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Growth Pattern and Competitiveness of Indian Shrimp Export Trade

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Shrimp is the world's most important commodity accounting for about 19 percent of international seafood trade in value terms. In India's export trade shrimp contributed about 29 percent in quantity and 67 percent in value in the year 2002-2003. The present study was an attempt to critically examine compound growth rate and competitiveness of Indian shrimp in international seafood market based on the data collected from FAO fisheries statistics database, MPEDA statistics and Globe fish commodity update. The results indicated that India has been quite competitive in the shrimp trade, although there is a decline in the competitiveness of Indian shrimp in recent years. On the other hand, Thailand has emerged as a strong contender recording an increased competitiveness over the years. Certain policy measures are suggested to sustain the competitiveness of Indian shrimp exports in international market.

Key words : Shrimp, Competitiveness, Compound growth rate, Constant market Share (CMS)

Marine products form an important group of primary commodity exported from India accounting for about four per cent of the total export earnings. Starting from mere scrapes in the pre- independence period, it is a saga of steady striking and sustained growth that the industry had recorded raising India's status and prestige securing her a respectable position among the maritime nations of the world. Export of marine products has increased considerably to an all time high both in volume and value during 2002-03 with actual export of 467297 tonnes valued at Rs.6881 crores or US $ 1425 million. Shrimp is the world's most important seafood contributing to about 19 percent of international trade in value terms and the leading markets are USA, Japan, Spain, France, UK and Italy. Even though the share of Shrimp export has decreased from 30.09 per cent of the previous year to 28.85per cent in quantity and from 69.50 per cent of the previous year (2001-2002) to 66.97 per cent in terms of value it recorded a growth of 5.56, 11.31 and 9.46 per cent in terms of volume, rupee realization and in US $ terms during 2002-03. The structural changes in international seafood trade in the last decade in terms of structures of production, consumption, trade flows, stocks and prices seemed to have a significant impact on the export trade. Being a signatory of WTO and having started its liberalization process, there is a real need to evaluate the performance of Indian shrimp export in the world seafood market. This paper seeks to assess and compare the growth and competitiveness of Indian shrimp trade with that of its competitors in the international market by using the well known constant market share technique.

Materials and Methods

The present study is based on time-series data collected from different published government and nongovernmental sources. The data pertaining to total shrimp products exported from India, competitors and world total are collected from the Food and

Agricultural Organization (FAO) Year Book of Fishery Statistics. The data on imports of shrimp for India, competitors and world were compiled from shrimp commodity update of Globefish and FAO fishery statistics-commodities. Fishery products exports for India and competitors were collected from Food and Agricultural Organization (FAO) statistics for fishery commodities. The country-wise shrimp and seafood export from India was compiled from different volumes of Marine Products Export Development Authority (MPEDA).All the values of exports and imports are in U. S. dollars to net out the effect of changes in exchange rates.

The growth in shrimp export of India and that of the world was analyzed by using the exponential growth function of the form,

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

Where,

Y= dependent variable for which growth rate was estimated

a = Intercept

b = Regression co-efficient

t = Time variable

e = Error term

Logarithmic form of the equation (1) can be written as,

$$\ln Y = \ln a + t \ln b + \ln e$$

$$\text{i. e., } Y' = A + Bt + E \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where,

$Y' = \ln Y$

$A = \ln a$

$B = \ln b$

$E = \ln e$

Equation (2) is in the linear form. Parameters of this equation A and B were estimated using the method of least squares. From A and B, a and b were worked out as,

$a = e^A$

$b = e^B$

Significance of the regression coefficient was tested using t-test.

The compound growth rate(r) was computed by using the relationship

$$r = (e^B - 1) \times 100 \quad \ldots\ldots\ldots\ldots (3)$$

The growth rates were calculated for 1976 to 2001, in terms of volume, value and unit value for India as well as the world.

The competitiveness of Indian shrimp exports to the major destinations has been analyzed using the Constant Market Share (CMS) model for the period 1982 to 2001 covering 20 years. The data on exports to major destinations were obtained from various issues of FAO, fisheries statistics-commodities and MPEDA.

By using the CMS model the total change in exports can be decomposed into growth effect, market effect and competitiveness effect. The data is divided into four sets with a discrete two time period (a base year and an end year) each covering five-year (1982-1986, 1987-1992, 1993-1996 and 1997-2001) data was employed for the Constant Market Share Analysis. (Richardson, 1971; Bishwas, 1982; and Tiwari, 1983)

$$\Delta q_i = S_i^o Q_i^1 + S_i^o \Delta Q_i + \Delta S_i^o Q_i^o + \Delta S_i \Delta Q_i - S_i^o Q_i^1$$

$$= S_i^o \Delta Q_i + \Delta S_i Q_i^1$$

i = subscript for import market

o = superscript indicating the base period

1 = super script indicating the end of the observation period

Δ = change in a variable between two periods

q_i^o = quantity exported from India to market 3 during the base period

Q_i^o = total quantity imported in market 3 during the base period

S_i^o = market share of Indian shrimp in market 3 during the base period

$S_i^o = q_i^o / Q_i^o$

q^o = quantity exported from India to all markets during the base period

Q^o = quantity imported by all markets during the base period

S^o = market share of India in all markets during the base period

This is the decomposition of the total changes in export value of the commodity with respect to one import market. Summing the equation over all import markets,

= Import growth effect + Market effect + Competitiveness effect.

The import growth effect is the potential change in the total exports of a country assuming a constant (base period) market share.

The market effect is the difference between the overall import growth effect ($S^o \Delta Q$) and the sum of the market specific growth effects ($\Sigma_i S_i^o \Delta Q_i$).The growth effect is determined by the magnitude of S_i^o or ΔQi. Hence, for an equal absolute change (ΔQ_i), a large (region) effect is necessary. Also, under, the constant market share in the base period, the sign and magnitude of the absolute change (ΔQ_i), determines the importance of a region's contribution to the market effect. Therefore, the market effect is likely to be negative under unfavourable import demand conditions in the most important regions.

The competitiveness effect is the residual after subtracting the import growth effect and the market effect from total change in exports. The competitiveness effect takes the charge in market shares (ΔS_1) explicitly into consideration. The severity of a market share loss in an import market ($-\Delta S_i$) is proportional to the absolute size of the import market (Q_i). In short, the competitiveness effect indicates the extent to which a country is able to gain international market shares despite potentially adverse world demand movements, in terms of both market and commodity.

Results and Discussion

Shrimp export from India is growing in terms of both quantity and value; especially from 1990s (Fig. 1). The compound growth rate of shrimp export is computed for India, competitors and world in terms of volume, value and unit value. The growth rate registered for shrimp export from India and world were significant at one percent in terms of volume, value and unit value. World shrimp export had grown by 7.26 per cent in quantity and 9.28 per cent in value terms per year for the study period 1976 to 2001(Table1). Indian shrimp export registered less growth rate in quantity (4.77 percent), value (6.68 percent) and unit value (1.83 per cent). This indicates that other shrimp exporting countries in the world had grown in terms of volume and value and India is lagging behind. The lower growth of shrimp exported from India can be due to the gradual increase in demand for shrimp in our domestic market and overdependence

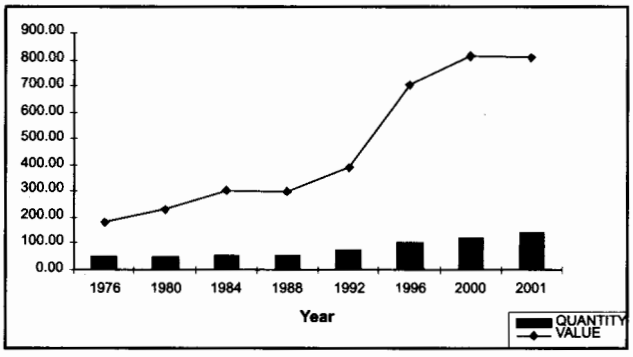

Fig. 1. Shrimp export from India during 1976 to 2001 (Quantity in '000 MT and Value in US $ Million)

on capture shrimp by Indian processors. There is lack of market research in seafood export sector which in turn might have resulted into poor brand image for Indian shrimp in foreign markets. Major part of shrimp exported from India was in peeled and deveined (PD) or peeled and undeveined (PUD) form which serve as raw material for foreign importers. This is not the case with other countries like Thailand.

China,Thailand,Vietnam,Indonesia,Mexico, Greenland and Ecuador are the major competitors to India in shrimp export markets namely, Japan, USA and European Union. Compound growth rate of shrimp exported from these competing countries were also found out in order to have a comparative look with that from India. In terms of volume of shrimp exported to the world shrimp market, Thailand had grown highest with a growth rate of 15.00 percent per annum during 1976 to 2001 (Table 1). Ecuador is next to Thailand with a compound growth rate of 14.23 percent for the same time period studied. All the countries studied except Mexico (0.50 percent) are showing higher growth rate than that of India in terms of volume of shrimp exported. In terms of value of shrimp exported also, Thailand is the leader with a growth rate of 19.78 percent, followed by Vietnam (17.14 percent), Ecuador (13.79 per cent) and Indonesia (9.84 per cent). Countries like China, Mexico and Greenland showed growth rate in value which is less than that of India. Growth in unit value realization for the shrimp export from countries like China (-2.65 percent), and Greenland (-0.03 percent) and Ecuador (0.39 percent) were negative. This indicates that unit value realized from these countries has been on the down swing over the years. The growth in unit value realization is highest for Vietnam (5.01 percent), followed by Thailand (4.16 percent). But the unit value realized for Indian shrimp export has shown only a growth rate of 1.83 percent, which is almost similar to that of world (1.88 percent).

Thailand now processes imported shrimp, as well as its own domestically produced shrimp, mainly for re-exports. Its geographical location, skilled human resources and well-developed infrastructure also provide the ideal climate for investment in the shrimp trade sector. Even though black tiger shrimp can be farmed anywhere in the tropics, the long stretching western and eastern coastlines of Thailand is the ideal location. Compared to other South-East Asian countries like Thailand, Vietnam,

Table 1a. Comparison of Compound Growth Rate (CGR) of Shrimp export (Quantity in '000 MT) from major competitors of India During 1976 to 2001

Country	Regression Coefficient	Compound Growth rate (CGR)
India	0.0466*	4.77
China	0.0827*	8.62
Indonesia	0.0681*	7.04
Thailand	0.1397	15.00
Mexico	0.0050*	0.50
Greenland	0.0496*	5.08
Vietnam	0.1094	11.56
Ecuador	0.1331	14.23
World	0.0701*	7.26

Table 1b. Comparison of Compound Growth Rate (CGR) of Shrimp export from major competitors of India During 1976 to 2001 (Value US $ Million)

Country	Regression Coefficient	Compound Growth rate (CGR)
India	0.0647	6.68
China	0.0558	5.74
Indonesia	0.0939	9.84
Thailand	0.1805	19.78
Mexico	0.0144	1.46
Greenland	0.0493	5.05
Vietnam	0.1582	17.14
Ecuador	0.1292	13.79
World	0.0887	9.28

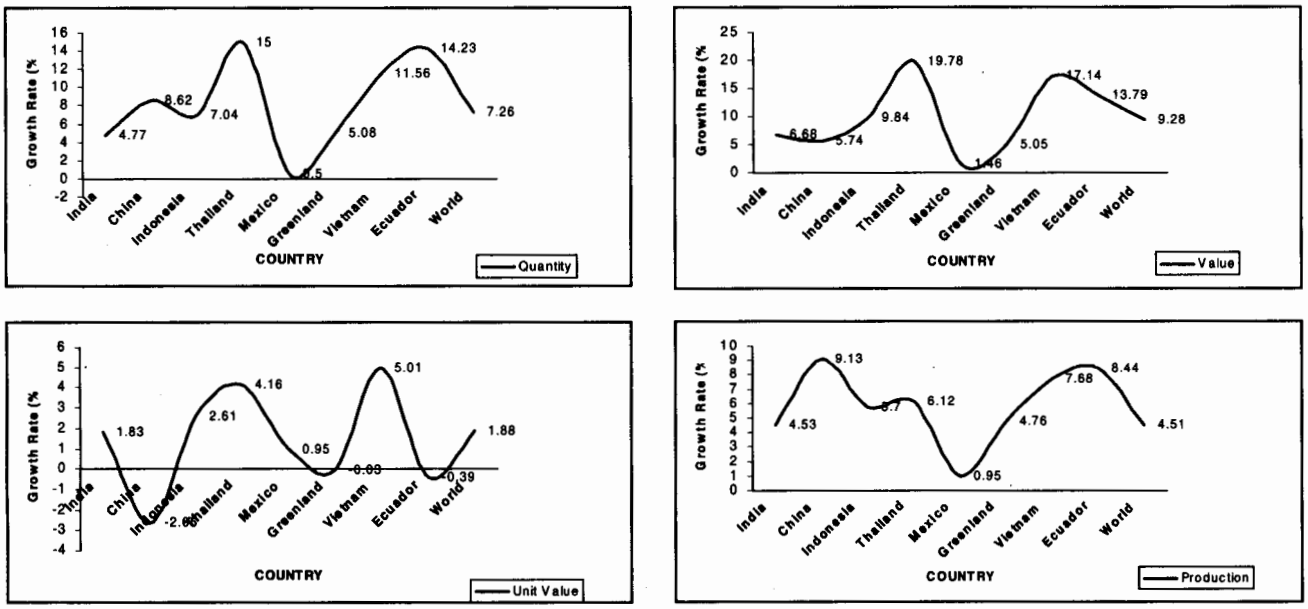

Fig. 2. Comparison of Component Growth Rate (CGR) of shrimp export and shrimp production from India, World and major competitors of India during 1976 to 2001
(Quantity in 000 MT, Value in US $ Million and Unit Value in US $ per Kg)

Indonesia, etc, Indian aquaculture is not much modernized with advanced techniques. Thai processors are able to constantly match importing countries' hygiene and sanitary standards, ensuring that shrimp products from Thailand are accepted worldwide. They have adopted the very latest technology for shrimp processing, particularly in the development of value-added products.

Indian shrimp production had shown 4.53 per cent growth rate during 1979 to 2001, which is almost the same as that of the world (4.51 percent) during the same period. Shrimp production in almost all the shrimp exporting, countries like Argentina and Greenland shown better growth than India. China is showing intensification in shrimp production with the highest growth rate of 9.13 per cent per annum for the period studied, followed by Ecuador (8.44 per cent), Vietnam (7.68 per cent), Thailand (6.12 per cent) and Indonesia (5.70 per cent). Indian shrimp export in terms of quantity (4.77 per cent) had almost kept the pace with production (4.53 per cent) (Fig. 2). In order to diversify our export basket Indian Government has been giving importance to the export of other items like fish and there by a gradual reduction in the export share of Indian shrimp in our export basket.

Gowda and Jalajakshi, (1994) opined the annual compound growth rate of Indian shrimp export is 5.9 percent (quantity) and 15.85 percent (value) based on the data from 1966 to 1991. In this study the growth rate was 4.77 percent and 6.68 percent for quantity and value, respectively. Since only the growth rate in terms of value is showing huge variation, it may be due to the different currency base which had been used in both the studies. Further, Gowda and Jalajakshi, (1994) used the data of Indian foreign trade and MPEDA (which is in Indian rupees), but the present study is based on the FAO data (which is in dollar terms). The difference in exchange rate can be the reason for this variation.

Barrows (1999) reported that Indian seafood export had grown by 18 percent for

Table Ic. Comparison of Compound Growth Rate (CGR) of Shrimp export from major competitors of India During 1976 to 2001 (Unit value US $

Country	Regression Coefficient	Compound Growth rate (CGR)
India	0.0181	1.83
China	-0.0269	-2.65
Indonesia	0.0258	2.61
Thailand	0.0407	4.16
Mexico	0.0095	0.95
Greenland	-0.0003	-0.03
Vietnam	0.0489	5.01
Ecuador	-0.0039	-0.39
World	0.0186	1.88

a period of six years (1988 to 1994).This growth rate has been slightly higher than Thailand and Indonesia which achieved compounded annual growth rates of around 16 percent during the same period. But as per the present study, both these countries shown a higher growth rate of shrimp exported than India for the period of 1976 to 2001. India, Thailand and Indonesia have been the most successful countries in terms of growth rate in seafood exports during 1988-1994.

The results reveal that Indian shrimp is very much competitive in all the markets, particularly in Japan market with a maximum value of 747.24 percent, followed by Italy (266.13 percent), USA (203.31 per cent) and Hong Kong (194.14 per cent). This positive competitive effect makes clear that Indian shrimp export to world market is highly competitive.

Import growth effect was positive for Spain (771.32 per cent) Italy (616.95 per cent) and UK (50.43 per cent), indicating that Indian shrimp exports to these three markets have been increasing over the recent past (Table2). Negative import growth effect in India's major destinations namely, Hong Kong (-5453.07 per cent), Japan (-288.29 per cent) and USA (-110.95 per cent) reveals that even though Indian shrimp is competitive in these markets, India's export share is coming down in Japan and USA for the study period (1982 to 2001).

The market effect was positive for Hong Kong (5358.93 per cent), UK (32.08 per cent) and USA (7.64 per cent), but it was negative in the case of Italy (-783.08 per cent), Spain (-700.35 per cent) and Japan (-358.95 per cent). This negative market effect may be attributed to the uneven imports during the study period in these markets.

Gowda and Jalajakshi, (1994) studied the competitiveness of Indian shrimp export using constant market share (CMS) method for a period of 1976-77 to 1986-87. Their results revealed that Indian exports to Japan market are increasing mainly due to the increasing imports in to this market and the other two effects were negative. But the present study gives a different picture. In Japan market the import effect and market effect are negative and the competitiveness effect is positive (in terms of volume of shrimp exported). This may be due to the fact that the present study is for a period of twenty years (1982 to 2001) and the market situations might have changed totally after 1986-87. But in USA market, Indian shrimp has been found to be competitive by both these studies. The present study shows that the growth of Indian shrimp export in USA market is not due to the increasing imports of shrimp in this market as the value of import growth effect for Indian shrimp in USA market is negative. Gowda and Jalajakshi, (1994) opined that the increase in imports of shrimps in this country play a favourable

role in Indian shrimp exports. Among European markets our major destination is UK. As per the present study all the effects are showing positive values for Indian shrimp in this market while Gowda and Jalajakshi, (1994) opined that except market effect, the other two effects are positive for Indian shrimp in UK market.

Amidst fisheries playing an important role in agricultural diversification, employment generation, export promotion and food security, the present study reveals even though the export grew in terms of quantity the rate of growth was marginal when compared to the major competitors from the South East Asian countries The attainment of increasing competitive advantage both in marine products and in shrimp is attributed to foreign investment, deregulation and high profile marketing approach which is basically reflected in good relationship with buyers, knowledge of market needs, assurance of quality and delivery on schedule.

Under the new trade policy initiated in 1991, the major changes have been effected in agricultural trade, with respect to the canalization of agricultural trade has been almost abandoned and the government does not determine now the value or nature of the exports or imports, except for a few items. In addition the Quantitative restrictions on agricultural trade flows had been dismantled completely with effect from 1st April, 2001 with the announcement of the tariff reductions.

In this situation, there is a great need for more pragmatic interpretation of the export - import policies as well as the tariff policy towards boosting the seafood trade of the country. Competitiveness involves private sector initiative, government initiative and effective dialogue between the two. Strategic policies related to the production, processing (including handling) and export are the needs of the day. Some of the pertinent policies which are important include the following:

- In order to keep pace with the South East Asian countries more emphasis needs to be given for increasing shrimp production by bringing more area under culture and increasing productivity through better management. It may be further mentioned that freshwater prawn farming, *Macrobrachium rosenbergii*, which has better growth and less susceptibility to disease as compared to tiger prawn, *Penaeus monodon*, needs to be popularized.

- The processing sector needs to be diversified with more of value added products.. For this exporters should be aware about quality requirements of importers and the value added products preferred by them. In order to encourage value added exports, governmental interventions are required including subsidies.

- Export marketing research must be promoted in order to find out the consumer preference in foreign markets and also the availability of new markets for our seafood. Diversification of fishing area, market destinations and products should be done in order to sustain shrimp export trade.

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