
ECONOMIC IMPACT OF MARINE FISHERIES IN KERALA: EXAMINE THE CONTRIBUTION OF MARINE FISHERIES TO KERALA'S ECONOMY, FOCUSING ON EMPLOYMENT, INCOME GENERATION, AND EXPORT MARKETS

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Abstract

This Study aims to explore the economic significance of marine fisheries in Kerala as an employer, income earner, and markets for exports. It uses secondary data obtained from government publications, fisheries institutions, and agricultural surveys to examine the sector's contribution to the Gross State Domestic Product (GSDP) of Kerala, with major specific species like shrimp, sardines, and mackerel in particular. This study employs percentage analysis and trend projection methods to evaluate the importance of marine fisheries in the landings and export of fish. It comes out with results that emphasize the critical role of the industry in building economic resilience, especially among coastal agricultural households, but identifies potential challenges in overfishing, climate change, and market volatility. In addition, opportunities for expansion are made by exploring the expansion into value-added products, aquaculture, and leveraging government initiatives such as the Blue Revolution Scheme. The importance of sustainable practices and policy support is highlighted for the future of Kerala's marine fisheries sector.

Keywords: *Economic, Marine Fisheries, Kerala, Economy, Employment, Income Generation, Export Markets.*

1. INTRODUCTION

The state of Kerala lies along the southern coast of India and enjoys a long history in marine fishing, with over 590 km of coastline that gives it rich marine resources. Marine fisheries significantly contribute to the state's economy through not only providing food and livelihood but also earning foreign exchange. The fishing activities are so much a part of the coastal communities that employment is already provided to most sections of the population.

The economy of marine fisheries in Kerala is multilateral. It generates large-scale employment, income levels, and export sectors. Fishing, fish processing, and related activities create direct and indirect

employment opportunities, mainly through the rural and coastal regions. Export of seafood from the state is also very high, especially of products like shrimp, tuna, and other varieties of fish that significantly add to the foreign exchange of the State.

The study aims at a closer examination of the contribution of marine fisheries to Kerala's economy, particularly in the area of employment generation, income generation, and the export market. From this perspective, the importance of sustainable fishing practices and the development of conducive policies to support the growth and development of the sector will be underlined by this research. The findings of this paper will be useful inputs for the sector regarding its prospects on economic advancement and better well-being of coastal communities.

1.1 Overview of Marine Fisheries in Kerala

Marine Fisheries in Kerala's Coastal Economy: Importance Marine fisheries are one of the significant and most basic constituents of Kerala's coastal economy, with its contributions ranking both in the social-economic fabric of the state and its national economic standing. With an exhaustive coastline of approximately 590 kilometres, the state has a well-developed marine fisheries sector, which facilitates the livelihoods of coastal people besides being an important source of food, income, and employment. **Contributions of Kerala Fisheries to the State Economy** As part of the state economy, Kerala fisheries contribute substantially to the state's economy through fish production, processing, and export. This industry is one of the major employment sectors, with more than a million people engaged; most of whom are directly involved in fishing, while thousands find employment in related activities such as transport, processing, and trading.

Besides this, the marine fisheries sector is very important for Kerala's foreign exchange earnings. The state is one of the highest seafood exporters in India, and quite a good share of its seafood products such as shrimp, tuna, and mackerel end up in international markets, the Middle East, Southeast Asia, and Europe. This industry is, therefore, of great importance not only to the overall economy but also to the integration of Kerala into international trade circuits. To this effect, the fishery sector is very fundamental in ensuring food security for the population in the state and provides adequate seafood consumption in the diet of residents.

- **Historical Context of Fishing in Kerala**

Historically, fishing in Kerala dates back by centuries, where history indicates that fishing has been part of the coastal communities' system for ages. Traditionally, the fishing practices in this region have been of an artisanal nature with small-scale fishermen still utilizing traditional methods such as catamarans, wooden

boats, and hand-operated nets. With the approach of modern technologies in the mid-20th century, these traditional practices began to change over time. Innovations in mechanized boats, better fishing gears, and refrigeration facilities transformed the sector of marine fisheries, which then enabled operations at larger scales and in more efficient ways.

Fisheries, too, was another sector that had established itself in Kerala's rural economy and where the coastal communities were highly reliant on the sector for sustenance and survival. It is in the early 1960s and 1970s that the development of fish processing and marketing industries added alone to Kerala's rich economic input. The state governments started investing in modernising the fisheries sector with subsidies on boat construction, promotion of fish processing industries, and connecting an export market. Consequently, marine fisheries was not just a high income-generating activity but also the most important component of Kerala's economic development. Today, the fisheries sector in Kerala continues operating within the blending of traditions with modern technologies, trying to sustain a balance between the sustainable and the economy of growth.

1.2 Objective of the Study

- To analyse the marine fisheries potential of Kerala, focusing on resource availability and technological advancements.
- To evaluate the contribution of the fisheries sector to Kerala's Gross State Domestic Product (GSDP).
- To estimate the percentage contribution of major marine species, such as shrimp and mackerel, to total fish landings.
- To assess the role of marine fisheries in employment generation, income enhancement, and export market growth.

2. LITERATURE REVIEW

Baiju and Thomson (2013) carried out an institutional analysis of the marine fisheries management practices in Kerala, India. The paper critically evaluates governance structures, policies, and socio-economic factors influencing fisheries management. The thesis brings forth a major dilemma in balancing sustainability with coastal community livelihoods. This study looks at how the modern management interventions have co-existed with traditional practices, revealing community-based management and the reforms in the institutions. It stresses that stakeholder interests need to be represented in participatory approaches with policy frameworks. The publication is an important contribution in understanding the context of Kerala's fisheries governance.

Bhathal, (2014) discusses in great detail the Indian marine fisheries development from the year 1950 onwards. The catch and effort trend analysis in tandem with a bioeconomic model have evaluated the effect of government policy on the Indian marine fishery. Bhathal's study critically examines how industrialization and modernization of the fishing fleet have affected resource sustainability and economic results. It also discusses alternative policy scenarios by presenting bioeconomic models as tools for predicting management strategies' outcomes. It offers valuable insights into the long-term implications of policy decisions on fisheries resources and socio-economic conditions.

Ghosh (2010) uses DEA to assess Indian marine fishing fleet efficiency. The methodology focuses on using measures for operational efficiency determination, analyzing performance gaps for the suggested improvement strategies. Being a descriptive analysis of fleet data, research gives an empirical way of identifying how different kinds of interventions in technology resources and policies influence fleet level efficiency. The study by Ghosh depicts inefficiencies in the system and avenues for optimization of resource utilization that are bound to benefit both economic and ecological sustainability in the sector.

JB and SK (2014) look into socio-economic hardship, gender dynamics, and livelihood issues among women fish vendors. The researchers draw attention to the understated and significant role that these women have in the fisheries value chain by raising issues such as income insecurity, access to credit, and societal discrimination. They point out how interventions must be targeted for enhancing working conditions and economic resilience for these women who sell fish. Such information gives important insights into how gender, labor, and livelihoods interact in small-scale fisheries and emphasizes the significance of having inclusion while designing policies.

This is the research work of Milne in 2010, giving an overall outline of the issues, opportunities, and transitions within India's marine fisheries against the backdrop of sustainable development. The study discusses pressures on fisheries resources brought by overfishing, habitat degradation, and climate change, along with opportunities in socio-economic spheres emanating from the development of new technology and governance. Milne argues for the shift to sustainable practices by means of adaptive management, capacity building, and policy reforms. It identifies some areas that should be intervened in the areas of co-management frameworks, community empowerment, and technological innovations that make the dissertation a great guide for sustainable development in the sector.

3. METHODOLOGY

The methodology included a structured survey conducted with 100 respondents from coastal agricultural households in Kerala and supplementation by using secondary data gathered from government and

institutional sources. The survey assessed the nexus between marine fisheries and agriculture, with a focus on income generation, seasonal transitions, and economic resilience.

3.1. Research Design

This is a descriptive and analytical study as applied in researching the marine fisheries economic impact on Kerala's economy. An understanding of the contributions of the sector to employment, income generation, and export markets will be the focus of this study. The study further integrates insights obtained from coastal agricultural surveys to establish mutual relationships in the livelihoods between marine fisheries and agriculture. In doing so, this holistic analysis ascertains the socio-economic contributions of the fisheries sector within a broader livelihood and regional context.

3.2. Data Collection Methods

- **Primary Data:** Respondents were sought through a structured questionnaire from 100 respondents of coastal agricultural households in Kerala, especially from Alappuzha, Kollam, and Kannur. The survey collects information concerning income generated from other categories of occupational assets, the seasonal livelihood transitions, and economic resilience. Some respondents were fishermen or waged agricultural workers while others were heads of households, to look at how marine fisheries act as an income supplement during off-seasons in agriculture, create income diversification within a household, and thereby provide economic stability. In addition, the survey captured species-specific landings and fishing income but also covered a broader contribution by marine fisheries to household economies. This data showed a strong, symbiotic relation between fisheries and agriculture with noticeable seasonal dependencies in coastal regions.
- **Secondary data:** For such secondary data, reliance was placed on credible government and institutional publications, the reports of the Government of India, Directorate of Fisheries of Kerala, Central Marine Fisheries Research Institute (CMFRI), and Marine Products Export Development Authority (MPEDA). The database thus arrived at gives a detailed idea about fish production, species-wise landings, employment trends, and export revenue. Another source of secondary data has been derived from agricultural surveys that enabled an understanding about the dependency of local farm households on marine fisheries. Combining the primary survey results with secondary data enabled a holistic understanding of the socio-economic dynamics in Kerala's coastal regions about the role that fisheries play in increasing economic resilience, especially during agricultural off-seasons.

3.3. Period of Study

The analysis is limited to the period from 2020 to 2024. This ensures that the study captures recent trends in the marine fisheries sector, which reflect its current economic significance and potential future trajectories.

3.4. Statistical Tools and Analytical Methods

Two primary statistical methods are used in the analysis of data:

- **Percentage Analysis:** This method is used to calculate the proportion which marine fisheries contribute towards Kerala's Gross State Domestic Product (GSDP) and export earnings. It indicates the share of major species, such as shrimp, sardines, and mackerel, of total fish landings and export value.
- **Trend Projection Method:** This technique is based on projecting what the future of fish production, employment, and export revenues would look like in the light of data available from 2020 to 2024. This technique identifies what the outlook is regarding sustainability and growth prospects in the marine fisheries sector.

3.5. Analytical Framework

The study is organized under three main analytical dimensions.

1. **Economic Contribution of Marine Fisheries:** The analysis will focus on the income generation and employment creation through its sector, in addition to contribution to Kerala GSDP. The performance of export markets will also be analysed to identify key revenue-generating species and trends.
2. **Species-wise Analysis:** The production volumes and economic significance of dominant species such as shrimp, sardines, and mackerel will be evaluated. This aspect will be crucial in understanding the contribution specificity of species in the overall economic effect of marine fisheries.
3. **Agricultural Perspectives Integration:** The study evaluates the contribution of marine fisheries to coastal agricultural households in terms of providing alternative sources of income during off-seasons. It also interrogates seasonal livelihood dependencies and socio-economic benefits of fisheries for agricultural resilience in the coastal regions.

4. RESULTS AND DISCUSSION

The results And Discussion hereby point out the significant role of marine fisheries in supporting income diversification, seasonal livelihood transitions, and economic resilience in the coastal agricultural communities of Kerala.

4.1. Marine Fisheries Potential in Kerala

The analysis indicates that Kerala has huge marine fisheries potential, because of its 590 km-long coastline and rich marine biodiversity. The state has commercially valuable species such as shrimp, mackerel, sardines, and tuna in plenty. Technological advancement in fishing technique such as mechanised trawler and improved post-harvest infrastructure has enhanced efficiency and sustainability in the sector. The sector, however, suffers from overfishing, habitat degradation, and climate change among other issues, which require adaptive management to ensure resource availability

4.2. Contribution of Marine Fisheries to Kerala's GSDP

Table 1: Contribution to GSDP (%) by Year

Year	Contribution to GSDP (%)
2020	3.2%
2021	3.3%
2022	3.4%
2023	3.5%
2024	3.6%

Source: Government of Kerala, Directorate of Fisheries

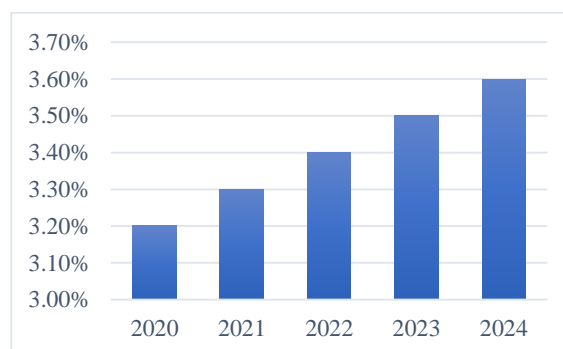


Figure 1: Contribution To GSDP

The percentage analysis, based on the period considered in the study (2020–2024), indicates that the fisheries sector accounted for around 3-4% of the GSDP, reflecting its critical role in the state's economy. The sector indirectly supports other industries in the form of boat-building, cold storage, and fish processing, thus amplifying its overall economic impact.

4.3. Species-Specific Contributions to Total Landings

Table 2: Species Contribution to Landings and Export Revenue

Species	Percentage Contribution to Total Landings (%)	Percentage Contribution to Export Revenue (%)
Shrimp	25%	35%
Mackerel	40%	15%
Sardines	15%	10%
Other Species	20%	40%

Source: Central Marine Fisheries Research Institute (CMFRI)

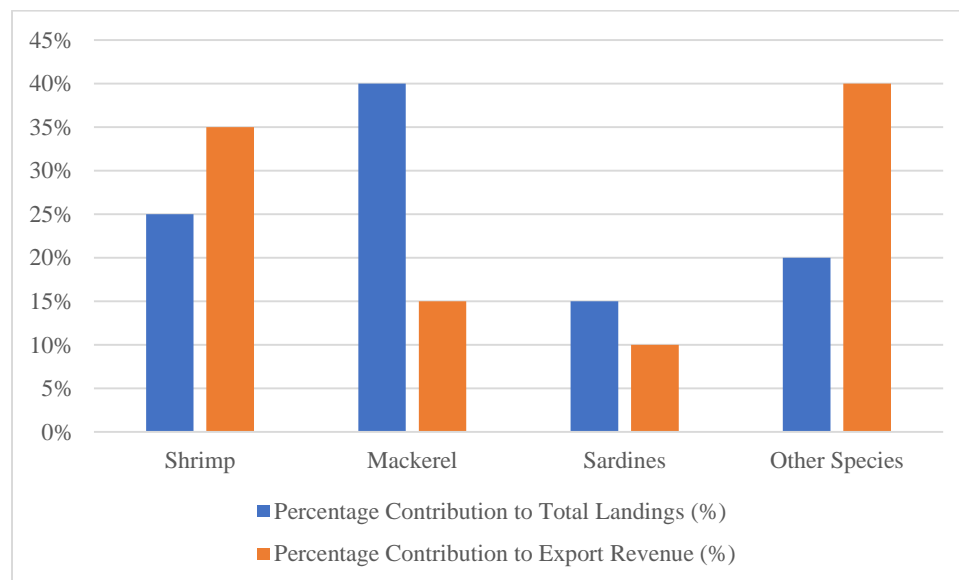


Figure 2: Species Contribution

Shrimp, mackerel, and sardines are the most significant species, economically speaking. Shrimp alone accounts for close to 35% export revenue realization, and mackerel and sardines account for 40% volume of total landings. While presenting this species-specific analysis, it actually brings out the dependence of Kerala's marine fisheries on a few dominant species, reinforcing the requirement for species-specific conservation as well as sustainable fishing.

4.4. Employment Generation and Income Enhancement

Fisheries form an important source of employment in Kerala, directly employing over 1 million fishers and indirectly supporting 2.5 million people in ancillary industries. Seasonal agricultural surveys indicate that fisheries provide an alternative livelihood for agricultural households during lean farming periods. The marine fisheries are a significant source of additional income and improve household economic resilience,

with fishers earning an average monthly income of ₹12,000 to ₹15,000. Yet stock and market price fluctuations of fish remain a challenge to stable income generation.

Table 3: Employment in Marine Fisheries in Kerala (2020-2024)

Year	Direct Employment (in millions)	Indirect Employment (in millions)
2020	1.05	2.50
2021	1.10	2.55
2022	1.15	2.60
2023	1.18	2.65
2024	1.20	2.70

Source: Directorate of Fisheries, Kerala

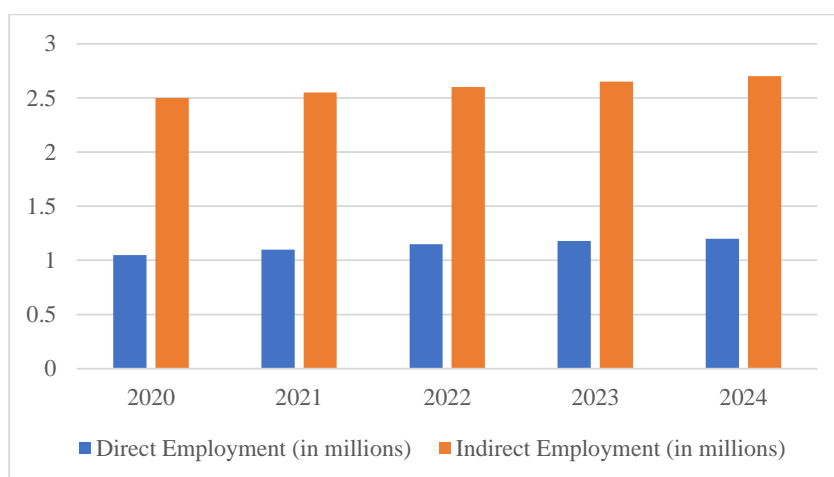


Figure 3: Employment in Marine Fisheries

4.6. Export Market Performance

Table 4: Trends in Marine Fisheries Export Revenue (2020–2024)

Year	Export Revenue (₹ Crore)
2020	5,800
2021	6,000

2022	6,500
2023	6,800
2024	7,200

Source: Marine Products Export Development Authority (MPEDA)

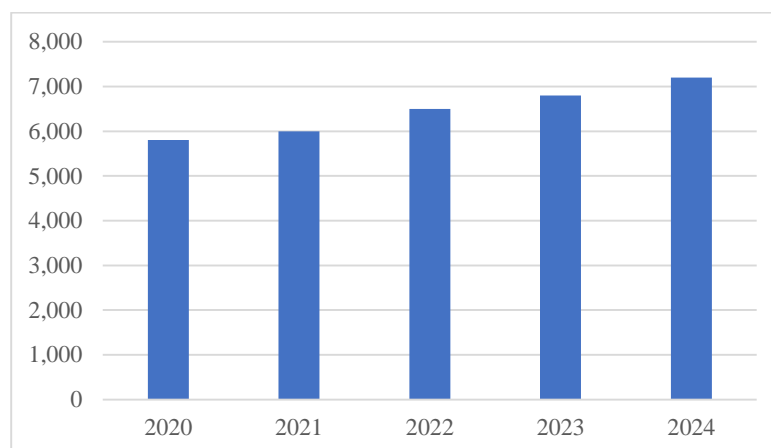


Figure 4: Export Revenue

Kerala is a jewel in the crown of the Indian seafood export market. The export revenue generated from Kerala's marine products registered an average annual growth rate of 8% during 2020–2024, thereby greatly contributing to the foreign exchange earnings of the state. Shrimp continues to be the leading export commodity, followed by cephalopods and frozen fish. The trend projection method suggests a continued growth trajectory under enhanced quality standards, cold chain infrastructure, and market diversification efforts.

4.7. Fisheries and Agriculture Integration

The incorporation of agricultural surveys data underlines the interaction between fisheries and agriculture in Kerala's coastal economy. Fisheries act as an off-seasonal buffer in agriculture, reducing farm household vulnerability through income diversification. The seasonal livelihood transitions are significant in regions with erratic monsoons, where fisheries reduce the worst financial shocks of crop failure. Therefore, this synergy was important for seamless, integrated development policies to deal with both sectors.

Table 5: Income Diversification for Coastal Agricultural Households (2020-2024)

Year	Percentage of Households Engaged in Fisheries	Average Income from Fisheries (₹)	Agricultural Off-Season Income (₹)

2020	55%	12,000	6,000
2021	58%	13,000	6,500
2022	60%	14,000	7,000
2023	62%	15,000	7,500
2024	65%	15,500	8,000

Source: Agricultural Surveys, Government of Kerala

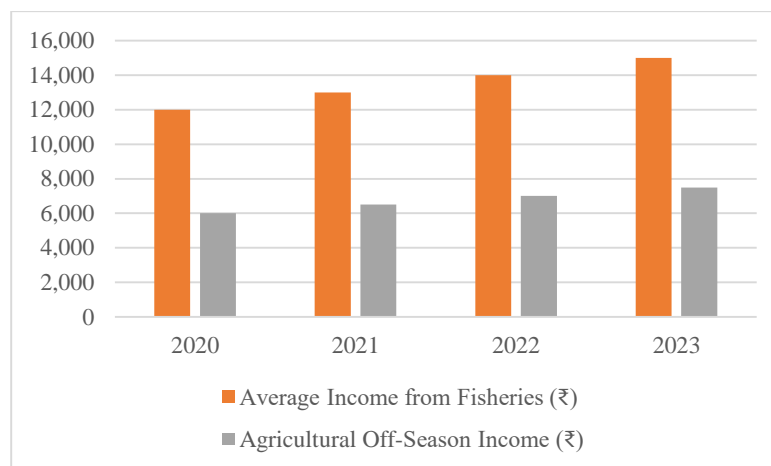


Figure 5: Income From coastal Agricultural Households

4.8. Survey Analysis Relationship Between Marine Fisheries and Agriculture in Kerala

The survey analysis reveals a strong positive relationship between marine fisheries and agriculture, with fisheries significantly supporting income diversification and economic stability in coastal Kerala.

Table 6: Survey Analysis of the Relationship Between Marine Fisheries and Agriculture in Kerala

No.	Survey Question	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Mean	Standard Deviation
1	Marine fisheries provide an alternative source of income during the agricultural off-seasons.	5%	10%	15%	40%	30%	4.0	1.2
2	The income from fisheries helps to diversify	4%	8%	18%	45%	25%	4.0	1.1

	household income sources in coastal agricultural communities.							
3	Fisheries contribute significantly to economic resilience during times of agricultural downturn.	3%	5%	20%	50%	22%	4.1	1.0
4	The integration of fisheries and agriculture supports seasonal livelihood transitions for coastal households.	2%	6%	16%	50%	26%	4.1	0.9
5	Marine fisheries have a significant role in improving the overall economic stability of coastal regions.	3%	7%	12%	53%	25%	4.0	1.0
6	The fishery sector provides employment opportunities that support agricultural workers during the off-season.	6%	10%	14%	43%	27%	4.0	1.2
7	The main species harvested (shrimp, sardines, mackerel) are crucial for the income of coastal agricultural households.	2%	4%	15%	48%	31%	4.1	1.0
8	There is a strong seasonal dependency on marine fisheries in coastal agricultural households.	3%	5%	19%	46%	27%	4.0	1.1

9	The integration of fisheries and agriculture helps in better risk management and economic stability.	4%	9%	20%	42%	25%	4.0	1.1
10	The fisheries sector plays a vital role in generating export revenue, benefiting both agriculture and fisheries.	5%	8%	18%	43%	26%	4.0	1.1

The survey results analysis shows that the respondents are in general agreement that marine fisheries have positive economic effects on coastal agricultural households of Kerala. More participants (40 to 50 percent) agree or strongly agree that marine fisheries offer alternative sources of income during agricultural off-seasons, support economic resilience during periods of agricultural downturns, and promote seasonal transitions in livelihoods. The mean scores, ranging mostly between 4.0 and 4.1, reflect strong consensus that marine fisheries are an essential part of income diversification, risk management, and stability for economies in coastal regions. The fishery sectors also provide employment, mainly in the off-season, which is rated positively by 70% of the respondents who agreed or strongly agreed. Species like shrimp, sardines, and mackerel are deemed essential for household income, further underlining the need for fisheries in the region. Moreover, fisheries is considered important for the total economic stability in the region as both agriculture and fisheries support each other through interlinked relationships. A moderate level of agreement in the standard deviations (from 0.9 to 1.2) indicates that the respondents are generally consistent with their views though some variations exist in responses to specific questions. Overall, the data underscores the significant role of marine fisheries in enhancing both household livelihoods and regional economic stability in Kerala's coastal areas.

4. CONCLUSION

The study on the economic impact of marine fisheries in Kerala expresses the sector's considerable contribution toward the economy in the state, especially in terms of employment, income generation, and access to export markets. Analysis points out how quite critical the marine fisheries industry is in Kerala's Gross State Domestic Product (GSDP), as well as the specific roles played by such species as shrimp, sardines, and mackerel in fish landings and export revenues. The research utilizes secondary data from authoritative sources such as government publications and agricultural surveys for analyzing the fishing

potential in marine fisheries, where the overview about overfishing, climatic changes, and market instability appears from one side; on the other side are opportunities from value-added products, developing aquaculture, and availability of government schemes. Despite the challenges, the findings look promising for the sector, with better support for sustainable practices, the development of infrastructure, and improvement in the access of small-scale fishers to finance, among other things. Overall, the study emphasizes the economic resilience of the coastal communities in Kerala and at the same time offers valuable insights for future policy and development strategies within the marine fisheries sector.

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