



Export destinations for Indian ornamental fish: Constant market share analysis*

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ABSTRACT

Ornamental fish culture has emerged as a highly profit oriented lucrative sector. It is so called the million dollar industry. While most of the countries in the world have taken up the lead in ornamental fish trade, India is still a sleeping giant with a share of less than 1%. India has huge potential to develop this sector due to its rich resources of pisci flora and fauna. In the present study an attempt was made to study and examine the competitiveness of Indian ornamental fish exports amongst its important export destinations (Singapore, USA, Japan, Malaysia, Germany) using constant market share analysis. This study is based on the data pertaining from 1991–2009 from UNCTAD and WTO statistical data base. Constant market share gives an idea about whether the product exported has its own competitive nature or is competitiveness driven by the growth in world exports or demand of the product due to development in the destination market. CMS analysis suggested that India's ornamental fish exports are more competitive in USA rather than other major export destinations like Singapore, Malaysia etc. India's increase in export of ornamental fish to Singapore, Malaysia is mainly market driven rather than its own competitiveness. Therefore to sustain and enhance India's competitiveness, India needs to have manifold increase in ornamental fish production, grow parallel with world's trend in ornamental fish trade and export more to those countries where it is highly competitive in its own way.

Key words: Competitiveness, Constant Market Share, Ornamental fish

Fisheries sector contributes significantly to the national economy while providing livelihood to approximately 14.49 million people in the country. India is the third largest producer of fish in the world and second largest producer of freshwater fish in the world. The fish production during 2007–08 is estimated to be 71.20 lakh tonne (Government of India, Annual Report, 2009).

India being an important aquaculture country in the world is also a major maritime state and home for more than 10% of globefish biodiversity. The large and expanding world market offers greater growth and profit opportunities than domestic market. Producing about 4.4% of world's fish, India trades to an extent of only 2.4% in global fish market (Handbook of Fisheries and Aquaculture 2006).

About 600 ornamental fish species are reported worldwide from various aquatic environments. The World exports of ornamental fish is valued at about USD 270.5 million (UNCTAD 2009) and since 1985 the value of international trade in exports of ornamentals is increasing at an average growth rate of approximately 14% per year. Thus it offers a lot of scope for international trade and economic development. More and more people are entering into this lucrative business of culturing and breeding these

fishes.

About 80% of ornamental fishes from India to International market are exported via Kolkata Airport, of which the lion's share (more than 80%) is contributed from north eastern region. Even domestic trade is annually growing at a rate of 20% (FAO 2007). A rich diversity of species and favourable climate, cheap labour and easy distribution make India (West Bengal in particular within India) suitable for ornamental fish culture. About 90% of Indian exports go from Kolkata followed by 8% from Mumbai and 2% from Chennai (Ghosh *et al.* 2003).

India's share in global ornamental fish trade is negligible and is less than 1% and the present export is dominated by wild caught species (Nair 2006). India can be considered as one of the gold mine for ornamental fishes because of existing potential of producing more colourful fishes and thus can be a major player in international ornamental fish trade and thereby greatly increase foreign earnings, provide large employment and rural livelihood in conjunction with its high economic growth rate. But India is not exclusive and monopolistic; it faces stiff competition from other well established trading nations.

MATERIALS AND METHODS

This study is based on the time series data pertaining to the period 1991 to 2009 compiled from various sources. The data on India's total trade and world total trade i.e.

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Indian total export, world total exports, other top countries total exports were collected from WTO statistical data base published by World Trade Organisation (WTO). Data on ornamental fish trade (import and exports) for various countries including India and ornamental fish trade of the world was collected from United Nations Commodity Trade Statistics Data Base (UN COMTRADE) produced by United Nations Statistical office (Live ornamental fish commodity code:030110). Data on fisheries export were also compiled from UN COMTRADE. Data for GDP (gross domestic product) was collected from Department Of Agriculture, Government of India.

All the values of export and imports have been referred in US dollars to net out the effects of changes in exchange rate. The ornamental fish export data of major countries was analysed for a period 1991–2008 and top 10 exporters were selected on basis of average export.

Market share: India's export share in its destination market was carried out to get an idea about top destinations. The time series data of India's ornamental fish exports to the world (country wise) from 2003–2009 was collected. Based on the data descriptive statistics such as mean, std dev were worked out and percentage market share of top 10 markets were calculated and then interpreted. The top 10 destinations obtained were then used for further analysis using constant market share.

Constant market share: Based on the %age share of the India's export to its destinations the top important destinations obtained namely were Singapore, Japan, USA, Malaysia and Germany. Therefore these countries were considered for constant market share analysis. The data required regarding India's export of ornamental fish to these destination countries were collected from UNCOMTRADE and data were compiled based on the CMS formula.

The constant-market-shares (CMS) analysis became popular in applied international economics with the pioneering work of Tyszynski (1951). It is a method that disaggregates the trade data of a focus country and compares it with the trade flows of the rest of the world. This technique can be used to find the extent to which stagnation in the export of less developed countries is due to adverse commodity and market effects. In shorter aspects it is useful for projecting the export performance. The CMS analysis is based on the assumption that a country's share in world markets should remain constant over time. The main idea underlying the constant market share analysis is that the export structure of a given country affects its global export performance, despite changes in other factors, such as those associated with competitiveness. According to the CMS method, the proportionate increase in exports of a single commodity over time comprises a number of effects

- a. Standard growth effect
- b. Market distribution effect
- c. Residual effect, which is also termed as 'competitiveness'.

In simple terms the increase in exports can be explained in terms of 3 factors: the general growth of world exports

to the focus destinations; the extent to which the particular market represents growing centres of demand; and finally a residual term which captures the net gain or loss in the market share presumably due to the changes in the relative price and / quality of the product, not to mention the marketing effect or skill of the exporters. The CMS model (Richardson 1971) is as follows:

$$\Delta H = [S^0_i \Delta W_i] + [\sum_j S^0_{i,j} \Delta W_{i,j} - (S^0_i \Delta W_i)] + \sum_j W^1_{i,j} \Delta S_{i,j}$$

Where, ΔH ; change in total exports of commodity 'i', between time 1 and time 0; S^0_i – India's share in total world exports of commodity 'i', in time; ΔW_i – change in total world exports of commodity 'i', between time 1 and time 0; $S^0_{i,j}$ – India's share in total exports of commodity 'i' to country j, in time 0; $\Delta W_{i,j}$ – change in world exports of commodity 'i' to country j, between Time 1 and time 0. $W^1_{i,j}$ – total exports of commodity 'i' to country j, in time 1; $\Delta S_{i,j}$ – change in India's share in total exports of commodity 'i' to Country j, between time 1 and time 0.

In the above equation described the first bracketed term is the standard growth effect, second bracketed term is the market distribution effect and the last bracketed term is the residual effect representing competitiveness.

A positive large growth effect suggested that India's export is driven mainly by changes in world trade of that particular commodity. Mean while a positive and relative large market distribution term would suggest that India's exports of that particular commodity concentrates mainly on rapidly growing markets for that particular commodity. Similarly a positive and large residual term denotes a net gain in India's market share in the focus destination after all other effects have been accounted for. It is assumed that net gain or loss can only be caused by changes in the relative prices of India's product. Therefore a positive residual term is taken as a sign of competitive strength, while a negative one is taken or considered to indicate weakness.

However in reality the observed trade patterns can be distorted by government policies, interventions which may therefore misrepresent underlying comparative advantage. This acts as a limitation in using these and similar indices. The extent to which the government policies (import restrictions, subsidies etc) might distort indices of revealed comparative advantage is therefore a concern.

CMS methods were carried out on yearly basis and each year and each decomposition at the end of a period becomes the beginning of the next period. Then the simple average of yearly decomposition is then used to represent the chosen period. The main advantage of using this method is that the choice of year chosen as a beginning of the overall period does not dominate the results.

RESULTS AND DISCUSSION

Market diversity and species diversity are the important indicators which signifies export pattern of that country. Ornamental fishes from India have high demand in the international market which may be due to their vibrant colours and agility. Markets for Indian ornamental fishes

has never been consistent, the geographical spread of the markets has exhibited an ever changing hue. The major destination country for export during 2009 was Singapore while in 2003 it was Japan and Malaysia. There has been a regular fluctuation with respect to destination markets for India's ornamental fish exports. Even though Indian ornamental fishes have market in many countries across the world market share analysis indicated that Singapore, USA, China Hong Kong SAR, Malaysia, Japan, Germany, United Arab Emirates, United Kingdom, Thailand and Netherlands have important top 10 destinations since 2003–2009.

Singapore, USA, China Hong Kong SAR, Malaysia and Japan are India's favourite top 5 market destinations which account for about 70% out of the top 10 destination markets. India's favourite market destination is Singapore accounting for almost 42.85% out of the top ten markets which is followed by Japan accounting 13.88% and Malaysia accounting for 9.97%. USA and China Hong Kong SAR both accounting for 7.5% each. Thus the above 5 countries together accounts for about 70% out of top 10 market destinations. Other important market destinations coming under the top 10 lists are Germany, United Arab Emirates, United Kingdom, Thailand and Netherland.

Species diversity of Indian ornamental fish trade: Indian ornamental fish sector is small but it forms one of the vibrant sub sectors of fisheries and aquaculture. From India 187 species are traded of which 85% are wild fishes. The major shares of exports of ornamental fishes are from the wild from the eastern and north eastern states of the country. The locational advantage of an international airport in Kolkata has helped West Bengal become a hub for ornamental fish trade. Mumbai forms the main angel and tetra breeding centre, whereas Chennai farmers devote much of their time to mollies, goldfish culture. Due to their close proximity to sea bulk collection of sea angels and other allied species have become popular in Chennai. Large numbers of fishes traded are of indigenous origin which includes loaches, gouramis, barbs, danios, eels, catfishes, air breathing fishes and glass fishes. The commonly cultured fishes include molly, guppy, platy, sword tail, barbs, cichlids,

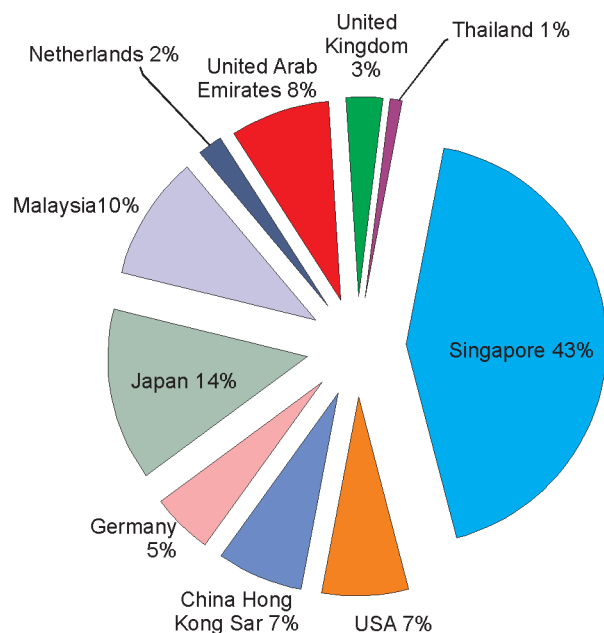


Fig. 1. Top destinations for India's ornamental fish exports (% share), 2003–2009.

angels, siamese fighter, tetras, gold fish, manila carp, sharks (Ghosh 2010). The major breeding centres are located in Kolkata, Mumbai and Chennai as these metros have become major export points.

Constant market share analysis (CMS): CMS analysis for India's top 5 ornamental fish export destinations, viz. Singapore, Japan, USA, Malaysia and Germany for 19 years (1991–2009) delineates the proportionate increase in India's ornamental fish export to these destinations. Table 1 shows the mode of competitiveness of Indian ornamental fishes to the above mentioned destinations. The results revealed that Indian ornamental fish is not very much competitive in all markets especially in Singapore and Malaysia which are the important importers contributing to a bulk share of 56% of ornamental fish export from India out of the 5 major destinations. The competitive effect was -72.8% to Malaysia and -8.6% to Singapore indicating negative competitiveness Indian ornamental fish in these 2 markets. Apart from Malaysia and Singapore, Indian ornamental fish is very much competitive in all markets, particularly USA market with competitiveness effect of 179.2% , followed by Japan (104.54%) and Germany (99.02%). This positive competitive effect makes clear that Indian ornamental fish to world is highly competitive in few markets.

The second and third column of the Table 2 gives an idea about the growth factor and changes in market of the importing nation effecting positively or negatively on exports from India.

Singapore and Malaysia: Import growth effect was positive for Singapore was 53.47% and Malaysia 31.99% indicating that the increase in imports of ornamental fish by these countries plays a favourable role in increase in Indian ornamental fish export. India's export to Singapore and Malaysia has increased over time mainly due to the

Table 1. Top destinations for India's ornamental fish exports (% share), 2003–2009

Country	%
Singapore	42.85
Japan	13.88
Malaysia	9.98
United Arab Emirates	7.81
China Hong Kong Sar	7.52
USA	7.48
Germany	4.61
United Kingdom	2.66
Netherlands	1.73
Thailand	1.49
Sum	100

changes in world ornamental fish trade and due to their growing market in ornamental fish trade. The market distribution effect of 55.14% and 140.87% for Singapore and Malaysia was also observed to be high followed by negative competitive effect of -8.6% and -72.87%. This clearly showed that exports from India to Singapore and Malaysia are driven by increase in world trade of ornamental fishes and also development in market for ornamental fishes in these destinations. India has lost its competitiveness in these 2 destinations. Singapore being a major player in ornamental fish exports mainly deals with importing ornamental fishes, conditioning and re-exporting it to the world.

Japan and Germany: Indian ornamental fish exports to Japan and Germany also have undergone a high growth effect of 34.23% and 15.15% respectively which again indicated the fact that India's export increase to these destinations are mostly driven by changes or increase in world ornamental fish trade. But the market destination effect is negative (-38.78% and -14.29% respectively) and there is a positive high competitive effect for India's export in these 2 destinations. This gives a clear picture that

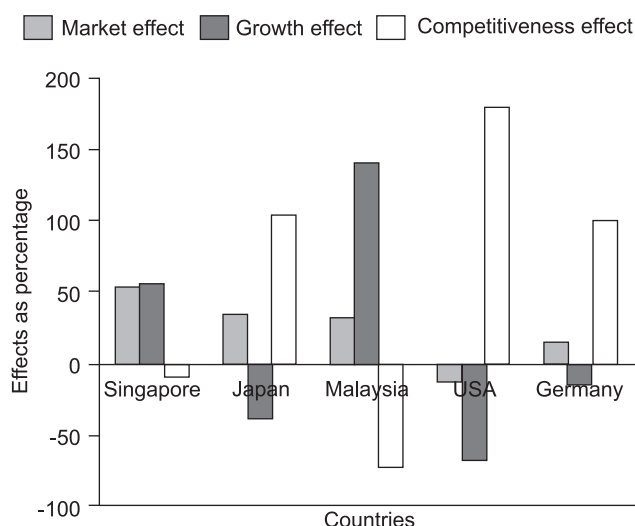


Fig. 2. Constant market share analysis (CMS) of India's top destinations, 1991–2009.

increase in Indian ornamental fish exports to Japan and Germany is not because of the growing market or the specialisation of these 2 countries but certainly due to competitiveness of Indian ornamental fish which are well accepted and demanded.

USA: The import growth effect as well as market destination effect for India's export to USA was negative followed by a positive high competitive effect as shown in Table 1. This revealed that Indian ornamental fish is competitive enough in US market, but it is observed that India's export share to USA has been decreasing over the years which can be a matter of concern.

With positive competitive effect USA followed by Japan and Germany found to be a safe and efficient market for India's ornamental fish export compared to other countries like Singapore and Malaysia. There is a need to concentrate on these markets and explore possible opportunities in these markets.

Realising the importance and potential of this sector several steps in order to create awareness regarding sustainable collection, culturing, breeding and handling of fishes were carried out by ICAR institutes namely, Central Institute of Fisheries Education (CIFE) Mumbai; Central Inland Fisheries Research Institute (CIFRI), Barrackpore; Central Institute of Fresh water Aquaculture (CIFA) Bhubaneswar; Central Marine Fisheries Research Institute, (CMFRI), Central Institute of Brackishwater Aquaculture (CIBA) and many other institutes.

MPEDA has also developed various schemes to promote an export oriented ornamental fish sector-

- Schemes for providing financial assistance for establishment of ornamental fish breeding units (OFBU)
- Schemes for providing financial assistance for establishment of ornamental fish marketing societies (OFMS)
- With the aim to boost exports of ornamental fish MPEDA has already finalised the guidelines on green certification which is already practiced in many countries.

The Kerala Aqua Venture International Limited (KAVIL) has recently started to boost up the ornamental fish production and trade.

The market for Indian ornamental fish is not consistent

Table 2. Constant market share analysis of India's top ornamental fish export destinations, 1991–2009 (Value in USD)

Countries	Change in export value	Growth effect	Market destination effect	Competitiveness effect
Singapore	8914666.829	4767121.932	4915811.22	-768266.3229
%	100	53.4750	55.1430	-8.6180
Japan	21335541.61	7305241.405	-8274807.165	22305107.37
%	100	34.2398	-38.7841	104.5444
Malaysia	14897616.09	4767121.932	20986704.52	-10856210.36
%	100	31.9992	140.8729	-72.8721
USA	9460831.593	-1093679.223	-6399340.753	16953851.57
%	100	-11.5601	-67.6404	179.2004
Germany	31456343.93	4767121.932	-4495354.16	31150605.19
%	100	15.1547	-14.2908	99.0281

Research support for ornamental fish industry.

over a period except for Singapore. Singapore being India's major destination is a leading player in ornamental fish trade. The trade with Singapore, Japan, and Malaysia may be intense due to cheap freight charges and availability of more flights for transportation when compared to other countries. Shyam *et al.* (2013) mentioned the significance of flight availability from India to Middle East countries, due to which these countries have emerged as prospective markets for the state of Kerala as well as for the country as a whole. While some destinations for India continue to be less competitive but the export of ornamental fishes to these destinations is still intense. For destinations like USA, Japan, and Germany the share of export is decreasing over the years even though Indian ornamental fishes are witnessing sign of competitiveness in this market. The reasons may be due to low quality of fishes exported or weak logistics. Countries like USA, Japan, and Germany are more stringent in their standards in terms of quality and environmental issues. Whereas Singapore imports the fishes, conditions it and re-exports them to the world. Thus poor quality maintenance may be the reason for India continuing to trade intensively with Singapore rather than other countries where it has competitiveness. Ajayan (2008) quoted that Singapore being largest exporter of ornamental fish sources the materials directly from several countries such as India, Sri Lanka and then re-exporting them. The lack of proper organised market channel resulting in more and more wild catch of ornamental fishes, rather than depending on culture side. Ratna (2009) has also mentioned that many of the traders directly catch fishes from natural waters, instead of breeding those using scientific practices.

Thus examining all these 5 destination market of Indian ornamental fish exports it will be a wise decision for India to concentrate more of its exports to USA, Japan and Germany where it has gained a high level of competitive effect rather than following old trend of exporting to Singapore and Malaysia where it has lost its competitiveness. USA specially can be a major important destination for Indian ornamental fishes as Indian exports enjoy high competitive effect with negative growth as well as negative market destination effect. To achieve this India needs to think on mass culture of ornamental fishes, depend less on wild collection, improve on breeding techniques, disease resistance and create a good image in terms of its novelty and quality fishes. This will help India to overcome the fluctuations observed in the export pattern of Indian

ornamental fishes. Ajayan (2008) mentioned that the success of the industry thrives on novelty and India can tap its vast resources to be an important player in this trade. Ornamental fish trade is a vibrant sector to flourish, India can turn its weakness into strength and try to invade into the destinations where it has competitiveness and make its mark in international trade of ornamental fishes.

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