

Project Report
on
**A STUDY ON OVERVIEW AND CHALLENGES FACED BY MARINE PRODUCTS
EXPORTERS IN INDIA**

Submitted to the
School of Maritime Management, Indian Maritime University
partial fulfillment for the requirements for the award of degree in
MBA- Port & Shipping Management

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DECLARATION

I, **NANDHU SREEVALSAN** (Reg. No. 1903304017) student of the School of Maritime Management, Indian Maritime University – Chennai Campus, hereby declare that this project report titled **“A Study on Overview and Challenges faced by Marine Products Exporter in India”** submitted in partial fulfillment of the requirement for the degree of Master of Business Administration in Port & Shipping Management is my original work carried under the guidance of my project guide. It has not formed the basis for the award of any Degree/Diploma of any University / Institution. The information submitted is true and original to the best of my knowledge.

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EXECUTIVE SUMMARY

The fishing sector in India with over 200000 traditional vessels and about 58000 mechanized vessels remains essentially traditional and technologically underdeveloped in comparison with developed countries and other developing countries. Generally, it is dominated by small fishermen. Over 60% of the exports from sea catch are contributed by the mechanized sector and 7% by the traditional sector. Most of the mechanized vessels are ill equipped to undertake long voyages. Deep- sea fishing, which has a very low share of less than 1% in exports, has not been able to make a dent in the fishing sector.

Marine capture fisheries have very important role for food supply, food security and income generation in India. India has a coast line of 8129 Km, and it spreads over 9 maritime states and 4 Union Territories. Following are the major fisheries infrastructures in marine sector. Coastal fisheries fall under State jurisdiction and take place within the first 12 nautical miles from the base line out to sea while Deep-sea fisheries operations, falling under the jurisdiction of the Union Government, are mostly taking place between the 12 nautical miles and the outer boundary of the EEZ. Management of inshore fisheries is the responsibility of State Governments, usually operating through State Fisheries Departments and with specific State-based legislation.

The Indian Seafood Industry today is on a totally different footing as to what existed in the late sixties. India has taken a major stand in the Global Seafood Market and our seafood is one of the biggest foreign exchange earners. Today we have world class seafood factories following quality control procedures meeting the most stringent of international standards. Though shrimp continues to dominate our export basket, the Indian Seafood Industry has diversified its product range and its markets. For many years, Japan was India's largest export market but in the last two years United States has emerged as India's leading export market. We export mainly basic raw material for reprocessing to Japan whereas our exports to the United States consists of value-added products for direct use in the American Food Service Industry and for retail sale in the supermarkets. We reached a peak export level of US\$1.3 billion per annum in 2001 and subsequently the industry has stagnated due to recession and the after effects of Tsunami and now in the form of Covid pandemic.

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CHAPTER 1: INTRODUCTION

1.1. Marine Seafood Industry

Despite pitched world competition, Asian country's export of marine merchandise has up from nearly \$4 billion in 2012-13 to \$6.7 billion (Rs 46,000 crore) in 2018-19 with the potential to scale new heights within the next 5 years, high officers of the Marine merchandise Exports Development Authority (MPEDA) aforementioned in Kochi Thursday. They were speaking at a conference on the eve of the twenty second India International food Show (IISS) that returns to Kochi when a spot of twelve years.

Frozen shrimp, which accounts for 44% of the export amount among seafood things from India, remains the most common product. Frozen fish, squid and decapod are the opposite merchandise being exported from the country. Asian country is that the largest bourgeois of shrimp to the North American nation and also the second-largest cultivation producer within the world.

India has immense potential for fisheries in sight of our long outline spanning regarding 8,118 kms additionally to midland water resources. India is the world's second-largest producer of fish, as well as the second-largest producer of freshwater fish. the world plays a crucial role in the overall socio-economic development of India. The world has gained importance because it contributes considerably to the national food security, sustenance generation, agriculture diversification and increased interchange earnings. As a result, ranging from a strictly ancient activity in the early fifties, fisheries and cultivation have now remodeled into a big industrial enterprise. As per the estimates of CSO, the Gross price supplemental from fisheries sector at current costs throughout 2013-14 was authority 96,824 large integer that is regarding 5.2% of the Gross price supplemental from Agriculture, biological science and fishing sectors at current prices. Bharat contributes 5.7% of the full international fish production. Fish production has multiplied from forty two 100000 tones (25 lakh tones for marine and seventeen lakh tonnes for midland fisheries) in 1991-92 to 96 lakh tones (35 lakh tonnes for marine and sixty one lakh tones for inland fisheries) in 2013-14 (Provisional). India exported around 10.5 100000 tones of fish and fish merchandise price value around authority thirty three thousand large integer in 2014-15. According to the Indian EUTHERIAN mammal Census of 2003, 14.5 million people

were involved in various fisheries-related occupations. Regarding 75% of the fishers are engaged in midland fisheries activities and about a quarter of a % in marine fisheries.

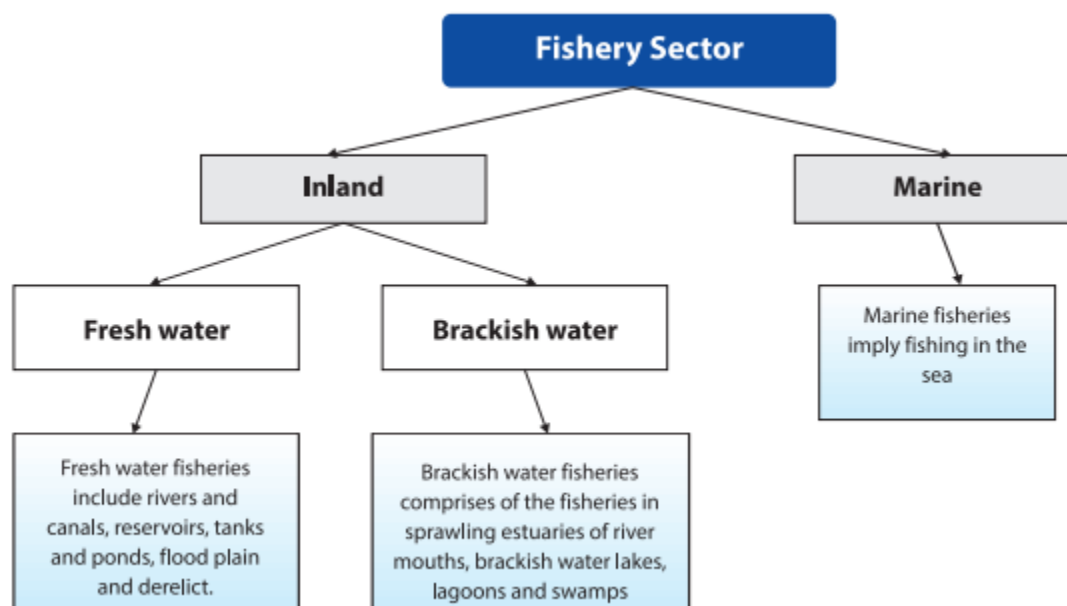


Figure 1.1

There is another way of categorizing the fish cultivation i.e. Capture and Culture fisheries.

Capture fisheries - The cultivation is practiced without storing the seed stocks. There is a gradual decrease in the yield because of the uncontrolled catching of juveniles and brooders.

Culture fisheries - The cultivation of selected fishes in the confined areas with care to fetch higher yields. The seeds are stocked, nursed and reared in the confined areas and feed with proper supplements.

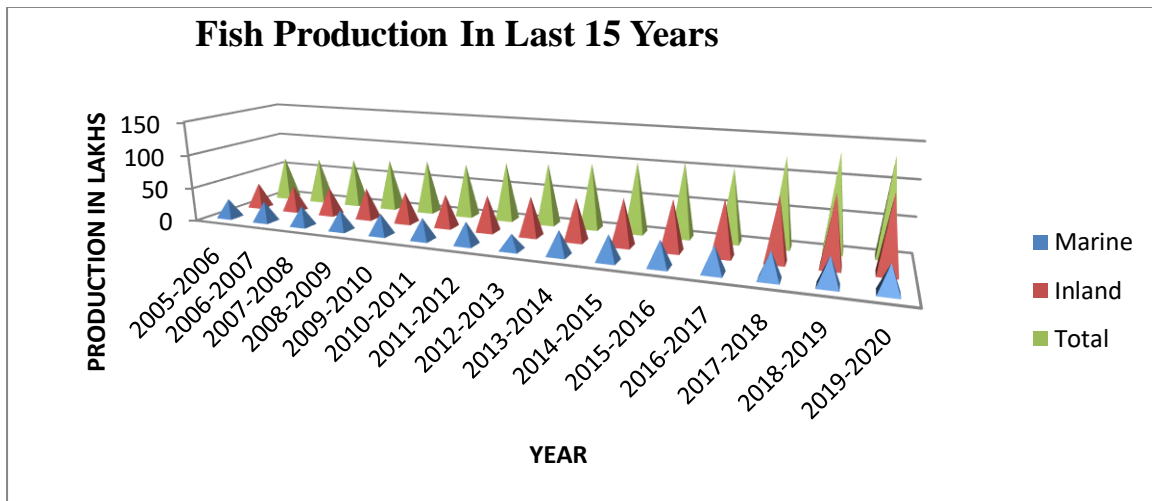
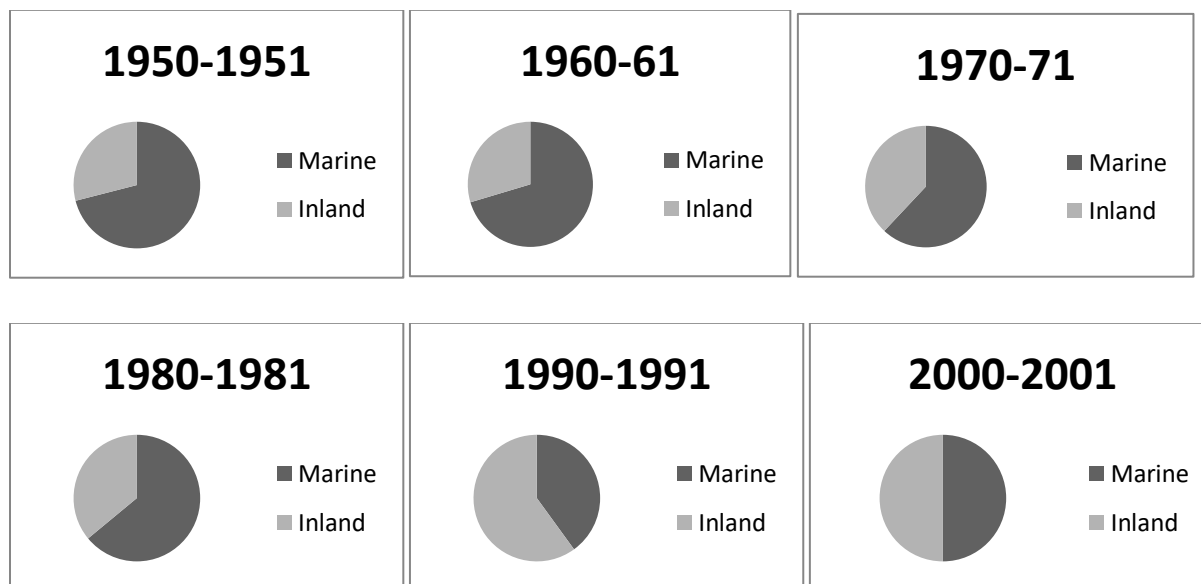


Figure 1.2

SOURCE: CMFRI Report

Interpretation: The production of last 15 years half taken immense growth from 72.7 in 2005 - 2006 to 135.7 in 2019-2020

CONTRIBUTION OF INLAND AND MARINE FISHERIES OVER THE DIFFERENT TIME SPAN



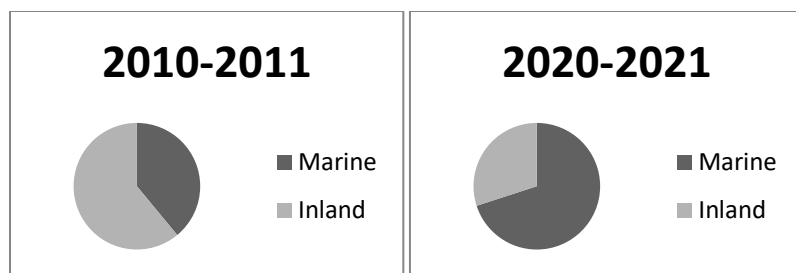


Figure 1.3

Source: CMFRI Report

Interpretation: There was huge change from 1950 -2021 in 1980 marine export was 64% of total production which became equal by 2001 and by 2021 the marine products increase to 64 % and a change surplus of items from the marine inland is around 30%.

Freshwater Aquaculture:

Within the United States of America, there are 240 3 million ponds and tanks for freshwater culturing. The different sources wherein fish farming may be undertaken consist of the flood undeniable lakes and different herbal lakes, reservoirs, irrigation canals and paddy fields. India is largely a carp United States of America with extra than 80% of the manufacturing being contributed through carps alone. The different substantial contributor in latest years is Pangasius species. India is now the 0.33 biggest manufacturers of Pangasius with inside the global after Vietnam and Thailand. The inland fish manufacturing for the 12 months 2013-14 turned into round sixty one lakh MT. Andhra Pradesh turned into the pinnacle manufacturer with 15.eight lakh MT accompanied through West Bengal with 13.nine lakh MT. The graph under in Exhibit five depicts the pinnacle ten states with inside the freshwater aquaculture manufacturing for the 12 months 2013-14. The proportion of freshwater aquaculture inland fisheries has improved from 34% in mid 1980's to 80% in latest time.

Brackish water aquaculture:

It is practiced in three different ways as described below:

- Fish production after the harvest of rice in the low land areas. It is generally practiced in central Kerala, along the northern coastal waters of Karnataka, Goa and some areas in West Bengal.
- Fish production in ponds throughout the year in larger and deepen fields, it is practiced in Kerala and West Bengal.
- Rice and fish are raised together and is practiced majorly in West Bengal and Goa.

1.2 INDIA'S EXPORTS OF MARINE PRODUCTS

Exports of marine items reached an all-time high of USD 5511 million during the 2014-15 fiscal year. Exports of marine products surpassed all prior highs in terms of volume, rupee value, and dollar value. In terms of quantity and value, frozen shrimp remains the most important export item in the export basket, accounting for 34% of total USD earnings and 67 % of total USD earnings. In terms of volume, the United States is the largest market for frozen shrimp exports (1,12,702 MT), followed by the World Organization (81,952 MT), Southeast Asia (69,068 MT), and Japan (30,434 MT). In terms of price, processed shrimp contributes 76 % of total shrimp export. Fish is the second most important export item, accounting for about 29% of total export value and 11% of total USD revenues. Fr. cuttle saw a 21% increase in quantity and a 32% increase in value. Dried fish exports increased by 4% in quantity and 1% in rupee terms, respectively, while live animal exports increased by 8%, 7%, and 2% in quantity, rupee value, and USD realization, respectively, compared to the previous year. The amount of chilled goods has increased by 59 percent.

Major Export Markets from India

The fisheries area has been one of the important participants of forex profits thru export. Over the beyond few years, protection has turn out to be very topical situation eliciting a top notch deal of public issue particularly withinside the evolved nations, in which meals protection offences at the moment are dealt at Government level. Once caught, marine meals merchandise are exceptionally perishable. Marine meals for export generally want to be speedy frozen after preliminary

processing and saved frozen till bought via way of means of the consumer. New projects had been followed for growing the arena to growth yields and make sure a sustained livelihood for fishermen. There has additionally been an amplified attempt to growth exports to different nations thru enhancements in infrastructure facilities like bloodless garage that higher cope with post-harvest management. To cope up with the growing demand for secure meals and to meet the wishes of health / first-class aware purchasers of the worldwide seafood market, MPEDA Quality Control Section has diagnosed the subsequent thrust regions for improvement / development and implements programmes which may be addressed through green bloodless chain answers throughout the price chain

- Monitoring of seafood first-class in touchdown and pre-processing facilities.
- Integrated improvement software for upgrading seafood first-class via way of means of supplying infrastructural facilities like pre-processing facilities and putting in place of mini lab toward first-class assurance.
- Evolving requirements for compliance for export of fish and fishery merchandise to numerous evolved nations primarily based totally on requirements / norms / guidelines prescribed via way of means of such nations from time to time. Fishing Harbors Up gradation/development.

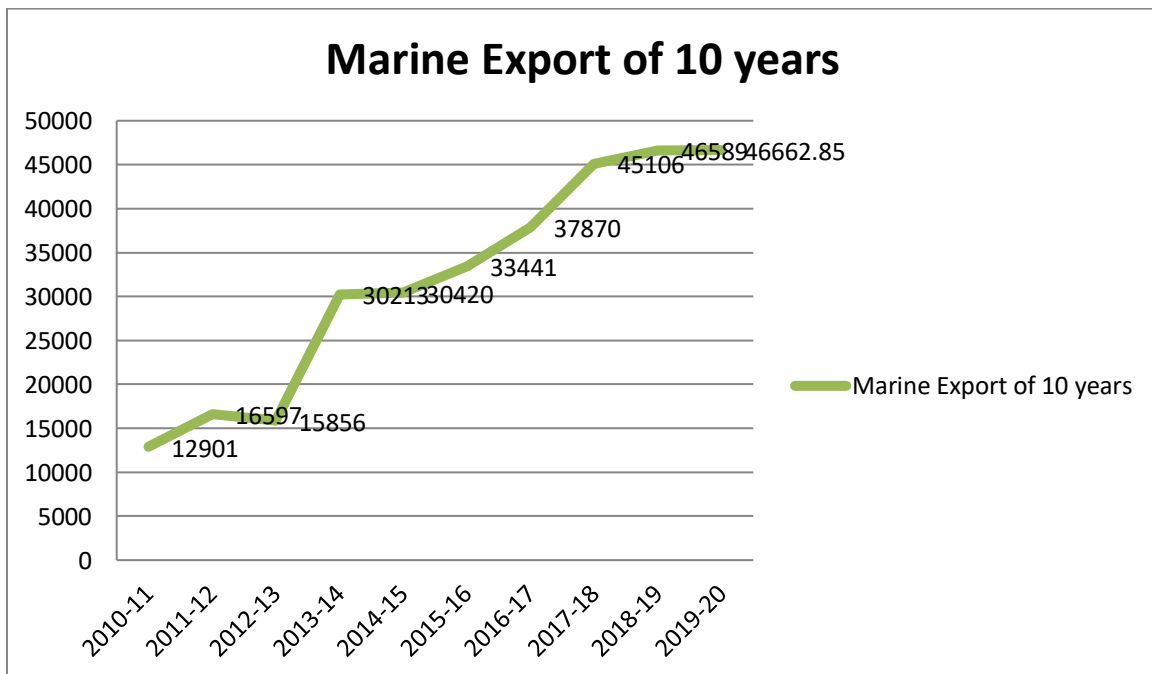


Figure 1.4

Source: CMFRI Report

Interpretation:

Flake Ice/Block Ice (Farm to Factory Gate)>> are the cold chain components for the export value chain. IQF (Processing and Freezing)>> Block Processing/Blast Freezing/IQF (Processing and Freezing)>> Cold Chain Containers >>Freezer Cold Storages (Storage) (Logistics and Export). The following is a brief explanation of these components:

Block Ice/Tube Ice/Flake Ice/Slurry Ice – Block Ice plants are the foremost wide accessible supply of ice for the fishing business within the country. These ice plants are densely established in the coastal regions in the main for satiating the requirement of the fisheries sector. Tube Ice is that the new development in the fishing industry as several of the ocean food factories have already resorted thereto for obtaining regular ice production in the plants. Flake Ice machine is widely employed in IQF sea food plants and is helpful wherever immediate chilling is required. Suspension Ice machine can be mounted aboard fishing vessels making certain speedy cooling of fish until it reaches the shore.

IQF process - India till the year 1986 was mercantilism fish merchandise by mistreatment typical kind of state change whereby the merchandises were usually packed in blocks of two kgs by block freezing. The disadvantages of block freezing are that the product loses its identity and also the client is forced to shop for the product in bulk. In cases wherever reprocessing is concerned the standard of upshot is affected. Hence these factors necessitated the introduction of on an individual basis fast Frozen Products. Among the marine items exported from India, shrimp is the most important item. Since the preference in mercantilism countries is towards IQF products and additionally there's worth addition if the products are IQF. The most important sorts of IQF products that are exported embody shrimp, decapods fish, lobsters and fishes.

Cold Storages - Once fish is frozen, it should be holding on at a relentless temperature of -23 degree Centigrade or below so as to keep up an extended period of time and guarantee quality. an outsized portion of soldier is water. as a cause of the water in fish contains several dissolved

substances, it doesn't uniformly freeze at the melting point of pure water. Instead, the free water in fish freezes over a good vary of temperature, starting at around } -2 degree Centigrade. the quantity of remaining free water decreases till the merchandise reaches a temperature of approximately -40 degree Celsius. Fish command below that temperature Associate in Nursing pre-packed so as to notenable water loss through sublimation will behold on for an indefinite period. Unfortunately, there are comparatively few industrial freezers capable of storing fish at -40 degrees Celsius as a cause of the tremendous variation in energy costs. Fish are so commonly hold on at -18 to -29-degree Centigrade leading to a variable period of time starting from a few weeks to virtually one year. A production cold store is typically a district of the fish process plant for storing frozen finished products. Bulk cold stores normally offer a similar service as production cold stores, however are typically settled at far from the particular processing industries and are normally a lot of larger than the production stores that cater to the wants of different processing plants additionally for storing frozen sea foods on custom hiring basis. Capability of cold stores commonly ranges between 1,000 MT and 10,000 MT. However, the size of the cold store is determined by a number of factors, including the volume of traffic, the average storage time, the number of goods, and the number of customers.

1.3 Statement of Problem

Seafood exports have traditionally been considered one of the country's "growth sectors," but recurrent policy formulations haven't done enough to promote the industry's growth. Exporters have long believed that policy changes are made without taking essential elements into account, such as the competitive environment in our competitors' economies.

Diesel is not regarded an input for calculations in the former DEPB (Duty Entitlement Passbook Scheme) scheme or the Drawback scheme, putting the sector at a significant disadvantage. Despite the tremendous hurdles that this sector faces, both external and internal reasons, DEPB's 8 percent support has been decreased to 3.5 percent, and the VKGUY (Vishesh Krishi and Gram Udyog Yojna⁵)'s percent support has been reduced to 3 percent.

Because international markets, particularly those in the United States and the European Union, are very weak and risky as a result of the economic crisis, the sector is very concerned about its immediate and long-term prospects, which is exacerbated by the massive reduction in the sector's

support package. The sector and its nearly 3 million employees would face serious problems in the coming days unless the support packages are reinstated, both in terms of increased VKGUY and Drawback rates.

1.4 Research Objective

- To Study about the overview of marine products exported from India.
- To identify the challenges faced by sea food exporters in India with special reference shrimp exporters
- To have an analysis on future of sea food exporting in India

1.4 Scope of the study

- Number of marine products exported from India for last 5 years can be identified.
- Forecasting the future exports of marine exports from India can be done.
- Growth of marine products exports for the last 5 years can be monitored.
- The percentage of exports gained by different states of India from overall exports can be identified.

1.5 Limitations of the study

There are some limitations in completing this research,

- Time limit for collecting data was less so sufficient number of data cannot be collected.
- This study is limited exported from India.

1.6 Research Methodology

Secondary data will be used in this study. Secondary data on the production of marine fish over time by different industries. The data's will be collected from the publications of the Central Marine Fisheries Research Institute (CMFRI) and the export data from the Marine Products Export Development Authority (MPEDA) and also from various books and journals

1.7 CHAPTERIZATION SCHEME

- Chapter 1 gives an overview of the Indian marine industry, including fish production during the last 15 years, India's participation in marine exports, and more. Study objectives, research methods, study scope, and limits
- Chapter 2 Literature reviews
- Chapter 3 Analysis of Indian Marine Export
- Chapter 4 An analysis on the export of marine products from and India
- Chapter 5 includes the conclusion of the study and Recommendation

Chapter 2: Review of Literature

1. Indian Sea Food Industry: The Cold Chain Perspective

[Food & Agribusiness Strategic Advisory & Research (FASAR), YES BANK]

This report was presented On the occasion of the India Cold Chain Show 2015; we are pleased to release the YES BANK Knowledge Report - Indian Sea Food Industry - The Cold Chain Perspective. The paper gives an overview of the Indian Fisheries Industry, the current state of the cold chain in both the domestic and export sectors, identifies critical infrastructural issues, and makes specific recommendations to support integrated cold chain development in the Indian Sea Food value chain.

2. Marine Fisheries

[Rao, K Virabhadra]

Review studies developmental measures in various fields of fisheries taken up during the past 35 years have helped the country to build up a modern fishing industry making it eighth among the fishing nations of the world as far as fish production is concerned and the number one nation with regard to the export of prawns. The marine fisheries research programs that have been undertaken in the country have added valuable knowledge on the exploited and unexploited resources, their characteristics and dynamics in relation to their environment. The paper gives an overview of the Indian Fisheries Industry, the current condition of the cold chain in both the domestic and export sectors, identifies critical infrastructure issues, and makes specific recommendations to support integrated cold chain development in the Indian Sea Food value chain.

3. Socio Economic Scenario of Marine Fisheries in Kerala - Status and Scope for Improvement

[Sathiadhas, R (2006)]

Study concludes that the percentage of fishery area with inside the Agricultural State Domestic Product of Kerala improved from 5.18 % with inside the eighties to 9.36 % in nineties and thereafter maintained a strong position. The regular boom in percentage of

fisheries with inside the agricultural and allied sectors through the years establishes the importance of this dawn area.

4. Spatial zing Globalization: A “Geography of Quality” in the Seafood Industry

[Becky Mansfield]

The sociospatial structure of world industries can be characterized via way of means of distinction and plurality as lots as via way of means of the coordination of practices over space. One vital issue that shapes those dynamics in modern meals industries is the pleasant of products. Challenging current views that outline pleasant as an opportunity to international, business varieties of manufacturing, this evaluation unearths that pleasant is likewise vital for business meals manufacturing and for the worldwide geography of the surimi seafood enterprise. Surimi, a fish paste utilized in a extensive collection of products, including fish desserts and imitation crab, changed into as soon as solely Japanese. Now, this enterprise is international in scope, with manufacturing and intake encompassing webweb sites throughout Asia, the Americas, and Europe. Interactions amongst varieties of products, marketplace variations, processing strategies, and the traits of fish shape fluid definitions of product pleasant that form styles of deliver and call for in the international enterprise. Terming those spatial interactions a “geography of pleasant,” this text suggests that variations in how pleasant is built have an effect on the improvement of dynamic transnational change styles and new nearby industries in every marketplace. This converting geography of pleasant offers perception into the advent and renovation of a geographically differentiated but nonetheless international-scale enterprise. The geography of pleasant on this enterprise is such that relative dis-integration among one-of-a-kind commodity chains characterizes the motion towards international-scale manufacturing and intake.

5. Restructuring the Chinese seafood industry, global challenges and policy implications

[Knut BjørnLindkvist]

This article discusses how the Chinese seafood enterprise will have an effect on the relaxation of the world's fishing industries. The evaluation is primarily based totally on theories of monetary comparative advantage, the worldwide department of labour and the

internationalization procedure associated with change activities. Given the growing home call for fish in China, the restrained availability of home fish shares and much less fulfillment for farmed marine fish in China are taken into consideration a number of the maximum crucial elements in proscribing the increase in Chinese seafood production. The necessity of uncooked fish imports into China may also boom strain on international fish shares and worldwide fish fees, ensuing in tighter components international and better seafood fees for the Chinese. Sustainable fish harvests and change require more potent fishery management, particularly with inside the members of the family among seafood agencies and governments alongside the whole worldwide price chain offering China. Such structural adjustments may also permit new price-brought opportunities for fish farming and the upgrading of positive fish species for human intake that had been formerly applied simply for fish feed.

6. Utilization of seafood processing waste – challenges and opportunities.

[Ian Knuckey]

During the processing of fish usually simple the fillets are retained whilst the majority of product (as much as 66%) is discarded. Across the seafood enterprise in south-jap Australia alone, it's forevisioned that >20,000 t of fish product waste is produced annually. Some of this fish waste is rendered, however maximum is dumped to landfill at a fee of as much as \$150/t. This exercise is coming beneath expanded scrutiny because of environmental problems and is turning into an growing fee to the seafood enterprise. Hydrolyzed fish waste composted with rock phosphate, bureaucracy a natural solid-phosphate fertilizer. To commercialize this opportunity, running relationships want to be fashioned among the seafood enterprise and fertiliser manufacturers. As a part of this dating the seafood enterprise can offer hydrolyzed fish offal as a strong liquid fish concentrate. This is mixed with rock phosphate and inoculated with bacteria and fungi the usage of superior composting technology. This guarantees temperatures round 60°C are carried out to produce a pathogen unfastened compost blend. By constructing up of microbial populations, the supply of phosphorus with inside the apatite of the rock phosphate may be expanded, at the side of vitamins held with inside the microbial biomass. This product has the twin benefits of imparting wished vitamins to agricultural plants as nicely as using waste substances in any other case pricey to dispose of. Three

discipline trials (processing tomato, irrigated pasture and dry land triticale) are beneathneathmannerto evaluate the agronomic effectiveness of a fish waste primarily based totally rock phosphate fertilizer. Processing tomato crop benefited from the software of the fish primarily based totally rock phosphate fertilizer to the equalvolume as superphosphate on thestop of seasons.

7. Coping with the Standards Regime: Analyzing Export Competitiveness of Indian Seafood Industry

[Somasekharan, JayasekharHarilal, K. NParameswaran, M.]

In this studies paper a Constant Market Share (CMS) method become hired to research export overall performance dynamics of Indian seafood (shrimps and cephalopods) with inside the main export destinations (EU, USA and pick Asian countries), which bills for a big marketplace for Indian seafood. The Constant Market Share version becomes used to collapse the increase in exports of seafood into marketplace length impact, marketplace composition impact and competitiveness impact. The evaluation become done for the seafood exports for a span of 12 years from the year 1996 to the year 2007, the duration in the course of which India needed to face extreme demanding situations from evolving meals protection guidelines with inside the EU and USA. To account for competitiveness at the disaggregated commodity level, the evaluation is extended. In the previous study, we discovered that cephalopod exports were more competitive, but shrimp exports were less competitive. To a certain extent, it shows that as a result of tight food safety regulations, both change-facilitating and change-limiting effects can coexist.

8. Quality standards in seafood industry

[Hassan, F.; Mukundan, M.K.; Prathap, S.K.]

Food protection has been diagnosed as an vital detail in global meals primarily based totally buying and selling emphasizing the significance of exceptional protection and assessments at specific levels of manufacturing cycle. WTO negotiations resulting loose exchange throughout the globe have additionally delivered necessities of stringent exceptional norms and certification. Seafood gadgets throughout the U.S orientated closer to exports have conformed closer to the product exceptional specs set through importers from time to time. This consists of compliance with Sanitary and Phytosanitary measures along with Hazard Analysis and Critical Control Points (HACCP). International

compliances are capital extensive that most effective gadgets of huge length may want to come up with the money for to adhere. This has been gradually reviewed and backed through Government corporations to reinforce compliance stage and cause improvement of export associated infrastructure.

9. Micro plastics in seafood as an emerging threat to marine environment: A case study in Goa, west coast of India

[MahuaSahaPriyanshaGupta]

The present study exhibits the occurrence of MPs in different matrices (water, sediment and biota) from the Sal estuary, Goa, situated on the central west coast of India. Polyacrylamide (PAM), polyacetylene, ethylene vinyl alcohol (EVOH), polyvinyl chloride (PVC), and polyamide were the most common polymer types identified by - FTIR (nylon). The polymers that were found in abundance in the guts of finfish and entire shellfish were also found in abundance in sediment and the water column. The presence of MPs in commercially important shellfish and finfish samples from the Sal estuary was highlighted in this investigation. The existence of MPs in numerous types of marine species in the Sal estuary is convincingly demonstrated in this study. Because shellfish is a delicacy in the area and plays a significant role in the seafood economy, the MPs could endanger human health. MPs are also found in water and soil, as well as in the digestive tracts of finfish, posing an ecological danger.

10. A case study on Maharashtra's sea food exporters

[Dr. Gopal & S.S. Dhond]

Since the beginning of the decade, the Indian sea food business has had sustained year-on-year growth in the low double digits. The Indian economy has grown significantly over the last decade, coming in second only to China in terms of expansion rates in Asia-Pacific. According to the Sea Food Exporters Association of India, the Sea Food Export market today is worth about Rs. 10,000 crores and employs over 3 lakh citizens. Hence, the sea food export industry is a major constituent in the Indian Economy. The Indian sea food export industry by and large still remains fragmented and dominated by traditional methods with excessive labor deployment. The Sea Food Export industry in India currently generates 5.2% of total industry value for Asia Pacific. India's share in the world Sea Food market is around 1.74%. This percentage is an increase on the 4% figure

for 2001; this growth trend is set to continue, with the Indian industry generating an anticipated 6.3% share of the Asia-Pacific industry's value by 2015. As a developing economic region, the Indian industry is developing with higher growth rates than those in Asia-Pacific countries with mature economies, such as Japan and Australia. Given the above scenario, the Sea Food Export industry in India is expected to accelerate from its current value growth position. With an anticipated CAGR of 8.3% in the 2010-2015 periods, the industry is expected to reach a value of Rs 50,000 cores by the end of 2015, an increase of 49.2% since 2005. The development in the Indian economy will create demand for more Sea Foods: this demand will provide a significant revenue boost for companies operating within this industry.

CHAPTER 3 OVERVIEW OF INDIAN SEAFOOD INDUSTRY

3.1. Capture fisheries

3.1.1 Fisheries Infrastructure

Marine capture fisheries play a critical role in India's food supply, food security, and economic generation. India's coast line stretches for 8129 kilometers and is divided among nine maritime states and four Union Territories. The important fisheries infrastructure in the maritime industry is listed below. Coastal fisheries are governed by the states and take place within the first 12 nautical miles from the base line out to sea, whereas deep-sea fisheries are governed by the Union Government and take place largely between the 12 nautical mile and the EEZ's outer limit. State governments are in charge of inshore fisheries management, which is normally done through State Fisheries Departments and particular State-based legislation.

3.1.1.1 Maritime States of India

- Gujarat
- Maharashtra
- Goa
- Karnataka
- Kerala
- Tamil Nadu
- Andhra Pradesh
- Odisha
- West Bengal

3.1.1.2 Number of fishing crafts in India

India's multi-species, multi-gear marine fishing industry is classified into four categories;

- Non-Motorized
- Motorized
- Mechanized
- Deep sea fishing sector

The introduction of mechanical boats, primarily trawlers, during the 1970s was a watershed moment in India's fisheries development. India's fishing fleet has grown dramatically since the introduction of motorized boats. According to the D/o Fisheries' Real Craft registration portal, India has 53 fishing vessels, including 65876 non-motorized, 66910 motorized, and 136920 automated fishing vessels.

Sl. No.	State	Deep Sea Fishing Vessel	Motorized Crafts	Mechanized Boats	Traditional Crafts (Non-Motorized)	Total
1	Andaman and Nicobar	0	2006	114	1453	3573
2	Andhra Pradesh	0	23574	2093	15709	41376
3	Daman & Diu	2	315	1976	0	2293
4	Goa	0	11	2530	315	2846
5	Gujarat	0	11650	16513	77	28240
6	Karnataka	0	9185	4555	9065	22805
7	Kerala	51	30947	5802	2799	39599
8	Lakshadweep	0	1458	48	398	1904
9	Maharashtra	0	0	20667	7653	28320

10	Orissa	0	13003	1882	15039	29924
11	Puducherry	0	1970	1042	1834	4846
12	Tamil Nadu	0	36411	5878	5637	47926
13	West Bengal	0	6400	3098	5897	15395
	Total	53`	136920	66918	65876	269047

Table 3.1: State wise export

SOURCE: ReALCraft registration portal of D/o Fisheries, MoF,AH&D 2019

3.1.1.3 Coastline length and landing centers of different Maritime States of India

India is blessed with a coastline of 8,129 km, 2.02 million sq. km. of Exclusive Economic Zone (EEZ) including 0.5 million sq. km. of continental shelf.

Sl. No.	State	Approximate length of coast line	Number of landing Centers
1	Andhra Pradesh	974	271
2	Goa	104	34
3	Gujarat	1600	123
4	Karnataka	300	88
5	Kerala	590	178
6	Maharashtra	720	152

7	Odisha	480	57
8	Tamil Nadu	1076	352
9	West Bengal	158	44
10	Andaman & Nicobar Islands	1912	25
11	Daman & Diu	27	7
12	Lakshadweep	132	19
13	Pondicherry	45	26

Table 3.2: Coastline length and landing centers of different Maritime States of India

3.1.2 Existing Norms in Marine Production

3.1.2.1 Ban period

The trawl prohibition in fisheries was one of the management strategies in place to govern the fishery and protect marine resources, which had resulted in a significant increase in fish output in recent years.

State	Days	Period
West Bengal	61	15th April to 14th June
Odisha	61	15th April to 14th June
Andhra Pradesh	61	15th April to 14th June
Tamil Nadu	45	15th April to 01st June
East coast	45	15th April to 29th May

West coast	45	15th June to 29th July
Kerala	47	14th June (midnight) to 31st July
Karnataka	61	15th June to 10th August
Goa	61	01st June to 31st July
Maharashtra	61	1st June to 31st July
Gujarat	66	10th June to 15th August

Table 3.3: Ban period in India Sea food Source: Sea food Regulation by CMFI

3.1.2.2 Traditional fishing and commercial fishing

Traditional fishing refers to any small-scale commercial or subsistence fishing that uses traditional methods like rod and gear, arrows and harpoons, throw nets and drag nets, and so on. Traditional fishing tactics will differ significantly from place to region in terms of specifics. They rely on local and indigenous knowledge, most of which has been passed down through a strong oral tradition from generation to generation. Catamarans and dug-out canoes are commonly used by traditional fishermen when venturing out to sea. The catching of fish for commercial purposes is known as commercial fishing. Commercial fishing gear is divided into three categories: active, passive, and other miscellaneous.

Active Fishing Gears

- Surrounding nets: These are roughly rectangular walls of netting equipped with floats and sinkers that are cast to enclose fish schools after the presence of fish is detected. In general, these nets are used in the surface layers. Purse seine, for example.
- Seine nets: Seine net is a long wall of netting with or without a bag that is supported by floats and sinkers that are operated by the water's edge. Ropes tied to the end of the wings run the net, which are used for hauling and herding the fish. Boat seines/Danish seines, for example.
- Trawls: Trawls are classed as bottom, midwater, or pelagic trawls depending on where the operator is in the water column. Beam trawls and otter trawls are separated by the entrance of the mouth. Trawls are classed as one-boat trawls, two-boat trawls, pair trawls, or bull trawls based on the number of boats utilised. Double rig trawls, triple rig trawls,

and quad rig trawls are categorised based on the number of trawls operated from a single vessel.

- Dredges: Dredges are bottom-operated dragging gear with an oblong iron frame and an attached bag net for collecting shellfish.
- Hooks & Lines: Fish are tempted with edible or artificial bait or lures that mimic the appearance and movement of natural prey, and are then held by a hook hidden in the bait or lure. The hook is attached to a snood or line. The fish is also held captive by the piercing action of hooks or jigs that pass by. Pole and line, jig line (squid jigging), and troll line are among examples.
- Lift net: A lift net is a submerged horizontal netting panel or a cone-shaped bag with the mouth facing upward that is manually or automatically lifted to filter fish in the overlying water column.
- Falling gear: Falling gear is cast over a region where fish are present, then gathered and hoisted to catch the fish. Cast net, Cover coat, Lantern net, and so forth.

Passive Fishing Gears

- Gill nets and entangling nets: Gill nets are rectangular walls of netting held erect by floats and sinkers placed in the target fish's swimming layer, catching the fish by gilling them in the mesh. Entangling nets are made out of single or multi-walled netting that is suspended vertically in the water by floats and sinkers, catching fish via entangling rather than enmeshing. To build vast fleets, nets are frequently connected end to end.
- Traps: Traps are passive fishing gears that include enclosures into which fish are attracted or steered and from which escape is difficult due to labyrinths or retarding devices such as funnels or constrictions.
- Hooks & Lines: Fish are enticed by edible bait or lure and finally held by the hook concealed in the bait or lure. The hook is connected to a line or snood. Long lines when set close to the bottom are called bottom-set long lines when set in surface and mid water with freedom to drift with the current are called drifting long lines; when set vertically, they are called vertical long lines; when combining the properties of bottom and vertical long lines they are called bottom vertical long lines.

- Fishing without gear: This category includes animal gathering by hand or with simple implements such as shovels, picks, or knives, with or without the use of diving equipment; and fishing with trained animals or birds such as cormorants.
- Stupefying methods: It includes use of the poison or under water explosives to paralyze the fish. These methods are prohibited in responsible fisheries.
- Grappling and wounding gear: Fish are caught by injuring, grappling, and killing them with sharp devices such as clamps, tongs, lances, bow and arrow, harpoon, and rifles.
- Electrical fishing: Electrical fishing equipment makes use of the effects of pulsating electric fields on fish, such as initial reaction, electro taxis (anodic attraction), electro-narcosis, and electrocution.

3.1.3 Technology used for fishing

The technology used among the traditional fisher folk of Kerala for catching fish such as the fishing craft and the gear are traditionally evolved and differ according to the needs of the specific local fishing conditions. For example, the south has multi species and dispersed fishery, which requires multiple gears. The fishermen in this area mainly use the traditional boat called as the Catamaran while going out individually, in pairs or in groups of three (Houtart and Nayak, 1988).

3.1.3.1 The Catamaran

The Catamaran is made up of two or three logs of wood with coir ropes tying them together. The rope is tied around a cross piece of wood in the shape of stumped bull horns placed at the end of the logs. Small gaps are purposefully left in-between the logs to allow the water to drain thus reducing the impact of waves (Ram, 1991). There are two types of Catamarans. One is smaller with a crew size of two and is used for hook and line fishing such as anchovy, sardine and the prawn nets. Hook and line fishing is more common in the south because of multispecies and dispersed fishing, In the hook and line fishing, the gear is made of a hook with a line attached to it. The bait lures the fish. The fish gets caught in the barb while attempting to eat the bait and cannot free itself. The gear is very selective in action in catching different species and different sizes of fish. The hook is very important and the size of the hook, the type of the hook used, the

type of bait used determines the selectivity of the catch. The larger Catamarans can accommodate 3 to 4 persons and are used in pairs with bell shaped nets.

3.1.3.2 The Vallam

Vallam, a small boat or plank canoe, is another sort of small boat or plank canoe used for fishing from the coast. It's formed by coir ropes stitching together many jungle jack planks. Pitch is applied to the inside of the boat to make it watertight (Ram, 1991). Vallam comes in two varieties. The smaller of the two, Kettu Vallam, is owned by a group of 6 to 12 fishermen.

It is popularly used for hook and line fishing in Trivandrum and Alleppey districts. Ottathadi Vallam is a dugout canoe between 10 to 15 meters long, carrying upto 15 members. It is made by scooping out large logs of softwood such as jungle jack or mango. These are owned collectively (Iyengar, 1985). Houtart and Nayak (1988) inform that majority of the fishermen in the South are thus self-employed, but there are a few fishermen who remain coolies or laborers all throughout their lives. The fishermen at the central region of Kerala use larger crafts and gears because of the presence of sand banks and rich fishing grounds. The fishermen here work together in groups. The north has single species fishing and the craft and the gears used are larger. Houtart and Nayak (1988) write that this has led to polarization between the big and the small artisanal fish workers, where the small fish workers resort to hook and line fishing while others survive as laborers.

3.1.3.3 Mechanization in fishing

The modernization of fisheries was initiated by the government in the 1950s, write Kurien and Sebastian (1982). Before this initiative, fishing was a caste based artisanal activity that used variety of fishing technologies such as crafts and gears according to the local needs. The first phase took place in the form of the Indo-Norwegian project. This project originally aimed at community development and proposed the introduction of small mechanized boats and the construction of harbors in a few villages. However, after the 1960s, the major focus of the project shifted with an increasing demand for prawns for export markets. Thus, large trawl boats started to be used for harvesting prawns. By the 1970s, the mechanized fleet began to encroach

on the territory of the traditional fishermen who continued their own way of fishing. Kurien and Sebastian (1982) argue that, this gradually has led to a gap between the traditional fishermen and the fishermen using newly mechanized fishing boats for prawn fishing. Mechanization has gradually led to the deterioration of the economic condition of the traditional fishermen because of the huge gap between the two types of fishing. This has also led to a gradual decrease in fish quantities as well as changed the traditional patterns of fish drying, processing as well as marketing of fish and thus has gradually led to the marginalization of the traditional fishing communities.

3.1.4 Illegal, Unreported and Unregulated (IUU) fishing

The issue of illicit, unreported, and unregulated (IUU) fishing in world fisheries is a serious and growing concern in the framework of the Code of Conduct for Responsible Fisheries and its overarching goal of sustainable fisheries. In all capture fisheries, IUU fishing hampers attempts to protect and manage fish stocks. When faced with IUU fishing, national and regional fisheries management bodies may fall short of their objectives. This condition results in a loss of both short- and long-term social and economic potential, as well as negative consequences for food security and environmental preservation. IUU fishing has the potential to bring a fishery to its knees or substantially impede efforts to restock depleted stocks. Due to a lack of political will, priority, capacity, and resources to ratify or accede to and implement existing international treaties addressing IUU fishing, they have not proven effective.

IUU fishing is not a new phenomenon in capture fisheries, and it is not limited to the high seas. It also happens in coastal states' exclusive economic zones (EEZs) by national and foreign vessels, as well as in river and interior fisheries. While it is difficult to assess the entire IUU catch in tonnage or value terms in marine fisheries, the amount of IUU fishing has reached major proportions for several species. These catches are made by both authorised and non-authorized fishers in many circumstances; that is, the catches are not taken solely by vessels flying 'flags of non-compliance' (FOC).

The lack of effective flag State control is the main cause of IUU fishing. The prevalence of IUU fishing would be considerably decreased in a perfect world with full and efficient flag State regulation. However, the world is not ideal, and some States fail to meet their international law

commitments in terms of vessel monitoring and control after allowing vessels to fly their flags. Furthermore, once a vessel assumes the flag of a state, some states do not offer sufficient authorizations for it to fish. Due to the lack of control and fishing permits, such vessels are free to engage in IUU fishing. IUU fishing is not a new phenomenon in capture fisheries, and it is not limited to the high seas. It also happens in coastal states' exclusive economic zones (EEZs) by national and foreign vessels, as well as in river and interior fisheries. While it is difficult to assess the entire IUU catch in tonnage or value terms in marine fisheries, the amount of IUU fishing has reached major proportions for several species. These catches are made by both authorised and non-authorized fishers in many circumstances; that is, the catches are not taken solely by vessels flying 'flags of non-compliance' (FOC). Efforts to rebuild vulnerable stocks that are subject to severe management restrictions or moratoria will be thwarted if IUU fishing is not curtailed, and IUU fishers target vulnerable stocks that are subject to strict management controls or moratoria.

a. Illegal fishing means fishing activities:

- Without the authorization of the state or in violation of its rules and regulations, conducted by national or foreign fishing vessels in nautical waters within its control.
- Conducted by fishing vessels flying the flags of states that are contracting parties to a relevant regional fishery management organization, but which operate in violation of the organization's conservation and management measures, to which those states are bound, or of relevant international law provisions. Or
- Those done by cooperating states to a relevant regional fisheries management body in violation of national laws or international obligations, including those conducted by fishing vessels in contravention of national laws or international obligations.

b. Unreported fishing means fishing activities:

- This has not been reported to the appropriate national authority, or has been reported incorrectly in violation of national laws and regulations; or

- These were carried out in a relevant regional fisheries management organization's area of competence and were either not reported or misreported in violation of that organization's reporting procedures.

3.2 Processing Infrastructure

3.2.1 Capacity

There are almost 465 processing plants available in all regions of India with the total capacity of 20,255.14 MT. The region wise total numbers and capacity of processing plants are shown below

Centre	No	Capacity (MT)
Regional Office Kochi	99	3,005.71
Sub Regional Office Quilon	14	417.30
Sub Regional Office Mangalore	36	2,155.13
Regional Office Mumbai	48	3,449.80
Sub Regional Office Goa	14	900.46
Regional Office Veraval	103	5,508.93
Regional Office Kolkata	32	914.86
Sub Regional Office BBSR	21	663.70
Regional Office Vizag	56	2,272.50
Regional Office Chennai	9	163.15
Sub Regional Office Tuticorin	33	803.60
Total	465	20,255.14

Table 3.4: Major Capacity Infrastructure

3.2.2 Technology

3.2.2.1 Freezing

Freezing basically consists in removing heat from a substance until it attains subzero temperatures and assumes a hard consistency by the solidification of its water content, both free and combined and hardening of the organic tissues.

Quick Freezing

It is the freezing of items at a high rate. Small ice crystals form during rapid freezing, preserving the product's quality. Large ice crystals occur when flesh is progressively frozen, breaking the fibers and cells. These meats lose more fluid and have a poor texture after defrosting. Although the quality of the meat degrades, it is still safe to eat. Protein denaturation occurs at a temperature just below 00 C, which is the key zone for deterioration. All of the fish should be quickly frozen at a temperature of 0 C to -50 C in 2 hours or less, according to the instructions.

Factors which affect freezing time:

1. Freezer type
2. Freezer operating temperature
3. Refrigeration system and operating condition
4. Air speed in an air blast freezer
5. Product temperature
6. Product thickness
7. Product shape
8. Product contact area and density
9. Product packing
10. Species of fish

3.2.2.2 Types of Freezers:

- a) Air Blast Freezers: Blowing a continuous stream of cold air over the fish
- b) Plate Freezers: Direct contact between the fish and a refrigerated surface
- c) Immersion or Spray Freezers: Immersion in or spraying with a refrigerated liquid

a. Air Blast Freezers

Fish is frozen in an air blast freezer in a stream of high-velocity cold air, either in a batch or continuously, typically in a duct or tunnel in which a stream of cold air is guided over the product on shelves (batch) or on a conveyor (continuous air blast freezer); also known as blast freezer, freezing tunnel, or tunnel freezer. The blast freezer's advantage is its adaptability. It can handle a wide range of irregularly shaped goods and can be frozen in a variety of forms and sizes.

Continuous air blast freezers: Fish are carried through the freezer (trolleys or they may be loaded on a continuously moving belt or conveyor) in this sort of air blast freezer, usually entering at one end and departing at the other.

Batch air blast freezers: Fish is frozen in an air blast freezer in a stream of high-velocity cold air, either in a batch or continuously, typically in a duct or tunnel in which a stream of cold air is guided over the product on shelves (batch) or on a conveyor (continuous air blast freezer); also known as blast freezer, freezing tunnel, or tunnel freezer. The blast freezer's advantage is its adaptability. It can handle a wide range of irregularly shaped goods and can be frozen in a variety of forms and sizes.

b. Plate freezers

The fish is frozen in a contact freezer or plate freezer by direct contact with a refrigerated surface, commonly between two hollow metal plates cooled by a refrigerant, with a distance between the plates ranging from 100 mm to more. A horizontal plate freezer is a form of freezer in which fish is frozen between two or more hollow, horizontal, parallel plates through which refrigerant circulates, notably in flat packs such as laminated blocks. The refrigerated, parallel

plates in a vertical plate freezer are vertical, and it is mostly used at sea or on land to freeze enormous 25 or 50 kilograms blocks of whole, gutted, or headed and gutted fish.

1. Horizontal plate freezers

The two main uses for this type of freezer are the freezing of pre packed cartons of fish and fish products for retail sale and the formation of homogeneous rectangular blocks. An HPE will only operate correctly if good contact is made on both the top and bottom surfaces of the pack or tray to be frozen.

2. Vertical plate freezers

The main benefit of this sort of freezer is that it allows fish to be frozen in bulk without having to package or arrange on trays. The plates resemble a bin with an open top, into which fish are placed directly. As a result, this sort of freezer is ideal for bulk freezing, and it has been widely used to freeze whole fish at sea in factory ships. In most situations, fish can be put between the plates without the need of wrappers, and water isn't required to reinforce the frozen block or increase plate contact.

3. Immersion freezer or spray freezer

It's typically utilized for small-size IQF goods that can be frozen in minutes. The frozen fish product is in direct contact with the chilled liquid (freezant). Brine freezing involves immersing fish such as tuna in a tank of recirculating cold sodium chloride brine at -150 C in a brine immersion freezer, which can take up to 3 days to thoroughly freeze a large tuna.

3.2.2.3 Freeze drying

Accelerated Freeze Drying (AFD):

Sublimation is the process of removing water (and other solvents) from a frozen material. It involves three steps: freezing, primary drying (sublimation), and secondary drying (desorption). Accelerated Freeze drying (also known as lyophilization) is a dehydrating method that is commonly used to preserve perishable materials or make them more transportable. Freeze-drying works by freezing the substance and then lowering the surrounding pressure, allowing the frozen water to sublime directly from the solid phase to the gas phase. Freezing, primary drying

(sublimation), and secondary drying are the three major phases in a freeze drying process (desorption). Each stage is crucial to achieving the desired level of quality.

3.2.2.4 Cooking

Cooking fish affects the texture and flavour of the food while also killing pathogenic germs. The most resistant germs can be killed by heating fish to a temperature over 66 °C or 150 °F (pasteurisation conditions). To avoid excessive nutrient loss due to heat degradation, oxidation, or leaching, the cooking time must be carefully controlled (the loss of water-soluble nutrients into the cooking liquid).

3.2.2.5 Chilling

Fish must be preserved in a low-temperature environment, such as ice or chilled seawater, as soon as possible after being caught. The freezing procedure limits the activity of enzymes and decreases the growth of bacteria that exist in fish. Fish are far more prone to microbial contamination and structural degeneration than land animals because they have a lower body temperature, softer texture, and less connective tissue.

Depending on the exact geographic location and the time it takes to transfer the fish to the processing plant, ice cooling and holding often requires a one-to-one or one-to-two weight ratio of ice to fish. When compared to ice cooling, chilled saltwater cooling and holding causes less bruising and other structural damage to the fish corpses.

3.2.2.6 Live seafood

Many markets, particularly in Southeast Asia and China, prefer live fish to frozen fish. If the seafood is alive, many customers are willing to pay a higher price. To preserve optimum selling condition and avoid mortality, live and fresh fish and seafood are particularly reliant on the transit environment. To avoid temperature, abuse and to counterbalance hard handling, special packing systems should be used. When you choose a high-quality good for air shipment, you can be sure it will arrive in good condition. Product handling should begin on the fishing boat or at the fish farm to ensure good quality. Natural elements such as seasonal fluctuations, specific harvest zones, feeding habit, sex, and spawning condition of fish and seafood will all influence

quality levels. Product quality and freshness are largely influenced by harvest procedures and ship treatment.

There are a number of species-specific aspects to consider when transporting live fish and seafood to ensure that the product arrives alive. The following are some of these factors: 1) respiratory rates; 2) stress tolerance; 3) excretory functions; and 4) temperature tolerance ranges.

3.2.2.7 Canning

Canning is a method of preserving food that has a shelf life of one to five years on average. A method of obtaining long-term microbiological stability for non-dried goods without the use of refrigeration by sterilizing the contents of hermetically sealed containers, such as cans, through continuous heating. Fish have a low acidity, which allows microorganisms to thrive. Foods with a low acidity (pH more than 4.6) must be sterilized at a high temperature (116-130°C) for public safety reasons. To reach temperatures over the boiling point, a technique of pressured cooking is required, which is given by the can's containment. The containing can inhibit bacteria from entering and multiplying within after sterilization. Apart from sterilization, no preservation approach is completely reliable. *Clostridium botulinum* (the bacteria that causes botulism), for example, can only be killed at temperatures exceeding boiling.

3.3 value addition

3.3.1 Packaging types:

- Pouch packs / cans
- Vacuum packed trays / pouches
- Modified atmosphere packaging
- Controlled atmosphere packaging
- Sous vide
- Boil-in pouches
- Retort pouching
- Other advanced packing system

3.3 Supply Chain of sea foods

We won't be able to achieve sustainable oceans by enhancing just one part of the supply chain. There is no market incentive for fish farmers or fishermen to improve their production or capture practises unless businesses along the supply chain value and differentiate sustainable seafood from pirated, illegal, or wastefully processed items.

Businesses that prioritise sustainability must also show that they are successfully carving off market share from traditional sources, giving investors confidence in their potential to prosper and develop – and motivating them to contribute the funding necessary to scale their operations.

Simply put, all of these connections mean that, in order to see large-scale economic growth of sustainable fish farms and fishing operations, we need greater business innovation at every point along the seafood supply chain, as well as in the connections between these parts.

A sustainable fisherman or farmer, for example, needs reliable data and cost-effective solutions for their own gear and supplies. This allows them to fish and produce in the most environmentally friendly way possible. Then they must be able to sell their products higher up the supply chain, to a distributor or processor who values sustainability enough to tell the difference between sustainable fish and fish that were not caught or farmed sustainably.

To help visualize how these pieces fit together, we developed a simple schematic, dividing the supply chain into six stages:

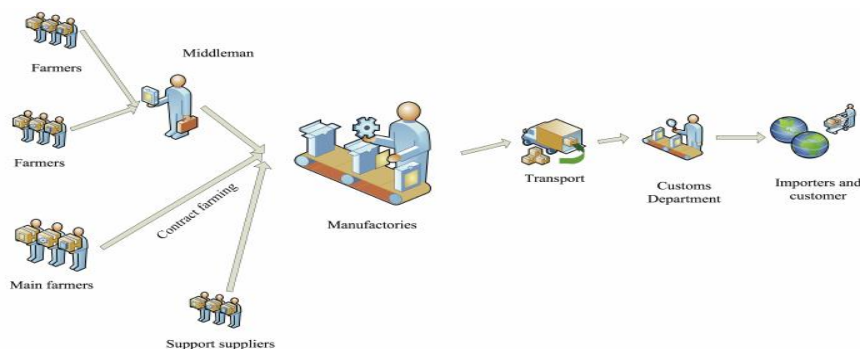


Figure 3.1: Process of Sea food

Stage 1: Pre-production inputs: Even before the fish is caught or farmed, this first stage takes place. It entails gathering and analyzing data that is crucial to the long-term management of fisheries or fish farms. It also includes advancements in materials used in fishing and farming.

Stage 2: Actual wild fish capture at sea or farm-based fish and shellfish production.

Stage 3: At the ports or on fields, purchase and collect seafood.

Stage 4: Value-added product preparation. Whole fish are filleted, breaded, canned, or otherwise packed into appealing consumer items in this process.

Stage 5: Logistics and distribution — delivering fresh and frozen seafood to clients

Stage 6: The final stage is sales. The fish on our plates, in restaurants, or on the shelves of our favorite supermarket are all examples of this final stage.

In each of these domains, as well as the links between them, there are opportunities to take market share from established enterprises. Entrepreneurs from all around the world are hard at work to capitalise on these prospects.

Many businesses are also bridging the sustainability gap by combining multiple components of the supply chain into a single entity. Organic Ocean and Local Catch, for example, work at various points of the supply chain. They purchase seafood from sustainable fishermen, process and package it, and then sell and distribute it to consumers, restaurants, and chefs who care about the environment.

Each of these domains, as well as the links between them, offers opportunities to take market share away from established enterprises.

Many businesses are also bridging the sustainability gap by combining various components of the supply chain into a single enterprise. Organic Ocean and Local Catch, for example, are involved in the supply chain at various stages. They purchase seafood from sustainable fishermen, prepare and package it, and then sell and distribute it to environmentally conscious consumers, restaurants, and chefs.

CHAPTER 4: AN ANALYSIS ON THE EXPORTS OF MARINE PRODUCTS FROM INDIA

Exports of marine products from India

In 2018-19, the country's marine product exports reached new heights, surpassing one million tons in volume for the first time and earning Rs 33441.61 crore, a more than 10% increase in value. According to the Marine Products Export Development Authority's (MPEDA) yearly figures, marine exports achieved an all-time high of \$ 5511.12 million. Despite the challenging international market conditions, it smashed all prior records in terms of quantity, rupee value, and dollar value.

Seafood exports increased by 6.86 percent in volume, 10.69 percent in rupees, and 10.05 percent in dollar earnings compared to the previous year. The Euro's devaluation, a difficult market environment had been produced by China's weakening economy, the depreciation of the yen, and the depreciation of the Indian rupee, as well as the improvement of exports from Southeast Asian countries. The price of shrimp, one of the country's main exports, has dropped dramatically. Despite this, the country managed to put on a solid performance by expanding supply.

Major Marine Products export

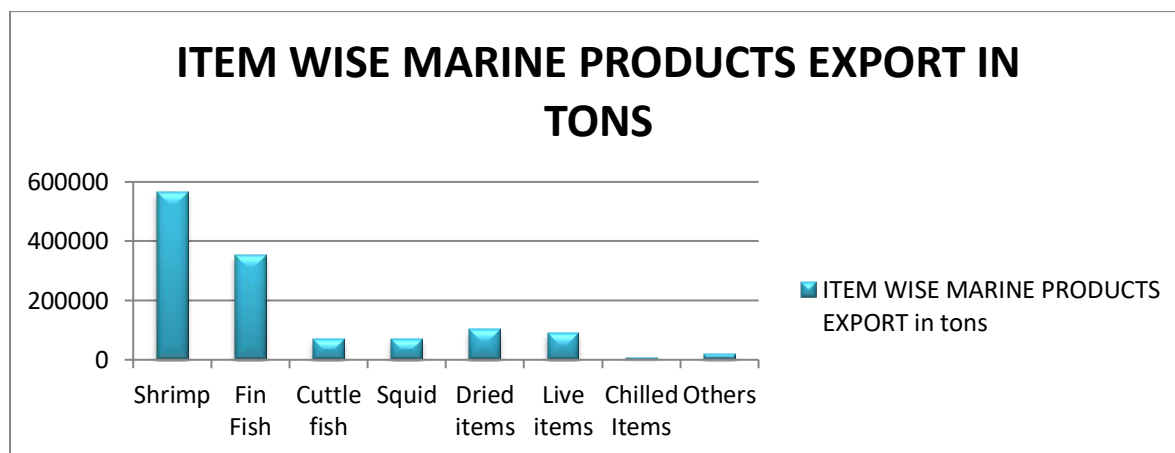


Fig 4.1 Source: CMFRI Report

Interpretation: Shrimp is one of the major sea products the market 44.44 % of sea food market is hold by shrimp exporters

4.2 Shrimp exports from India

India's seafood export potential are being boosted by a global lack of farmed shrimp. After surpassing the Rs30,000-crore milestone last year, shipments have increased by about 30% through the end of July, with Vannamei shrimp accounting for a large portion of the earnings. The Covid outbreak and slow overseas markets have thrown a veil over India's booming seafood industry, with the country shipping 11,49,341 tonne of marine products worth Rs 43,717.26 crore (US\$ 5.96 billion) in FY 2020-21, down 10.88 percent from the previous year.

The United States, China, and the European Union (EU) were the major importers, while frozen shrimp remained the top export commodity, followed by frozen fish.

India exported 12, 89,651 tones of seafood worth Rs 46,662.85 crore (US\$ 6.68 billion) in 2019-20, a decrease of 6.31 percent in rupee terms and 10.81 percent in dollar terms over the previous year.

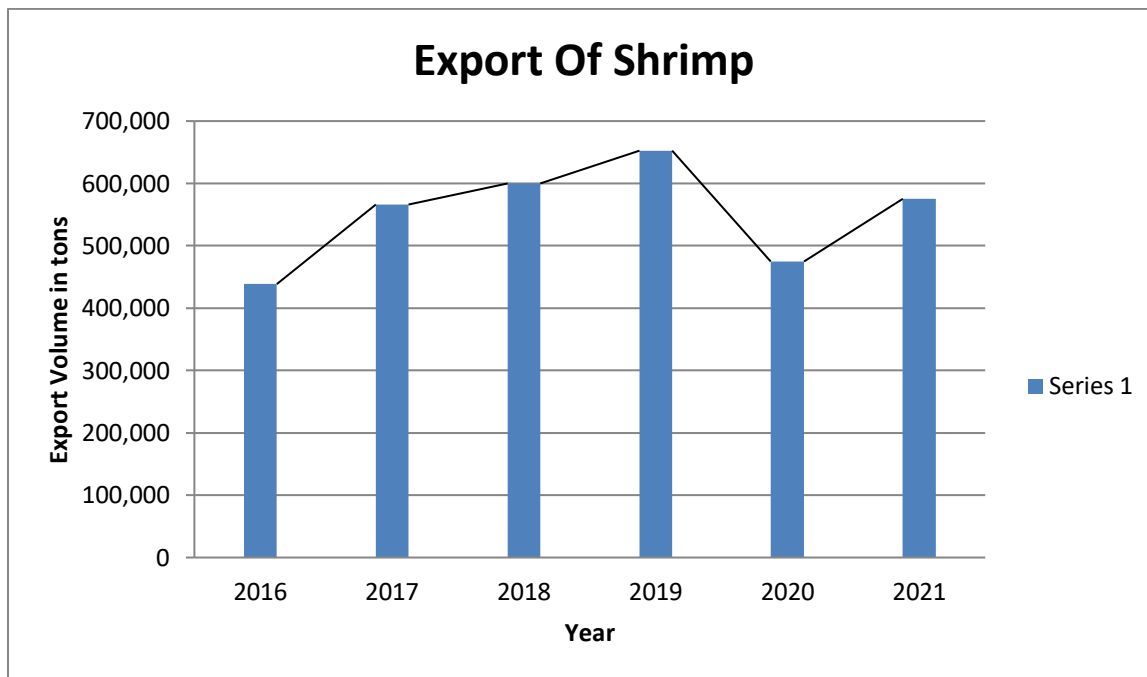


Fig 4.2 Source: CMFRI Report

Interpretation: Shrimp exports during the period increased by 6.04 per cent in dollar value and 6.20 per cent in quantity. From the trend analysis export of shrimp industry is showing huge prospect which will help shrimp to sustain top exported marine products from India.

4.3 SWOT ANALYSIS

Definition

SWOT analysis (or SWOT matrix) is a structured planning process that assesses the four parts of a project or commercial initiative. It is an abbreviation for strengths, weaknesses, opportunities, and threats. A SWOT analysis can be performed on a firm, product, location, industry, or individual. It entails recognising the internal and external elements that are favourable and unfavourable to achieving the goal of the business endeavour or project, as well as the internal and external factors that are favourable and unfavourable to achieving that goal.

Strengths

- Relatively unpolluted coastal waters for growing coastal aquaculture for home and export seafood production.
- Access to high-value marine seafood such as shrimp, lobsters, crabs, sea cucumbers, and fish such as tuna, groupers, and snapper, among others.
- Possibility of direct export of valuable food fish such as tuna, grouper, and ornamental fish
- A vast magnitude of fishery resources, including coastal pelagic, demersal, offshore, and deep-sea fishes to the tune of 2.435 lakh tonnes, as exploitable potential. • An EEZ encompassing 0.6 million sq kms, nearly 30% of India's EEZ. • An aggregate coastline of 1,912 kms, nearly 25% of India's total coastline.

Weaknesses

- Large-scale fishing and coastal/offshore aquaculture facilities are lacking.
- There is a scarcity of accurate data on the size and dynamics of exploitable and cultivable aquatic resources.
- Processing and marketing facilities are insufficient.
- The islands are around 1000 kilometres from the Indian continent.
- Many coastal sections are inaccessible, particularly on the western parts of the islands, constraining development to the island's eastern shores.
- There is a scarcity of local skills and technologies, as well as skilled individuals.

- A scarcity of funds to invest in high-risk initiatives on the local level
- There is a lack of a comprehensive framework for promoting and regulating sustainable fishing.

Opportunities

- Marine fishing resources that are grossly underutilised, allowing for massive economic exploitation opportunities.
- Tuna fishery with enormous potential, the majority of which can be exported.
- The availability of pollution-free places appropriate for cage culture, a previously untested venture even on the Indian mainland.
- Production of high-value black pearls and comparable items from major bivalve/gastropod mollusks is a possibility.
- Expansion of the marine ornamental fish export market
- To create job possibilities in the fishing industry.
- Scope for development of tourism due to the availability of choice seafood and sport fishing.

Threats

- A foreign fishing vessel is poaching.
- Target fishing may result in overexploitation of specific resources.
- Groundwater resources are being salivated as a result of coastal aquaculture activity.
- Ready-to-eat imported processed fisheries products, such as canned tuna and salmon, are currently available in Indian retail department shops.
- The catch of marine fish is at a standstill. As a result, it is critical to make the most of available resources while minimising waste.

4.4 CHALLENGES IN MARINE EXPORTS

Marine product exports have decreased by 6.91 percent in volume and 16.60 percent in US dollar revenues. Currently, the industry is going through a difficult period. We were just a few months ago celebrating the end of our most successful fiscal year, smashing all prior export records and crossing the \$3.5 billion mark. Despite the fact that the current setback might be linked to some unexpected occurrences on the world scene, the consequences have been disastrous.

The following are some of the issues that require the concerned authorities' quick attention and resolution:

4.4.1 Increase in Reefer base rates

Regardless of the size of the container or the port of destination, all shipping companies operating from Indian coasts have unilaterally declared an increase of US\$1500.00 in freezer container freight costs.

The Federal Maritime Commission requires all ocean freight companies transporting products to US ports to publish their tariff rates (FMC). These rates, however, do not reflect the real tariffs paid by shippers. They will differ from shipper to shipper, depending on the terms of a unique contract between the shipper and the freight carrier. The open tariff rate filed with FMC will apply to all other shippers. The difference in tariff rates between the contracted and open tariff rates for the United States. The cost of living on the East Coast could be as much as US\$1500.00 or more. Shippers' unhealthy practice of bargaining for freight prices has been exacerbated by the lack of appropriate legislation for establishing freight rates to certain destinations.

Despite this, the freight companies have not discussed the rise with shippers or announced their intention to raise rates in advance. The application of a US\$1500.00 increase across the board for all destinations and container sizes clearly suggests that the increase was implemented without sufficient process, rationale, or supporting documentation. Aside from the FMC-filed tariff, they can raise rates even more using procedures like BAF (Bunker Adjustment Factor), CAF (Currency Adjustment Factor), GRI (General Rate Increase), PSS (Peak Season Surcharge), and CS (Congestion Surcharge).

It's incredible that this service provider (freight carriers) and their agents (Shipping Services Providers) operating out of India with a licence applied for and granted by the Indian government are allowed to operate completely outside of any Indian government control measures and fix the rate scale according to their whims and fancies.

Exporters of low-value seafood to East Asia and the Middle East will face major difficulties since they will be unable to compete with competitors who are not affected by the unilateral rise. Many exporters have begun to use transshipment through foreign ports to avoid paying the exorbitant freight charges demanded in cities such as Chennai, Cochin, and Mumbai. Despite the fact that it may take a few extra weeks in transit compared to direct service from Indian ports, exporters prefer the indirect route because the freight savings are significant. With the rise in cargo size, the savings become much more considerable.

A 40' reefer container (18000kgs) from Cochin costs US\$1700.00 in freight to the UAE. A price rise of US\$1500.00 (88.32 percent) will raise the price of the commodity by Rs.4.60/kg, increasing the profit margin for the shipper. The increase will be Rs.3.44/kg for East Asia and China (24000kgs). If the product is Ribbonfish, the increased freight will effectively shut down the Indian Ribbonfish market. The increase in value added IQF products will range from Rs.5.90 to Rs.6.88/kg.

As can be seen from the above scenario, if the proposed freight increase is implemented, the future commerce of seafood will suffer a significant setback.

4.4.2 Terminal Handling Charges (THC)

The excessive Terminal Handling Charges (THC) paid by Indian terminal operators are a key stumbling block for the seafood export business in India. Although the Tariff Authority for Major Ports (TAMP) sets the THC rate scale, the maritime services sector pays little attention to the regulatory body, knowing full well that no penalties will be imposed. THC levels in Indian ports are currently considerably high when compared to ports in adjacent countries such as Sri Lanka and the Middle East. According to media statistics, India accounts for more than half of Colombo Port's overall cargo volume. This is, of course, due to the hefty taxes at Indian ports. According to reports, Colombo port is planning to expand its cargo handling capacity to three times its current level, in anticipation of an increase in Indian cargo passing through the port.

They appear to be looking at the prospect of Indian traders taking advantage of the enormous economies of scale.

4.4.3 Anti-Dumping Duty

From August 4, 2004, the United States slapped an anti-dumping charge on frozen shrimp imports from India. The average charge levied on Indian businesses was 10.17 percent in the first AR, but it was reduced to 7.22 percent in the second AR. In the second AR, it was decreased to 1.69 percent, and in the third, it was reduced to 0.79 percent. This was increased to 1.69 percent in the sixth AR. It was increased from 1.69 percent to 2.51 percent following the sixth Administrative Review (AR). The US Department of Commerce (DoC) announced the results of the sixth AR and decreased the tax for Falcon Marine Exports, the mandated respondent for the review, to zero. From February 2011 until January 2012, the revised duty will be in effect.

When the seventh administrative review is completed in 2013, the DoC's decision will take effect. In 2005, there were 270 Indian enterprises exporting to the United States; today, that number is down to 68.

4.4.4 CVD Petition Filed against Seven Countries including India

The US's 'Coalition of Gulf Shrimp Industries' has filed a petition with the International Trade Administration, the US Department of Commerce (DoC), and the US International Trade Commission (ITC) asking for countervailing duties to be imposed on certain frozen warm water shrimps from China, Ecuador, India, Indonesia, Malaysia, Thailand, and Vietnam. Several charges are made in the petition about countervailing subsidies offered in India for the manufacture, processing, and export of particular frozen warm water shrimp.

The petition lists a number of support programmes as being anti-competitive to India's shrimp sector. According to the petition, the Indian government is aggressively promoting its shrimp sector by providing large government subsidies. It demands that an investigation into the countervailing subsidies supplied to the Indian shrimp sector be launched, and that duties be imposed by a countervailing duty order in an amount sufficient to offset the benefit imparted by these subsidies. The petition also requests that the US Department of Commerce investigate incentives to raw shrimp producers in India.

4.4.5 Withdrawal of SHIS for Marine Industry

On the 5th of June 2012, the Director General of Foreign Trade (DGFT) released the Annual Supplement to the Foreign Trade Policy (FTP), which enlarged the Status Holder Incentive Scheme to include more export product classes, including marine products. However, neither Chapter 3 of FTP nor the Handbook mentions the term "marine products." Exporters were unable to take advantage of SHIS incentives as a result of this anomaly.

4.4.6 Importers default

Importers fail to pay exporters due to factors such as the depreciation of the importer's currency, the quality of the goods, the labelling and certification of the goods, the failure to obtain green certification for seafood, a high level of waste in the importer country, war between the countries, and so on.

4.4.7 Cultural and language Differences

In international trade, culture and language are crucial. They are unable to deal at a higher level than what they are expected to export to the host countries due to a lack of awareness of the common language used in international trade.

CHAPTER 5 CONCLUSION & SUGGESTIONS

5.1 Conclusion

This study concluded that, the frozen shrimp and frozen fish (in terms of Quantity) are the main marine products exported year by year. Product diversification and value addition of marine products along with the adoption of the appropriate marketing strategy will help to improve Indian marine exports. Even though the exports show an increasing manner the fall in global shrimp rates and Corona caused pandemic pulled down marine products exports by 14 per cent in value and 4.5 per cent in quantity during the six months to September, from a year ago.

India's seafood producers are suffering from a pandemic, as declining shrimp prices and currency devaluation hurt year-on-year export results. Exports of marine exports increased by over 60% in the last several years to INR 330 billion (\$4.9 billion), but this year's exports are down by 14% in value and 4.5 percent in number compared to the same period last year. Rain and floods in Andhra Pradesh and Tamil Nadu, which account for the majority of farmed shrimp output in India, have left the country with insufficient numbers of farmed shrimp.

A number of host factors have had a negative impact on sea-catch. Aquaculture shrimp, primarily the Vannamei shrimp, are used by export houses. According to the Seafood Exporters Association of India (SEAI), catch from the seas has decreased 30-40% across all coastal states in the last six to eight weeks. The main cause was a delayed monsoon, which changed the movement of popular fish like sardine and mackerel, reducing their availability on Indian shores. Their costs have risen by 50% this season, to Rs.150 per kg, compared to the previous season. As a result, obtaining such fish has become more expensive.

Both the Bay of Bengal and the Arabian Sea have experienced significant climate shifts in the last decade, particularly following the 2004 tsunami. The migratory of fish has shifted dramatically, and most of the fish that were formerly found in shallow waters are now absent from the coastal zone. He stated that there is a significant shift in the under-water current across the Indian oceans, which is causing harm to the marine ecosystem.

Each of these domains, as well as the links between them, offers opportunities to take market share away from established enterprises. Entrepreneurs all over the world are working hard to

capitalise on these possibilities. Many businesses are also bridging the sustainability gap by combining various components of the supply chain into a single enterprise. Organic Ocean and Local Catch, for example, are involved in the supply chain at various stages. They purchase seafood from sustainable fishermen, prepare and package it, and then sell and distribute it to environmentally conscious consumers, restaurants, and chefs. In comparison to last year, the US imported more than 10% more shrimp from India. The depreciation of the Yuan has produced significant volatility in currency markets all around the world.

With a market share of 26.46 percent in dollar terms in 2018-19, the United States is the largest market for Indian seafood goods, followed by South East Asia (25.71 percent), and the European Union (20.08 per cent). In terms of quantity and value, frozen shrimp is the most important export item in the export basket, accounting for 34.01 percent of total dollar earnings and 67.19 percent of total dollar earnings in 2018-19. Because of the poor rates, farmers are not opting for a second crop. The 16/20 size (number of shrimps per kilogramme) was hovering at \$8.5, down from \$10 a month ago. Similarly, in the last 30 days, the price of a 21/25 size has reduced from \$9 to \$7.5. Importer inquiries are disheartening.

According to experts, marine product exports are expected to dip 5-10% this fiscal year. In 2014-15, India's seafood exports increased by 6.86 percent to 1.05 million tonnes worth \$5.5 billion. Prices have also declined in the international market as a result of low demand and reduced purchasing power in consuming countries as currencies have depreciated. In general, exports in the second half of the financial year benefit from New Year demand. This season's second half, though, is likewise uninteresting.

5.2 SUGGESTIONS

1. Quality control measures and increase in infrastructure facilities for production of value-added items help in achieving the superior market.
2. To achieve greater share of export market, enhance the skill of trade especially in the SME segment in coping with the new requirements and challenges of the retail market.
3. Insurance coverage for the fish/ shrimp farming should be strengthening.
4. Packaging of seafood is to be upgraded so as to catch up with the rest of the world.
5. Incentives for value addition should be strengthening.

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ANNEXURE

Questionnaire

Name:

Designation:

Gender:

e-Mail:

Mobile Number:

1. Which are the most exported marine products from the company in the past 5 years?
2. What is opinion about the export of ormental fishes?
3. How does tourism influence marine export from India?
4. Are the marine fishery resources under exploited?
5. What is the effect of Indian Retail Department stores in the export of marine products?
6. Why are the high cost ventures not happening much in India?
7. Are costal agricultural activities a threat to the marine export? if yes why, if no why?
8. How is the EEZ helping the marine export?
9. Do you feel whether the fishing is not promoted? If yes explain, If no why?
10. Why is shrimp and tuna having more export value in Marine Exports?
11. Have Covid 19 effected the export of products?