EFFECTIVENESS OF HACCP SYSTEM IN MARINE FOOD EXPORT INDUSTRY WITH REFERENCE TO MPEDA

by

P.J. AASHIQUE

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DECLARATION

DECLARATION

We hereby declare that this project entitled "**EFFECTIVENESS OF HACCP SYSTEM IN MARINE FOOD EXPORT INDUSTRY**" is a bonafide record of research work done by us during the course of major project work and that it has not previously formed the basis for the award to me of any Degree/Diploma, Associateship, Fellowship or other similar titles of any other University or Society.

Place: Vellanikkara

Date:

P J AASHIQUE

(2015-31-003)

CERTIFICATES

CERTIFICATE

Certified that this project report entitled **"EFFECTIVENESS OF HACCP SYSTEM IN MARINE FOOD EXPORT INDUSTRY WITH REFERENCE TO MPEDA"** ***is*** a record of project work done independently by Mr. P. J. AASHIQUE under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship or associateship or other similar title to them.

Vellanikkara

14-10-2017

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DESIGN OF THE STUDY

1.0 INTRODUCTON

MARINE PRODUCTS EXPORT INDUSTRY

The prosperity of a country depends on many activities which it gets involved. Export is a developing activity which plays a major role in development of a nation. The role played by marine products in export process of the country is something which is inevitable.

The marine products export basket of India comprises mainly frozen shrimp, frozen fish, frozen squid, frozen cuttle fish, dried fish, chilled items, canned items, live items, frozen lobsters, frozen octopus, pickles etc…Until recently frozen frog legs was also one of the important items of export. Restrictions imposed on catch of frogs in order to maintain ecological balance and the crude process of their killing considered as cruelty are bound to affect the export of this item.

The principle export markets for Indian marine products are Japan and USA. Though the export of marine products affected to a large number of markets. Other destinations o some significant includes European Union, China, South East Asia, Middle East, East Europe, African countries, Latin American countries, other Asian and European countries.

The important ports through which marine products are exported from India includes Mumbai, JNP, Kandla, Porbandar, Pipava, Goa, Kochi, Trivandrum, Mangalore/ICD, Karwar, Chennai, Tuticorin, Mundra, Haldia, Calicut, NSICT, Karimganj, Ahamadabad, Agarthala, Paradeep, Mid Sea, Delhi, Kakinada, Kolkata, Vizag, Hill Land Customs, Trichy, Banglore, Okha and Port Blair.

Since the purpose of the industry is to export marine products, they have to follow a list of safety standards and regulations regarding the processing, packaging, handling and transporting of products.

MPEDA (Marine Products Export Development Authority) is a force to help the country in promoting the export of marine products to various international destinations. It functions as a

supporting body to the farmers in increasing their production, by way of providing all type of assistance. The authority got various kinds of schemes which would help in promoting the trade of marine products and in protecting the exporters from all kinds of threats.

HACCP CONCEPT AND IMPLIMENTATION

HACCP is a preventive system of hazard control that a food processor can use to ensure that the food produced is safe for consumers. This system has been recognized as the state of the art system for food safety. It is not a zero risk system, but it is designed to reduce the risk of occurrence of food safety hazards to a minimum.

The HACCP system identifies critical control points, which occur in the processing and handling food and seafood and requires that preventive measures were established to avoid food safety hazards.

The steps like time, temperature, net weight, use of additives, etc... are then carefully monitored to keep the processing check. These include the point of receipt, the thermal processing stages and post cook stages, final packing on storage conditions. The important feature is the system of record keeping which would have to be made available for inspection and verification by the regulatory authorities. This became mandatory by 18th December 1997

To implement the new concept of HACCP a cell has been constituted in MPEDA to impart training to the technologists working in sea food industry and to implement the same. The HACCP personals of MPEDA were trained by FDA in their trainer's training program. They have also inspected the processing units and given assistance for preparing the HACCP manual at the request of the units.

The MPEDA having understood the requirements of the Indian industry and the quality stipulations by the importing countries and the standards such as:

i. Codex Alimentarius
ii. ISO 9000
iii. The European Union Regulations
iv. Hazard Analysis and critical control Point requirements of US

1.0 STATEMENT OF THE PROBLEM

HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, physical hazards from raw materials production and handling to manufacture, distribution and consumption of the finished products. HACCP is a preventive strategy with shared responsibility from farm to table. HACCP allows manufacturers to identify hazards as they could occur through the stages of production so that adequate measures can be implemented so they can be prevented.

MPEDA has certain guidelines and procedures regarding HACCP implementations in marine export industry. These procedures have to be followed by the exporting companies under MPEDA to avoid hazard and to meet the export standards at international level. The study is aiming to understand the perception of the management of the company about implementing HACCP and the effectiveness in avoiding hazards.

2.0 OBJECTIVES OF THE STUDY

i. To understand and to measure HACCP protocols implemented in marine food export industry under MPEDA.

ii. To evaluate the management perception on HACCP system implementation in marine food export under MPEDA

iii. To study the constraints in HACCP implementation system in marine food export and suggest solutions.

3.0 METHODOLOGY

Respondents of the study comprises the following

i. Officers of MPEDA
ii. Management of the Companies implementing HACCP system under the governance of MPEDA

Study Area : Ernakulam

Period of Study : July 21- October 3

Respondents : There are 88 marine food exporting companies in Ernakulam district under MPEDA, out of which all the 88 companies have been selected for the study. Managers of the 88 companies will be the respondents.

5.0 DATA COLLECTION METHOD

The study uses both primary data and secondary data. The primary data will be collected from the companies that are implementing HACCP system according to the MPEDA norms by the help of structured questionnaires.

Secondary data will be collected through direct interviews with the governing officers of MPEDA.

6.0 DATA ANALYSIS

Statistical tools such as time series analysis and percentage analysis are used along with IBM-SPSS

7.0 OBSERVATIONS TO BE MADE

From MPEDA:

i. Procedures of implementing HACCP by marine export industry.

ii. Guidelines suggested by MPEDA for marine export industry.

From the companies implementing HACCP system:

i. Procedures adopted for implementation of HACCP

ii. Perception of management on implementing and maintaining HACCP system.

iii. Constrains faced by the company for implementing HACCP

8.0 SCOPE OF THE STUDY

The implementation of HACCP system can enhance the performance of a food processing company, especially with regards to export. The study can help to understand about the HACCP principles and its importance in food related industries such as marine and seafood export industries. The study also highlights about the government interest and insistences in order to maintain food safety and to meet export standards. The study will throw light on significance of HACCP implementation in marine and seafood export industries.

9.0 LIMITATIONS OF THE STUDY

i. The reliability of data for the study will be based on the respondents.
ii. Short span of time is a constrain for the study.

10.0 CHAPTERISATION OF THE STUDY

The study is presented in 5 chapters

1. Design of the Study.
2. Theoretical orientation: HACCP system and its implementation.
3. Industry and Organization profile.
4. Data analysis
5. Summary of Finding, Suggestions and Conclusions.

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REVIEW OF LITERATURE

In In this chapter, an attempt is made to review critically the available literature. A comprehensive review of past studies is useful to formulate concepts, methodologies and tools of analysis to be used for study. The review was made on the following headings:

i. Marine food export industry

ii. HACCP implementation system

STUDIES RELATED TO MARINE FOOD EXPORT INDUSTRY

Bhattacherjee2 (1973) found out that in the initial years of export, the seafood industry did not have any minimum standards fixed for it. Due to after-sales hazards only the necessity for third party inspection of quantity was felt. Experience with the operation of the compulsory quality control and pre-shipment inspection had only helped the industry to raise the quality as well as quality consciousness. He was of the view that the realization of the government that even a genuine mistake in processing can cause irreparable damage to the export trade of seafood items. This paved way for the introduction of compulsory quality control in India. But the existing, under organized situation in the industry, highly perishable nature of commodity and sensitiveness of processing techniques will make the quality control measures very complex

Verghese(1985) made a study on aquaculture in India, in which the potential for aquaculture and the problems for aquaculture were analyzed. He stated that the industry was suffering from inadequate infrastructures, administrative outlooks and bottlenecks, absence of technology transfer, large capital outlays and irregular seed supplies.

J. Short4 (1987) suggested that under the present supply constraint and spiraling per capital consumption of sea food the challenge for seafood processing would be more. Based on US experience, the author cited market segmentation and targeting as means to maximize returns from limited resources. The processors must be more selective with respect to the utilization of resources by searching profitable products and customers.

Josupeit 5 (1988) outlined the differing performances of five main seafood commodities-shrimp, tuna, ground fish, cephalopods and canned small pelagics in 1987 as well as their outlook for 1988. The cultured shrimp led the way in expanding shrimp marketing in 1987 and as a result

of this the shrimp market was characterized by a persistent over-supply situation in the following years. To capitalize this situation producers and traders should promote shrimp in the countries in Europe where consumption is still far below average.

Prasad (1991) identified that infrastructure facilities at the processing plants were inadequate and many of such plants were not operating to its full capacity. Because of the seasonal nature of the raw material availability, the procurement costs were becoming very high and ultimately the export prices were not matching the production costs. These post-harvest technology of fish need to be improved and upgraded fish canning and products in consumer packs must suit not only the requirements of Japanese market but also the European market.

Singhal (1991) was of the view that India provides tremendous potential for the growth of the seafood industry but the market base for the Indian marine products had been made heavily dependent on Japan and USA despite the fluctuating demand found over there. In spite of the heavy demand for IQF shrimp products in the international markets, our products could not compete because of market resistance manifested through the established marketing channels from developed nations, tariff and non-tariff barriers created by government in importing countries, inherent structural weaknesses of the Indian industry and lack of aggressive promotional efforts. Moreover, the labour intensive operations and manual processing and handling of products were perceived to be unhygienic.

Krishnan(1992) made a study on the potentiality of Indian marine industry. According to him, the potential for enhancing the marine industry, as a leading one was bright but it was only the techniques and methods that have to be developed as it would result in higher production and lower price. He also concluded that to combat competition from Latin America and South East Asia the production strategy need to be improved.

Subasinghe (1993) was of the opinion that prepacked products offered convenience to end consumer apart from offering wide range of products in value added forms. Recent legal developments on labeling, so as to help the consumers in choosing a healthy and economic diet,

environmental legislation on packaging, eco-labeling practices by few countries also added to the significance of packaging of fish. Hence, it was important for the exporters to be fully aware of the total environmental impact of various operations required to produce the product and its packaging and to strive to reduce this impact to a minimum.

Sakthivel (1993) reported that though Western Europe as a whole emerged as the second largest importer of marine products, export to individual countries did not adhere to a steady pattern as each country had its own characteristic demand for fish and fishery products. He also identified that there was a ready market for a wide range of value added shrimp based products in Europe.

Ramachandran(1994) explained that the profitability of the market greatly depended on controlling the production cost since the Indian seafood trade was functioning in a buyers' market. The prices were decided for the product considering the international market supply and demand. He also pointed out that improving the quality and reducing the wastage of material would control the production cost. Moreover, a two stage scoring system was suggested by him; one to assess which raw material had to be processed first and the next to find out its total score.

Vivekandan(1994) Indian seafood industry was in the threshold of a major revolution. Conventional methods were fast changing and the industry was topping the list of sunrise industries in India. Major seafood buyers in the international market preferred Indian products as the marine products industry in Taiwan, Indonesia and China were with various problems

Varghese19 (1995) cautioned that apart from the shrinkage in marine catch the cost of catching and logistics of handling wild fish were rising at a rate beyond the financial viability level. In such a situation, the production through farming was imperative to augment export production. However, the technology for hatchery production of seed and grow out production management were yet to be developed in the country for commercial production.

Taliat (1995) made a study on the trends of seafood market at global level and found out that due to short supplies of fish catches, the major producers and exporters of seafood were forced to import raw material to keep their factories running. He also observed that convenient products in value added forms were having more demand and with the fast increasing communication system by way of fax, telex, Internet and credit rating systems the trade would be pushed up.

Alagaraja (1995) found that domestic markets consumed about 90 percent of the total fish catches. When data on country-wise, quantity-wise, species-wise exportedfish and fishery products were available, data on region-wise domestically marketed were not available. Thus, it was recommended to undertake market surveys, which would go a long way in directing the fish catches to the suitable markets for realizing better prices.

Santos (1995) listed down the general benefits and advantages of the application of HACCP system in seafood industry. To apply the concept, the companies would need to upgrade their installations and equipment, arrange for proper communication between sanitary authorities of both countries, employ well trained personnel, and to seek political will.

Sundaram(1999) held the view that the marine product sector remained untapped. India had not fully exploited the 200 nautical miles of its exclusive economic zone to earn foreign exchange and to increase employment through exports of marine products. Hence, this sector should be given priority by the government in addition to the care taken to minimize the adverse effect on employment of fisher folk and also ecology.

STUDIES RELATED TO FISHERY RESOURCES

George (1973) made a remark that for successful exploitation of the marine fishery resources, it was most vital that knowledge of the resources was essential. In India all along the centuries, marine fisheries exploitation has been in the hands of a type of people who are very backward and conservative. So, modern developments in fisheries had no impact on them. It was only in recent years that a change in attitude has taken place. Marine fish landing in India had attained the level of slightly near a million tons. It is possible to step up this production several fold. For this, considerable planning is required. Very large numbers of mechanized fishing vessels were required, besides landing and berthing facilities for these vessels. Adequate quantities of ice, water, fuel, oils, should be set up. All these will require high financial investments. For making such investments a thorough knowledge of the available resources is necessary. Many countries have produced fishery atlases giving full information of resources. In India also production of such

an atlas is necessary and for this efficient and thorough studies of resources will be required. The explorative survey so far done is inadequate and this should be planned in a much bigger way.

Sudarsan et.al. (1988) conducted a study on the appraisal of marine fishery resources of the Indian Exclusive Economic Zone. This study was based on the exploratory survey data collected by Fishery Survey of India vessels and attempt to assess the quantum of resources from the presently unexploited grounds outside 50 metre depth upto 300 metre in the case of demersal fisheries within EEZ of India. He stated that the current yield of fishery resources of the sea around India was about 1.8 million tons against wide ranging estimates of a potential of 2.3 - 8.5 million tons, which offered great scope to increase the marine fish production. The report also described the infrastructure facilities required to exploit these resources.

STUDIES ON INTERNAL AND EXTERNAL TRADE OF MARINE PRODUCTS

Chidanibanuti k., (1974) analyzed the export prospects of marine products. He observed that the major importers of Indian marine products were Japan, the USA, Srilanka. Australia, the UK and France. The two major items of world exports were shrimp and tuna. The author found that the landings of tuna were then restricted to Lakshadweep and few centers in Andaman 's due to lack of tuna fishing vessels, trained personnel and technical facilities. He suggested that the export potential could be exploited by generating adequate infrastructure, accelerating the programmes of production in the offshore and deep sea fishing grounds, improving methods of processing and effective marketing in an organized and regulated manner. Diversification of products and markets can be effectively done by exporting Sardines. deep sea lobster. frozen fish, tuna etc, to additional markets in Canada, Denmark, Sweden, Germany, Spain, East-Europe and South East Asia.

Sivayya K.V, (1979), in his article revealed that the share of exports of Indian marine products in aggregate exports increased from 1.62 percent in 1967 to 3.2 percent in 1976. The value of Indian marine products had been more than proportionate to the aggregate exports of the country. Frozen shrimp accounted for a major share, both in quantity and value, which had been mainly responsible for the sustained increase in the exports of Indian marine products. The USA and Japan were the major importers of Indian marine products. The share of other markets like UK, Australia, France and Srilanka declined due to imports of low valued items. Besides, due to

excessive concentration on shrimp, India could not capture a sizeable share in the marine products exports to several countries where there was considerable demand for tuna and allied species. The author suggested that the potential resources should be assessed and tapped by continuing inshore, off-shore and deep sea fishing as well as culturing. Efforts should made for product and market diversification. The appropriate strategy and policy ingredients should be evolved carefully. In a way, the primary task was three fold, to discover, to optimize and to produce results.

Verghese P.V., (1995), in his paper made an attempt to analyze the exploitation of marine fisheries resources and exports of India. He observed that the seafood export from India mainly depended on marine catch. The entire fishing industry was depending on exports. The marine landings and marine products export over the years were compared and it was noted that there was a steep rise in the unit value of exported items which was also reflected in the total export value realized. The high cost of vessels with powerful engines and accessories with high rate of fuel consumption have already made the capture fisheries intensive. The traditional system of fishing ensured optimum current benefits without affecting the potential for similar benefits in the future. The present day fisheries had become non-selective and as a result for short-term economic gains they rapidly deplete the fishery. In this situation the author emphasized the formulation of proper regulations and restrictions towards conservation for the sustainability of the operations.

Pillay, T.V.R., (1998), holds that the export of seafood had been a major incentive for the involvement of companies and corporations in large scale aquaculture operations. Though this had helped in earnings of foreign exchange, there was considerable resentment towards the neglect of domestic markets. He points out that the seafood exporters themselves realized the importance of this when the export markets were affected by unexpected problems, causing considerable financial losses. So he suggested that it was necessary to have a balance between domestic and export markets.

Srivastava K.P., (1999 (a)), in his paper analyzed the status of seafood quality management in India. He stated that, so far, 59 seafood processing units and seven freezer vessels had been approved to export their products to the countries of European union. The author suggested that the seafood exporters of India should develop necessary infrastructure required for the establishment of HACCP (Hazard Analysis critical Control point) based seafood quality and

safety management system because the Indian Seafood export trade was in a position to ensure the quality and safety of fishery products to the specific requirements of the importing countries.

Srivastava K.P., (1999(b)) discussed the quality requirements of seafood in India. He pointed out that over the last few years significant changes in policy and quality criteria had been observed in the international seafood trade. In keeping with the present day consumers demand for quality and governments responsibility for seafood safety, the author suggested that the sincere efforts should be made by Export Inspection Council, Export Inspection Agencies, Marine Products Export Development Authority and Central Institute of Fisheries Technology to develop necessary infrastructure for the establishment of a Hazard Analysis of Critical Point (HACCP) based seafood quality and safety management system.

Scheuplein J. Robert (1999) and Sakthivel M., (1999) made an attempt to highlight the various strategies to increase export of fish and fishery products from India. They observed in their studies that shrimps, crabs, lobsters, squids and tin fishes constitute major items of the export. Those were previously sent dried and canned but at present in frozen form, increasingly live fishes were exported. The demand from the various countries like the USA, France, Australia, Canada and Japan had changed throughout the years. The current share of seafood to the total Indian exports was 3.4 percent while India's share of the total world market was 2.52 percent. The smooth floor, roofing, handling and storeaging the catch, facilities for freshwater and ice and chill rooms were the facilities lacking at the landing centres. The employee landings centers and other users needed training in the handling facilities. Fish products were processed at cheaper cost, in value added form for a higher unit price, formation of a separate ministry for fisheries in the Central Government and ilso the stralcwv cwetalt tic clorment of fisheries had been suggested by the author.

Tharakan A.J (1999), in his study observed that India had international competitive advantage in shrimp and cephalopods. Therefore, he suggested that higher unit value realization from the export of these two products should be realized by value addition and creation of international brand equity for Indian Shrimp and cephalopods.

STUDIES RELATING TO FISHING TECHNOLOGY

Chennubhotla, V. S. K et,al. (1999) had conducted a study about the different kinds of non-mechanized and mechanized crafts used and gear employed along the Andhra Pradesh coast. They observed that until the middle of 1960s fishing for marine fin fishes and shellfishes along the Andhra Pradesh coast used to be carried out employing indigenous non-mechanized crafts. Subsequently. trawlers and later mechanized vessels operating gillnets came into use which resulted in the decreased fish production. Use of outboard engine on indigenous crafts for reaching fishing grounds was a recent feature of near the coast fishing.

STUDIES RELATING TO PRODUCTION

Chakraborty, Nair and Balakrishnan (1973) in their article examined the characteristics of marine fish production in India. India produced annually, Approximately 0.7 million tons of marine fish. Total production figures as well as landings from individual fisheries vary widely over the years. Increasing effort was put to produce higher yields. A study of these figures had assumed importance lot proper understanding of' the resources of important fisheries. The quarter wise catch figures of important fishes had been studied and indices showing their seasonal and regional occurrences had been constructed and discussed.

Saxena (1984) studied the management aspects of shrimp Fishery with particular reference to India in 1984. According to him, the Indian shrimp fishery after 1975 had been experiencing a decline, which had been substantiated by reduction in catch per unit effort. In the light of the decline of the Indian shrimp fishery, three types of tools to manage the same had been suggested: (i) an exhaustive techno-economic survey was undertaken to study the production, processing and marketing costs, margins, practices, channels, etc, along with the socio-economic conditions to the local fishermen in order to provide alternative employment opportunities and financial compensation, (ii) the type of management tools included regulatory measures and (iii) relate to the encouragement of shrimp culture.

Sabha Rao (1986) made a study to examine the trends in the total fish production of Andhra Pradesh and compared the same with all India fish production at different points of time. Andhra Pradesh was lagging behind in the long term trend of annual growth of fish production

than that of India as a whole during the period 1961-81. The catching pattern with reference to percentage distribution of different species in different years showed a declining trend in most cases. The common feature in all the species was the heavy fluctuations.

Devaraj, Sathiadhas and Reghu (1998) in their paper reviewed that the marine fish production in India. They assessed that the economic performance of trawlers and motorized gillnetters, distribution pattern of marine fish in the internal market and the performance of marine fishery exports, evaluated the capacity utilization of processing plants and suggested the policy measures for improvements in production and marketing of marine fish.

Ammini (1999) attempted to assess the status of marine fish production in Kerala vis-a-vis the production before ban was introduced. The author had made a comparison of fishroduction between the pre-ban period (1981-1987) and ban period (1988 - 1997) There had been unprecedented growth in the marine fish production in Kerala during the last decade which incidentally coincided with theperiod during which ban on trawling during monsoon had been in vague. Comparison of the average landings during 1981 - Q87 and 1988 - 1997 indicated an increase of 69 per cent in overall landings in the state and surprisingly two points which deserved consideration were:(a) the increase (69 per cent) had been uniform in pre-monsoon, monsoon andpost monsoon periods, (b) the relative intensity of landings during the three seasons remained the same during pre-ban and ban period (26 per cent during permission, 24 per cent during monsoon and 50per cent during post monsoon).

Shiyani, R.L, (2002) made an analysis on district-wise and species-wise growth and instability of marine fisheries in Gujarat. It had been concluded from the study that relative share of Junagadh, Kutch and Jamnagar districts in the total marine fish production of the state increased substantially over a period of time, whereas a drastic decline in the case of Valsad and Ambreli districts was noticed. The instability indices were comparatively higher during 1970-80 in all the districts except Kutch, Ambreli and Jamnagar. The compound growth rates of fish production of almost all the species were positive and significant. It had been suggested that awareness campaign among th(fishermen on the importance of mesh size regulation would be useful for the sustainable benefit of marine fisheries in the long run. The Government should take necessary step to enforce sea law demarcating different fishing grounds for different craft gee combination which would

help in maintaining the socio-economic balance instead creating socio-economic conflicts among the fishermen.

STUDIES RELATING TO MARKETING

Singh and Gupta (1983) conducted a study on marine fish marketing, a fisheries development in India in the year 1983. They pointed out that the transportat of fish was very inefficient in India. Due to inadequate transportation, no fresh fish was ailable in potential markets located away from the landing centres, whereas surplus fish at harbours were sent to fish meal plants. Further, it had been observed that the catches of certain varieties like sardines and mackerels were landed in a large quantity in the fishing season.

Devadasan (2003) had given an account of a good potential for India to increase its share in international fish trade by exporting value added fish products. It has been concluded that most of the market channels used were not suitable to trade value added products. A new and an appropriate channel would be the super market chain, which procure directly from the source of supply. Appearance, packaging and display Would were all important factors leading to successful marketing of any new value added product. The retail pack must be clean, crisp and clear and make the contents appear attractive to the consumer. The customer must be given confidence to experiment with a new product launched in the market.

STUDIES ON PROBLEMS AND PROSPECTS OF MARINIE PRODUCTION

Prakash et.al (1997) in their research work found that in India increase in the Export of aqua products is mainly due to the rapid adoption of intensive aqua farming. In recent years, due to burgeoning industrialization the fishery resources are being heavily threatened by environmental pollution and contemporarily, there has been a world-wide upsurge of interest towards maintaining fresh water and marine fishes and invertebrates in captivity. In aqua farming, good water quality is a prerequisite for the propagation of desired aquatic organisms as it enhances higher survival. better growth and total production. Therefore, proper water quality management is the key to achieve sustainable aquaculture.

Tharakan, A.J., (1998) made an attempt to highlight the reason for impairs and solutions for seafood industry in India. This throws light on the problems related to infrastructure facilities like power, potable water, transport facilities. modern techniques, financial assistance, capacity utilization etc. The author recommended that all the fishing vessels including country crafts, mechanized boats and trawlers must be given time to upgrade to meet the National Standards. The state must overcome the basic infrastructure problems, the peeling and preprocessing facilities should be upgraded to operate under high hygiene and sanitation standards.

Devaraj .M., et.al (1999), in his study noted that marine fisheries production in India which was only 0.5 million tones (MT) in 1950 increased rapidly breaking at 2.7 mt in 1997. The population of active fishermen and the efficiency of fishing vessels had substantially increased. Inappropriate exploitation patterns were showing signs of detrimental effect on the fisheries.

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THEORETICAL ORIENTATION

CHAPTER 2

THEORETICAL ORIENTATION

2.1 Hazard:

Hazard is any biological, chemical or biological agent that is responsibly likely to cause illness or injury in the absence of its control.

Biological hazards include harmful bacteria, viruses or parasites.

Chemical hazards include compounds that can cause illness or injury due to immediate or long-term exposure.

Physical hazards include foreign objects in food that can cause harm when eaten, such as glass or metal fragments.

It is important to understand that, for the purposes of HACCP, hazards only refer to the conditions or contaminants in food that can cause illness or injury to people. Many conditions are highly undesirable in food, such as the presence of insects, hair, filth or spoilage. Economic fraud and violations of regulatory food standards are equally undesirable. All of these defects must be controlled in food processing. However, they often are not directly related to the safety of the product. Unless these conditions directly affect food safety, they are not included in a HACCP plan.

2.2 What is HACCP?

HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product.

The HACCP approach is unique for every product and for every production unit: in each case, a detailed study of the fish farming methods, inputs and production conditions is required, and the sequential flow is necessary to identify hazards and the critical control points.

Another important feature of HACCP is that it provides the basis for clearly defining and modernizing the roles industry and government must play to ensure the safety of food. The

government does not produce food. Thus, government action alone cannot make it safe. At the point of production and processing, only food companies have the capability and responsibility to make food safe. Maintaining food safety also requires responsible private action at each step of distribution, retail preparation and sale, and subsequent handling by consumers.

The government's core regulatory role, which HACCP can facilitate, should be to verify that companies are meeting their responsibility. The government should define in law the companies' basic food safety obligation and provide accountability for businesses to meet those standards through appropriate oversight and enforcement.

For successful implementation of a HACCP plan, a company must be strongly committed to the HACCP concept. A firm commitment to HACCP by top management provides company employees with a sense of the importance of producing safe food.

In the development of a HACCP plan, five preliminary tasks need to be accomplished before the application of the HACCP principles to a specific product and process.

- Assemble the HACCP team
- Describe the food and its distribution
- Describe the intended use and consumers of the food
- Develop a flow diagram which describes the process
- Verify the flow diagram

On the other hand, the seven principles of HACCP have been universally accepted by government agencies, trade associations, and the food industry around the world.

2.3 HACCP SYSTEM IMPLIMENTATION PROCESS

Prior to application of HACCP to any sector of the food chain, that sector should have in place prerequisite programs such as good hygienic practices according to the Codex General Principles of Food Hygiene, the appropriate Codex Codes of Practice, and appropriate food safety requirements. These prerequisite programs to HACCP, including training, should be well established, fully operational and verified in order to facilitate the successful application and implementation of the HACCP system.

For all types of food business, management awareness and commitment is necessary for implementation of an effective HACCP system. The effectiveness will also rely upon management and employees having the appropriate HACCP knowledge and skills.

During hazard identification, evaluation, and subsequent operations in designing and applying HACCP systems, consideration must be given to the impact of raw materials, ingredients, food manufacturing practices, role of manufacturing processes to control hazards, likely end-use of the product, categories of consumers of concern, and epidemiological evidence relative to food safety.

The intent of the HACCP system is to focus control at Critical Control Points (CCPs). Redesign of the operation should be considered if a hazard which must be controlled is identified but no CCPs are found.

HACCP should be applied to each specific operation separately. CCPs identified in any given example in any Codex Code of Hygienic Practice might not be the only ones identified for a specific application or might be of a different nature. The HACCP application should be reviewed and necessary changes made when any modification is made in the product, process, or any step.

The application of the HACCP principles should be the responsibility of each individual business. However, it is recognised by governments and businesses that there may be obstacles that hinder the effective application of the HACCP principles by individual business. This is particularly relevant in small and/or less developed businesses. While it is recognized that when applying HACCP, flexibility appropriate to the business is important, all seven principles must be applied in the HACCP system. This flexibility should take into account the nature and size of the operation, including the human and financial resources, infrastructure, processes, knowledge and practical constraints. Small and/or less developed businesses do not always have the resources and the necessary expertise on site for the development and implementation of an effective HACCP plan. In such situations, expert advice should be obtained from other sources, which may include: trade and industry associations, independent experts and regulatory authorities. HACCP literature and especially sector-specific HACCP guides can be valuable. HACCP guidance developed by experts relevant to the process or type of operation may provide a useful tool for businesses in designing and implementing the HACCP plan. Where businesses are using expertly developed

HACCP guidance, it is essential that it is specific to the foods and/or processes under consideration. More detailed information on the obstacles in implementing HACCP, particularly in reference to SLDBs, and recommendations in resolving these obstacles, can be found in "Obstacles to the Application of HACCP, Particularly in Small and Less Developed Businesses, and Approaches to Overcome Them" (document in preparation by FAO/WHO).

The efficacy of any HACCP system will nevertheless rely on management and employees having the appropriate HACCP knowledge and skills, therefore ongoing training is necessary for all levels of employees and managers, as appropriate.

2.4 STAGES OF HACCIP SYSTEM IMPLIMENTATION

The application of HACCP principles consists of the following tasks as identified in the Logic Sequence for Application of HACCP

1. Assemble HACCP team

The food operation should assure that the appropriate product specific knowledge and expertise is available for the development of an effective HACCP plan. Optimally, this may be accomplished by assembling a multidisciplinary team. Where such expertise is not available on site, expert advice should be obtained from other sources, such as, trade and industry associations, independent experts, regulatory authorities, HACCP literature and HACCP guidance. It may be possible that a well-trained individual with access to such guidance is able to implement HACCP inhouse. The scope of the HACCP plan should be identified. The scope should describe which segment of the food chain is involved and the general classes of hazards to be addressed (e.g. does it cover all classes of hazards or only selected classes).

2. Describe product

A full description of the product should be drawn up, including relevant safety information such as: composition, physical/chemical structure (including A_w, pH, etc…), microbial/static treatments (heat treatment, freezing, brining, smoking, etc), packaging, durability and storage conditions and method of distribution. Within businesses with multiple products, for example,

catering operations, it may be effective to group products with similar characteristics or processing steps, for the purpose of development of the HACCP plan.

3. Identify intended use

The intended use should be based on the expected uses of the product by the end user or consumer. In specific cases, vulnerable groups of the population, e.g. institutional feeding, may have to be considered.

4. Construct flow diagram

The flow diagram should be constructed by the HACCP team (see also paragraph 1 above). The flow diagram should cover all steps in the operation for a specific product. The same flow diagram may be used for a number of products that are manufactured using similar processing steps. When applying HACCP to a given operation, consideration should be given to steps preceding and following the specified operation.

5. On-site confirmation of flow diagram

Steps must be taken to confirm the processing operation against the flow diagram during all stages and hours of operation and amend the flow diagram where appropriate. The confirmation of the flow diagram should be performed by a person or persons with sufficient knowledge of the processing operation.

6. List all potential hazards associated with each step, conduct a hazard analysis, and consider any measures to control identified hazards

The HACCP team should list all of the hazards that may be reasonably expected to occur at each step according to the scope from primary production, processing, manufacture, and distribution until the point of consumption.

The HACCP team should next conduct a hazard analysis to identify for the HACCP plan, which hazards are of such a nature that their elimination or reduction to acceptable levels is essential to the production of a safe food.

In conducting the hazard analysis, wherever possible the following should be included:

- the likely occurrence of hazards and severity of their adverse health effects;
- the qualitative and/or quantitative evaluation of the presence of hazards;
- survival or multiplication of micro-organisms of concern;
- production or persistence in foods of toxins, chemicals or physical agents; and,
- conditions leading to the above.

Consideration should be given to what control measures, if any exist, can be applied to each hazard.

More than one control measure may be required to control a specific hazard(s) and more than one hazard may be controlled by a specified control measure.

7. Determine Critical Control Points

There may be more than one CCP at which control is applied to address the same hazard. The determination of a CCP in the HACCP system can be facilitated by the application of a decision tree, which indicates a logic reasoning approach. Application of a decision tree should be flexible, given whether the operation is for production, slaughter, processing, storage, distribution or other. It should be used for guidance when determining CCPs. This example of a decision tree may not be applicable to all situations. Other approaches may be used. Training in the application of the decision tree is recommended.

If a hazard has been identified at a step where control is necessary for safety, and no control measure exists at that step, or any other, then the product or process should be modified at that step, or at any earlier or later stage, to include a control measure.

***8.* Establish critical limits for each CCP**

Critical limits must be specified and validated for each Critical Control Point. In some cases, more than one critical limit will be elaborated at a particular step. Criteria often used include measurements of temperature, time, moisture level, pH, available chlorine, and sensory parameters such as visual appearance and texture.

Where HACCP guidance developed by experts has been used to establish the critical limits, care should be taken to ensure that these limits fully apply to the specific operation, product or groups of products under consideration. These critical limits should be measurable.

9. Establish a monitoring system for each CCP

Monitoring is the scheduled measurement or observation of a CCP relative to its critical limits. The monitoring procedures must be able to detect loss of control at the CCP. Further, monitoring should ideally provide this information in time to make adjustments to ensure control of the process to prevent violating the critical limits. Where possible, process adjustments should be made when monitoring results indicate a trend towards loss of control at a CCP. The adjustments should be taken before a deviation occurs. Data derived from monitoring must be evaluated by a designated person with knowledge and authority to carry out corrective actions when indicated. If monitoring is not continuous, then the amount or frequency of monitoring must be sufficient to guarantee the CCP is in control. Most monitoring procedures for CCPs will need to be done rapidly because they relate to online processes and there will not be time for lengthy analytical testing. Physical and chemical measurements are often preferred to microbiological testing because they may be done rapidly and can often indicate the microbiological control of the product.

All records and documents associated with monitoring CCPs must be signed by the person(s) doing the monitoring and by a responsible reviewing official(s) of the company.

10. Establish corrective actions

Specific corrective actions must be developed for each CCP in the HACCP system in order to deal with deviations when they occur.

The actions must ensure that the CCP has been brought under control. Actions taken must also include proper disposition of the affected product. Deviation and product disposition procedures must be documented in the HACCP record keeping.

11. Establish verification procedures

Establish procedures for verification. Verification and auditing methods, procedures and tests, including random sampling and analysis, can be used to determine if the HACCP system is working correctly. The frequency of verification should be sufficient to confirm that the HACCP system is working effectively.

Verification should be carried out by someone other than the person who is responsible for performing the monitoring and corrective actions. Where certain verification activities cannot be performed in house, verification should be performed on behalf of the business by external experts or qualified third parties.

Examples of verification activities include:

- Review of the HACCP system and plan and its records;
- Review of deviations and product dispositions;
- Confirmation that CCPs are kept under control.

Where possible, validation activities should include actions to confirm the efficacy of all elements of the HACCP system.

12. Establish Documentation and Record Keeping

Efficient and accurate record keeping is essential to the application of a HACCP system. HACCP procedures should be documented. Documentation and record keeping should be appropriate to the nature and size of the operation and sufficient to assist the business to verify that the HACCP controls are in place and being maintained. Expertly developed HACCP guidance materials (e.g. sector-specific HACCP guides) may be utilised as part of the documentation, provided that those materials reflect the specific food operations of the business.

Documentation examples are:

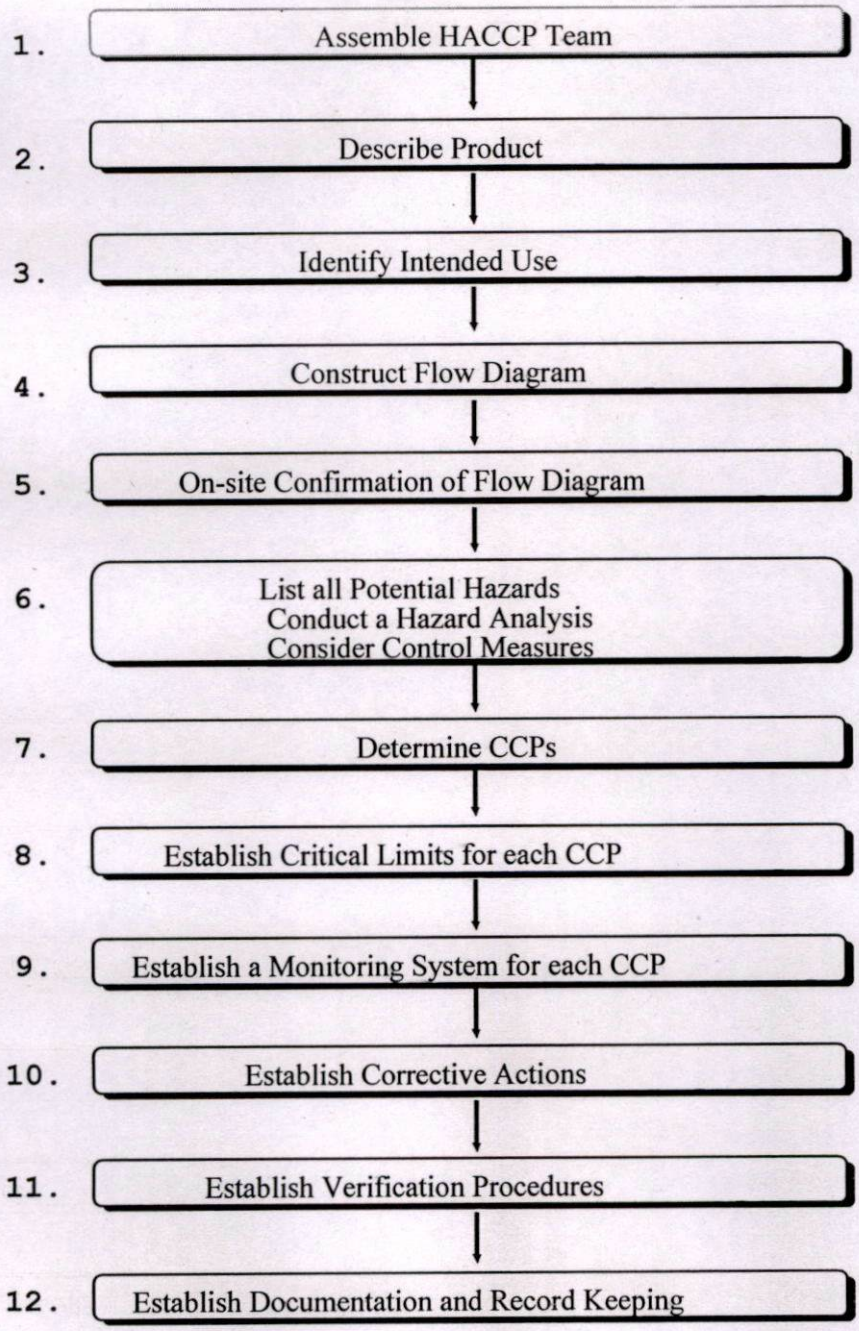
Hazard analysis;

CCP determination;

Critical limit determination.

A simple record-keeping system can be effective and easily communicated to employees. It may be integrated into existing operations and may use existing paperwork, such as delivery invoice and checklists to record, for example, product temperatures.

Logic Sequence for application of HACCP



2.5 TRAINING

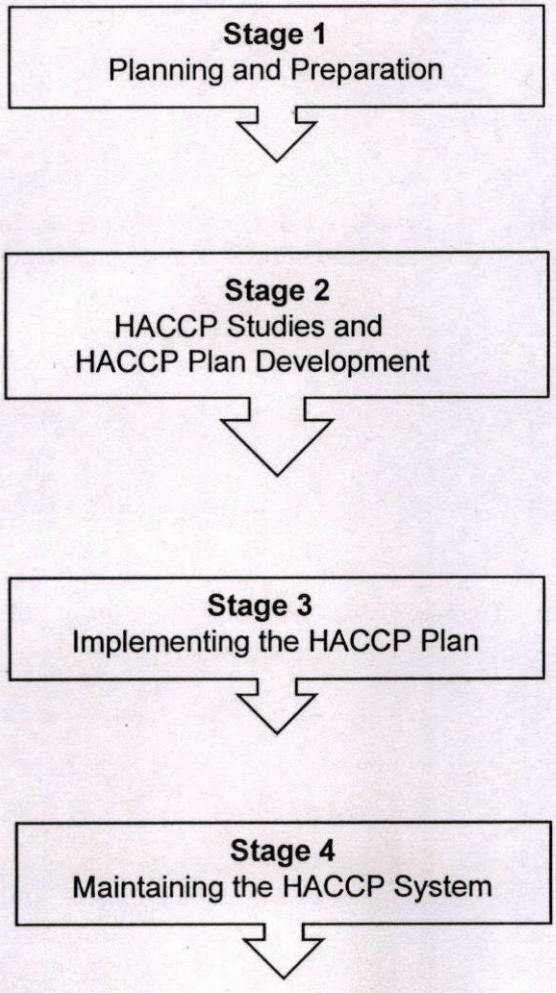
Training of personnel in industry, government and academia in HACCP principles and applications and increasing awareness of consumers are essential elements for the effective implementation of HACCP. As an aid in developing specific training to support a HACCP plan, working instructions and procedures should be developed which define the tasks of the operating personnel to be stationed at each Critical Control Point.

Cooperation between primary producer, industry, trade groups, consumer organisations, and responsible authorities is of vital important. Opportunities should be provided for the joint training of industry and control authorities to encourage and maintain a continuous dialogue and create a climate of understanding in the practical application of HACCP.

2.6 The Key stages of HACCP:

When the decision is taken to use HACCP within a company, there is often the inclination to charge ahead and start doing something without taking the time to consider the best approach for your company. It is important to have sufficient knowledge before getting started, i.e., to understand both the theory of HACCP and the practicalities of implementation.

Any company that is new to the HACCP techniques will go through four key stages to obtain an effective system. This approach can also be used when updating the system.



2.7 Planning and Preparation

This is where the foundations are laid and it is important to take time here to:

- Ensure that the appropriate people are identified and trained.
- Establish what support systems are already in place and what needs to be developed.
- Consider the most appropriate structure for your HACCP system.
- Plan the entire project, including a realistic timetable for development and implementation of the HACCP plan.

The first thing to do is to consider what you are trying to achieve. The path you take to a fully implemented HACCP system will then depend on where you are starting from and the maturity of your existing systems.

HACCP is a people-based system. As a tool, HACCP is used by people and if the people are not properly educated, experienced, and trained then the resulting HACCP system is likely to be ineffective and unsound. Early involvement of senior management is fundamental to the effective implementation of HACCP. Real commitment can only be achieved if there is complete understanding of what it takes to develop and maintain a food safety program and how HACCP fits into this. Senior managers do need a basic understanding of the most likely food safety hazards and ways to control them. This will include an understanding of what HACCP actually is, what benefits it can offer to the company, what is really involved, and what resources will be required. This understanding will be achieved not only by reading books, but also by attending a food safety and HACCP briefing and discussion session, as a senior management group. This may be undertaken by a reliable consultant if there is no one able to do it internally. Open discussion should be encouraged, with the end result that the decision to enhance the program is given full support by all members of the management team. This will be important in cascading commitment to everyone in the company.

HACCP is only going to be effective as a means of managing food safety if the people responsible for it are competent. As a result, training and education becomes the single most important element in setting up a successful HACCP system. It not only provides the technical skills required in implementing HACCP, it also helps in changing attitudes of people where required. This cannot be stressed enough. Codex comments that the efficacy of any HACCP system relies on management and employees having appropriate HACCP knowledge and therefore, ongoing training is necessary for all levels of employees and managers and that this is an "essential element for the effective implementation of HACCP" (Codex, 2009b). ISO22000

2.8 PRELIMINARY STEPS INVOLVED IN IMPLEMENTATION OF HACCP

The application of HACCP principle consist of the following stages.

(a) Assemble HACCP team

The food operation should assure that the appropriate product, specific knowledge and expertise is available for the development of an effective HACCP plan. This is effective by assembling a multi-disciplinary team. Where such expertise is not available on site, expert device should be obtained from other sources. Main objective hear is to identify the scope of plan. The scope should describe which segment of the food chain is involved and the general clauses of the hazard to be addressed.

(b) General Information

Record the name and address of the processing facility in the space provided on the first page of the hazard analysis work sheet and the HACCP platform.

(c) Product Description

A full description of the product should be drawn up including the relevant safety information such as consumption physical/chemical structure (include AW,pH etc…) static treatment (freezing, brining, smoking etc…) packaging durability etc…

(d) Describe Method of Distribution and Storage

Identify how the product is distributed and stored after distribution. Record this data to the work sheet

(e) Identify the Intended Use

Identify the intended consumer or user of the product. The intended consumer may be general public or a section of the population such as infants or the elderly. The intended user may be another processor, who will further process the product. Also identify how the product will be used by the end user.

(f) Develop a Flow Diagram

The purpose of the flow diagram is to provide a clear sample description of the steps involved in the processing of the fishery product and its associated ingredients as they flow form receipt to distributor.

2.9 PRINCIPLES INVOLVED IN HACCP IMPLIMENTATION

Once the preliminary steps are completed the team develops the HACCP plans based on the following HACCP principles.

Principle 1

Conduct Hazard Analysis

After satisfying that the pre requisite programs are implemented, the HACCP team conduct hazard analysis. This analysis begins with the HACCP team brain storming the potential species related and process food safety hazards that could affect the product. The team then determines the significance of each potential hazard whether it is reasonably likely to occur. For each significant hazard, the team identifies preventive measures.

Hazards may be chemical, physical or biological property. Chemical hazards are often looked on as the most important by the consumer. But in reality they often pose a relatively low risk at levels likely to be found in food and cause long term effects. Biological hazards on

the other hand usually present the greatest immediate danger to the consumer through the potential to cause food poisoning.

Principle 2

Identify the Critical Control Points

It is important to identify the critical control point at each stage of the processing. The CCP must be taken care properly because it is the key state of the whole system.

Principle 3

Establish Critical Limits

After completing the hazard analysis, the team determines the appropriate critical control points for each of the significant hazards. Critical control points are the stages in a processing operation where the food safety hazards are controlled.

Principle 4

Establish Monitoring Procedures

The team then establish monitoring procedures to ensure that the critical limits were consistently met. Each procedure should specify what has to be monitored. Monitoring is usually performed using physical or chemical measurement or by observation. It must provide a real time date but can be continuous or intermittent.

Principle 5

Establish Corrective Action Procedures

After monitoring the team may establish corrective act on procedures to be followed wherever there is deviation for the critical limits. Corrective action procedures must be sufficient to restore control to the process and to ensure that no unsafe product is distributed. An effective corrective action plan must correct and determine the cause of the non-compliance to assure that the CCP is brought back under control when the deviation occurs, identify the

non-conforming product and the same has to be disposed. It may be necessary to determine the cause of deviation to prevent future recurrence.

Principle 6

Establish Record Keeping System

The team then develops system of record keeping that will document the accomplishment of the monitoring procedures, corrective action procedures and verification procedures. The monitoring records are to be listed in the HACCP plan.

Principle 7

Record Keeping

Finally the team establishes verification procedures. Verification is the use of methods procedures or testes in addition to those used in monitoring to determine if the HACCP system is in compliance with the HACCP plan and whether the plan is still adequate to address the significant hazard it is included collaboration product testing at the options and plan reassessment. As with the monitoring principle verification procedures should state both the method and frequency of the procedure.

Verification includes the following steps

Reassessment of HACCP plan

A reassessment of the adequacy of the HACCP plan is necessary whenever any changes occur that could affect the HACCP analysis. Such changes may include raw materials product formulation processing methods. The HACCP plan has to be modified immediately whenever there is a re-assessment.

Ongoing verification activities

(a) A review of consumer complaint that has been received by the processor to reveal the existence of identified critical control points.
(b) The calibration of process monitoring instruments.
(c) At the option of the processor performing periodic end product or in process testing.

Record review:

This includes the review of the records that documents

(a) The CCP monitoring records

(b) Calibration of any process control instrument used at CCP

(c) Taking corrective action

This is to ensure that the records are complete and to verify whether the right actions are taken.

INDUSTRY AND ORGANIZATION PROFILE

CHAPTER 3

INDUSTRY AND ORGANIZATION PROFILE

3.1 Industry Profile

Export plays a very significant role in the development and growth of any country. For many countries, export earnings constitute one of the most important sources of meeting foreign exchange requirements for development projects. India is a developing country requiring import of equipment, machineries, technical know-how to support growth and modernization of several of its developmental activities. To fulfill this, the country has two options; one is to allow free flow of foreign capital both foreign direct investment and credit from international Monetary Institutions, and the other option is to increase its exports to earn foreign exchange, sufficient to pay the import bills. India has availed both the sources with greater role for the former in the 10.50's and 1960's. Only from early years of 1970's, export received adequate attention. A drastic change in the policy was made in 1991 with a focus on liberalization and globalization of the economy, the later assigning high priority for export as an engine for growth. A liberal outward looking policy aims at export led growth and a rapid growth is expected to have a strong trickle down effect to remove poverty and unemployment in the economy.

The traditional goods from agriculture and handicrafts have dominated exports from India. Only recently, non-traditional goods such as engineering products, machine tools, processed foods and computer software find significant shares in total export by India. At the same time, the policies of globalization, especially the emergence of GATT and WTO have opened up new opportunities for increased export of traditional goods, with high value additions. It can be taken as both a challenge and an opportunity. It is a challenge because the quality of the product must meet the international standard(ISO) to stand the stiff competition of the world trade; and an opportunity because it opens up the new scope for more efficient use of natural resources land and sea to the benefit of a vast section of Indian population that is dependent on these resources and is poor and underemployed. Sector of such prospective export oriented production is fisheries.

3.1.1 India's marine products Export profile:

The principal export markets for Indian marine products are Japan. USA though exports of marine products are affected to a large number of markets. Other destinations of some significance include European Union, China, South East Asia, Middle East, East Europe. African countries, Latin American countries, other Asian and European countries.The important ports through which marine products are exported from India includes Mumbai, JNP, Kandla, Porbandar, Pipavav, Goa, Kochi, Trivandrum, Mangalore/ICD, Karwar, Chennai, Tuticorin, Mundra, Haldia, Calicut, Nsict, Karimganj, Ahmadabad, Agartala, Paradeep, Mid Sea, Delhi, Kakinada, Kolkata, Vizag, Hill Land Customs, Trichy, Bangalore, Okha, Port Blair

The marine products export basket of India comprises mainly frozen shrimp, frozen fish, frozen squid, frozen cuttle fish, dried item, chilled items, live items, frozen lobster, frozen octopus, canned item, pickles and others. Until recently frozen frog legs was also one of the important items of export. Restrictions imposed on catch of frogs to maintain ecological balance and the crude process of their killing considered as cruelty are bound to affect the exports of this item.

3.1.2 MAJOR MARINE PRODUCTS EXPORTED FROM INDIA

The major marine products exported from India include the following.

i. **Frozen Shrimp**

It includes AFD shrimp, Block frozen shrimp, breaded shrimp. cooked salad shrimp individually quick frozen (Kg) shrimp and cultured shrimp.

ii. **Frozen Fish**

It includes Chinese promfert, Promfert(black), Promfert(white)

iii. **Frozen tuna**

iv. **Frozen cuttle fish**

v. **Ornamental fish**

3.1.3 Food Processing Industry

The Indian food industry is poised for huge growth, increasing its contribution to world food trade every year. In India, the food sector has emerged as a high-growth and high-profit sector due to its immense potential for value addition, particularly within the food processing industry.

The food industry, which is currently valued at US$ 39.71 billion! is expected to grow at a Compounded Annual Growth Rate (CAGR) of 11 per cent to US$65.4 billion by 2018. Food and grocery account for around 31 per cent of India's consumption basket.

Accounting for about 32 per cent of the country's total food market, The Government of India has been instrumental in the growth and development of the food processing industry. The government through the Ministry of Food Processing Industries (MOFPI) is making all efforts to encourage investments in the business. It has approved proposals for joint ventures (JV), foreign collaborations, industrial licenses and 100 per cent export oriented units.

The Indian food and grocery market is the world's sixth largest, with retail contributing 70 per cent of the sales. Food has also been one of the largest segments in India's retail sector, which was valued at US$ 490 billion in 2013@. The Indian food retail market is expected to reach ₹ 61 lakh crore (US$ 894.98 billion) by 2020.

The Indian food processing industry accounts for 32 per cent of the country's total food market, one of the largest industries in India and is ranked fifth in terms of production, consumption, export and expected growth. It contributes around 14 percent of manufacturing Gross Domestic Product (GDP), 13 per cent of India's exports and six per cent of total industrial investment. Indian food service industry is expected to reach US$ 78 billion by 2018.The Indian gourmet food market is currently valued at US$ 1.3 billion and is growing at a Compound Annual Growth Rate (CAGR) of 20 per cent. India's organic food market is expected to increase by three times by 2020.

3.1.4 THE INDIAN SEAFOOD INDUSTRY

3.1.4.1 SEA FOOD

Seafood consists of an extensive variety of sea animals and seaweed, which are served as a delicacy or is regarded as suitable for the purpose of eating. Seafood usually comprise mostly of seawater animals, such as fish and shellfish (including mollusks and crustaceans). Seafood is also used collectively to refer to animals from fresh Water and any other kind of edible aquatic animals. This category makes up the hulk of the human food that comes from the waters of the world. Under this classification, edible seaweed is also included, though it is specifically termed as sea vegetables. Types of Seafood Sea food is categorized under three main classes: Fish, Shellfish and Roe. • Fish is any non - tetrapod chordate, i.e., an animal with a backbone that has gills throughout life and has limbs, if any, in the shape of fins. Few of the fishes which are regarded as edible are Anchovy, Bluefish, Catfish, Eel, Flounder. Grouper.

3.1.5 HISTORY OF MARINE PRODUCTS EXPORT IN INDIA

The evolution of export of Marine Products from India can be studied under various stages. They are presented below.

3.1.6 FIRST STAGE [FROM 50s TO EARLY 70]

In this stage, India's marine products exports mainly selected dried items like anchovies. shrimps, shark tins etc. The traditional nei2-hbourin, countries like Sri Lanka, Malaysia. Singapore and Burma were the major markets. During this period fish was also the cheapest animal protein food for domestic consumers. and the exports markets mostly served the poor in those countries. The exports in no way then affected Indian domestic consumers, but acted as a cushion for the producers (fisheries) as it helped to maintain a steady price for their produce even during seasons of bumper landings.

3.1.7 SECOND STAGE [FROM 70s TO EARLY 90s]

In this stage frozen items took the center stage and markets also got shifted to developed countries like US. Japan and European nations. While initially frozen shrimp as the major item. slowly cephalopods (cuttlefish and squid) and other crustaceans also became important species in

the export basket during this period. As these were selected items, it did not affect seriously the domestic fish consumers. especially the poor and the middle class. As foreign exchange earnings were a prime motto during this period, the Government came forward with lot of incentives, subsidies for production as well

The fall in supply of shrimp also coincided with the increasing dominance of frozen fish (fin fish) in terms of quantity and this could be termed the most important change in happening in marine products export in the last one or two decades. In the year 2006-07, while frozen fish formed 44 % and in the year 2008-09, the emergence of chilled items (mainly fin fish) increased significantly to 21450 tins (4 %) from a mere 6540 tons in 2007-08. Unfortunately, all this was happening even, when India's total marine fish ladings in the country was either declining or stagnating and not showing any growth. The marine fish landings were not increasing due to lack of fishing effort, because India has reached the sustainable limits of Indian seas. Hence it is possible to increase the exports only by depriving Indian fish to the domestic consumers.

It is no more a situation of a few selected and highly priced varieties sent overseas thus not affecting e the domestic fish trade and fish consumers. Even low priced fishes are now more and more exported. This is more evident from the changes noticed in the export destinations. In terms of quantity, over the last more than one decade, China and other southeast Asian countries take away almost half of Indian marine products export. In 1996-2000 periods, they accumulated by 40 % of the volume, but only 20 % by with their performance for finfish. In 2009-2009 China and South East Asian countries topped with 39 % by volume. Putting European Union behind with 25%. During 2009-10 export earn9ings have crossed 2 billion US $ and Rs. 10,000 crore marks. Exports aggregated to 678436 tons valued at Rs. 10048.53 crores and US $ 2132.84 million. This recorded an increases growth of 12.54 % in quantity,16.74 % in Rupee earning and 11.75 % growth in US $ earning.

Export of marine products during April –March 2010-2011 have achieved the US $ 2.67 billion mark by registering a growth of 10.96 % in quantity. 20.42% In INR value and 25.55 % in US $ realization compared to the same period of last year according to the provisional export figures. This is the first tie in the history of Indian, marine products industry that the export figures are crossing the US $ 2.5 billion mark. Average unit value realization has also gone u by 13 %

3.1.8 IMPORTANCE OF FOREIGN TRADE IN INDIA

Before 1947 when India was a colony of the British, the pattern of foreign trade was typically colonial. India was the supplier of foodstuffs and raw materials to the industrialized nations particularly to England and an importer of manufactured goods. This dependence on foreign countries for manufacturers did not permit industrialization at home, rather as a result of the competition from British manufacturers., the indigenous handicrafts suffered a severe blow. With the dawn of independence, the colonial pattern of trade was changed to the needs of a developing economy. An economy, which decides to embark on a programme of development, is required to extend its productive capacity at a faster rate. For this, imparts of machinery and equipment, which can't be produced in the initial stages at home, are essential. Such imports, which either help to create new capacity in some lines of production or enlarge capacity other lines of production, are called developmental imports. Besides these imports, a developing economy is also required to import consumer goods, which are in short supply at home during the period of industrialization. Such imports are anti-inflationary because they reduce the scarcity of consumer goods.

It is therefore, inevitable that during the early years of development, imports have to be increased at a very faster rate. It can't be restricted because the level of investment as well as the growth of these countries in dependent on these imports. It is natural that the balance of trade in such a situation will turn heavily against the developing country. To meet the growing foreign debt in a view of inelastic imports, a developing country must increase tits exports.

In India, the approach has been to identify products, sectors and industries based on potential, capability and world trends in demand and competiveness and to provide for these a policy framework, which is helpful in increasing exports. Therefore, late eighties onwards a certain degree of selectivity has been followed by the government for focusing special attention. Fourteen sectors have been identified including marine products, processed foods, jewelers, electronic goods, readymade agreements etc. for making thrust in international markets.

India pursue trade policies to improve exports of the above thrust sectors with an idea to reduce the trade deficit and to remove disequilibrium in the balance of payments. Liberal trade policies are those that reduce government controls and replace direct intervention with price mechanisms (such as tariffs). For the benefit of exporters, advance licenses, export promotion for capital goods (EPCG), duty drawback, 100 percent export oriented goods (EOU's) an Export processing zones (EPZ), which are meant for facilitating imports for export promotion.

3.1.9 FOREIGN TRADE POLICY OF INDIA 2009-2016

The thrust of the new foreign trade policy of India 2009-2016 as well as the earlier one is to double to India's export of goods and services. It further states that the long –term policy objective for the government is to double India's share in global trade by 2020. The Marine Products Export Development Authority (MPEDA) goes even further and its vision document brought out in 2017 wanted exports to increase from the current level of .61 million MT to atleast 2 million MT by the year 2015. The new national policy clearly states that there will be no qualitative restrictions on export of marine products. Through promotional measures including fiscal incentives for critical development of infrastructure for exports, duty free import of inputs for exports, setting up export zones, and providing full refund of all indirect levies and taxes.

The government as a developmental endeavor, always considered promotion of marine products export. Any development in the marine fisheries sector, including export promotion, cannot be pursued without taking into consideration certain basic characteristics of Indian fishery resources, which are given below.

- Limited and renewable natural resources embed in a complex food chain
- Found more inshore than offshore a- availability per unit area
- A common property resource
- A protein rich food resource ensuring food security of the people
- Source of livelihood for millions of people both in production and marketing

The growth in India's marine products exports is described in Indian rupee terms by the ministries and export promotion agencies. I the year 2008- 2009, India's marine products exports earnings

was worth Rs. 8608 crores and according to the chairperson of MPEDA, in 2007-2008, the earnings was worth only Rs. 7621 crores and hence there is a 13 % growth.

3.1.10 INDIA'S SEAFOOD GROWTH

3.1.10.1 Country profile

India with a long coast line of 8129 kms, two million sq. kms of exclusive Economic Zone and 1.2 million hectares of brackish water bodies, offers vast potential for development of fisheries. against an estimated fishery potential of 3.9 million tons from marine sector, only 2.6 million tons are tapped. Fishing efforts are largely confined to the inshore waters through artisanal, traditional, mechanized sectors. About 90 % of the present production from the marine sector is from within a depth range of up to 50 to 70 meters and remaining 10 percent from depths extending up to 200 meters. While 93 percent of the production is contributed by artisanal, mechanized and motorized sector, the remaining 7 % is contributed by dep sea fishing fleets confining their operation mainly to the shrimp ground in the upper east coast.

India is one of the oldest civilizations in the world with a kaleidoscopic variety and rich cultural heritage. It is positioned between latitudes 8 4' and 37 6' north and longitudes 68 7' and 97 25' east with a geographical are of 3.87,263 sq. km (about 2.4 percent of the earth's surface are). The country is bounded by the Himalayas in the north, the Indian ocean in the south, the Bay of Bengal on the east and the Arabian sea on the west.

After independence in 1947, the country adopted a socialist style of development through centralized planning. The national five year plans were formulated and implemented to harmonize the use of resources for parallel development of capital- intensive heavy industries, with labour intensive small scale industries and the rural and agricultural sectors.

Within three decades of independence, the country record achievements I technology and also attained self-sufficiency in food production through the green revolution. However, the growth of the country in this period and the worsening balance of payment situation led the government to undertake a series of reforms. Beginning in id-eighties, this reforms were mainly directed to minimize the state interference in business and liberalize the economy. These efforts culminated in the new economic policy of 1991 and a clear shift from pre-planning to pro-market

growth model based on the principles of liberalization, privatization and globalization of the economy.

India now stands as the third largest economy in the world in terms of purchasing power parity (PPP) and the second fastest growing major economy in the world, with a GDP growth rate of 9.4 in the last fiscal year 2006-2007. However, in spite of marked developments in industrial and service sectors, agricultural sector continues to remain as the major determinant of the health of the economy. It contributes about20% of the Gross domestic product (GDP) and employs about 60 % of the labour force in the country. Industries contribute about 26 % of the GDP and employ about 12 % of the labor force and tertiary sector contributes the rest and employs about 28 percent of the labour force. In the year 2007-2008 total GDP was 4723400. GDP from agricultural forestry and fishing was 782597. GDP from fisheries alone was 35650. GDP from fisheries as percentage to total GDP was 0.75 and GDP from agricultural forestry and fishing was 4.56

3.1.10.2 Fisheries Sector

The fisheries sector occupies a very important role in the socio economic development of India. Soon after independence in 1947, the government started focusing on the fisheries sector for two reasons: (1) to promote fisheries production I order to ensure food safety (subsequently foreign exchange earnings were also added) and (2) capacity building in fisheries through subsidization of various assets. As a result, starting from a purely traditional activity in the fifties, both aquaculture and fisheries have now transformed into commercial enterprises. The sector has been recognized as a powerful income and employment generator as it stimulates the growth of a number of subsidiary industries and is a source of cheap and nutritious food.

Fishing is one of the oldest occupation of the mankind and even today it is. It is the key income earning sector of many maritime countries, both developed and developing. Fishing provides not only occupation to enormous people, but also a rich provider of immense food and related sources. The national planning committee, during the discussions for growth strategies in tis sector in 1948, described the traditional fishing sector as "largely of primitive character, carried on by ignorant and ill-equipped fisherman". Their techniques are rudimentary; their capital investment is less. These explanations are broad enough to sketch an elementary picture of the traditional fishing sector in India.

3.1.10.3 Indian Fisheries

Before independence, in India, the marine fisheries production was of subsistence level. Like the other productive sectors under colonial economy, the fisheries sector was also under the muddles of poverty, lower religious and social status. After the drawn of Indian republic, the Government of India held many studies to evolve strategies to make the distracted economy stronger.

3.1.10.4 Administration of Indian Fisheries

The constitution of Republic of India has enlisted the respective powers of the union and states to make law and administer different sectors. Development and regulation of marine fisheries within the territorial water of Indian coast, known as inshore fisheries and of inland fisheries development and for improving the living conditions of fishermen. They assist the mechanization of fishing boats, arrange bank loans through Fisherman co-operative societies for purchase and improvement of crafts and gears and development of domestic marketing and also manage housing schemes for fishermen. They also establish boat building yards, nylon net factories, fishermen training centers etc. Some state governments also set up fisheries corporations.

3.1.11 Role of Central Government

In the central government, there is no separate ministry for fisheries and different tasks of marine fisheries development., from exploration to marketing., fall under the administrative jurisdiction of ministries of Agriculture., Commerce and constituted food processing industries. The ministry of agriculture deals with fish production, the ministry of commerce handles the regulation and the task of promoting exports and the ministry of food processing industries looks after the d development of fish processing activities.

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3.1.12 Theoretical Approach to Fishing

Today the basic point of fishery management is the Maximum Sustainable Yield (MSY), defined as the greatest yield that the stock can reproduce year after year, however it is known that the key variables determining production possibilities from a fish population are rate of entry into fishable age rate growth of individual fish, natural mortality and fishing mortality. Thus, with the extension of EEZ, while opportunities to argument fish production and employment have been opened, they are yet to be efficiently exploited. In the event of inefficient exploitation and under exploitation, natural mortality would offset the net increase in the stock from the rate of entry into fishable age and growth. Exploitation of these opportunities possess complex biological, economic, social and political problems.

3.1.13 The Scope of the Fisheries Resources in India

There is a vast potential of fisheries resources, which remain unexplored. Government should come up with helping hand to promote deep sea dishing without over exploiting it. Conditions of the landing centers should be improved to promote overall quality exports. The infrastructural facilities of the country like develop net of ports, domestic facilities should be promoted. The danger of over exploitation of resources should be in the minds of each as the destruction of the resources without minding its existence may bring darkness in the immediate future. The flow of goods in a profitable and responsible manner should not be disrupted. Fisheries resources should be exploited in an optimum manner without disturbing the natural equilibrium of the habitat of fish. In addition to this, the resources procured from nature should be handled with utmost care during harvesting., processing and marketing to avoid wastages.

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3.2 ORGANISATION PROFILE

3.2.1 Marine Products Export Development Authority –MPEDA (Ministry of Commerce, Govt. of India)

The Marine Products Export Development Authority (MPEDA) was constituted in 1972 under the Marine Products Export Development Authority act of 1972. The role envisaged for MPEDQ under the state is comprehensive covering fisheries of all kinds, increasing exports, specifying standards, processing, marketing extension and training in various aspects of the industry.

India with a long costal line and abundant fish resources has emerged as one of the leading seafood suppliers in the world. MPEDA, as a nodal agency setup by the government of India in 1072 for the promotion of seafood exports from India. Gives a detail account of India's seafood potential, products, processing units and export promotion. The seafood industry of India has come a long way and today seafood is exported to nearly 70 countries from India. MPEDA function sunder the ministry of commerce, Government of India and acts as a coordinating agency with different central and state government establishments engaged in fishery production and allied activities

3.2.1.1 Objectives of the MPEDA

MPEDA has the following objectives and it is presented below

- Conservation and management of fishery resources and development of offshore fishing
- Registration of export and processing plants

- Regulation of marine products export
- Laying down standards and specifications
- Acting as an agency for extension of relief as per directions from government
- Helping the industry relation to market intelligence, export promotion, and import of essential items
- Imparting training in different aspects of the marine products industry, with special reference to quality control, processing and marketing
- Promotion of commercial shrimp farming
- Promotion of joint ventures in aquaculture, production processing and marketing of value added seafood.

3.2.1.2 Work Program of MPEDA

MPEDA has the following work programs and it is presented below

1. Registration of infrastructure facilities for seafood export trade
2. Collection and dissemination of trade information

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3. Projection of Indian marine products in overseas market by participation in overseas fairs and organizing international seafood fairs in India

4. Implementation of development measures vital to the industry like distribution of insulated fish boxes, putting up fish lading platforms, improvement of peeling sheds, modernization of industry such as upgrading of plate freezers installation of IQF machinery, generator sets, ice making machines, quality control laboratory etc.

5. Promotion of aquaculture for production of shrimp and prawn for export
6. Promotion of value added seafood
7. Promotion of Tuna fishery
8. Implementation of organic farming
9. Conservation management

3.2.1.3 Office Network of MPEDA

The headquarters of MPEDA is located at Kochi , Kerala. The regional offices of MPEDA in India includes Veravel *Gujarat), Mumbai(Maharashtra), Cochi (Keala), Chennai (Tamil Nadu), Vishakapattanam (Andra Pradesh), and Kolkata(West Bengal) and six sub regional offices in India are at Goa, Mangalore Kollam, Tuticorin, Bhuvaneswar and Guwahati; are functioning as field offices for implementation of various activities of the authority besides engaging themselves on export promotion of marine products by providing guidance and assistance to the processing industry and the expert trade.

Similarly, six regional Centres at Kochi (Kerala), Panvel (Maharashtra), Valsad (Gujarat), Tanjavoor (Tamil Nadu, Vijayawada (AndraPradesh) and Bubhaneswar (Orissa) and four sub regional centers at Kannur (Kerala), kanwer (Karnataka), Bhimavaram (Andra Prasdesh) and Klkata (West Bengal) extend assistance to augent production of shrimp to sustain and increase exports. MPEDA has also set three standalone laboratories, other than the one in headquarters, at

Bhimvaram , Nellore in Andhra Pradesh and Bhubhaneswar (Orissa) equipped with sophisticated equipment's like LC MS for t testing various parameters.

The authority operates to overseas trade promotion offices, one at Tokyo (Japan) and one at New York (United States) with resident directors as head of offices. The Objectives of the trade promotion offices are to promote seafood exports into the receptive countries by i

Liaising with Indian exports as well as overseas Importers, developing contact with Government agencies, officials to remove identifies constraints, promote the image of Indian products through publicity campaigns, identify markets for new products, create awareness on the capabilities of Indian processing, packaging, quality inspection procedures etc. and also to identify sustainable joint venture partners for deep sea fishing, aqua culture projects, processing and marketing value added products etc. The advisor of agriculture and marine products division of Indian trade Centre, sat Brussels assists MPEDA in its trade promotional activities in Europe, and lasies with the European countries.

Marine Products Export Development Authority (MPEDA), as a logical extension of its initiatives to project the capabilities of seafood processing seafood processing ad to optimize the installed capacity utilization, MPEDA has been imp0lemetimng various schemes aimed at increasing the production from culture and capture fishing, value addition and market thrust. The center has identified value addition and super quality ready to eat marine products in consumer packs to achieve the target of 6 $ billion worth of seafood exports by 2017

3.2.1.4 Schemes of MPEDA

The plan schemes of the MPEDA are implemented under seven major heads namely

- Market promotion
- Capture fisheries
- Culture fisheries

- Processing infrastructure
- Research and development
- Viability and gap funding

The market and its situations are always changing even with a slight stimulus and so the exporters should be well prepared to meet the unexpected changes anytime. The products should be modified with the changing trends of the market. The export promotion council and MPEDA also give financial and advisory support to the exporters. The council also comes with market promotional schemes to promote export. Some of the product development and market promotional schemes which are most beneficial to exporters are research and development of new products, training in new technology by inviting overseas technical experts to India. Assistance for setting up to of chilled rooms at export premises, objections of resource potential from Indian serene and unpolluted water sources, printing and distribution of leaflets and booklets in different languages and quality assurance in processing. Development of rapport between exporter and importer. Invitation to ensured experts for export promotion visit, organizing international buyer seller meets and participation in specialized trade fairs.

3.2.1.5 Marketing Services

MPEDA compiles and disseminates trade enquiries received from overseas buyers among exporters. In association with concerned agencies it sorts out trade disputes. It compiles and disseminated information about freezer space requirements for shipment or frozen cargo and liaises with shipping companies and airlines to meet the demands of the industry. It liaises with the government for conservation measures of over exploited resources like shrimps, lobsters, sea cucumbers, sea weeds and sea shells etc. Marketing expertise is shared with exporters and those involved in fishing industry.

3.2.1.6 Market Promotion

Market services and market promotion have assumed special significance in view of the growing stiff competition from other seafood exporting countries in all oversees market. Consequent on the large scale development of commercial scale shrimp farming in several shrimp producing countries in Asia and Latin America, the shrimp exporting countries are making all efforts to making all major world markets. These are need for stepping up of promotional programs in major overseas markets and developing better rapport with trade and officials in the importing countries.

MPEDA has drawn up various market promotional programs for projecting Indian marine resource potential, products diversification, quality assurances and liberal incentives for joint ventures. These include

1. Overseas market survey
2. Data collection and maintenance of data bank
3. Assistance for market development
4. Publicity through media and production of literature and films on trade promotion
5. Sponsoring of sales team / delegations. Invitation of overseas experts for export promotion visit to India
6. Organizing buyer seller meets in overseas markets.
7. Participation in overseas trade fairs and exhibitions

Exhibitions and trade fairs within India MPEDA proposes to implement the MPEDA quality marketing 0r logo scheme to accord special recognition to products of high quality marketed by seafood units in the country. The logo scheme is a purely voluntary scheme based on voluntary comprehensive t as set of comprehensive quality standards laid down for processing plants, raw materials, additives, products and regular in plant monitoring. The logo has been registered with the logo has been registered with the registrar of Trademarks and patents in USA, Europe and Japan

DATA ANALYSIS

Chapter 4

Data Analysis and Interpretation

General information:

4.1 Product range of the companies under MPEDA

Table 4.1 Shows the seafood products processed by the companies

Sl. No	PRODUCT NAME	FREQUENCY	PERCENT
1	Frozen Shrimp	20	22.72
2	Frozen Squid	10	11.36
3	Frozen Cuttle fish	2	2.27
4	Other Frozen Fish	18	20.46
5	All the above	38	43.19

Source: Primary data

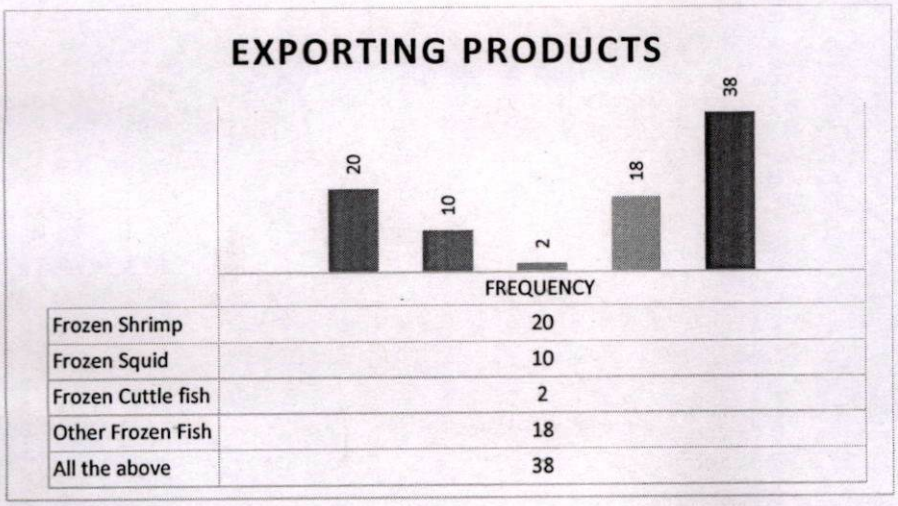

Figure 4.1

The table shows that frozen shrimp is the most demanded product for export (22.72%) and the least demanded is frozen cuttle fish with 2.27%. Around 43% of the companies' export more than 3 types of products.

4.2 Annual Turnover of the company

Table 4.2 shows the turnover of the companies

SL. NO.	RANGE(in crores)	FREQUENCY	PERCENTAGE
1	Less than one crore	-	-
2	1-9 crores	21	23.86
3	10-49 crores	20	22.72
4	50-99 crores	34	38.64
5	Above 100 crores	13	14.78

Source: Primary data

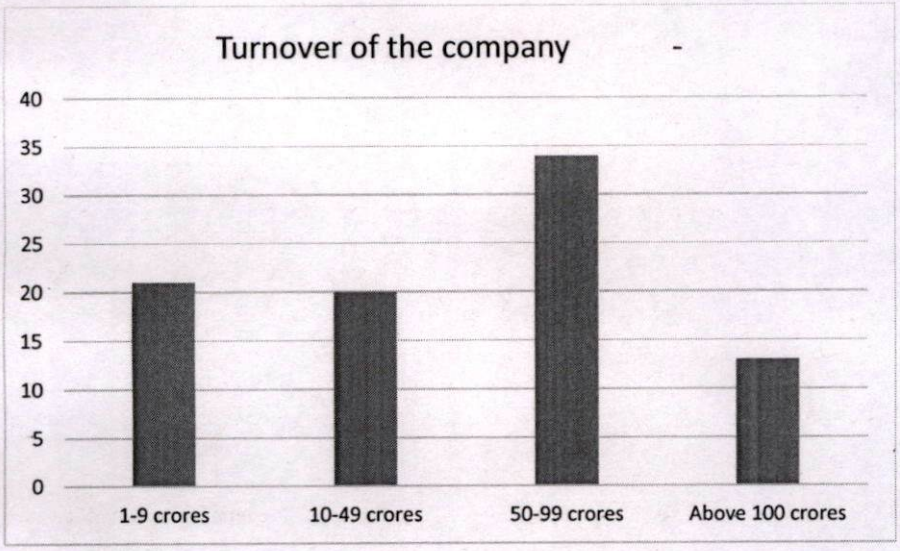

Figure 4.2

According to the table 4.2, 23.86 % of the companies are having a turnover range between 1-9 crores and 22.72% of the population is having a turnover between 10-49 crores. And more than 53% of the companies are having above 50 crores as annual turnover.

4.3 Exporting area

Table 4.3 shows the zone to which the company exports their products.

SL. NO.	ZONE	FREQUENCY	PERCENTAGE
1	Europe	35	39.78
2	North America	25	28.40
3	South America	10	11.36
4	Middle-East	15	17.04
5	Africa	2	2.28
6	Australia	1	1.14

Source: Primary data

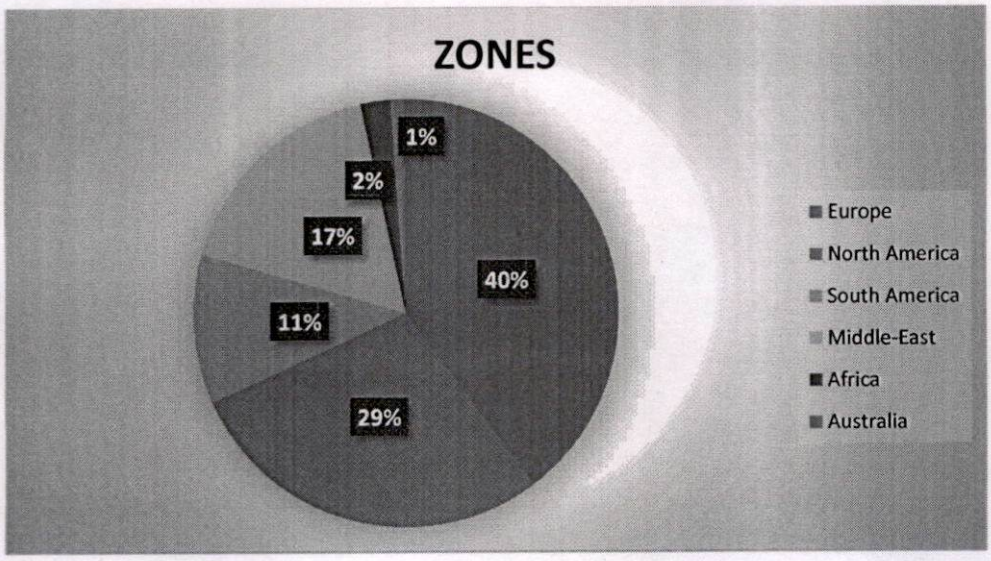

Figure 4.3

The major share of Indian sea food is being exported to Europe (40%) and the second largest consumer of Indian sea food is North America (29%) which includes USA and Canada. Middle East countries including Gulf countries are the third largest consumers with a share of 17%.

4.4 Processed products of the Company

Table 4.4 shows the processed products of the company

SL. NO.	PROCESS TYPE	FREQUENCY	PERCENTAGE
1	Ornamental	5	5.68
2	Live	15	17.05
3	Frozen	43	48.86
4	Dried	22	25.00
5	Others	3	3.41

Source: Primary data

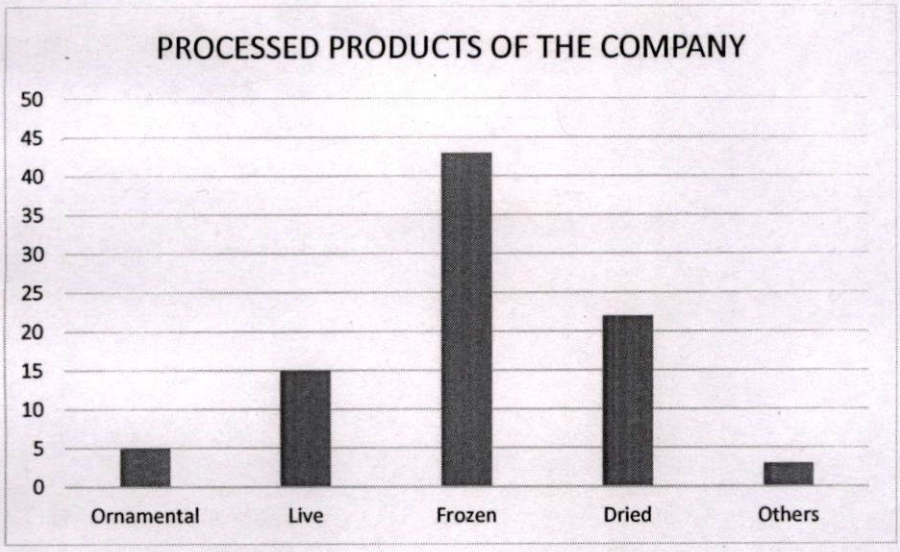

Figure 4.4

48.86% of the exported products are in the frozen form. Second largest category of export is dried form of products with a share of 22%. Around 17% of the export are in live form.

4.5 Mode of Transportation

Table 4.5 shows the preference for various modes of transportation

SL. NO	MODE OF TRANSPORTATION	FREQUENCY	PERCENTAGE
1	Airways	17	19.31
2	Roadways	3	3.41
3	Waterways	68	77.28
4	Others	-	-

Source: Primary Data

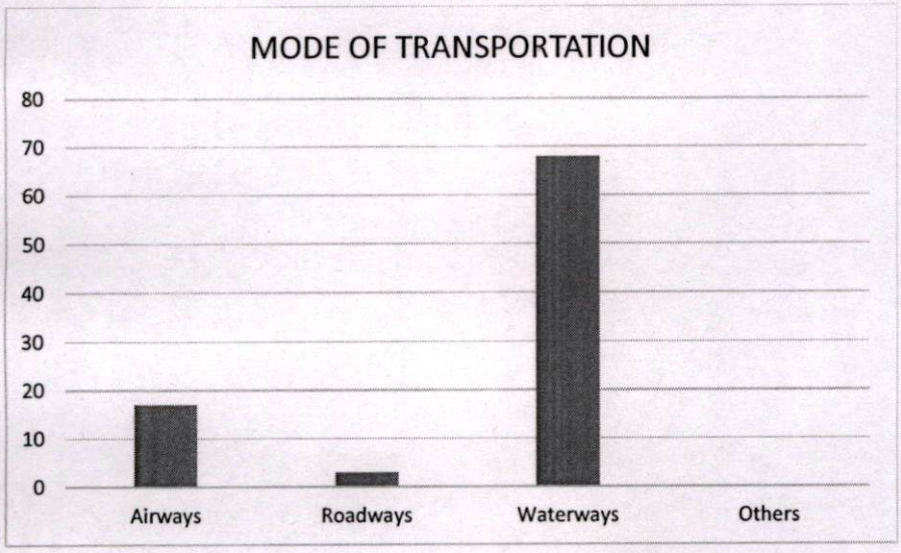

Figure 4.5

The above figure clearly showed that most of the companies prefered waterways as their mode of transportation. Around 77% of the total population prefer waterways. And the second most preferred mode of transportation is airways with 19.31%. Roadways are the least chosen mode of transportation with 3.41%

4.6.1 HACCP training session

Table 4.6 .1

SL. NO	TRAINING SESSIONS ON HACCP SYSTEM	FREQUENCY	PERCENTAGE
1	Yes	76	86.36
2	No	12	13.64

Source: Primary data

As shown in the table, 86.36% of the companies conduct training sessions relating to HACCP system and its implementation

4.6.2 Frequency of training sessions

SL. NO	PERIOD OF TRAINING	FREQUENCY	PERCENTAGE
1	Monthly	30	39.47
2	Once in 3 months	24	31.57
3	Once in 6 months	20	26.32
4	Annually	2	2.64

Source: Primary data

Out of 76 companies who are conducting training sessions, around 39.47% companies are conducting the sessions once in a month, 31.54% companies are conducting sessions once in 3 months and 26.32% are conducting once in 6 months. Only 2.64% companies are conducting sessions annually.

Efficiency of HACCP system implemented

4.7 Capability of identifying Hazards

The table 4.7 shows the capability to identify the hazards by HACCP system

SL. NO	CAPABILITY OF IDENTIFYING HAZARDS	FREQUENCY	PERCENTAGE
1	No	1	1.13
2	Partially	46	52.28
3	Completely	41	46.59

Source: Primary data

The table says that around 98% of the total population have an opinion that the HACCP system helps to identify the hazards. Out of which 52.28% of the population believe that they can identify the hazards partially and 46.59% of the population believe that they can identify the hazards completely.

4.8 Availability of HACCP team in the company

The table 4.8 shows the availability of HACCP team in the company

SL. NO	PRESENCE OF HACCP TEAM	FREQUENCY	PERCENTAGE
1	Yes	76	86.37
2	No	12	13.63

Source: Primary data

As shown in the table, 86.37% of the companies have a HACCP team in their company to handle the activities. And 13.63% of the companies doesn't have a HACCP system.

4.9 Establishment of critical limit

The table 4.9 shows the extend of critical limits that have been established in the companies

SL. NO.	ESTABLISHMENT OF CRITICAL LIMITS	FREQUENCY	PERCENTAGE
1	Yes	65	73.86
2	No	23	26.14

Source: Primary data

The data shows that 73.86% of the companies have established critical limits in their operations as a part of HACCP system to avoid hazards.

4.10.1 Existence of Monitoring system

The table 4.10.1 shows the details about presence of monitoring system

SL. NO.	EXISTENCE OF MONITORING SYATEM	FREQUENCY	PERCENTAGE
1	Yes	58	65.91
2	No	30	34.09

Source: Primary data

Out of 88 companies, 58 companies have a monitoring system to monitor the HACCP related activities going on in their company. But 30 companies do not give importance to a monitoring system and such a system is practically absent in the firm.

4.10.2 Period of monitoring

SL. NO	PERIOD OF MONITORING	FREQUENCY	PERCENTAGE
1	Hourly	13	22.41
2	Daily	22	37.94
3	Weekly	21	36.20
4	Monthly	2	3.45

Source: Primary data

The above diagram clearly shows that most of the companies have a monitoring system either by daily basis (37.94%) or by weekly basis (36.20%). Monthly basis is the least mode of inspecting. This shows that monitoring process is given proper importance and frequency of monitoring is high.

4.11 Documentation Process for HACCP system

The table 4.11 shows whether there is a documentation process in the company for HACCP system

SL. NO.	EXISTANCE OF DOCUMENTATION PROCESS	FREQUENCY	PERCENTAGE
1	Yes	48	54.55
2	No	40	45.45

Source: Primary data

The table shows that almost half of the population (54.55%) keeps a record for the HACCP implementation system. This shows that the companies give proper importance to the system and are making proper use of it for further operations.

4.12.1 Efficiency of HACCP system implemented.

The table 4.12.1 shows the parameters of HACCP system.

SL. NO	PARAMETERS
1	Capability of identifying hazards
2	Presence of HACCP team
3	Critical limit establishment
4	Existence of monitoring system
5	Effectiveness of monitoring system
6	Documentation process

Total score= 6

The efficiency in implementation of the HACCP system was measured on the above six parameters. Based on these 6 attributes, the companies are allotted scores and the total population was classified into 4 categories.

i. Score 6 = Highly efficient
ii. Score 5 = Moderately efficient
iii. Score 4 = Efficient
iv. Score 3 and below = least efficient
v.

4.12.2 Category based on scores obtained

SL. NO.	CATEGORY BASED ON SCORES OBTAINED	NO. OF COMPANIES	PERCENTAGE
1	Highly efficient	36	40.9
2	Moderately efficient	23	26.14
3	Efficient	17	19.32
4	Least efficient	12	13.64

Source: Primary data

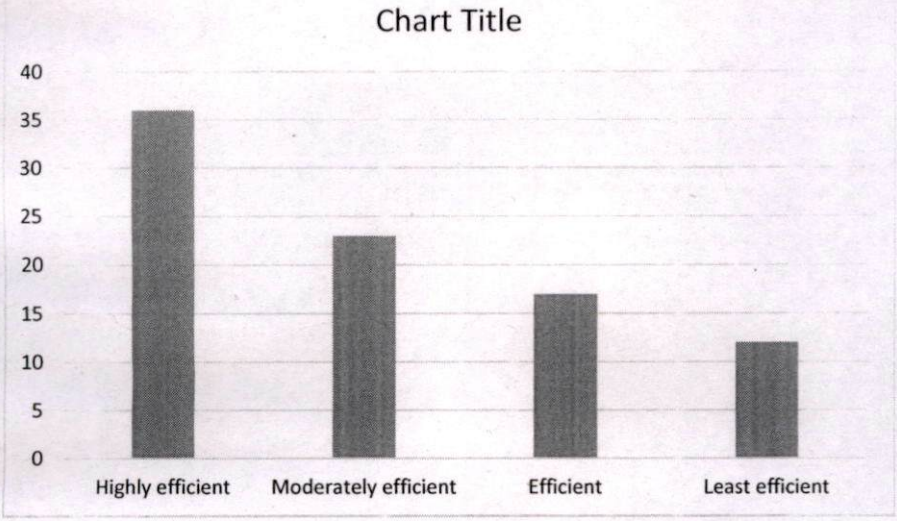

Figure 4.6: Efficient of the companies in implementing HACCP protocols.

According to the data given above, majority of the companies lies in the category of "highly efficient" with 40.9%. The second largest category is the "moderately efficient" category with 26.14%. The least efficient category is having the least number of companies with 13.64%

Perception of the management about the effectiveness of HACCP system implemented under MPEDA

4.13 Controlling of hazards

The table 4.13 shows the effectiveness of controlling hazards by the implementation of HACCP system

SL. NO	EFFECTIVENESS OF CONTROLLING HAZARDS	FREQUENCY	PERCENTAGE
1	Not Effective	1	1.13
2	Partially	41	46.59
3	Completely	46	52.28

Source: Primary data

According to the above chart and table, almost all the companies think that they are able to control the occurrence of hazards by the help of the HACCP system implemented in their company. Around 46.59% of the population says that they are able to control the hazards partially by the HACCP system and 52.28% of the total companies believe that they are able to keep the hazard under control completely

4.14 Affordability of HACCP system

The table 4.14 shows the affordability of the HACCP system for the companies

SL. NO.	AFFORDABILITY OF HACCP SYSTEM	FREQUENCY	PERCENTAGE
1	Not affordable	37	42.05
2	Marginally affordable	20	22.72
3	Highly affordable	31	35.23

Source: Primary data

According to the above table, 53.40% of the companies are able to maintain the HACCP system in affordable way. But 46.6% companies are thinking that maintaining HACCP system is expensive.

4.15 Meeting International Standards

Table 4.15 shows the efficiency of HACCP system in meeting the international standards for the product

SL. NO	MEETING INTERNATIONAL STANDARDS	FREQUENCY	PERCENTAGE
1	No	1	1.13
2	Partially	44	50.00
3	Completely	43	48.87

Source: Primary data

According to the table, out of the total population, 50% of the companies have an opinion that they are able to partially meet the international standard by the implementation of HACCP system. 48.87% of the companies think that they are completely able to meet the international standards by the help of HACCP system.

4.16 Quality Standards

The table 4.16 shows the efficiency of the HACCP system in meeting quality standards.

SL. NO	INCREASE IN QUALITY STANDARDS	FREQUENCY	PERCENTAGE
1	No	-	-
2	Partially	37	42.05
3	Completely	51	57.95

Source: Primary data

The table says that 57.95% of the total population agrees that they are able to increase their quality standard by the help of HACCP system and 42.05% of the population think that they are only able to increase the quality standards partially by implementing HACCP system in their company.

4.17

PERCEPTION OF THE MANAGEMENT ABOUT HACCP SYSTEM	
SL. NO.	PARAMETERS
1	Controlling of Hazards
2	Affordability of HACCP system
3	Meeting International Standards
4	Quality Standards

Perception of the management about the effectiveness of HACCP system in the company is been measured on the basis of these 4 parameters. Each parameter is measured in 3 point scale and combined. The total population is classified into 3 categories on the basis of the scores obtained in the above 4 parameters.

Score 7 and above = Highly effective

Score above 3 and below 7 = Moderately effective

Score 3 and below = Not effective

4.18 Effectiveness of the HACCP system

SL. NO	EFFECTIVENESS OF THE HACCP SYSTEM IMPLEMENTED	FREQUENCY	PERCENTAGE
1	Highly effective	21	23.87
2	Moderately effective	49	55.68
3	Not effective	18	20.45

The table shows that according to the perception of the management, 23.87% of the company is having a highly effective HACCP system. 55.68% of the companies are having a moderately effective HACCP system and 20.45% companies have an ineffective HACCP system.

Constraints faced by the companies in implementing HACCP system

4.19.1 Assistance by MPEDA for Implementing HACCP System

The table 4.19.1 shows the information about assistance provided by MPEDA for implementation of HACCP system.

SL. NO.	ASSISTANCE BY MPEDA FOR HACCP IMPLEMENTATION	FREQUENCY	PERCENTAGE
1	Yes	69	78.41
2	No	19	21.59

Source: Primary data

4.19.2 Sufficiency of assistance provided by MPEDA.

The table 4.19.2 shows the sufficiency of assistance provided by MPEDA

SL. NO.	SUFFICIENCY OF ASSISTANCE BY MPEDA	FREQUENCY	PERCENTAGE
1	Yes	31	44.92
2	No	38	55.08

Source: Primary data

According to table 4.19.1 and table 4.19.2, around 78.41% of the companies receives assistance from MPEDA. Out of which more than 55% of the companies think that the assistance provided by MPEDA is not sufficient for the management of HACCP system. And 44.92% of the companies think that they are provided with sufficient assistance by MPEDA

4.20 Opinion about mandatory implementation of HACCP in domestic marine product industry

The table 5.16 reveals about the company's opinion about implementing HACCP system in domestic marine product industry on a mandatory basis

SL. NO	OPINION ABOUT IMPLIMENTING HACCP SYSTEM AS MANDATORY IN DOMESTIC MARINE PRODUCT INDUSTRY	FREQUENCY	PERCENTAGE
1	Yes	13	14.77
2	No	21	23.86
3	Only for Larger Firms	54	61.37

Source: Primary data

The above tables show that the majority (61.37%) of the companies have an opinion that domestic marine product industry should implement HACCP system on a mandatory basis.

FINDINGS AND SUGGESTIONS

CHAPTER 5

SUMMARY OF FINDINGS, SUGGESTIONS AND CONCLUSION

HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, physical hazards from raw materials production and handling to manufacture, distribution and consumption of the finished products. Hazard Analysis Critical Control Point (HACCP) has now been recognized as the best system for ensuring food safety. HACCP is a preventive strategy with shared responsibility from farm to table. HACCP allows manufacturers to identify hazards as they could occur through the stages of production so that adequate measures can be implemented so they can be prevented. HACCP system is a mandatory factor for exporting industry, especially for marine food industry. The system put forward the importance of hygiene, quality and hazard free products. The HACCP system runs on the seven basic principles starting rom identification of the hazards to documentation of the activities. The activities of the system is been carried out by a HACCP team which includes Technical Managers, Company Engineers, Microbiologist, Quality Manager, supervisors, External specialists.

Marine Products Export Development Authority(MPEDA) being a governing authority for marine products export industry, works for the welfare of marine products exporting companies. MPEDA guides the export companies for implementing and maintaining HACCP system. The study had the following objectives.

iv. To understand the HACCP protocols implemented in marine food export under MPEDA.

v. To evaluate the perception of the management on HACCP implementation in marine food export under MPEDA

vi. To study the constraints in HACCP implementation in marine food export and suggest solutions.

The study on the topic was carried out in Ernakulam district. The respondents of the study were the managers of the marine food exporting companies.

5.1 Major Findings of the Study

1. There were a total of 88 marine products exporting companies under MPEDA who are following HACCP system. The major product exported was frozen shrimp and22.72% of the companies have frozen shrimp as their major exporting product. The least demanded is frozen cuttle fish with 2.27%. Around 43% of the companies' export more than 3 types of products
2. Indian seafood export industry is exporting marine products all over the world. The major share of Indian sea food is being exported to Europe (40%) and the second largest consumer of Indian sea food is North America (29%) which includes USA and Canada. Middle East countries including Gulf countries are the third largest consumers with a share of 17%. Europe is the major market for Indian seafood products.
3. The companies have more than 3 process types based on the form in which the company is exporting the products. 48.86% of the exported products are in the frozen form. Second largest category of export is dried form of products with a share of 22%. Around 17% of the export are in live form. 5.68% of the total export products are the ornamental fish which is getting more income compared to other categories.
4. The mode of transportation plays an important role in exporting products. Most of the companies prefer waterways as their mode of transportation. This is mainly because of the law cost of transportation. Bulk amount of products can be exported through waterways at cheaper cost. Around 77% of the total population prefer waterways. And the second most preferred mode of transportation is airways with 19.31%. Roadways are the least chosen mode of transportation with 3.41%.
5. Trainings for implementing and maintaining HACCP systems were given for all level of employees. out of 88 companies,76companies (86.36%) conduct training sessions relating to HACCP system and its implementation. Out of 76 companies who are conducting training sessions, around 39.47% companies are conducting the sessions once in a month, 31.54% companies are conducting sessions once in 3 months and 26.32% are conducting once in 6 months. Only 2.64% companies are conducting sessions annually. Most of the companies are giving proper importance to training.

6. The most important duty of the HACCP system is to identify the hazards. Around 98% of the total population have an opinion that the HACCP system helps to identify the hazards. Out of which 52.28% of the population believe that the can identify the hazards partially and 46.59% of the population believe that they can identify the hazards completely.
7. It is important to have a HACCP team in the company to monitor and handle the HACCP activities in the company. 86.37% of the companies have a HACCP team in their company to handle the activities. And 13.63% of the companies doesn't have a HACCP system.
8. The data shows that 73.86% of the companies establishes their critical limits in their operations as a part of HACCP system to avoid hazards. Establishing critical limits s an important aspect of HACCP procedures.
9. Out of 88 companies, 58 companies have a monitoring system to monitor the HACCP related activities going on in their company. But 30 companies do not give importance to a monitoring system and such a system is practically absent in the firm. Most of the companies have a monitoring system either by daily basis (37.94%) or by weekly basis (36.20%). Monthly basis is the least mode of inspecting. This shows that monitoring process is given proper importance and frequency of monitoring is high.
10. The final stage of the HACCP system is to maintain the data in the HACCP activities in documented form. Almost half of the population (54.55%) keeps a record for the HACCP implementation system. This shows that the companies give proper importance to the system and are making proper use of it for further operations.
11. According to the parameters dependant on the effectiveness of HACCP system, the companies are classified into 4 categories. Majority of the companies lies in the category of "highly effective" with 40.9%. The second largest category is the "moderately effective" category with 26.14%. The least effective category is having the least number of companies with 13.64%. This shows that a remarkable portion of the total population is still not maintaining an effective system of HACCP.
12. The main purpose of the HACCP system is to control the hazards occurred. Almost all the companies think that they are able to control the occurrence of hazards by the help of the HACCP system implemented in their company. Around 46.59% of the

population says that they are able to control the hazards partially by the HACCP system and 52.28% of the total companies believe that they are able to keep the hazard under control completely

13. The implemented HACCP system should be affordable for the company. 53.40% of the companies are able to maintain the HACCP system in an affordable manner. But 46.6% companies are thinking that maintaining HACCP system is a burden. Larger companies can easily afford the cost of HACCP system. But it is a burden for smaller companies.
14. HACCP system is mandatory for all the marine product export companies. But it is not a mandatory factor for domestic food industry. But a major part of the population has an opinion that only major firms should be compelled to maintain HACCP system. Out of the 88 companies, 61.37% companies have an opinion that only larger firms in food industry must be implementing HACCP system. And 23.86% companies say that HACCP system should not be a mandatory factor for the food industry.
15. HACCP system helps the company to meet international standards. Out of the total population, 50% of the companies have an opinion that they are able to partially meet the international standard by the implementation of HACCP system. 48.87% of the companies think that they are completely able to meet the international standards by the help of HACCP system.
16. 57.95% of the total population agrees that they are able to increase their quality standard by the help of HACCP system and 42.05% of the population think that they are only able to increase the quality standards partially by implementing HACCP system in their company.
17. 78.41 % of the companies says that they are getting technical assistance from MPEDA for the HACCP system implementation. The assistance provided by MPEDA can support the company to implement, maintain and monitor the HACCP system effectively.
18. Even though MPEDA is giving technical assistance, 55% of the companies think that the assistance provided by MPEDA is not sufficient for the management of HACCP system. And 44.92% of the companies think that they are provided with sufficient assistance by MPEDA.

19. The domestic industry is not having a completion of maintaining HACCP implementation. But most of the exporting companies have an opinion that the domestic companies with reasonable turnover should be compelled to maintain HACCP system.

5.3 Suggestions:

1. The company should follow strict policies to maintain the HACCP system which is always beneficial for the company in many aspects.
2. The employees should be given sufficient training sessions by the company management with compulsory attendance so that the employees will take the sessions seriously.
3. Sufficient funds should be allotted by the management for the establishment as well as the maintenance of the HACCP system.
4. The monitoring process of both companies and MPEDA should be strengthened so that the system will be well maintained and efficiency can be measured and corrective actions can be taken.
5. It would be better if government could provide financial assistance for small firms to establish and maintain HACCP system.
6. MPEDA should take initiative to provide technical assistance by conducting training sessions for the marine products export companies.
7. It would be helpful if the companies are graded by MPEDA based on the effectiveness of the maintenance of HACCP system on the basis of quality and other international standards.

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MBA AGRIBUSINESS MANAGEMENT

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(For Academic Purpose Only)

Effectiveness of HACCP System in Marine Food Export Industry with Reference to MPEDA

QUESTIONNARE FOR MANAGEMENT

1. Name of the organisation : _____

2. Location:

_____

3. Exporting products:

   i. Frozen Shrimp ☐ ii. Frozen Squid ☐

   ii. Frozen Cuttle Fish ☐ iv. Other frozen fish ☐

   v. All the above ☐

4. Mention the exporter type of the company

   (a) Manufacturer exporter (b) Merchant Exporter

   (c) Route Through merchant Exporter (d) Ornamental fish Exporter

5. Turnover of the company

   (a) Less than one crore ☐ (b) 1 –9 crores ☐

   (c) 10-49 crores ☐ (d) 50-99 crores ☐

   (e) above 100 crores ☐

6. Number of exporting units the company owns.

(a) one ☐ (b) 1-5 units ☐

(c) 6-10 units ☐ (d) 11 and above ☐

7. The zones to which the company is exporting:

(a) Middle –East ☐ (b) South America ☐

(c) North America ☐ (d) Europe ☐

(e) Africa ☐ (e) Australia ☐

8. Number of employees under the company

(a) less than 100 ☐ (b) 101 – 300 ☐

(c) 301-500 ☐ (d) 501 and above ☐

9. Mention the process type of the company.

(a) Ornamental ☐ (b) Live ☐

(c) Frozen ☐ (d) Dried ☐

(e) Others ☐

10. Which mode of transportation is been preferred by the company?

(a) Airways (b) Roadways

(c) Waterways (d) Others

11. Does the company conduct training sessions related to HACCP implementation?

(a) Yes ☐ (b) No ☐

12. If yes, how frequently does the sessions occur?

(a) monthly ☐ (b) once in 3 months ☐

(c) once in 6 months ☐ (d) annually ☐

13. Is the company capable of identifying hazards before they occur?

(a) No ☐ (b) Partially ☐ (c) Completely ☐

14. Is there a HACCP team in the Company?

(a) Yes ☐ (b) No ☐

15. Is there an establishment of critical limit in each department

(a) Yes ☐ (b) No ☐

16. Does there exist a monitoring system in the company to review the activities?

(a) Yes ☐ (b) No ☐

17. If yes, is the monitoring system effective?

(a) No (b) Partially (c) Completely

18. Does the company have any documentation process for the HACCP system?

(a) Yes ☐ (b) No ☐

19. Do you think that the hazards have been controlled by the implementation of HACCP?

(a) No (b) Partially (c) Completely

20. Is the cost of maintenance of HACCP system affordable for the company?

(a) Yes ☐ (b) No ☐

21. Does the company think that the HACCP implementation should be mandatory for entire food industry?

(a) Yes ☐ (b) No ☐ (c) Only for larger firms ☐

22. Does the company think that the HACCP implementation helps the company to meet the international standards of safety?

(a) No ☐ (b) Yes ☐ (c) depends up on the nature of the company ☐

23. Have the HACCP system increased the quality standards of the company?

(a) Yes ☐ (b) No ☐

24. Does MPEDA provide any technical assistance with regards to the implementation of HACCP system?

(a) Yes ☐ (b) No ☐

25. If yes, whether the assistance provided is sufficient?

(a) Yes ☐ (b) No ☐

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26. Is there any monitoring/inspecting procedures held in your company by MPEDA with regards to

HACCP system?

(a) Yes ☐ (b) No ☐

27. Please list out the constraints faced by your company in HACCP implementation in marine food export.

(i) Whether the system is profitable

(ii) Whether the system should be mandatory for domestic industry

(iii)

28. Suggest some solutions

(i)_____

(i)_____

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