ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 14, Iss 1, 2025

A Brief Study of Marine Fishery Sector of Maharashtra

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Abstract:

India has a 7,500 kilometer of coastal area. Main occupation of the coastal region is fishing business. Most of the families are depend on fishing activity in the coastal area. After independence Government of India taken initiative to develop the fishery business and boost the livelihood of fishermen community. Production of marine fishery is increased from 5.34 lakh tons in 1950-51 to 36.88 lakh tons on 2017-18. India is second largest country in the world in fish production, after China. India has taken initiatives in five-year plans, blue revolution 1 and blue revolution 2 for increase the fish production. New fishing harbors and fish landing centers have been constructed; initiative is taken to increase the deep-sea fishing, subsidies and grants provided to the traditional fishermen for fishery activity. Impact of all these, the India is one of the largest fish producing and fish exporter in the world. Maharashtra is 6th largest fish producing state in the country with coastal area of 720 kilometers and around 5 lakh ton fish production annually. Koli is traditional fishermen community residing at coastal area of Maharashtra. Pomfret, Seer Fish, Prawns, Mackerel fish, Black Pomfret, Indian Salmon etc. are the fish species caught at coastal region of Maharashtra.

Keywords: *Fishery, Coastal, Government, Traditional, Export, Fish, blue revolution*

1. Introduction:

In the era of globalization, the fundamental principle guiding both commercial organizations and individuals is adaptability: to either embrace change or risk obsolescence. This paradigm underscores that success hinges on the capacity to innovate and evolve. Since the Industrial Revolution in 18th-century England, technological advancements have continuously transformed industries worldwide, including manufacturing, agriculture, and services. The marine fishing sector, particularly vital for coastal nations, has also undergone significant modernization to sustain growth and development.

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Marine fisheries are a cornerstone of the economy for many coastal nations, providing livelihoods for millions and contributing to food security and export revenues. In India, with a coastline extending over 7,500 kilometers, the marine fishing industry plays a pivotal role in the socio-economic fabric of coastal communities. The country's Exclusive Economic Zone (EEZ), spanning 2.02 million square kilometers, offers vast marine resources. The western coast, known as the Malabar Coast, encompasses the states of Gujarat, Maharashtra, Goa, Karnataka, and Kerala, while the eastern coast, or Coromandel Coast, includes Tamil Nadu, Andhra Pradesh, Odisha, and West Bengal. Recognizing the sector's importance, the Government of India and various coastal state governments have implemented initiatives to modernize and sustain the marine fishing industry. These efforts include promoting the adoption of modern fishing technologies, providing financial support through grants and subsidies, and aligning policies with the broader blue economy framework. Such measures aim to ensure the sustainable utilization of marine resources, enhance productivity, and improve the livelihoods of coastal communities.

According to the Marine Fisheries Census 2010, India had approximately 3.52 million fisherfolk, with 0.72 million active fishermen operating about 239,000 fishing crafts, including mechanized, motorized, and non-mechanized vessels. The sector contributed about 1% to the national Gross Domestic Product (GDP) during the 2009–2010 period. In Maharashtra, a key player in India's marine fishing industry, the state recorded a marine fish production of 4.75 lakh metric tons in the 2017–18 fiscal year, with 76,345 active fishermen across 456 settlements along its 720-kilometer coastline. This research paper aims to explore the modernization of India's marine fishing industry, with a particular focus on Maharashtra, evaluating the impact of technological advancements, policy interventions, and sustainable practices on the sector's development.

2. Objectives of the study

The present study is undertaken with the following objectives:

1) To Know the History of Marine fishery Business.

2) To Study the Growth of Indian Marine Fishery Industry.

3) To Know the various Initiatives taken by the Government for Development of Marine Fishery.

4) To Study the fish production of India and Maharashtra.

3. Methodology:

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The present study is based completely on secondary data which is collected from books, journals, research articles, internet, newspapers, magazines, Government websites etc. The information also collected from the discussions from the various professionals and experts who are working in the field of Marine Fishery.

4. Limitations of the study:

The present study is limited only with the marine fresh fish catch of Maharashtra and India. All other factors like Prawn farming, Aquaculture, fish processing activities are excluded from this study.

5. Review of Literature:

Following independence, India saw a notable increase in the collection of marine fish. Both the state and the federal governments are in charge of managing and controlling the fishing industry. Both governments work together to promote the sector's growth. Following independence, the government created a five-year plan that included provisions for the growth of the fishing industry. The primary cause of India's increased production was technological advancements in fishing gear and craft. In India, particularly in Maharashtra, the overall fishery harvest has expanded considerably, but the economic growth of the fishing community has not improved as anticipated.

The work that has already been done by different researchers, academicians, the government, etc., must be taken into consideration in order to comprehend the subject, tools and techniques, and research methodology employed by specialists. The researcher can minimize duplication of effort by using the previously completed work as a guide. This research aids analysts in understanding the different concepts and analytical methods used by the experts in the study. It also helps analysts understand the precise work completed and the work that remains to be done. The analyst may be able to modify the study instruments and techniques after reviewing the previous research, if feasible. This section examines and takes into account earlier studies in the field of marine fisheries that deal with technological advancements, financial literacy, the socioeconomic status of the fishing community, fish marketing and pricing, research carried out by different government agencies, infrastructure facilities, etc., both in India and globally. This allows for a better understanding of the issues under investigation.

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1) Research on the "economic analysis of fishing craft from Tamilnadu" was conducted by Kalidos Radhakrishnan et al. (2016). According to him, any investing activity generates revenue. As a result, the investor receives revenue from their investment in fishing gear. The fishing industry is expanding daily. Using the capital budgeting technique and taking into account the consistent revenue from fishing vessels, the financial feasibility of fishing vessels is evaluated. The expenses are separated into two groups: fixed costs and operating or running costs. Fuel costs account for the majority of operating expenses. Fishing boats that are powered, echanized, and traditional are profitable. The traditional fishing craft is more profitable since it requires less investment than motorized and mechanized fishing fishing craft. Additionally, the researchers discover that mechanized crafts do better financially and economically than the other two categories of crafts. For traditional and motorized fishing crafts to be more profitable, proper management is necessary.

2) The study "economic analysis of marine fishery in the Cox bazaar of Bangladesh" was conducted by K M Mehedi Adnan et al. (2016). For economic analysis, the researcher employed nine independent variables. The researcher multiplied the catch by the price to determine the total return or revenue. Although there are many factors that influence the revenue from fish capture, the author has chosen a few key ones for research purposes, such as the cost of fuel, personnel, ice, etc. The majority of boats in Bangladesh are operated by non-seagoing proprietors, and fishing endeavors include two parties: a labor supplier and a capital investor. Researchers discovered that fishing businesses utilize two different kinds of gear, both of which generate positive net income. There is still room to expand the marine fishery's output with the use of advanced and better fishing equipment and ships. The study recommends that the financial institutions offer adequate funding to construct the boat and buy the necessary accessories. Boat owners' and fishermen's revenue sharing in Bangladesh has to be more equitable and logical. The researcher also recommends that the government provide fishermen with affordable access to critical finance and other amenities.

3) The study "cost of marketing, margins, and efficiency of marine fishery in Kerala" was conducted by N. Aswathy et al. (2014). According to the experts, there is a growing demand for marine fish both domestically and internationally, which is why fish prices in Kerala are rising daily. According to the study, a small number of money wholesalers, money lenders, and commission brokers control the majority of the domestic marine fish industry and make the most money from marketing. These mediators engage in the unethical practice of taking ten to fifteen

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percent of the landing center's auction proceeds as a discount. Fishermen rely on money lenders and traders because financial institutions do not offer them financing. Therefore, the researcher proposed that the government should improve the marketing process.

4) Rodrigues, Amanda Ricci et al. (2019) The study was carried out in Brazil. Because "poor governance is the cause of the poor economic condition of the world fishery." Understanding fishing economics is essential for the fishery industry to be economically sustainable. In Brazil economic and financial performance of fisheries is not effectively reported. For analysis purposes, the capital cost, operating cost, and revenue from the catch are taken into account. The research does not account for depreciation or the opportunity cost of capital and labor. The researcher discovered after examination that the boats or vessels continue to turn a profit. Compared to other fishermen, purse- seiners, shrimp trawlers, and bottom gillnetters make less money. Fuel and vessel maintenance expenses have a significant impact on profitability. The amount of fish caught, its value, and operating expenses are all impacted by labor costs. According to the study, in order to make money, management systems that reduce overcapacity and encourage the recovery of overfished species must be implemented as soon as feasible. In the area where most fleets are not making a lot of money, it is necessary.

5) The cost and return of mechanized fishing boat operators of the Visakhapatnam port were examined by K.S. Bose et al. (2010). The cost structure of marine fishing boat operations has been taken into account by researchers for the purposes of study. The total volume, value, annual total value, and annual profit were also taken into account by the researcher. The cost of a sona-type boat is more than that of a sorra-type boat, according to the researcher. A yacht of the Sona type offers extra amenities. Because there are more fish, the sona boat has a longer voyage time. Researchers discover that one of the most significant variable costs in the fish-catching process is fuel, specifically diesel. Boats of the sona type generate more money overall each year than boats of the sorra type. The MEBOs should improve their leadership, the researcher recommended. Each coastal state should set up its own financial institution to finance marine fisheries. The government now gives fuel subsidies, but they need to do it in a more sensible manner. Additionally, the researcher recommended that automated boats be upgraded. It is necessary to create fishing marketing organizations that offer fair and competitive pricing for captured fish.

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6) In his doctoral thesis, Viswanathan C. (1997) examined the "marketing of marine fishing." The researcher attempted to investigate the internal marketing system of fresh marine fish capture as well as the price spread and marketing expenses. The core market, according to the researcher, is present in all of Kerala's coastal landing locations. Fish prices are set at a beachside auction through haggling. In general, the type, amount, and number of purchasers all affect the price of the fish. Additionally, he contrasted the conventional and contemporary methods of selling and distributing marine fish. According to the study, there are three different kinds of marketing chains used in the promotion of marine fish.

Fish Producer - Wholesaler - retailer - Consumer

Fish Producer - Commission Agent Cum Wholesaler - Wholesaler - retailer - Consumer

Fish Producer - Fishermen Cooperatives - Wholesaler - retailer – Consumer

He discovers that the marketing channels are controlled by cooperative and private organizations. Seventy-five percent of the marine fish market excess is distributed to wholesalers and commission agents. The marketing channels for marine fish are either completely or partially controlled by the cooperative marketing channels. The producer, seller, or fisherman has little control and just takes prices. The mediator will make more money if they have more money to give the producer the advance. In general, the government doesn't become involved in fish marketing.

7) Beddington, J.R. et al. (2007) He focuses on the several issues that fishing businesses confront in managing their operations, with a particular emphasis on the "problems in management of marine fishery." There are many management tools available, but the fishing industry is not using them. According to the study, a dual strategy is necessary for effective management.

8) About 70% of fish production comes from the sea, according to Samiksha S.'s essay "Marine Fisheries: Deep Sea or off-shore fisheries and other details." According to the author, over 75% of India's total marine catch is found along the west coast. Fish catches are at their highest from September to February and at their lowest from June to August. Because the monsoon season begins in June, there aren't many fish caught along the west coast during this wet season. In India, deep sea fishing is being experimented with. The United States and Japan have supported the establishment of a number of deep-sea fishing stations. To catch the fish, a variety of tools and crafts are employed.

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9) Snigdha Chakra provided an overview of India's inland and marine fisheries under the article named "Inland and Marine Fisheries in India." Fresh water accounts for about 40% of all fish catches. A principal fishing zone is an area of more than 6,000 square kilometers in India that is used for marine fishing. According to the author, throughout the past 40 years, the marine fishing industry has grown by 3.5%. In general, marine fishing is more common in the Konkan and Malabar hill regions. Offshore fishing is more common in the western region. The Central Institute of Fisheries Education is established to give fishermen scientific and technical instruction.

10) Negi Mohita states that the four main categories of fishing in India are marine, inland, estuarine, and pearl fishing under the article "major forms of fisheries found in India." Although India has a large coastline, development in this area is moving very slowly. Compared to the east shore, the west coast is more developed. In contrast to Gujarat and Karnataka, the author believes that fish production is higher in Kerala and the Konkan. The fishing industry is developing extremely slowly. Traditional fishing methods are still used in a large number of coastal settlements.

11) In their paper "Evolving Fisheries Business in India with GIS," Ram Singh et al. (2016) According to the author, there are a few Indian states where fish production is great but fish consumption is low. Fish consumption is relatively high in the northeastern states. The study predicts that throughout the next ten years, there will be a major growth in demand for fish and fish products. The availability of fish, its demand, and its supply to needed regions via the quickest way are all displayed on a business map created using GIS based on the demand and supply of fish across the states. Fisheries scientists, managers of aquatic resources, and policy planners in developing nations may find the study helpful. The author proposed that in order to boost fishing productivity in the northeastern states, the government should implement new fishing regulations.

6. History, Growth and Development of Marine Fishery:

Water covers about 67% of the earth's surface. Thus, since ancient times, fish and fishing have played a significant role in human life. Evidence from a variety of cultures, including the Mohenjo-Daro, Harappa, Amri, Nal, Nundara, and Rupar cultures, has been discovered. In many societies, fish and fish hooks are clear indicators that fish play a significant role in human existence. The ancient culture also painted fish on ceramics. In Indian mythology, history, and tradition, the fishing business held a significant position. In India, people knew about fish before

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3000 BC (Jhingram 1975 C). Fish are also mentioned in a number of Vedas. In 246 B.C., Samrat Ashoka established the monetary administration of fishes in Pillar Edict V. It is in Kautilyas Arthshastra that the usefulness of fish as food is mentioned. Additionally, the great epics, stone carvings, paintings, and other works contain numerous historical references to fish, fish commerce, and the fisheries community (Silas 1977). In the 18th century, when India was ruled by foreign powers, attempts were made to collect fish and describe them in scientific literature. There was little research conducted on fisheries in general during the 18th and 19th centuries.

The Zoological Survey of India and the Maritime Survey of India conducted a number of fish-related research toward the end of the 19th and the start of the 20th centuries.

The central government and state governments share responsibilities for the marine fishing in India. The federal government is in charge of the waters between 12 nautical miles and the nation's 200 nautical miles, while the state government is in charge of the waterways inside the 12 nautical mile territorial region, or 22 kilometers. EEZ (World Bank policy note on marine fisheries in India, August 2010)

6.1 Pre Mechanization / Pre Independence:

Fish were used in the barter system to buy other goods, and the fishing industry provided livelihoods for people in India prior to its independence. During this time, the fishing industry was underdeveloped and ignored. India was the primary location for the use of sail-and-oar-based traditional watercraft until 1945. When the Indian Fisheries Act went into effect in 1897, a formal step toward the establishment and control of the maritime fishery was taken. The Act gives the states management and administrative authority over fisheries. Prior to the nation's independence, fisheries policy was solely focused on making money and showed only a passing interest in the development of marine fisheries. In 1907, "father of Indian Fisheries Development Sir F. Nicholas" founded the first fisheries department for fishery development in the Madras Presidency. (Devanesen et al. 1953; Bensam, 1999c). After World War I, numerous reports about the demand for fishery expansion were released. Until 1940, Indian marine fisheries were disregarded. The American and other allied army forces received high-quality fish from India during World War II, and the scarcity of food sparked interest in the growth of India's marine fisheries. Dr. Beni Prasad was invited to assess the nation's fisheries and provide crucial development advice at some point during the post-war development phase.

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Fisheries were regarded in the same way as agriculture in 1935 when the Government of India Act was passed by the English Parliament. Some Indian states took the initiative to promote their fisheries by creating and putting into effect a few fisheries development plans. A department of fisheries development connected to the Ministry of Agriculture was established after the Indian government decided to establish a central agency to advise and coordinate development in the fishery industry (Dr. S.C. Agarwal 2006). "Establishment of Central Fish committee and fisheries research center, starting of pilot project for mechanization, catching and storing of fishes, development of pond culture practices, and improvement of fish transport for the development of fisheries" was the recommendation made in the Kharegat Memorandum of the Indian Council of Agriculture Research in 1944. Another report from the Agriculture, Forests, and Fisheries Fish Subcommittee (1945) suggested that a "comprehensive program of work based on Survey of fishing area, initiation and coordination of research, Conservation, Development and exploitation of fisheries, improvement of the socioeconomic position of the fishermen, Provision of more efficient and Modern craft and tackle and the organization of the fish trade on proper line" be undertaken.

Inshore fishing was common during this time because Indian fishing vessels were not fit for deep-sea fishing, which prevented offshore waters from being used. For offshore fishing to be exploited, better equipment and vessels were required. The employment of mechanical fishing vessels along the coasts of Madras, Bengal, and Bombay was attempted in 1907. These automated boats were discovered to be inappropriate for the water conditions in India. Due to a lack of trained personnel and high initial costs, the Indian fishing industry was unable to continue using these vessels. Other issues with mechanization included a lack of harbor facilities, repairs and maintenance, and other issues. Some commercial companies began deep-sea fishing after World War II, but many also halted operations due to a lack of funding, skilled labor, maintenance, and other requirements. The Government of India planned to start pilot offshore and deep sea fishing in different places through Government agency. In 1946, Bombay established the first pilot deep sea fishing station. There weren't many suitable fishing vessels available because the Second World War had recently ended. After making the necessary modifications, the Indian navy's basset stem trawler "Berar" was commandeered and sent into service in 1948 under the name S.T. "Meena." Officers and a British skipper were assigned to this vessel. Early on, the government had

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challenges in appointing the crew member. Due to the exorbitant cost of operation and maintenance, the Meena was shut down in June 1949.

Dutch motor cutters M.T. Ashok and M.T. Pratap, along with two reekie boats, M.F.V. Bumili and M.F.V. Champa, begin operations in the winter of 1949–50. One cutter also has a small cold storage facility. One group of young Indians was sent by the Indian government to the UK for six months of training. These soldiers received two years of practical training after returning from their training. In the Bay of Bengal, the state of Bengal has since started offshore fishing. The state of Bombay began equipping sailing boats with motor engines and mechanizing traditional crafts. In India, fishing boats are gradually becoming mechanized. The mechanization of country craft is the initial step, followed by the introduction of basic small automated boats, the introduction of new, larger specialized boats, and the expansion of the fishing fleet.

6.2 Post Mechanization / After Independence

"Mechanization is the straightforward addition of motive power to the otherwise unaltered indigenous boat," Mr. Gurtner said. An inboard or outboard marine engine would provide the propelling power. "Mechanization is the installation of an engine for propulsion and mechanical devices for handling fishing gear," according to Mr. Paul B. Zeiner. To put it simply, a mechanized vessel is one that has an engine to move fishing gear and has a greater capacity for catching.

Following India's independence, the government made attempts to promote its fisheries. The government's five-year plans are the main driver of the fishing industry's development in India. The impoverished people of India rely on fish as a primary source of protein. Subsequently, the government imported fish and fish products to generate foreign exchange. One of the major sectors of the Indian government's foreign exchange earnings at the moment is fish and fish products. The government has been working steadily to improve the socioeconomic status of the fishing community, increase catch, and modernize the industry. In 1947, following independence, the Indian government constructed the Central Marine Fisheries Research Station in Mandapam, Tamilnadu. The Central Marine Fisheries Research Institute moved its headquarters from Mandapam, Tamilnadu, to Kochi, Kerala, in 1962 and changed its name to the Central Marine Fisheries Research Institute.

The Indian government created the Offshore Fisheries Station (OFS) in Tuticorin, Tamilnadu, and the Exploratory Fisheries Project in Kochi, as well as Vishakhapattanam in Andhra

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Pradesh. These two institutions were combined by the Indian government in 1983, and the new organization was called the Fisheries Survey of India, with its headquarters located in Mumbai, Maharashtra (Bensam 1999b; Sudarshan, 1987)[2]. Conducting surveys and assessments of fisheries resources as well as encouraging the sustainable use and management of marine fishery resources were the main duties of the Fisheries Survey of India. The Indian government established the Marine Engineering Division (MED) in 2005 as an additional department under the FSI to handle maintenance tasks such as dry docking or underwater repairs of deep-sea fishing vessels. There are facilities such as an engineering workshop, a slipway yard, an ILR servicing center, a dredging area, and a marine electronic department.

6.3 Mechanization Early stage:

At this point, attempts were made to mechanize the native boats, all of which are currently available for the fishermen to utilize. After minor modification, a small number of the native boats were determined to be fit and appropriate for mechanization. At this point, indigenous boats were successfully automated with the help of FAO experts Paul B. Ziener and K. Rasumsson. Gujarati and Maharashtra boats in particular were deemed ideal for mechanization. At this stage, Maharashtra's Versova/Satpati boat is utilized for mechanization.

Few boat kinds were introduced at this time, and even fewer were built for complete mechanization. Approximately ten newly designed boats were introduced between 1955 and 1958. These newly designed boats ranged in length from 5 to 15 meters. A 7.5-meter-long Pablo boat was discovered to be more successful and well-liked. By the end of 1969, over 3,000 native boats had been automated. (Adnan Amin and others, 2013).

6.4 Second Stage:

Efforts were initially made to mechanize the indigenous boats that could be mechanized; but, in certain states, such as Kerala, Karnataka, Orissa, etc., there were no crafts that could be mechanized. It was necessary to develop basic little automated fishing craft because the indigenous vessels, which were mechanized in the first stage, were useful for gill net and long lining, but their operating range has not increased considerably away from inshore water. Few new crafts were created for complete mechanized as part of the mechanization effort. About ten new crafts were discovered to be extremely popular and successful between 1955 and 1958.

6.5 Third Stage:

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Large fishing vessels were first used for deep-sea operations during this phase. During this phase, Indian experts examined major commercial designs and made necessary modifications to meet Indian conditions. With only minor adjustments, American designs were accepted since they were deemed more appropriate for Indian conditions. 40 steel trawlers were added in the fourth five-year plan, which was 17.5 meters long. These trawlers were employed for commercial offshore fishing and surveying. The government authorized the importation of thirty Mexican double rig shrimp trawlers by private businesses in the fifth five-year plan. For shrimp cath, these trawlers were proven to be quite effective. Since the EEZ up to 200 miles was announced in August 1976, deep sea fishing has increased. During this phase, commercial fishing operations were promoted by private entrepreneurs. At this point, private entrepreneurs brought in ships to conduct out industrial deep-sea fishing operations.

6.6 Fourth stage:

Following the successful mechanization of fishing vessels in the inshore, offshore, and deep sea, the government has worked to expand the fleet and increase the number of boats in order to make the most use of the marine resources that are currently available. Investments for deep-sea fishing vessels were substantial. Indian traditional fisherman are unable to make such a large investment. The government has therefore made the decision to get into a cooperative venture with foreign vessels. In 1956, Japanese fishing vessels, backed by their government, began deep-sea fishing in India. Deep-sea fishing in the Arabian Sea and Bay of Bengal was being conducted by South Korean vessels. There were 139 deep-sea fishing vessels operated by Indians in 1994.

7. Government Initiative for Development of Marine Fishery:

After Independence the Indian Government has taken various efforts through modernization, mechanization, developing various policies and providing financial support to the marine fishery Business.

7.1 Following table shows the initiative taken by the government in five-year plans.

Table Showing the objectives and Development in five-year plan

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Plan No.	Duration	Objectives and Developments
I	1951-1956	• Increase the fish catch by introducing mechanized boats • Improve ground Facilities and supplies of fishers • Improves fisheries statistics and training facilities • Initiate the charting for deep sea fishing grounds and develop newly located ones
II	1956- 1961	• Further expansion of existing activities related to mechanization and introduction of new vessels and gear material • Further improvement of infrastructure for training, preservation, processing, storage and transportation • Improve statistical information regarding production, supply and marketing of fish • Organizing multipurpose co-operative societies to encourage development of fishes
III	1961-1966	• Designing of improved mechanized fishing vessels and gear materials • Adequate equipments and facilities for preserving fish and their marketing • Impetus towards development of fisheries education, research institutes, improves condition of fishers and export trade
Annual Plans	1966- 1968	• Encourage export trade
IV	1969 – 1974	• Expansion of export trade • Initiation of deep sea fishing by import of trawlers and indigenous construction of deep sea trawlers

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		• Construction of fishing harbours at major and minor ports • Intensification of exploratory fishery surveys
V	1974 – 1979	• Motorisation of artisanal craft and introduction of purse seines in 1977 • Developments of fishing harbours • Declaration of EEZ (1977)
Annual Plans	1979-80	• Development of diversified fishery products
VI	1980 -1985	• Motorisation of artisanal craft • Exploratory survey in offshore grounds • Promulgation of Maritime Zone of India Act,1981 • Encouragement of deep sea fishing through licensing, chartering and joint venture vessels
VII	1985 – 89	• New Chartering Policy (1989) • Development of Post Harvest technology
Annual Plan	1990	• Development of deep sea fishing
Annual Plan	1991	• Substantial growth in motorized artisanal fleet of ring seiners
VIII	1992 – 1996	• Deep sea fishing by Joint Venture • Development of coastal Acquaculture • Substantial growth in motorized artisanal fleet of ring seiners • Export trade changes from a resource based to food engineering industry
IX	1997 – 2002	• Increase fisheries production (aquaculture & offshore fisheries)

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		• Further diversify and modernize fisheries and fishery products • Intensify research activities
X	2002-2007	• Enhance fish production from aquaculture, marine and inland fisheries; • Practise responsible and sustainable fisheries and aquaculture; • Encourage equitable participation; improve socioeconomic status of fishers; • Central Marine Fishing Policy (2004); • Expansion of oceanic fisheries, conversion of shrimp trawlers to tuna long liners.
XI	2007-2012	• Increase fish production, focus on unexplored potentials (island fisheries); • Maintain ecosystem health, conserve aquatic resources and genetic diversity; • Improve facilities for fish landing, handling and marketing; • Conversion of shrimp trawlers to tuna long liners.
XII	2012-2017	• Enhance fish production with focus on sustainable development; • Improve management of fisheries and encourage optimal exploitation; • Maximize net economic returns and expand export trade.

(Source: "Fisheries Centre Research Report 2005 Volume 13 Number 5 Historical Reconstruction of Indian Marine Fisheries Catches, 1950 – 2000 as a basis for testing the marine tropic index", Fisheries Centre, University of British Columbia, Canada by Brajgeet Bhathal (2005) ISSN 1198-6727 Page No. 8 and "Government led Development of India's Marine fisheries since 1950: Catch

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and effort trends and bioeconomic models for exploring alternative policies"a thesis by Brajgeet Bhathal submitted to The University of British Columbia (Vancouver) 2014)

7.2 Blue Revolution efforts from Government:

Blue revolution refers to the concept of rapidly increasing fish and marine product production through a package programme. The Fish Farmers Development Agency was established in India during the seventh Five-year Plan (1985-1990), when the Central Government sponsored it (FFDA). The vision of the Blue Revolution, the Neel Kranti Mission, is to achieve economic prosperity for the country and its fishers and fish farmers, as well as to contribute to food and nutritional security, by maximizing the potential of water resources for sustainable fisheries development while keeping bio-security and environmental concerns in mind. The Blue Revolution, also known as the Neel Kranti Mission, is a government-led initiative to boost the aquaculture industry. The main goal of this scheme was to promote fishing as a significant activity in order to double farmers' incomes. China, which accounts for roughly two-thirds of global aquaculture production, was the birthplace of the Blue Revolution.

Objectives of Blue Revolution:

a) To fully exploit the country's total fish potential, both inland and offshore, and triple production by 2020.

b) To transform the fishing industry into a modern one, with a particular emphasis on new technologies and processes.

c) To double the income of fishermen and fish farmers, with a particular focus on increasing productivity and improving post-harvest infrastructure, such as e-commerce and other technologies, as well as global best practises.

d) To ensure that all fishermen and fish farmers are included in the income-generation process.

e) To triple export earnings by 2020, with a focus on benefits to fishermen and fish farmers, including through cooperative, Producer Company, and other institutional mechanisms.

7.3 Blue Revolution 2.0

The Blue Revolution 2.0 focuses on fisheries development and management. This includes inland fisheries, aquaculture, and marine fisheries, including deep sea fishing, mariculture, and the National Fisheries Development Board's entire range of activities. The National Fisheries

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Development Board (NFDB) was established in 2006 as an autonomous organization under the administrative control of the Department of Fisheries, Ministry of Agriculture and Farmers Welfare, with the goal of increasing fish production and productivity in the country and coordinating fishery development in a holistic and integrated manner.[16]

Objectives of the Blue Revolution 2.0

a) Fully utilizing the country's total fish potential, both inland and offshore, and tripling production by 2020.

b) Developing the fishing industry as a modern industry, with a particular emphasis on new technologies and processes

c) Doubling the income of fishermen and fish farmers, with a particular focus on increasing productivity and improving post-harvest marketing infrastructure, such as e-commerce and other technologies, as well as global best practises.

d) Ensure that all fishermen and fish farmers are included in the income-generation process.

e) By 2020, export earnings will have tripled, with a focus on benefits to fishermen and fish farmers.

f) Improving the country's food and nutritional security[16]

7.4 Various Government Schemes/ Grants/ Subsidies for Development of Marine Fishery Business:

The Indian government has taken several actions to support the growth of fisheries through the Department of Animal Husbandry, Dairy, and Fishery and the Ministry of Agriculture and Farmers Welfare. Following independence, the Indian government's five-year plans contained provisions for the growth of maritime fisheries. The government has done everything it can to support the growth of the marine fishing sector. Some of the government's efforts to improve post-harvest operations, infrastructure, and marine fisheries are included below.

i) To Traditional and Artisanal Fishermen:

a) Motorization of Traditional Crafts: The central government will offer 50% financial assistance per OBM/IBM in general states, up to a maximum of Rs. 60,000, and 100% financial assistance, up to a maximum of Rs. 1.20 lakh per craft in union territories. The maximum unit cost should be Rs. 1.20 lakhs.

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b) Fishermen's safety at sea: The central government will provide 50% financial assistance per OBM/IBM in general states, up to a maximum of Rs. 1,00,000, and 100% financial assistance, up to a maximum of Rs. 2.00 lakh per craft in union territories. The maximum unit cost should be Rs. 2.00 lakhs.

c) Supporting Traditional and Artisanal Fishermen with:

i) Purchasing FRP Boats As an alternative to conventional, wooden boats with nets, up to 10 meters OAL: The cost of each boat is up to Rs. 4 lakhs, depending on the real subject. 50% of the unit cost, up to a maximum of Rs. 2 lakh per new boat, and 100% financial aid, up to a maximum of Rs. 4 lakh each craft, will be provided by the central government in union territories.

ii) Purchasing insulated fish and ice holding boxes: The price per unit for insulated fish and ice boxes is set at Rs. 25,000 per boat, subject to actual costs. The central government should contribute Rs. 12,500 per boat for general states and Rs. 25,000 per boat for union territories.

d) High Speed Diesel (HSD) refund for Fishermen:

i) The central refund on HSD for fishing purposes, up to a maximum of Rs. 3.00 per litre, will be 50% of the VAT tax relief for General States and 100% for Union Territories, respectively. During the nine active fishing months of the year, the Central Rebate is limited to 500 liters per fishing boat each month. Fishermen must meet the requirements set forth by the federal government in order to receive financial aid.

ii) For infrastructure development and post-harvest operations:

a) Fishing harbor and fish landing center establishment: The Central Government should give state governments or state agencies 50% of the approved project cost and union territories 100% for the construction of new fishing harbors and fish landing centers, as well as for the improvement, enlargement, repair, or renovation of already-existing fishing harbors and fish landing centers.

b) Post-harvest infrastructure development: Rs. 2.50 per lakh tonne per unit. Under this subcomponent, projects that qualify for central financial aid include ice plants, cold storage facilities, and ice plant/cold storage facilities. Up to a maximum of Rs. 50 lakh per plant project in general states, the central government will reimburse the beneficiary 50% of the unit cost. Financial aid is given to Central Government organizations and Union territories for 80% of the unit cost, up to a maximum of Rs. 80 lakh per plant project, in North Eastern and Himalayan states, and 100% of the unit cost, up to a maximum of Rs. 100 lakh per plant project.

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c) Modernizing or renovating the current cold storage, ice plant, and ice plant/cold storage: Each tonne costs Rs. 1.50 lakh. In general states, the central government offers financial assistance up to Rs. 30 lakh per plant project, or 50% of the unit cost. North/eastern or Himalayan states should receive financial assistance equal to 80% of the unit cost, up to a maximum of Rs. 48 lakh per plant project, while central government organizations and union territories should receive 100% of the unit cost, up to a maximum of Rs. 60 lakh per plant project.

d) Development of Retail Fish Market and Related Infrastructure: The plan calls for the construction of a modern, hygienic fish market with at least ten, twenty, and fifty retail outlets, as well as units for waste collection and disposal, fish cleaning and dressing areas, auction platforms, water and power supply facilities, and a common cold storage facility.

It costs Rs. 100 lakhs to have ten retail outlets at a fish market, Rs. 200 lakhs to have twenty retail outlets, and Rs. 500 lakhs to have fifty retail outlets. With a ceiling of Rs. 50 lakhs, Rs. 100 lakhs, and Rs. 2.50 lakh for 10, 20, and 50 retail outlets, respectively, the financial assistance for General States is 50% of the unit cost. The financial aid for North Eastern and Himalayan states will be 80% of the unit cost, with the respective ceilings for 10, 20, and 50 retail outlets being 80 lakh, 160 lakh, and 400 lakhs. 100% of funds are provided to Union Territories or central government agencies, with the maximum amounts being Rs. 100 lakhs, Rs. 200 lakhs, and Rs. 500 lakh for 10, 20, and 50 retail outlet units, respectively.

e) Establishing a retail or mobile fish store: The maximum cost per unit is Rs. 10 lakhs. 50% of the unit cost will be covered by financial aid for the general state, with a Rs. 5 lakh cap. Union Territories and Central Government Institutions should receive 100% financial aid with a ceiling of Rs. 10 lakhs, whereas the states of the North-Eastern and Himalayan regions should receive 80% financial assistance with a ceiling of Rs. 8 lakhs.

f) Financial Assistance for Refrigerator Trucks and Containers with a Minimum Capacity of 10 Tons: The unit cost is 25 lakhs, and the General States receive 50% of the financial assistance, up to a maximum of 12.50 lakh. The North Eastern states and Union territories receive 80% and 100% of the unit cost in financial aid, with a cap of 20 lakh and 25 lakhs, respectively.

g) Financial Assistance for Insulated Trucks with a Minimum Capacity of 10 Tons: The unit costs 20 lakh, and the General States receive 50% of the financial assistance, up to a maximum of

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10 lakh. The North Eastern states and Union territories receive 80% and 100% of the unit cost of financial aid, with a 16 lakh and 20 lakhs, respectively.

h) Financial Aid for Insulated Trucks with a Minimum Capacity of 6 Tons: The unit costs 15 lakh, and the General States receive 50% of the funding, up to a maximum of 7.50 lakh. The North Eastern states and Union territories receive 80% and 100% of the unit cost of financial aid, with a cap of 12 lakh and 15 lakhs, respectively.

i) Financial Assistance for Autorickshaw with Ice Box: The unit costs 2 lakh, and the general states receive 50% financial assistance up to a maximum of 1 lakh. The North Eastern states and Union territories receive 80% and 100% of the unit cost in financial aid, with a cap of 1.60 lakh and 2 lakhs, respectively.

j) Financial Assistance for Motorcycle with Ice Box: The unit costs 0.60 lakh, and the general states receive 50% financial assistance up to a maximum of 0.30 lakh. The North Eastern states and Union territories receive 80% and 100% of the unit cost in financial assistance,
with a cap of 0.48 lakh and 0.60 lakh, respectively.

k) Financial Aid for Bicycle with Ice Box: Each cycle costs Rs. 3,000, and the general states receive 50% financial assistance up to Rs. 1,500 each unit. The North Eastern states and Union territories will receive 80% and 100% of the unit cost of financial assistance, with a cap of Rs. 2,400 and Rs. 3,000, respectively. The Central Government's criteria and conditions must be met before any of the aforementioned financial aid can be given.

8. Fish Production of India and Maharashtra:

India contributed on an average of five percent in the global fish production. In the ranking of fish production countries, India stood second in the world in total fish production. The average annual growth of Indian fishery sector is around 4 % (policy note world bank 2010). The fishery sector of India contributes around 1% in the GDP and 4.7 % in the agricultural GDP (GOI 2010). Following table shows fish production of the India.

Table Showing Year wise fish production of India

Sr. No.	Year	Fish Production (in lakh tonnes)		
		Marine	Inland	Total

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1	1950 -51	5.34	2.18	7.52
2	1960-61	8.80	2.80	11.60
3	1970-71	10.86	6.70	17.56
4	1980-81	15.55	8.87	24.42
5	1990-91	23.00	15.36	38.36
6	1999-00	28.52	28.23	56.75
7	2010-11	32.50	49.81	82.31
8	2011 -12	33.72	52.94	86.66
9	2012-13	33.21	57.19	90.40
10	2013-14	34.43	61.36	95.79
11	2014-15	35.69	66.91	102.60
12	2015-16	36.00	71.62	107.62
13	2016-17	36.25	78.06	114.31
14	2017-18	36.88	89.02	125.90

(Source: Hand book on Fisheries Statistics 2018, Government of India and Report on the working group on Development and management of fisheries and aquaculture XII Five Year plan)

As we know that the marine fish is a renewable resource, the production of the marine fishery of India is increased from 5.34 lakh tonnes in 1950-51 to 36.88 lakh tonnes in the year 2017-18. This growth is because of the Governments efforts in Five Year plans, Modernization and technological changes in the field of Marine sector. In last ten years the marine fish production is not increased more as compared to inland fish production but overall production showing an increasing trend. Test of Marine fish is unique so, the demand for marine fish is more than the inland fish in the market.

The fishery sector of the India is playing an important role in the earning of the foreign exchange currency. Fish is a nutritious food which fulfils the need of animal protein of human being so; there is huge demand in for fish in the global market. Marine fish and fish product export is one of the fastest growing fields of India and India is one of the leading exporters of fish and fish product in the world.

a) State wise Fish Production

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In India there are 13 maritime states and union territories. These maritime states are contributing considerable share in the Indian economy. Most of the coastal people in these states are full time engaged in the fishery and fishery allied activities.

Table Showing State wise marine fish production (in lakh tonnes)

Sr. No.	State	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total
1.	Andhra Pradesh	4.33	4.14	4.38	4.75	5.20	5.80	6.05	34.65
2.	Goa	0.86	0.74	1.10	1.15	1.07	1.14	1.18	7.24
3.	Gujarat	6.92	6.94	6.96	6.98	6.97	6.99	7.01	48.77
4.	Karnataka	3.47	3.57	3.57	4.00	4.12	3.99	4.14	26.86
5.	Kerala	5.53	5.31	5.22	5.24	5.17	4.31	4.14	34.92
6.	Maharashtra	4.34	4.49	4.67	4.64	4.34	4.63	4.75	31.86
7.	Odihsa	1.14	1.18	1.20	1.33	1.45	1.53	1.51	9.34
8.	Tamil Nadu	4.27	4.28	4.32	4.57	4.67	4.72	4.97	31.80
9.	West Bengal	1.82	1.52	1.88	1.79	1.78	1.77	1.85	12.41
10.	A & N Islands	0.35	0.36	0.37	0.37	0.37	0.39	0.39	2.60
11.	Daman & Diu	0.17	0.19	0.19	0.32	0.23	0.23	0.24	1.57
12.	Lakshadweep	0.12	0.12	0.19	0.13	0.16	0.30	0.21	1.23
13.	Puducherry	0.38	0.36	0.38	0.42	0.47	0.46	0.42	2.89

(Source: Handbook on Fisheries Statistics 2018 p.no.11 – Govt. of India**)**

Table No. 1 depicts India's marine fish production by state. Gujarat is India's leading fish-producing state. In the last seven years, Gujarat has produced 48.77 lakh tonnes of fish. Kerala is India's second-largest fish-producing state, after Gujarat. Kerala has produced 34.92 lakh tonnes of marine fish in the last seven years. Andhra Pradesh, Maharashtra, and Tamil Nadu all contribute significantly to fish production. In the last seven years, Andhra Pradesh produced 34.65 lakh tonnes of fish, Maharashtra produced 31.86 lakh tonnes, and Tamil Nadu produced 31.80 lakh tonnes. Lakshadweep and Daman produced less than 2 lakh tonnes each.

b) Maharashtra Fishing Regulation and leasing policy:

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In Maharashtra Marine Fisheries Regulation Act 1982 is implemented for the Sustainable use and regulations of Marine fishery. The fishing craft or vessel needs to be registered only once in its lifetime. As per the Marine fisheries regulation Act fishing vessels are classified as Mechanized and non-mechanized. There is nominal registration fees required to be paid with registering authority. The fishing vessels needs obtain a license for operating the fishing vessel and the license is valid for specified area and for a period of three year. The penalties are also imposed by the Act on noncompliance of regulations. Generally, the fishing season of Maharashtra closes in June every year and opens at a festival of Narali Purnima in August. In this closed season traditional non mechanized fishing crafts are allowed to operate their activity generally in crakes. Maharashtra Government banned the purse seine mechanized fishing gear within the territorial water. Catch of purse seine vessels does not allow to land any port or landing center except Mirkarwada port of Ratnagiri. Mechanized boat does not allow to operate trawl net having mesh size of less than 35mm are not allowed to operate within the territorial water.

9. Conclusions:

Water covers about 67% of Earth, making fish vital to human life since ancient times, as seen in Indian mythology, Vedas, and archaeological finds. Fishing in India dates back to before 3000 BC and held cultural and economic importance. The Indian Fisheries Act of 1897 marked formal regulation, but serious development began only after World War II due to food scarcity and military demands. Mechanization efforts started post-independence, initially adapting indigenous boats with engines. By the 1950s–70s, purpose-built mechanized boats and trawlers were introduced, boosting offshore and deep-sea fishing. The government supported training, research, and infrastructure development, including creating institutions like the CMFRI and FSI. Private and international collaborations further expanded deep-sea fishing. Despite progress, traditional fishers struggled with high investment costs, leading to cooperative ventures with foreign fleets. Fish and fish products now play a major role in India's economy and exports.

India ranks third globally in fish production, contributing about 5% to global output, with fisheries adding 1% to GDP and 4.7% to agricultural GDP. Total fish production rose significantly from 7.52 lakh tonnes in 1950–51 to 125.90 lakh tonnes in 2017–18, driven by government efforts, modernization, and five-year plans. Inland fish production has grown faster than marine fish production in recent years. Fish exports are a key source of foreign exchange, with high global

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demand due to fish's nutritional value. Among states, Gujarat leads in marine fish production, followed by Kerala, Andhra Pradesh, Maharashtra, and Tamil Nadu. Maharashtra regulates fisheries under the Marine Fisheries Regulation Act, 1982, enforcing licensing, closed seasons, and gear restrictions. Fishing seasons are closed from June to August, reopening on Narali Purnima. The state bans purse seine nets in most territorial waters and regulates trawl net mesh size to protect marine resources. These measures aim for sustainable and equitable use of fishery resources.

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