country to jth country.

e_{jt} = the error term which is statistically independent of E_{it-1}

t = number of years considered for the analysis

n = number of importing countries

The transitional probabilities P_{ij} which can be arranged in a (columns x rows) matrix have the following properties:

$$\sum_{j=1}^n P_{ij} = 1 \text{ for all } i \text{ and } 0 \leq P_{ij} \leq 1,$$

There are several approaches to estimate the transitional probabilities of the Markov chain model such as un-weighted restricted least squares, weighted restricted least squares, Bayesian maximum likelihood, unrestricted least squares, etc. In the present study, Minimum Absolute Deviations (MAD) estimation procedure was employed to estimate the transitional probability, which minimizes the sum of absolute deviations. The conventional linear programming technique was used, as this satisfies the properties of transitional probabilities of non-negativity restrictions and row sum constraints in estimation.

The linear programming formulation is stated as

Min $OP^* + Ie$

subject to: $XP^* + V = Y$; and $GP^* = 1$ and $P^* = 0$

where,

0 - is the vector of zeroes,

P^* - is the vector in which probability P_{ij} are arranged.

I - is an appropriately dimensioned vector of areas.

e - is a vector of absolute errors.

Y - is the vector of export to each country.

X - is the block diagonal matrix of lagged values of Y

V - is the vector of errors

G - is the grouping matrix to add the row elements of P arranged in P^* to unity.

Direction of trade was examined only for the variable export quantity using the annual data of chilled pomfret exports. Direction of trade analysis was conducted for 8 selected countries for 5-year term in the post-lib 2004-2008 period. The major importing countries considered were selected based on average export quantity for the period under study. Based on this average, the top eight purchasing countries for the stated period were selected and arranged in descending order of tonnage purchased. Taiwan with large purchases in the period 2005-2008 was included for analysis of direction of trade, in addition to the seven countries identified as major buyers, for a total of eight countries. Sixteen Countries had no purchase over 2004-2008. 'Others Countries' was therefore made up of five minor countries.

OBSERVATIONS AND ANALYSIS

The results obtained from the present investigation have been discussed in the following sub heads:

Graphical trend in export quantity and export value:

Singapore was the bulk purchaser of chilled pomfret with a country maximum export quantity of 1,135.1 tons and maximum export nominal value of Rs.180.65 millions in the year 2000 but which declined thereafter to 251.4 tons in 2008 (Fig. 1 a). The overall picture of export trend was that the pattern for total countries mirrored the growth and fall of Singapore, except marginally over 2007-2008. Malaysia was the next leading market with more steady purchases but with far lower quantities, as may be gauged from the maximum purchase of only 296.2 tons in 1996. Kuwait was the other large buyer with 350.5 tons and nominal value Rs.102.2 millions in 2008 and was the leading market for that year. Japan, Hong Kong, UAE and Thailand were smaller buyers.

In just two years, the total exports of chilled pomfret have risen dramatically from an all-time low of about 496 tons in 1998 to an all-time high of 1,873.6 tons in 2000, a more than three and a half fold increase in quantity. Total exports were below 1000 tons from 2003 ending at only 887 tons in 2008 with (nominal) value of Rs.263 millions, a steep fall in quantity to less than half its maximum exports in 2000. The exports to other countries was very less as only a few countries take chilled pomfret. The trend in export real value can be seen in Fig. 1 b, which generally matches that seen for export quantity. The unit (nominal) value of realization was only Rs.296.39 in 2008 for chilled pomfret alone, whereas in the domestic market fresh pomfret fetched not less than Rs.350 per kg in 2008. The reasons for low export prices are not clear, but higher prices

should be sought.

Chilled pomfret is a much sought after product world wide. In the present study, the major influence of Singapore market is evident in the trend of total countries closely following the trend of Singapore in export of chilled pomfret by quantity and value. South East Asia was a better market region with purchases by Singapore, Malaysia, Thailand, followed by the Middle East with Kuwait and U.A. E., and the far east region with Japan and Hong Kong.

Percentage contribution to export quantity and export value:

For the post lib period, on an average, Singapore was the major buyer in terms of export quantity taking more than half the production (57%), followed by Malaysia (21%), Kuwait (11%), Japan (3% and Hong Kong (3%). U.A.E. and Thailand were smaller markets (Fig 3). In the recent period 2004-2008, the pattern was similar but the share of Singapore decreased marginally while that of Malaysia increased.

The share pattern of export real value realization was similar to that in export quantity. Value realization appeared to be lower from Singapore in relation to the export quantity in both periods considered, whereas, in contrast Malaysia showed relatively higher value contribution considering the

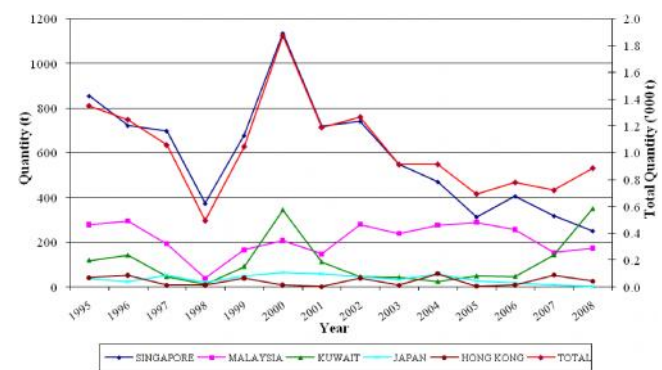
quantities lifted for both total and recent period. This may be due different size grades preferred in the two markets.

Compound growth rate in export quantity and export value:

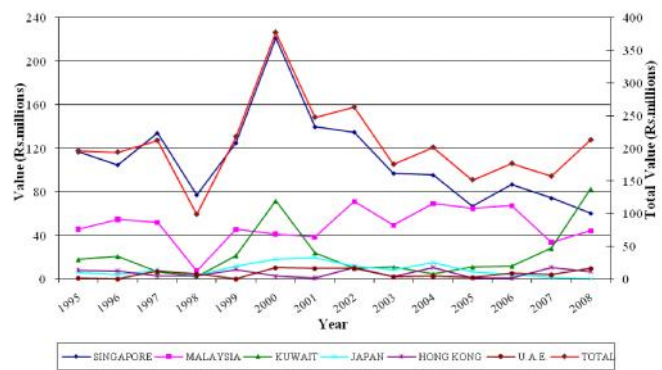
The growth rate of chilled pomfret in export quantity of Singapore, the largest importer, was negative (-7.40%) (Table 1). The growth rate of Japan, a smaller importer, was also negative (-13.76%), and was significant. The growth of Malaysia (1.52%) and Kuwait (2.17%), Hong Kong (-1.20%) and Total Countries (-3.16%) was low to negative but not significant.

The growth rate in export real and nominal value was analysed but only real value rate are discussed here and those of nominal values are presented for comparison (Table 1). The growth rate of Singapore in export real value also was negative (-4.53%), and significant. Growth in U.A.E. (31.06%) and Thailand (38.25%) was moderate but not significant. Total countries showed a negative rate (-0.56%), but was not significant.

The reasons for the fall in the market of Singapore are not clear, but possibly the nation is sourcing the product from neighbouring nations at a better bargain. Efforts should be made address the challenges be it price, safety, quality or

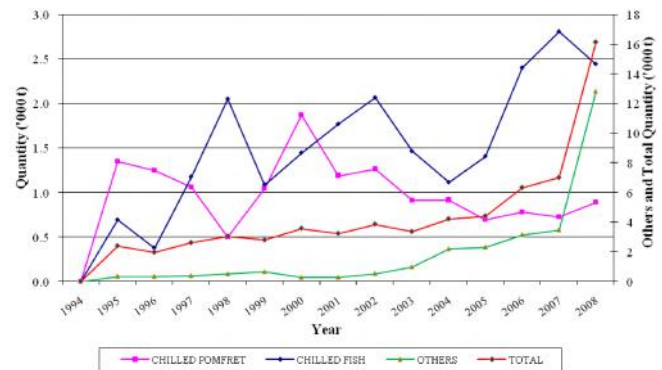


(a) Chilled pomfret : Export quantity

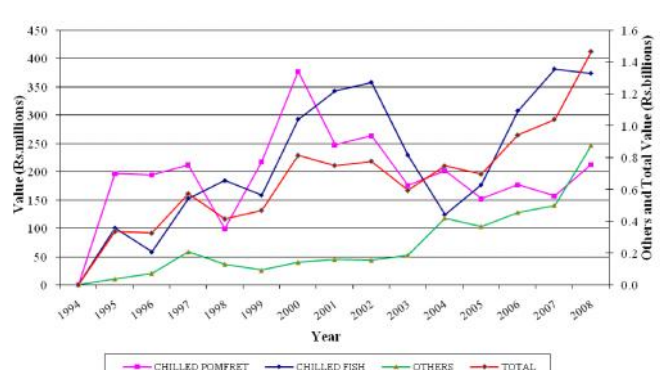


(b) Chilled pomfret : Export real value

Fig. 1 : Chilled pomfret: (a) export quantity (tons), and (b) export real value (Rs.millions) for major countries for the total period 1995-2008



(a) Chilled pomfret : Export quantity



(b) Chilled pomfret : Export real value

Fig. 2 : Chilled items: (a) export quantity (tons), and (b) export real value (Rs.millions) for the total period 1994-2008

other issues, and to regain the markets. The better revenue from Malaysia makes it an attractive alternative to be pursued. Also, efforts to increase exports to the promising nearby markets in the Middle East of Kuwait and U.A.E. should be taken up.

Instability index in export quantity and export value:

The instability index of export quantity was noticeable in case of Kuwait, a regular importer, with a higher level (95.54%) (Table 1). The instability in export quantity was moderate in case of Singapore (29.01%) and Malaysia (34.13%) and total countries (30.53%), whereas, Hong Kong (78.46%) and U.A.E. (74.94%) showed a high level of instability.

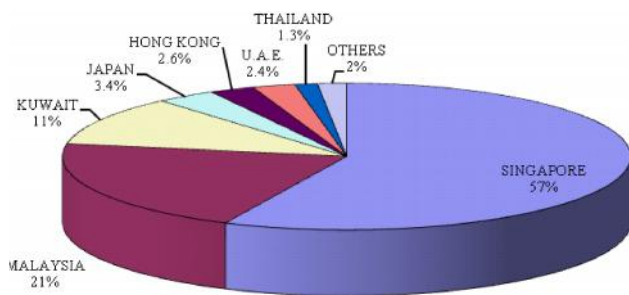
The instability index in real value is discussed here and the index in nominal value is presented for comparison (Table 1). Stability in export real value was relatively moderate and higher for the major countries of Singapore (31.34%), Malaysia (33.50%), Kuwait (101.60%), Japan (63.52%) and Hong Kong (74.76%). The instability index of export real value was moderate in case of U.A.E. (28.26%) and Thailand (28.92%) indicating variations in export. Instability in export real value of total countries was moderate (30.98) matching that in export

quantity.

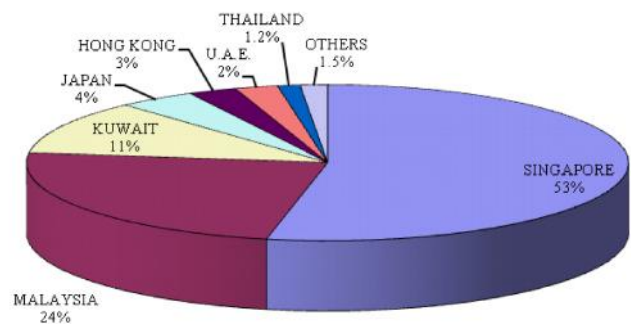
Overall, the major countries showed moderate to high instability in exports. Compared to the catches of pomfrets landed, the export quantities are very low. Realizing the importance of chilled fish exports in increasing the contribution of chilled items to total export value, MPEDA offers financial assistance for creation of basic facilities (new) for chilled fish as an export promotion measures (MPEDA, 2008). Such measures will promote chilled items exports and contribute to reducing fluctuations in exports.

Direction of trade in export quantity for the period 2004-2008:

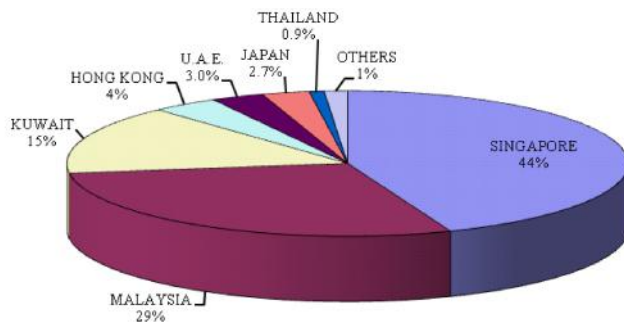
In the post lib period 2004-2008 for direction of trade in chilled pomfret, only Kuwait revealed a high probability of retention of previous market share (0.7234), with small probability of loss to U.A.E. (0.2555) and high probabilities of gain from Hong Kong (1.000), U.A.E. (1.000), and Thailand (0.8808) (Table 2). The dominant market of Singapore showed only a low probability of market share retention (0.2541), with substantial probability of loss to Malaysia (0.6443) and high probability of market share gain from Malaysia (0.9757). The



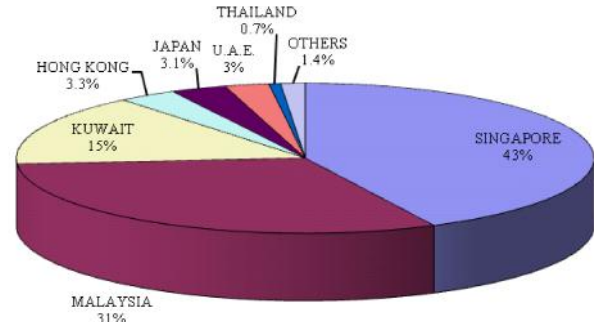
(a) Chilled pomfret : Export quantity average post lib period 1995-2008



(a) Chilled pomfret : Export real value average post lib period 1995-2008



(b) Chilled pomfret : Export quantity average 2004-2008



(b) Chilled pomfret : Export real value average 2004-2008

Fig. 3 : Chilled pomfret: percentage share in average export quantity (tons) for major countries for (a) post lib period 1995-2008, and (b) recent period 2004-2008

Fig. 4 : Chilled pomfret: percentage share in average export real value (Rs.millions) for major countries for the (a) post lib period 1995-2008, and (b) recent period 2004-2008

Table 1 : Chilled pomfret: growth rate and instability index for export quantity (kg) and export value (Rs.) for the post lib period 1995-2008

Country	Export quantity		Export real value		Export nominal value	
	Growth rate (%)	Instability index (%)	Growth rate (%)	Instability index (%)	Growth rate (%)	Instability index (%)
Singapore	-7.40***	29.01	-4.53**	1.56	0.33 ^{NS}	32.40
Malaysia	1.53 ^{NS}	34.13	3.34 ^{NS}	3.09	8.60**	35.93
Kuwait	2.17 ^{NS}	95.54	5.95 ^{NS}	5.77	11.34 ^{NS}	111.49
Japan	-13.76**	46.91	-10.09 ^{NS}	5.99	-5.52 ^{NS}	69.45
Hong Kong	-1.20 ^{NS}	78.46	-3.75 ^{NS}	6.95	1.14 ^{NS}	84.39
U.A.E.	38.40 ^{NS}	75.80	31.06 ^{NS}	28.86	59.85 ^{NS}	82.24
Thailand	61.99 ^{NS}	102.52	38.25 ^{NS}	28.92	89.60 ^{NS}	99.12
Others	-1.47 ^{NS}	131.99	-2.29 ^{NS}	10.61	2.68 ^{NS}	117.25
Total	-3.16 ^{NS}	30.53	-0.56 ^{NS}	1.58	4.50*	27.95

*, ** and *** indicate significance of values at P=0.01, 0.05 and 0.10, respectively

rest of the countries were unstable showing no probability of market share retention. The leading markets in this period 2004-2008 were Singapore, Malaysia and Kuwait, while Hong Kong, U.A.E., and Japan, were smaller buyers. Average quantities to Singapore were 44 per cent (353 tons) of the period's average annual total, while that for Kuwait was 15 per cent (123 tons). 'Others' was unstable with probability of loss to Taiwan (1.0000) and had negligible gains. Within other countries, U.S.A was an irregular and minor market.

In the present study, the major destination for chilled pomfret was Singapore followed by Malaysia, with a smaller share by Kuwait. Hong Kong, U.A.E., and Japan were minor markets. Pomfrets are prized in the Indo-Pacific region for their taste and are widely distributed throughout the Indo-West Pacific. Several species resembling the same shape and fin structure are also called as pomfrets along the coast of Pacific and Atlantic Oceans, and the exports from India probably serve as substitutes in these markets. Silver pomfret known as 'Zobaidy' forms a highly valuable shared fish stock in the Persian/Arabian Gulf and is popular in that region. The Silver and Chinese pomfrets are popular food fishes in countries along the East China Sea and Yellow Sea as these same species support a fishery there and hence, there is export demand from India. It is also well known that more than 60 per cent of India's seafood exports to South Asia are processed and re-exported.

SEAFISH (2008) reported that total worldwide imports of chilled fish and seafood into Singapore were about 81,357 tons in 2006. INFOSA (2010) noted that fresh/chilled (air-flown) fish were sent in large quantities to EU from South Asian countries. Among them India was seen to increase its exports from 517 tons to 799 tons during 2007-08. But in the EU, the major fresh/chilled fish item is mainly salmon and trout supplied largely by Norway. Interestingly in a new development of concern for exporters, all the major British retailers were reported to be selling previously frozen fish in thawed state as chilled seafood with no price difference between genuinely fresh and previously frozen seafood (Egenes *et al.*, 2011).

Further, while chilled fish were clearly labelled "fresh" or "fresh, never frozen" before 2005, now thawed products with a variety of names such as refresh, "mise en frais", chilled, defrosted, "frozen from fresh", etc., were sold as chilled products, according to the reported study percentage share in average export quantity (tons) and percentage share in average export real values (Rs.) for major countries have been presented in Fig. 3 and 4. Indian chilled products need to be developed as reliable brands and be sold directly in the foreign retail markets, to maintain the higher price value of chilled items.

Comparison of chilled pomfret exports to major export item group chilled items:

Chilled pomfret and chilled fish are 2 of the major products under the major export item group chilled items, one of the 12 major export item groups of marine products of India. According to the MPEDA yearbook of statistics of marine products exports 2008, there were 53 varieties of chilled items being exported from India in 2008 (MPEDA, 2011). There was a slow but steady increase in the number of items exported under this major group. A total of 37 chilled items were listed in 2005, 25 items in 2003, 19 items in 2002, 5 items in 2001 and 1999, and only 1 item in 1994 as per the respective yearbooks of MPEDA. The first record, and only record of export of chilled items in pre-lib period was of export of chilled lobster for the year 1994 to Sri Lanka, Oman/Muscat and Kuwait of a total of 3,321 kg (nominally) valued at Rs.773,256 in 1994. chilled items as an export commodity were absent in previous years.

The total export quantity of the chilled items group gradually rose from the year 1994 to reach a maximum of 16,100 tons in year 2008 (real) valued at Rs.1.46 billion (Fig.2). Chilled pomfret exports were maximum in year 2000 with 1,873 tons and (real) valued at Rs.377 million. 'Others' (51 products excluding the 2 selected items as per MPEDA yearbook 2008 list) has increased steadily from the year 2001 to reach 12,839 tons in 2008 (real) valued at Rs.878 million.

Chilled pomfret contributed 29 per cent, while chilled fish

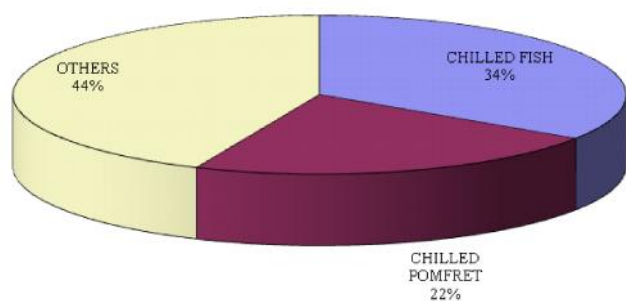
Table 2 : Chilled pomfret: direction of trade – transitional probability matrix for export quantity (kg) for the post lib period 2004-2008

Country	Singapore	Malaysia	Kuwait	Hong Kong	U.A.E.	Japan	Thailand	Taiwan	Others
Singapore	0.2541	0.6443	0.0000	0.0360	0.0202	0.0454	0.0000	0.0000	0.0000
Malaysia	0.9757	0.0000	0.0000	0.0000	0.0000	0.0000	0.0243	0.0000	0.0000
Kuwait	0.0000	0.0000	0.7234	0.0000	0.2555	0.0000	0.0000	0.0211	0.0000
Hong Kong	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
U.A.E.	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Japan	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Thailand	0.0000	0.0000	0.8808	0.0000	0.0000	0.0000	0.0000	0.0000	0.1192
Taiwan	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Others	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000

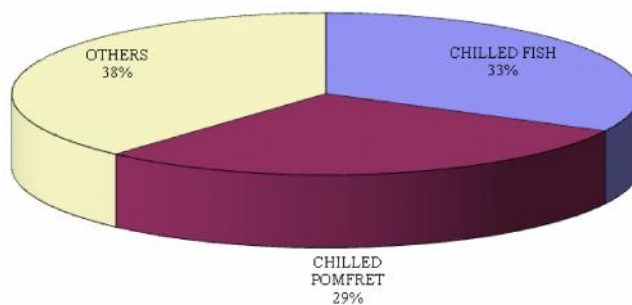
contributed a third (34%) of the share to average total quantities of chilled items major group, with the largest share by ‘Others’ (44%) (Fig. 5). However, it is seen that value realization was better for chilled pomfret (Fig. 6). Concomitant with the decline in quantities of chilled pomfret, the share of others has increased (63%) in the recent period.

Silver or white pomfrets *Pampus argenteus*, Family Stromateidae), the black pomfret (*Parastromateus niger* = *Formio niger*) and lesser caught Chinese pomfret (*Pampus chinensis*) are the 3 pomfret varieties fished in India. The fall in total export quantities may be due to (apart from possible

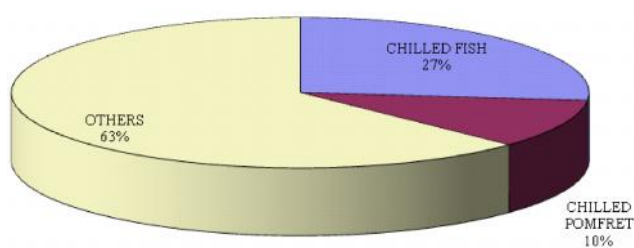
increase in domestic consumption) to diversion of raw material to other product styles/forms of export as there is no fall in pomfret landings. Pomfrets are exported in both frozen and chilled form from India. In the period upto 2002, there were only 3 items of pomfrets in frozen form, namely, frozen pomfret white, frozen pomfret black, and frozen pomfret chinese. From 2003, frozen pomfret IQF and frozen pomfret silver were added, and later individually quick frozen (IQF) silver pomfret was added in 2005. Upto 2001, there was only 1 chilled item of pomfret, chilled pomfret. From 2002, chilled pomfret silver, chilled pomfret black, and chilled pomfret chinese were added



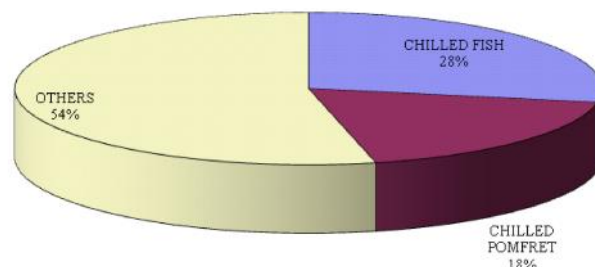
(a) Chilled items : Export quantity average total period 1994-2008



(a) Chilled items : Export real value average period 1993-2008



(b) Chilled items : Export quantity average 2004-2008



(b) Chilled items : Export real value average 2004-2008

Fig. 5 : Chilled items: percentage share in average export quantity (tons) for the (a) total period 1994-2008, and (b) recent period 2004-2008

Fig. 6 : Chilled items: percentage share in average export real value (Rs.millions) for the (a) total period 1994-2008, and (b) recent period 2004-2008

to the export listing. Chilled pomfret category has the largest quantities exported among these. Catches of silver pomfret were 29,281 tons, black pomfret was 18,880 tons, and chinese pomfret was 3,834 tons in the year 2008 which figures were in the range of the respective catches for the recent years.

Further, the exports of these other items from India have not increased in the major market of Singapore. The major diversion of raw material appears to be to the products frozen pomfret silver from 2003 and to chilled pomfret silver/white from 2002. The use of similar terms such as silver/white pomfret and white pomfret will have to be standardized by the authorities for export data collection and entry so that there is clarity on the quantities of the species exported. This will also enable suitable management measures to be taken based on the landings and export quantities. The Government of India has banned the export of pomfrets of less than minimum legal weight of 300 g (Pillai and Ganga, 2008), and this would have some impact on exports in future, but mesh size regulations are needed.

Conclusion:

Chilled pomfret as an export item was recorded only from 1995 and the item is one of the diversification products produced in the post liberalisation period. Being a highly valued variety world wide, exports fetch a high value realization in relation to quantities. The large market of Singapore should be regained and more exports to Malaysia must be targeted. Promising markets in the Middle East such as Kuwait and U.A.E. should be pursued. Keeping resource sustainability in view, exports of chilled pomfret should be encouraged.

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