



Simulating The Impact Of Environmental And Market Variability On Fishing Industry

Dr. Mohanadasan T*

*Associate professor of commerce, Department of PG studies and research in commerce

Abstract-

The fishing market has an important role in the development of the economy of India. However, environment and market variability play a significant role in the growth of the fishing industry by creating opportunities for investment and growth, but it can also pose challenges such as competition and threats to sustainability. It is important for the fishing industry to take a long-term approach to market variability, balancing short-term opportunities with the need to ensure the sustainability of fish stocks and the long-term health of the industry. Rectifying all the challenges in the fishing industry requires a multi-faceted approach, including government support, community-based management, and sustainable fishing practices. The study has collected information through the secondary qualitative method where valuable existing information has helped in making the study more accurate and understandable.

Keywords- Fishing industry, environmental impact, sustainability, market variability

I. INTRODUCTIONS

The fishing industry in India plays a significant role in the economy and food security of the country. There are various factors that control the market of the fishing industry and the environment plays an important role [1]. Faster globalization and changing climate have changed the environmental condition and that has impacted severely many food industries including fishing. On the other hand, fishing has an impact on the environment as well as slowly destroying the diversified aquatic habitat [2]. This study has explained the details of the Indian fishing industry, along with this the role of environment and market variability on the growth of the fishing industry. During business, the fishing industry often faces certain challenges which have been discussed. Apart from that, some recommendations have mentioned understanding the mitigation strategies of the challenges for the fishing industry in India.

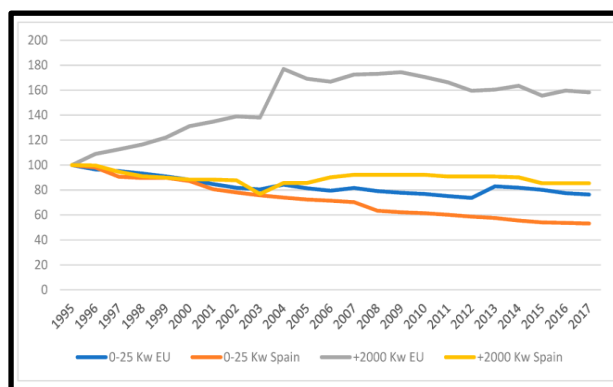


Figure 1: Impact of environment on sustainable fishing
(Source: 5)

II. OBJECTIVES

- To discuss the detailed knowledge of the fishing industry in India
- To evaluate the impact of environmental factors on the fishing industry
- To analyse the role of market variability in the growth of the fishing industry
- To rectify the challenges faced by the fishing industry in India
- To recommend solutions to the fishing industry for mitigating emerging challenges

III. METHODOLOGY

Fishing industry of India has a significant value in the global market as it produced 14.88 million metric tonnes of fish in the year 2019-2020. In order to collect all the relevant information for this study, the secondary qualitative data collection method has been followed. The use of existing journals or articles to collect information regarding the impact of the environment and market variability on the fishing industry of India has increased the understanding in an effective manner [3].

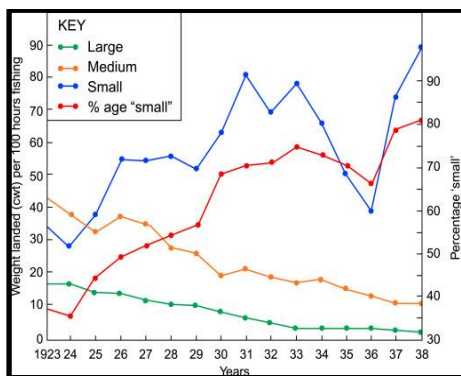


Figure 2: Statistics of fishing by analysing the large, medium and small market (Source: 2)

IV. THE FISHING INDUSTRY OF INDIA

India has a large and diverse fishing industry and it has a role in the development of the food industry of the country. The industry is characterized by a mix of traditional and modern fishing methods, with small-scale coastal fisheries and large mechanized vessels operating in the extensive coastline of India [16]. India has a significantly large coastline of over 7,500 km, which helps in managing the resources for the fishing industry of the country. On the other hand, India has 9 maritime states and 2 union territories that are involved in fishing activities [4]. In India, the fishing industry has been divided into two major sectors which are the marine sector and the inland sector. The marine sector contributes to over 90% of fish production, while the inland sector contributes to the remaining 10% of the total fish market of the Country.

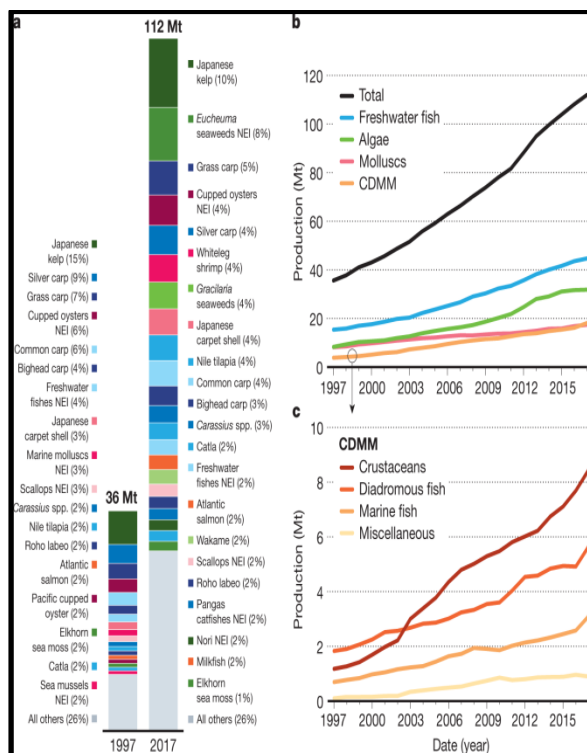


Figure 3: Retrospective review of global aquaculture (Source: 9)

India employs more than 14 million people in the fishing industry and making it one of the major employer sections of the country. India produces over 14 million metric tons of fish annually which makes the country one of the top producers of fish in the world [6]. The major fishing methods used in India include trawling, gillnetting, seining, and long lining. Traditional methods like dip nets, cast nets, and traps are also used in some areas for catching fishers from water bodies in the country [5]. The Indian government has implemented several policies and programs to support the fishing industry, including subsidies for fishing vessels, fuel, and equipment, and initiatives to promote sustainable fishing practices. It has been found that the major species of fish caught in India include mackerel, sardines, tuna, anchovy, hilsa, and pomfret.

V. IMPACT OF THE ENVIRONMENT ON THE FISHING INDUSTRY

Environmental factors have a significant impact on the fishing industry, affecting fish populations, fishing practices, and the livelihoods of people dependent on the industry. It has been found that climate change can affect fish populations by

altering water temperature, ocean currents, and other factors that disrupt life in the marine world [10]. This has reduced the fishing margins annually and the earning of this industry has been reducing severely [14]. Climate changes affected the migration patterns of fish which made it tough for a fisherman to locate and catch fish. On the other hand, the increasing population of the world has increased the rate of pollution. Pollution can affect fish populations and the health of fishermen [4]. Chemical pollution such as from pesticides and industrial waste, can accumulate in fish tissue and make them unsafe for consumption. Pollution can also damage fish habitats, making it harder for fish to survive and reproduce.

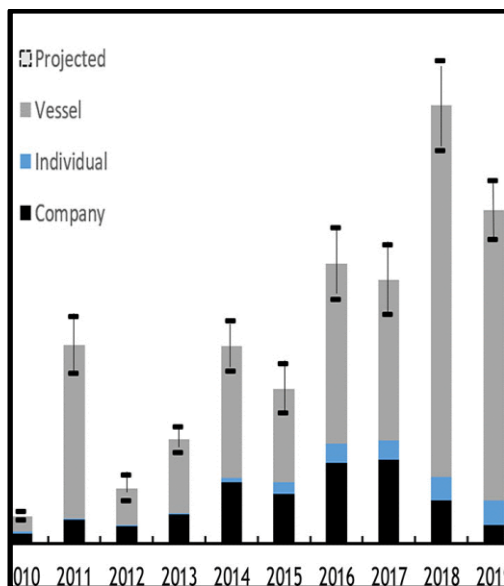


Figure : Fish crime in global oceans
(Source: 12)

Habitat destruction such as from coastal development can reduce the amount of available habitat for fish. It has made the situation harder for fish to survive and reproduce. It can also lead to changes in the food chain, affecting the availability of prey for fish [14]. On the other hand, overfishing has a significant impact on the fishing industry, reducing the amount of fish available for commercial fishing. Catching the fishes faster than their production rate, leads to the overfishing situation [13]. That rapidly decreases the fish population and disrupts marine life. Hurricanes, typhoons, tsunamis and many other natural disasters can damage fishing infrastructure and vessels, making it harder for fishermen to catch fish [7]. They can also affect fish populations by altering ocean conditions and reducing the availability of prey. Hence, it has been found that many environmental factors that can affect the fishing industry in India can affect the life of people related to the industry.

VI. ROLE OF MARKET VARIABILITY IN THE GROWTH OF THE FISHING INDUSTRY

Market variability is a factor that refers to the changes in demand of the people and the fluctuation of prices. Market variability has a significant role in the growth of the fishing industry in India. It has been found that market variability is able to create opportunities for fishermen and seafood companies to capitalize on high demand and high prices for certain fish species [12]. For example, if the demand for a particular species of fish increases, fishermen can adjust their fishing practices to target that species and sell it at a higher price. India is the second largest fish producer in the world which has accounted for 6% of the global fish production.

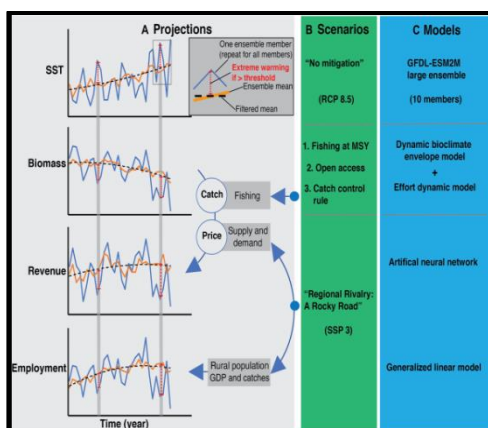


Figure 6: High temperature due to environmental changes affecting marine life
(Source: 15)

Market variability can encourage investment in fishing infrastructure such as boats, processing plants, and transportation systems. It has been found, when demand and prices are high, fishermen and seafood companies are more likely to invest in infrastructure to take advantage of market opportunities. The fishing industry has a contribution to the GDP of the country with 1.07% of the share [16]. The variability of the market can lead to increased competition among fishermen and seafood companies. The moment demand and prices increase, fishermen are likely to enter the market, leading to increased competition for fish and driving prices down [8]. Market variability can affect the sustainability of fish stocks if fishermen are incentivized to overfish certain species in response to high demand and prices. This can lead to declines in fish populations and threaten the long-term sustainability of the industry.

VII. CHALLENGES FACED BY FISHING INDUSTRIES IN INDIA

The fishing industry in India faces a number of challenges that can hinder its growth and sustainability.

List of challenges	The way it creates problems
Overfishing	Overfishing is a major challenge in India, with many fish stocks being depleted due to unsustainable fishing practices
Lack of infrastructure	Inadequate storage and processing facilities, and transportation systems
Illegal fishing	Climate change is affecting fish populations and the fishing industry in India
Climate change	The fishing industry in India faces a lack of infrastructure, including adequate storage and processing facilities, and transportation systems
Lack of access to credit and technology	Many fishermen in India face challenges in accessing credit and technology, which can hinder their ability to invest in their businesses and improve their livelihoods [19]
Lack of Knowledge	Lack knowledge regarding the importance of fish reproduction timing, hormone injecting procedure and other essential elements can lead to the wastage fishing
Lack of government support	The coastal areas of the country sometime faces some natural disasters that lead to the loss of business for the fishermen and that requires government support [20]

Table 1: Challenges faced by the fishing industry in India

All the functional areas of the fishing industry are affected due to the challenges. The marine life, fishermen, customers, and economy of the country can affect negatively due to the impact of challenges. Environmental safety can disrupt the growth of the fishing industry as well as the lack of knowledge of fishermen can harm the environment.

VIII. RECOMMENDATION FOR THE FISHING INDUSTRY IN INDIA TO MITIGATE CHALLENGES

The fishing industry is facing emerging challenges that require innovative and sustainable solutions. Some recommendations for the fishing industry to mitigate these challenges have mentioned below

Recommendations	Discussion of the recommendations
Aquaculture	It is the farming of fish and other seafood that can help mitigate overfishing and reduce pressure on wild fish stocks. The fishing industry can consider investing in aquaculture operations to supplement their catch and increase their overall productivity
Sustainable fishing practices	Using selective fishing methods, using eco-friendly fishing gear, and implementing catch-and-release policies can maintain sustainable practices [18]
Traceability and certification	Using electronic tagging and tracking systems, implementing third-party certifications, and promoting transparency in supply chains
Technology and innovation	Technology to trace the weather can help fishermen to avoid a critical situation in ocean. using drones for surveillance and monitoring, implementing sustainable fishing gear designs, and developing alternative energy sources for fishing vessels can be possible through innovation [17]
Collaboration and partnerships	Fishing industry can collaborate with government agencies, NGOs, and other stakeholders to address emerging challenges and promote sustainable fishing practices

Table 2: Recommendation to mitigate challenges in the fishing industry

In India, the fishing industry is able to promote the long-term health of the fish stocks, reduce their environmental impact, and improve their profitability and social impact.

IX. PROBLEM STATEMENT

Fishing industry in India has significance in the growth of the economy of the country. The coastal region of the country has increased the chances for many people to maintain their livelihood by making a career in the fishing industry [15]. The problem arises in this growing industry due to various reasons, where market variability and environmental factor play the most important role. The understanding of the demand of people and the reason behind the changes in their preferences can detect fishing effectively [9]. The problems arise when the fishing vessels or ships override the rules of the government and take part in illegal fishing which reduces the supply of seafood in the market. The use of the chemical more than required can lead to harm to marine life as well as consuming chemicals containing seafood, fish can harm humans as well [11]. Taking care of all the factors to avoid problems is able to maintain a balance between business and marine life that increases the earning of fishing industries. Government has an important role in making the industry more vibrant in the global market.

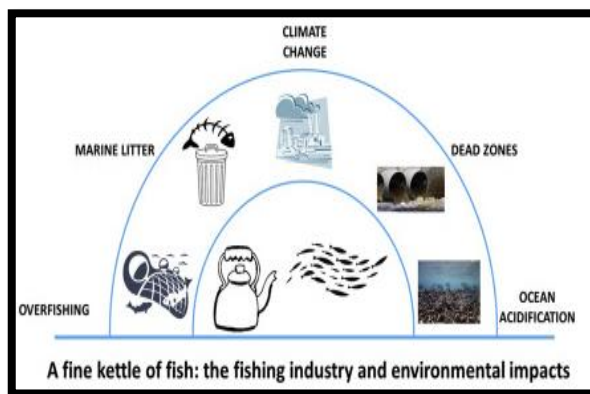


Figure 7: Impact of environment on Fishing industry
(Source: 15)

CONCLUSION

The fishing industry in India is a vital source of employment and food for millions of people, but it also faces significant challenges that need to be addressed to ensure its long-term sustainability. The fishing industry in India is a vital source of employment and food for millions of people, but it also faces significant challenges that need to be addressed to ensure its long-term sustainability. On the other hand, market variability has an impact on the growth of the fishing industry in India. The fishing industry in India can become more sustainable, profitable, and resilient by rectifying all challenges and managing them by implementing proper solutions.

REFERENCES

- [1]. Arantes, C. C., Fitzgerald, D. B., Hoeninghaus, D. J., & Winemiller, K. O. (2019). Impacts of hydroelectric dams on fishes and fisheries in tropical rivers through the lens of functional traits. *Current Opinion in Environmental Sustainability*, 37, 28-40. <https://www.sciencedirect.com/science/article/am/pii/S1877343518301003>
- [2]. Avtar, R., Singh, D., Umarhadi, D. A., Yunus, A. P., Misra, P., Desai, P. N., ... & Phanindra, K. B. V. N. (2021). Impact of COVID-19 lockdown on the fisheries sector: a case study from three harbors in Western India. *Remote Sensing*, 13(2), 183. <https://www.mdpi.com/2072-4292/13/2/183/pdf>
- [3]. Bennett, N. J., Blythe, J., White, C. S., & Campero, C. (2021). Blue growth and blue justice: Ten risks and solutions for the ocean economy. *Marine Policy*, 125, 104387. https://ueaeprints.uea.ac.uk/id/eprint/78125/1/Accepted_Manuscript.pdf
- [4]. Brown, A. R., Lilley, M., Shutler, J., Lowe, C., Artioli, Y., Torres, R., ... & Tyler, C. R. (2020). Assessing risks and mitigating impacts of harmful algal blooms on mariculture and marine fisheries. *Reviews in Aquaculture*, 12(3), 1663-1688. https://digital.csic.es/bitstream/10261/218650/3/Ross_et_al_2020_preprint.pdf
- [5]. Daniel, D. B., Thomas, S. N., & Thomson, K. T. (2020). Assessment of fishing-related plastic debris along the beaches in Kerala Coast, India. *Marine pollution bulletin*, 150, 110696. <https://www.fisheriesjournal.com/archives/2019/vol7issue2/PartA/7-1-48-550.pdf>
- [6]. Das, I., Lauria, V., Kay, S., Cazcarro, I., Arto, I., Fernandes, J. A., & Hazra, S. (2020). Effects of climate change and management policies on marine fisheries productivity in the north-east coast of India. *Science of the Total Environment*, 724, 138082. https://addi.ehu.es/bitstream/handle/10810/47391/JA-1680_ADDI.pdf?sequence=1
- [7]. Ellis, J., & Tiller, R. (2019). Conceptualizing future scenarios of integrated multi-trophic aquaculture (IMTA) in the Norwegian salmon industry. *Marine policy*, 104, 198-209. https://sintef.brage.unit.no/sintef-xmlui/bitstream/handle/11250/2611070/JMPO%2B3478_aam.pdf?sequence=2
- [8]. Hananiah, N., & Rahim, A. A. (2022). The application of hurdle technology in extending the shelf life and improving the quality of fermented freshwater fish (Pekasam): A Review. *Malaysian Journal of Science Health & Technology*, 8(1), 44-54. <https://mjosh.usim.edu.my/index.php/mjosht/article/download/240/150>
- [9]. Jänes, H., Macreadie, P. I., Zu Ermgassen, P. S., Gair, J. R., Treby, S., Reeves, S., ... & Carnell, P. (2020). Quantifying fisheries enhancement from coastal vegetated ecosystems. *Ecosystem Services*, 43, 101105. https://oceanwealth.org/wp-content/uploads/2020/04/Janes_etal-2020_EcoServ.pdf
- [10]. Kadfak, A. (2020). More than just fishing: the formation of livelihood strategies in an urban fishing community in Mangaluru, India. *The Journal of Development Studies*, 56(11), 2030-2044. <https://www.tandfonline.com/doi/pdf/10.1080/00220388.2019.1650168?needAccess=true&role=button>
- [11]. <https://www.tandfonline.com/doi/pdf/10.1080/00220388.2019.1650168?needAccess=true&role=button>
- [12]. Lewin, W. C., Weltersbach, M. S., Ferter, K., Hyder, K., Mugerza, E., Prellezo, R., ... & Strehlow, H. V. (2019). Potential environmental impacts of recreational fishing on marine fish stocks and ecosystems. *Reviews in Fisheries Science & Aquaculture*, 27(3), 287-330. <https://www.tandfonline.com/doi/pdf/10.1080/23308249.2019.1586829>
- [13]. Okeke-Ogbuafor, N., Stead, S., & Gray, T. (2021). Is inland aquaculture the panacea for Sierra Leone's decline in marine fish stocks?. *Marine Policy*, 132, 104663. <http://dSPACE.stir.ac.uk/bitstream/1893/33057/1/Inland%20Aquaculture%20in%20Sierra%20Leone%20Okeke-Ogbuafor%20et%20al.pdf>
- [14]. Okuduwor, A. A., Abu, G. A., Aye, G. C., & Abu, O. (2020). growth assessment of industrial fish supply in Nigeria. *Journal of Agricultural Economic, Extension and Science*, 6(2), 138-147. https://www.jaes.org/documents/vol_6_num_3/Growth_assessment_of_industrial_fish_supply_in_nigeria.pdf
- [15]. Patel, A., Mu, L., Shi, Y., Rova, U., Christakopoulos, P., & Matsakas, L. (2020). Novel biorefinery approach aimed at vegetarians reduces the dependency on marine fish stocks for obtaining squalene and docosahexaenoic acid. *ACS Sustainable Chemistry & Engineering*, 8(23), 8803-8813. <https://pubs.acs.org/doi/pdf/10.1021/acssuschemeng.0c02752>
- [16]. Raja, K., Aanand, P., Padmavathy, S., & Sampathkumar, J. S. (2019). Present and future market trends of Indian ornamental fish sector. *Int J Fish Aquat Stud*, 7(2), 6-15. <https://www.fisheriesjournal.com/archives/2019/vol7issue2/PartA/7-1-48-550.pdf>
- [17]. Shamshak, G. L., Anderson, J. L., Asche, F., Garlock, T., & Love, D. C. (2019). US seafood consumption. *Journal of the World Aquaculture Society*, 50(4), 715-727. https://sites.nationalacademies.org/cs/groups/pgasite/documents/webpage/pga_198073.pdf
- [18]. Siddik, M. A., Howieson, J., Fotedar, R., & Partridge, G. J. (2021). Enzymatic fish protein hydrolysates in finfish aquaculture: a review. *Reviews in Aquaculture*, 13(1), 406-430. <https://onlinelibrary.wiley.com/doi/pdfdirect/10.1111/raq.12481>

- [19]. Tsironi, T., Houhoula, D., & Taoukis, P. (2020). Hurdle technology for fish preservation. *Aquaculture and Fisheries*, 5(2), 65-71.
https://www.jaes.org/documents/vol_6_num_3/Growth_assessment_of_industrial_fish_supply_in_nigeria.pdf
- [20]. Wangkheirakpam, M. R., Mahanand, S. S., Majumdar, R. K., Sharma, S., Hidangmayum, D. D., & Netam, S. (2019). Fish waste utilization with reference to fish protein hydrolysate-A review. *Fish. Technol*, 56, 169-178.
https://www.researchgate.net/profile/Sudhansu-Mahanand/publication/334785905_Fish_waste_Utilization_with_Reference_to_Fish_Protein_Hydrolysate_-_A_Review/links/5d417f6592851cd046950483/Fish-waste-Utilization-with-Reference-to-Fish-Protein-Hydrolysate-A-Review.pdf
- [21]. Zhao, Y. M., de Alba, M., Sun, D. W., & Tiwari, B. (2019). Principles and recent applications of novel non-thermal processing technologies for the fish industry—A review. *Critical reviews in food science and nutrition*, 59(5), 728-742.
https://www.researchgate.net/profile/Yiming-Zhao-/publication/329872881_Principles_and_recent_applications_of_novel_non-thermal_processing_technologies_for_the_fish_industry-a_review/links/5f9fbf7e92851c14bcfc6079/Principles-and-recent-applications-of-novel-non-thermal-processing-technologies-for-the-fish-industry-a-review.pdf