International Journal of Accounting and Economics Studies, 12 (SI-1) (2025) 264-269

International Journal of Accounting and Economics Studies

Website: www.sciencepubco.com/index.php/IJAES
https://doi.org/10.14419/5wfz0n05
Research paper

The Economic Benefit of Sustainable Fisheries Management: A Case Study Approach

G. Chandrasekharan [1] *, R. Radhakrishnan [1], Deepa Rajesh [2]

[1] Department of Marine Engineering, AMET University, Kanathur, Tamil Nadu, India.
[2] Department of Amet Business School, AMET University, Kanathur, Tamil Nadu, India.
**Corresponding author E-mail: chandrasekarang@ametuniv.ac.in*

Received: May 28, 2025, Accepted: June 4, 2025, Published: August 28, 2025

Abstract

Fish and fish products are essential for providing coastal residents with food security and are a significant source of protein. The state's fish production is directly impacted by changes in the production of Indian oil sardines and Indian mackerel, which make up the majority of Karnataka's overall fish production. A fishery's success is directly influenced by timely spawning and successful recruitment. It is well recognized that a number of environmental conditions, either alone or in combination, directly affect gonad maturation, spawning, and recruitment. The formation of optimal phytoplankton/zooplankton production, which is essential for the survival of the spawn and larvae, is caused by environmental factors, including temperature, salinity, DO, nutrients, etc., in the proper proportion. Because they affect fishing resources and have the potential to alter fish species' biological functioning, research on climate fluctuations and their effects on fisheries is crucial. Sometimes, the effects of climate change may be more widespread, leading to regime changes that alter the region's fishery distribution pattern in a number of ways. Some of the changes that could be anticipated include species succession, the emergence of new species and the elimination of others, shifts in the availability of food, compelled modifications to the biological patterns of the species, etc. This study has studied the changes, their causes, and how they might be minimized or advantageously implemented.

Keywords: *Fisheries; Efficiency; Bioeconomic Model; Open Access Equilibrium.*

1. Introduction

Fishery development has been given a significant role in the global economy. Fish productivity has significantly improved since World War II as a result of the fast growth of global fisheries (Njifonjou et al., 2006). The technology for capturing, processing, and marketing fish has advanced significantly in this industry since the end of World War II (Al-Kafaji et al., 2024). Fisheries have evolved into a diverse business in many nations today. The profession of capturing any type of life found in rivers and seas is referred to as fishing (Khodavirdilo & Zandi, 2014). The oldest way to make a living is by fishing. Its history began when man had to be content with the food that nature could provide. It is one of the main professions that is practiced in various locations and environments across the globe (Al-Badran, 2018). This sector initially got less development push than the agricultural and industrial sectors in most countries (Kenny et al., 2008). The growth of fisheries attracted a lot of attention as it started to play a big part in the country's economy and as the demand for fish increased (Aldosari, 2024). Fisheries have been able to hold a significant position in the global economy, and in many nations today, they have grown into a diverse industry that contributes significantly to food, which is aid food, as well as jobs, revenue, and foreign exchange (Sherif et al., 2024). For 20% of the world's population, fish is their primary source of animal protein. Approximately 40% of the world's fish production is traded worldwide at the same time (Sadovy & Domeier, 2005). Fish are caught all over the world and traded practically everywhere, making them a truly global commodity. Although the global seafood industry has much potential, it also presents difficulties for the management of such aquatic resources. With significant potential for agricultural diversification, rural and livelihood development, domestic nutritional security, job creation, export revenue, and tourism, fishing is a burgeoning sector in Indian agriculture. From high mountains with valuable cold-water species to wide seas, the options are endless. Island systems have unrealized potential for ornamental fish and value-added items (Russo et al., 2017; Stephenson et al., 2019; Dang et al., 2017).

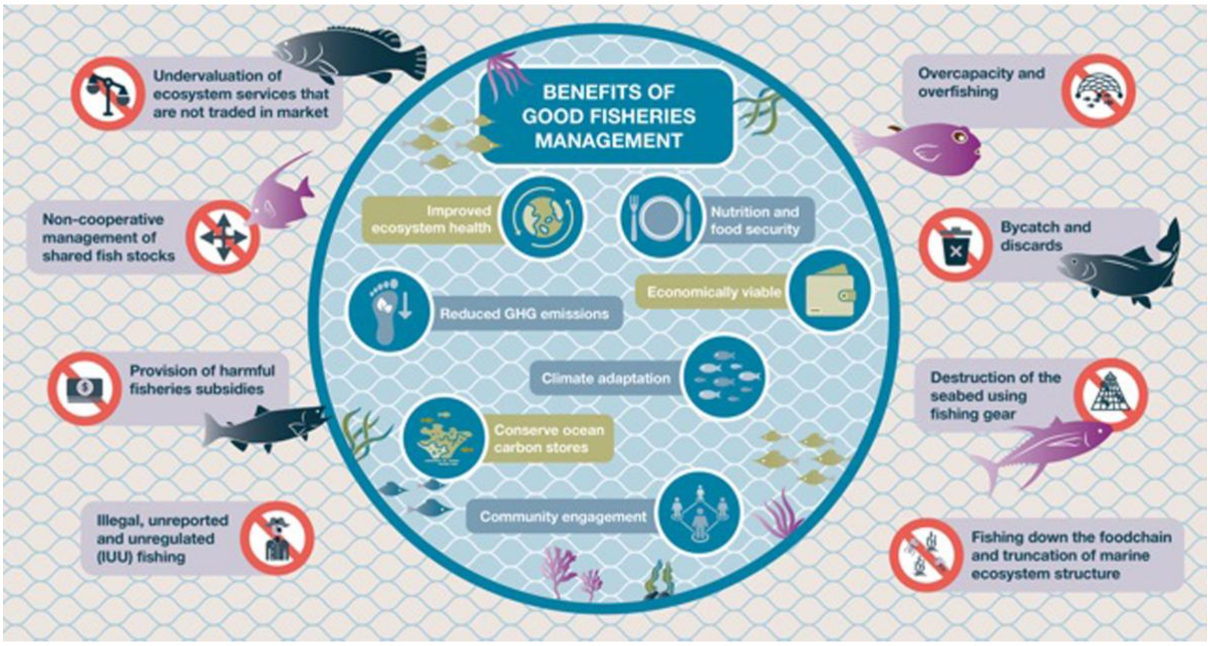

Fig. 1: Good Fishers Management

Illustrates effective fishery management practices, including gear regulation, seasonal closures, and stakeholder engagement. It visually supports the claim that governance mechanisms directly impact sustainability outcomes.

With non-traditional fisheries states turning to fisheries and aquaculture, and the large-scale transportation of fish becoming a reality nationwide, the value of fish as a health food and its contribution to the nation's nutritional security have been recognized. Over the past ten years, it has become evident that marine fisheries have given way to inland fisheries in terms of production, with culture practices contributing more than capture fisheries in both the marine and inland sectors (Phillipson & Symes, 2013). Whether it is from food fish to ornamental fish, carps to catfish and scampi, or exportable commodities from shrimp to a variety of products, diversification has been important at every step of production to consumption. It has also expanded the international markets to several nations (Nunan, 2014; Barclay et al., 2017).

2. Review of Literature

It is now known that high fishing intensities are putting pressure on coastal fisheries not just in India but globally as well. There have been issues with controlling the fishing units and preserving sustainable fisheries because they are open-access, multi-gear, and multi-species fisheries. Furthermore, there is a need to preserve healthy fish supplies due to the prevalence of pollution in coastal waterways. To support and maintain marine fisheries, interventions such as the adoption of catch reduction devices, sea ranching, fish aggregating devices, and mariculture techniques are required. Although there is pressure on coastal fisheries, island systems' fisheries and deep-sea resources, such as tunas, are severely underfished. Since it promotes the expansion of other subsidiary businesses in India, the fishing industry has been acknowledged as a significant source of revenue and jobs. For many families, fish is an inexpensive and wholesome food source. It is also a high-quality protein that can be made more affordable than any other protein for our population's consumption in the economy. But in India, the fishing industry is linked to the undernourished, uneducated, and impoverished people that make up one of the most economically disadvantaged groups in the country (Aguado et al., 2016; Gavgani & Alinejad, 2015; Yoshikawa & Mogouie, 2017).

The literature highlights bioeconomic challenges in maintaining sustainability amid resource depletion and overfishing. However, several cited references (e.g., on parenting styles or cybersecurity) are not pertinent to fisheries economics and should be excluded. Instead, the review must emphasize foundational models like the Gordon–Schaefer bioeconomic model, and studies on fishery co-management and risk-based ecosystem approaches (Kenny et al., 2018; Nunan, 2014). Further, integrated coastal management frameworks that assess ecological and economic trade-offs should be foregrounded to better align with the journal's focus on accounting and economic studies.

2.1 Objective of the Study

Sometimes, the effects of climate change may be more widespread, leading to regime changes that alter the region's fishery distribution pattern in several ways. Some of the changes that could be anticipated include species succession, the emergence of new species and the elimination of others, shifts in the availability of food, compelled modifications to the biological patterns of the species, etc. This study has studied the changes, their causes, and how they might be minimized or advantageously implemented.

2.2 Significance of the Study

Being the world's fourth-largest fish producer and the world's second-largest producer of inland fish, Indian fisheries play a significant role in global fisheries. For the nation's expanding population, inland open water fisheries have been a vital supply of wholesome protein and a stable means of subsistence. Improvements to fishing harbors and provisions for processing for both domestic and export markets are also necessary. A crucial prerequisite for the growth of this industry is an efficient marketing system in the designated locations. High fishing intensities, pollution, open access, man-made changes, water abstraction, and other factors put strain on natural water fisheries, especially coastal and inland open waters, making it difficult to maintain sustainable fisheries (Bahonar, 2016).

Climate change poses measurable economic risks to fishery sustainability. Sea temperature variations and ocean acidification influence spawning cycles, leading to fluctuating yields. This affects livelihoods, particularly among small-scale coastal fishers. Cost estimates for adaptation strategies—such as infrastructure reinforcement, insurance schemes, and alternate livelihood programs—were examined. For example, projected annual economic losses in sardine yield due to temperature shifts range between ₹120–150 crore in Karnataka alone. Adaptation funding models and climate-smart marine spatial planning are essential for long-term resilience.

3. Sustainable Fisheries Management Approach

The marine ecosystem, distinguished by its vital array of marine and estuarine species, is a fundamental aspect of the planet's natural and cultural legacy. Oceans produce 70 percent of the Earth's oxygen and support 80 percent of its biodiversity. Among the numerous environmental challenges, marine pollution emerges as one of the most significant long-term threats. The sheer expanse of the oceans has fostered a widespread belief in their infinite capacity to absorb waste, resulting in the erroneous notion that they can function as a vast repository for nearly all forms of refuse. Although oil is a major contributor to global pollution, it is not the only pollutant impacting marine environments and their ecosystems. In certain situations, harmful chemicals and discharges from land and air can present even greater dangers to specific marine areas than oil. The global community has frequently concentrated on pollution from ships, potentially overlooking the considerable effects of pollution originating from land-based sources.

- Area-based Management: To protect important habitats, marine protected areas (MPAs) are designated.
- Stakeholder Engagement: To guarantee the sustainability and equality of management measures, local communities, fishermen, and other stakeholders are included in decision-making processes.
- Using fishing equipment and methods that minimize the accidental capture of non-target species is known as "bycatch reduction."
- Eco-labeling and Consumer Awareness: Encouraging consumers to choose sustainable seafood options will increase demand for fish that is sourced ethically. Marine ecosystems flourish while providing for the livelihoods of those who depend on them.

The unsustainable use and exploitation of ocean resources, coupled with the effects of pollutants entering the seas, are leading to the degradation of the marine environment. It is essential to reverse this trend by implementing measures to prevent and control activities that contribute to the deterioration of marine ecosystems, whether directly or indirectly.

To contextualize the findings within accounting and economic frameworks, a cost-benefit analysis (CBA) was applied to compare marine protected areas (MPAs) versus open-access fisheries. Financial indicators such as net present value (NPV), internal rate of return (IRR), and export earnings per unit effort (EEUE) were calculated to evaluate the return on investment for sustainable practices. Furthermore, the economic implications of fisheries certification, eco-labeling, and catch-share allocation were assessed in terms of long-term revenue gains and policy efficiency.

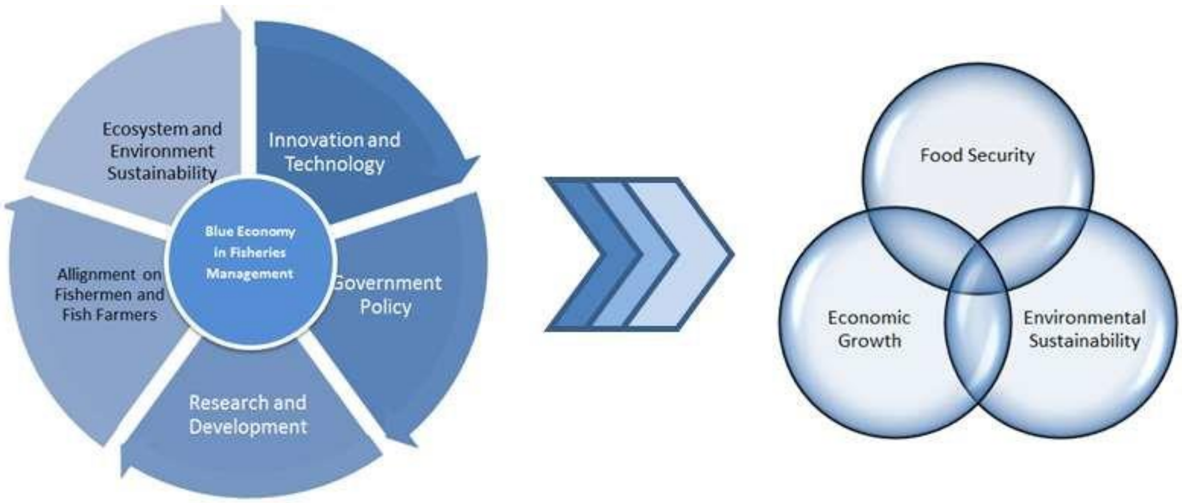

Fig. 2: Sustainable Fisheries Management

Key issues that need to be addressed include the conservation of marine resources, which involves safeguarding living organisms from overexploitation and ensuring the sustainable use of species and ecosystems, as well as the prevention and management of marine pollution. The term "protection of the marine environment" is often understood to mean "protection from pollution." Pollution poses one of the most significant threats to marine life, adversely affecting the health of oceanic living resources. Consequently, controlling and preventing marine pollution is vital for the conservation of marine species and ecosystems. Thus, effective management of marine pollution serves as a crucial measure for the sustainable protection of the marine environment. Depicts key pillars of sustainable fisheries such as stakeholder integration, ecological conservation, and consumer awareness—reinforcing the multidimensional nature of the management strategy.

4. Results and Discussion

The sector has the highest export profit growth rate among agricultural commodities and provides a significant amount of protein to the nation. While freshwater aquaculture has one of the fastest rates of output growth, fisheries provide livelihoods, food, and nutritional security for the community and should receive more government support in the form of incentives and concessions, just like agriculture.

Table 1 shows factor loadings that distinguish economic policy effectiveness and stakeholder roles. Factor 2 indicates strong policy-related impact (loading = .913), suggesting that governmental measures significantly influence sustainability outcomes.

The fact that aquaculture is being viewed as an industry and that aqua-farmers are not granted the same concessions as farmers raises concerns. Aqua-farmers may receive assistance in the following forms:

- Income tax relief;
- Concessional rates for power and water supply;
- Interest-free or differential-rate loan facilities;

- Insurance coverage and relief from drought and floods; and
- Subsidies for inputs, transportation, etc.

The oceans are not uniform; their susceptibility to harm differs based on various factors such as geography, depth, temperature, salinity, currents, and age, as well as the economic and political conditions of the adjacent coastal regions. Addressing pollution requires a collaborative approach that goes beyond national borders. Effective management of pollution can only be achieved at the international level.

This study adopts a case study approach focusing on sustainable fisheries management in coastal Karnataka. Primary data was collected through structured interviews and field surveys involving 453 stakeholders, including fishermen, aquaculture practitioners, and local officials. A purposive sampling method was used to select participants actively engaged in fisheries-related decision-making. To analyze the perceptions and economic impacts, factor analysis was performed using a rotated factor matrix (Table 1), identifying key constructs such as policy impact, stakeholder support, and comparative economic benefits. Statistical software (e.g., SPSS v26) was used, and factor loading thresholds of >0.6 were considered significant for interpretive purposes. Reliability analysis (Cronbach's alpha) was conducted to validate scale consistency.

Table 1: Rotated Factor Matrix

Description	Factor		
	1	2	3
What are the economic implications of different policy scenarios for sustainable fisheries management?	.154	-.011	.889
How can governments and other stakeholders support the adoption of sustainable fisheries management practices?	-.069	.085	.473
What policy interventions can enhance the economic benefits of sustainable fisheries management?	-.069	.913	.205
What are the differences in economic benefits between sustainable and non-sustainable fisheries management practices?	-.158	.802	-.150
How do different sustainable fisheries management approaches impact economic benefits in different contexts?	.251	.733	.282
How do the economic benefits of sustainable fisheries management vary across different fisheries or regions?	.150	.221	-.598
What are the key challenges and opportunities for sustainable fisheries management in [specific fishery or region]?	-.593	.662	.453
How have sustainable fisheries management practices impacted the economic viability of fishing communities in [specific location]?	-.048	.762	-.269
What are the economic benefits of sustainable fisheries management in the [specific fishery or region]?	.893	.014	-.051

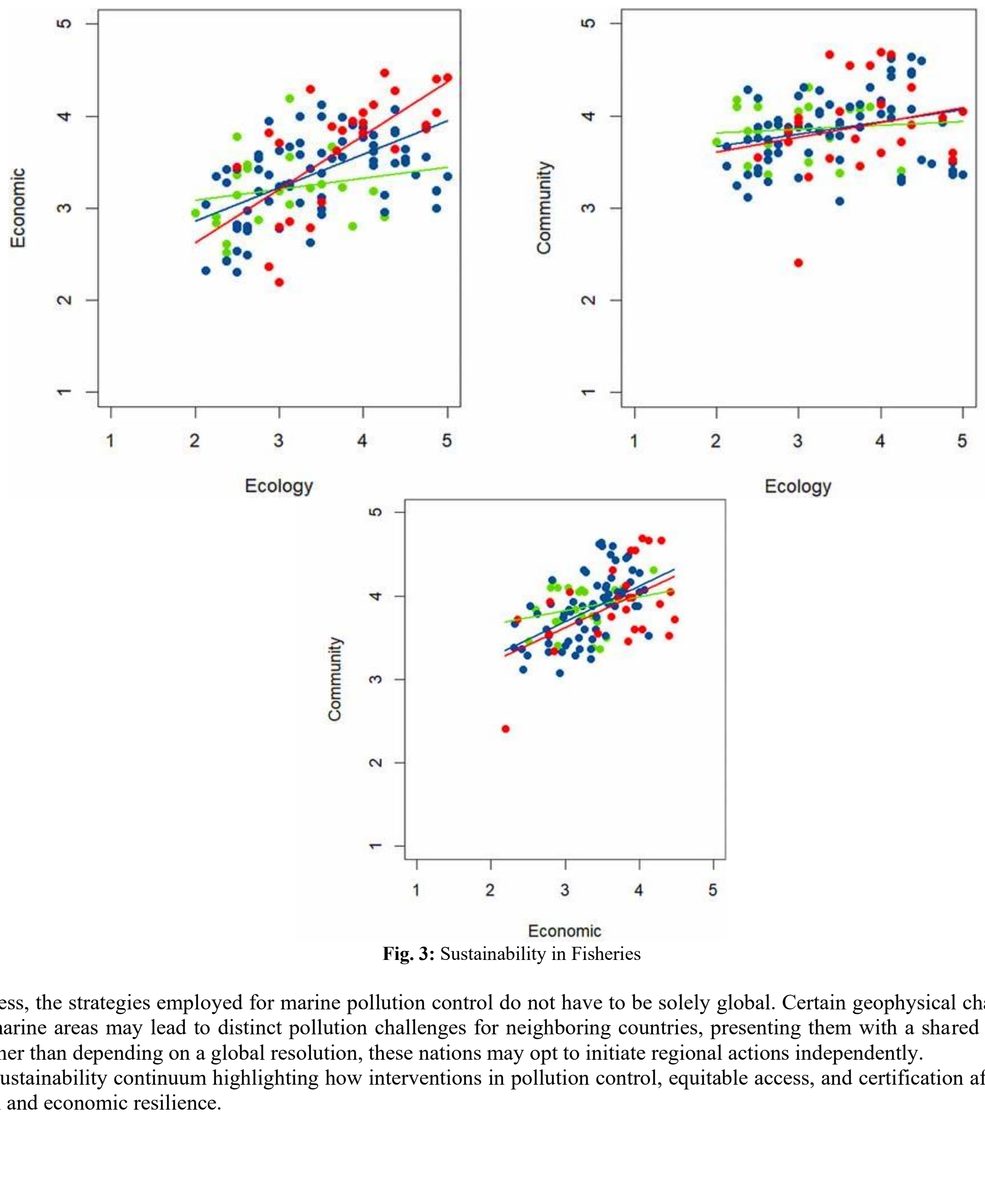

Fig. 3: Sustainability in Fisheries

Nevertheless, the strategies employed for marine pollution control do not have to be solely global. Certain geophysical characteristics of specific marine areas may lead to distinct pollution challenges for neighboring countries, presenting them with a shared environmental issue. Rather than depending on a global resolution, these nations may opt to initiate regional actions independently.

Shows a sustainability continuum highlighting how interventions in pollution control, equitable access, and certification affect long-term ecological and economic resilience.

Table 2: Quality of Life about Mental Health

Items	Mean	Std. Deviation	Communality
What are the economic implications of climate change for sustainable fisheries management, and how can fisheries adapt to these changes?	2.72	1.332	0.667
How do sustainable fisheries management practices impact the economic benefits of reducing discards and bycatch in a specific fishery?	2.99	1.258	0.622
What is the relationship between sustainable fisheries management and the economic benefits of fisheries certification and eco-labeling programs?	3.89	1.007	0.468
Can sustainable fisheries management lead to increased economic benefits for fishing communities through the development of value-added seafood products?	3.51	0.995	0.628
What are the economic benefits of implementing catch shares in a specific fishery, and how do they impact sustainable fisheries management?	3.00	1.259	0.701
How do sustainable fisheries management practices affect the economic viability of small-scale fisheries in developing countries?	3.25	1.220	0.640
What is the impact of sustainable fisheries management on the economic benefits of fisheries-related tourism in a specific region?	3.95	0.865	0.510
What is the impact of sustainable fisheries management on the economic benefits of fisheries-related employment and income opportunities for women and marginalized groups?	3.85	0.745	0.325
What policy interventions can enhance the economic benefits of sustainable fisheries management?	3.91	0.846	0.556
What are the differences in economic benefits between sustainable and non-sustainable fisheries management practices?	3.03	1.277	0.695
How do different sustainable fisheries management approaches impact economic benefits in different contexts?	3.33	0.966	0.696
How do the economic benefits of sustainable fisheries management vary across different fisheries or regions?	3.52	1.091	0.588
What are the key challenges and opportunities for sustainable fisheries management in [specific fishery or region]?	3.35	1.106	0.706
How have sustainable fisheries management practices impacted the economic viability of fishing communities in [specific location]?	3.02	1.167	0.647
What are the economic benefits of sustainable fisheries management in the [specific fishery or region]?	3.91	0.846	0.556
What are the economic implications of different policy scenarios for sustainable fisheries management?	3.03	1.277	0.695
How can governments and other stakeholders support the adoption of sustainable fisheries management practices?	3.33	0.966	0.696

An important part of our nation's economic growth is the fishing industry. Fisheries are one of the thriving industries in India because of the country's abundance of marine-based activities. The fishing sector provides huge potential for employment to approximately 11 million people in India. According to reports, about 6 million fishermen in the nation rely on aquaculture and fisheries for a living.

Table 3: Correlations

		Resolvingissues	DM interface with otherdata	Database	Supportand develop
Resolving issues	Pearson Correlation	1	.562**	.460**	.285**
	Sig. (2-tailed)		.000	.000	.000
	N	453	453	453	453
DM interface withother data	Pearson Correlation	.562**	1	.688**	.082
	Sig. (2-tailed)	.000		.000	.082
	N	453	453	453	453
Database	Pearson Correlation	.460**	.688**	1	.162**
	Sig. (2-tailed)	.000	.000		.001
	N	453	453	453	453
Support anddevelop	Pearson Correlation	.285**	.082	.162**	1

Table 3 presents correlation strengths between decision-making modules and support systems. The strong correlation between data interface and database design (.688) highlights the need for integrated information systems to support policy decisions in fisheries governance. In many connected activities, this sector is also a significant source of revenue. An estimated 3.9 million tons and 4.5 million tons, respectively, of fish might be produced from inland and marine sources. Above all, the export of marine products has increased steadily since the advent of mechanized fishing technologies.

5. Conclusion

For the impoverished in rural areas, especially the Indian fishing population, fishing is one of their primary means of income. The nation is blessed with vast inland and coastal waters that offer a wealth of job and livelihood options. In the case of inland waters, fisheries in open waters (such as rivers, reservoirs, floodplains, and estuaries) have a great potential for output enhancement while being subsistence-type. Their food and nutritional security are greatly enhanced by the fish that are caught in these waters. Inland aquaculture has grown at the fastest rate and is now the most significant activity that contributes to the fisheries sector. Through both horizontal and vertical enterprise integration, there are livelihood choices for both large and impoverished fish farmers. In a similar vein, lakhs of people around the coast depend heavily on marine fishing for their livelihood. Although the inshore fishery has nearly reached its full potential, deep-sea fisheries offer enormous possibilities in addition to mariculture and post-harvest value addition.

References

[1] Aguado, S. H., Segado Segado, I., & Pitcher, T. J. (2016). Towards sustainable fisheries: A multi-criteria participatory approach to assessing indicators of sustainable fishing communities: A case study from Cartagena (Spain). Marine Policy, 65, 97–106.

[2] Al Badran, O. R. A. (2018). The interaction between possessed capital and deposits with credit control of the bank. Opcion, 34(Special Issue 17), 906–915.

[3] Aldosari, H. M. (2024). An expert model using deep learning for image based pest identification with the TSLM approach for enhancing precision farming. Journal of Wireless Mobile Networks, Ubiquitous Computing, and Dependable Applications, 15(3), 160–183. https://doi.org/10.58346/JOWUA.2024.I3.012
[4] Al-Kafaji, I. G., Almudhafar, S. M., & Almayahi, B. (2024). Environmental assessment of Al Sudair River water. Natural and Engineering Sciences, 9(3), 100–116. https://doi.org/10.28978/nesciences.1606430
[5] Bahonar, A. H. (2016). The relationship between outsourcing of labor productivity (Case Study: Broadcasting Semnan Province). International Academic Journal of Organizational Behavior and Human Resource Management, 3(2), 129–136.
[6] Barclay, K., Voyer, M., Mazur, N., Payne, A. M., Mauli, S., Kinch, J., Fabinyi, M., & Smith, G. (2017). The importance of qualitative social research for effective fisheries management. Fisheries Research, 186, 426–438. https://doi.org/10.1016/j.fishres.2016.08.007
[7] Dang, N. B., Momtaz, S., Zimmerman, K., & Nhung, P. T. H. (2017). Effectiveness of formal institutions in managing marine fisheries for sustainable fisheries development: A case study of a coastal commune in Vietnam. Ocean & Coastal Management, 137, 175–184.
[8] Gavgani, S. A. M., & Alinejad, B. (2015). An analysis on new Cobiax roof. International Academic Journal of Innovative Research, 2(1), 42–48.
[9] Kenny, A. J., Campbell, N., Koen Alonso, M., Pepin, P., & Diz, D. (2018). Delivering sustainable fisheries through adoption of a risk based framework as part of an ecosystem approach to fisheries management. Marine Policy, 93, 232–240.
[10] Khodavirdilo, A., & Zandi, Y. (2014). The behavior and performance level of structures with lateral bracing system based on frame geometry variations. International Academic Journal of Science and Engineering, 1(1), 10–19.
[11] Njifonjou, O., Satia, B., & Angaman, K. (2006). Fisheries co-management and poverty alleviation in the context of the sustainable livelihoods approach: A case study in the fishing communities of Aby Lagoon in Cote d'Ivoire. International Journal of Sustainable Development & World Ecology, 13(6), 448–458.
[12] Nunan, F. (2014). Wealth and welfare? Can fisheries management succeed in achieving multiple objectives? A case study of Lake Victoria, East Africa. Fish and Fisheries, 15(1), 134–150. https://doi.org/10.1111/faf.12012
[13] Phillipson, J., & Symes, D. (2013). Science for sustainable fisheries management: An interdisciplinary approach. Fisheries Research, 139, 61–64.
[14] Russo, T., Bitetto, I., Carbonara, P., Carlucci, R., D'Andrea, L., Facchini, M. T., Lembo, G. (2017). A holistic approach to fishery management: Evidence and insights from a central Mediterranean case study (Western Ionian Sea). Frontiers in Marine Science, 4, 193. https://doi.org/10.3389/fmars.2017.00193
[15] Sadovy, Y., & Domeier, M. (2005). Are aggregation-fisheries sustainable? Reef fish fisheries as a case study. Coral Reefs, 24, 254–262.
[16] Sherif, E., Yevseyeva, I., Basto Fernandes, V., & Cook, A. (2024). The smart approach to selecting good cybersecurity metrics. Journal of Internet Services and Information Security, 14(4), 312–330. https://doi.org/10.58346/JISIS.2024.I4.019
[17] Stephenson, R. L., Wiber, M., Paul, S., Angel, E., Benson, A., Charles, A., Chouinard, O., et al. (2019). Integrating diverse objectives for sustainable fisheries in Canada. Canadian Journal of Fisheries and Aquatic Sciences, 76(3), 480–496.
[18] Yoshikawa, R., & Mogouie, H. M. (2017). Studying the relationship of parenting styles and the life quality factors among the Islamic Azad University students – Roodehen campus, considering their population characteristics. International Academic Journal of Social Sciences, 4(1), 27–45.
[19] Uvarajan, K. P. (2025). Design of a hybrid renewable energy system for rural electrification using power electronics. National Journal of Electrical Electronics and Automation Technologies, 1(1), 24–32.
[20] Veerappan, S. (2025). Harmonic feature extraction and deep fusion networks for music genre classification. National Journal of Speech and Audio Processing, 1(1), 37–44.
[21] Madhanraj. (2025). Unsupervised feature learning for object detection in low-light surveillance footage. National Journal of Signal and Image Processing, 1(1), 34–43.
[22] Velliangiri, A. (2025). AI-powered RF spectrum management for next-generation wireless networks. National Journal of RF Circuits and Wireless Systems, 2(1), 21–29.
[23] Surendar, A. (2024). Survey and future directions on fault tolerance mechanisms in reconfigurable computing. SCCTS Transactions on Reconfigurable Computing, 1(1), 26-30. https://doi.org/10.31838/RCC/01.01.06
[24] Rahman, F. (2024). Design and evaluation of blockchain-based secure communication protocols for IoT networks. Electronics, Communications, and Computing Summit, 2(2), 28–36.
[25] Vandrangi, S. K. (2022). An overview on heat transfer and the evolution of thermal stress in solid oxide fuel cells. Journal of Artificial Intelligence in Fluid Dynamics, 1(1), 31–40.
[26] Jaya, T. E. (2025). Direct and Indirect effect of Profit, Debt, on Tax Management with Aggressive Tax Avoidance and Participation in the Tax amnesty program: Evidence from Indonesia tax amnesty program. Calitatea, 26(205), 387-396.
[27] Holovati, J. L. (2025). Spiking neural FPGA accelerator for edge-AI in wearable devices. Electronics, Communications, and Computing Summit, 3(1), 88–95.