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Sustainable Vaname Shrimp Agribusiness Development Model in Parigi Moutong Regency, Central Sulawesi Province

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Abstract: This study aims to identify and evaluate a sustainable model, as well as assess the sustainability of whiteleg shrimp farming in Parigi Moutong Regency. The assessment of sustainability will be conducted using the Rapfish approach, which includes five dimensions that are customized to the specific research area to provide an accurate representation of the present state. The results of the study indicate that whiteleg shrimp farming in Parigi Moutong Regency has a satisfactory and stable level of sustainability, indicated by an overall index value of > 50% through the Rapfish approach. In order to address the challenges in managing white shrimp resources, such as coastal habitat destruction, overfishing, and lack of coordination among institutions, the government of Parigi Moutong Regency needs to establish integrated and coordinated cooperation with stakeholders.

Keywords: Agribusiness; Sustainability status and index; White shrimp

Introduction

Indonesia, as an archipelagic nation with over 17,500 islands and an 81,000 km coastline, boasts immense potential in the fisheries sector, particularly in shrimp farming. Key commodities such as black tiger shrimp (Penaeus monodon) and whiteleg shrimp (Litopenaeus vannamei) are products in high demand, both domestically and internationally. Among these two varieties, whiteleg shrimp has become the primary focus in the development of the national aquaculture industry, given its significant contribution to the country's economic growth. Whiteleg shrimp originates from South and Central America, but has now spread to various countries, including Indonesia (Octovianus et al., 2023). According to data from the Central Statistics Agency (BPS, 2019), shrimp exports accounted for approximately 36.27% of Indonesia's total fisheries export value during the period 2012-2018. The export value reached USD 1,742.12 million with a volume of 197.43 thousand tons in 2018. The fisheries sector has even targeted national shrimp production to reach 1,290,000 tons by 2024 with a production value of Rp90.3 trillion (MMAF, 2021). This commodity has become the largest contributor to the trade balance of the fisheries sector, both in terms of volume (14.13%) and value (42%) (Mashari et al., 2019).

Considering the national potential, the development of shrimp aquaculture has also become a primary focus in various regions, including Central Sulawesi Province, particularly Parigi Moutong Regency, which boasts vast shrimp farming land and favorable environmental conditions. Central Sulawesi Province has a coastline stretching 4,013 km and a potential for developing shrimp farming land totaling 42,095 hectares. One of the strategic regions in this province is Parigi Moutong Regency, which has a cultivation land potential of 10,816 hectares, with 6,866 hectares already utilized, yielding a production of 132,294.88 tons consisting of shrimp and milkfish.

However, the development of vaname shrimp agribusiness in Parigi Moutong Regency still faces

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various obstacles that hinder the achievement of optimal productivity. Some of the main barriers include the mismatch between the area of cultivated land and production results, limited access to superior seeds, and lack of information regarding the suitability of land for white shrimp cultivation (Pratiwi et al., 2023), and the threat of various disease outbreaks including vibriosis in vannamei shrimp cultivation, particularly in intensive systems (Rahmi et al., 2023; Sugiharta et al., 2023). This disparity indicates the necessity for a comprehensive evaluation of the sustainability aspects of the vaname shrimp aquaculture in that region. The environmental conditions also play a crucial role in this regard.

Multiple previous studies have highlighted important aspects in the management of sustainable fisheries resources, ranging from conservation (Mamesah et al., 2024), economic efficiency of fishing gear (Harahap et al., 2024), genetic enhancement in aquaculture (Amanda et al., 2024), to educational innovation through STEM e-modules (Setiawati et al., 2024) and microalgae cultivation media (Zsalzsabil et al., 2023). Still, despite each study contributing to sustainability aspects sectorally (conservation, fishing technology, aquaculture, and education), there is still an integrative gap in the cross-cutting approach linking conservation, technology, and education holistically in one sustainable fisheries management system.

One commonly used method for quickly and comprehensively assessing the sustainability of fisheries is RAPFISH, which relies on Multidimensional Scaling techniques to analyze the ecological, economic, social, institutional, and technological dimensions (Chaliluddin et al., 2023). This method also emphasizes the importance of collaboration among stakeholders to optimize sustainability across dimensions (Garlock et al., 2022). A study on flying fish fisheries in Pasongsongan (Farid et al., 2024) showed that while the ecological and economic dimensions were fairly good, the social and institutional dimensions were still moderate. Similar findings were observed in research conducted in Morotai (Abdullah et al., 2022), with only two dimensions falling in the category of moderately sustainable. Furthermore, a study in the Sunda Strait (Irnawati et al., 2021) indicated that all dimensions were in the low category, particularly in terms of technology.

The context indicates that while RAPFISH is a relevant method for evaluating sustainability, its results are highly dependent on local conditions and require a contextual approach. Therefore, the development of an adapted RAPFISH model, known as RAPVANS (Rapid Appraisal for Vaname Shrimp), is crucial to assess the sustainability of vaname shrimp aquaculture in Parigi Moutong Regency specifically.

This research was conducted to address the need for a sustainable business model for vannamei shrimp farming, by assessing the current conditions based on five main dimensions of sustainability. The main objective of this research is to evaluate the sustainability status of vannamei shrimp farming in Parigi Moutong Regency and identify critical aspects that require improvement, in order to serve as a basis for developing more adaptive and sustainable shrimp cultivation management strategies.

Method

Type of Research

This study falls under the category of descriptive research, which is focused on providing detailed descriptions of the facts, situations, variables, and phenomena observed during the research process, without actively controlling or manipulating conditions.

Location and Time of Research

The study took place in 12 sub-districts that serve as hubs for shrimp farming in the coastal region of Parigi, Moutong Regency, Central Sulawesi Province. The study lasted for a period of 1 year, beginning in July 2023 and concluding in June 2024.

Data Collection Method

In conducting this study, information will be collected from both primary and secondary sources. Secondary information was gathered from various sources such as literature reviews, documents from pertinent organisations, past research projects, and field observations. These sources gave a comprehensive overview of the difficulties encountered in vaname shrimp cultivation. Primary data were collected from shrimp farming businesses in Parigi Moutong, which are involved in various aspects of agribusiness, ranging from procurement of production facilities, production activities, processing, to marketing. This research followed several stages, starting with determining the number of respondents.

According to the Slovin formula, a total of 62 individuals were included in the sample, encompassing 160 individuals engaged in fisheries business, across ten sub-districts and twelve villages, in addition to 16 farmer groups. In addition, 11 policy experts were involved as additional respondents. The next stage was field identification to determine the real problems in vaname shrimp resource management, followed by data collection through literature study, observation, in-depth interviews, and questionnaire distribution. This data collection process aimed to formulate the problems faced in the shrimp farming sector in the area.

Data Analysis

The study utilises the Multi Dimensional Scaling (MDS) approach to analyse data on the sustainability of vaname shrimp, along with the RAPVANS method, an adaptation of RAPFISH. The test includes a range of topics like ecology, finances, community, organizations, and technology, with the use of Euclidean distance in statistical assessments. The primary aim is to evaluate the sustainability of fisheries in Donggala Regency by comparing their status to a benchmark of 'good' (100%) and 'bad' (0%) for each attribute that influences sustainability.

In MDS, the ordination technique relies on Euclidean distance in n-dimensional space, expressed as follows:

$$d = \sqrt{|(x_1 - x_2|^2 + y_1 - y_2|^2 + z_1 - z_2|^2 + ..)} \quad (1)$$

The position of an object or point in MDS is determined by examining the distance between point i and point j in relation to the origin δij using regression analysis. This is defined by the equation:

$$d_{ij} = \alpha + \beta\delta_{ij} + \varepsilon \quad (2)$$

When evaluating the sustainability of fisheries resource use, a score is assigned to each category based on multiple factors. The scores usually fall between 0 and 2 and are organized in a matrix grid. The rows in the grid represent various resource categories while the columns represent the attribute scores.

The ALSCAL approach focuses on minimising the squared distance between points (represented as d_ij) and the origin (denoted as 0_ijk) in a five-dimensional formula known as S-Pressure, which involves dimensions i, j, and k:

$$S = \sqrt{\frac{1}{m} \sum_{k=i}^{m} \left[\frac{\sum_i \sum_j \left(d_{ijk}^2 - O_{ijk}^2\right)^2}{\sum_i \sum_j O_{ijk}^4} \right]} \quad (3)$$

The weighted Euclidean distance can be expressed as the squared distance, or expressed as:

$$d_{ijk}^2 = \sum_{a=1}^{r} w_{ka} (x_{ia} - x_{ja})^2 \quad (4)$$

The development of this software is based on the MDS from the SPSS software, incorporating rotation and sensitivity analyses into one program. By using MDS, the software allows for visualisation of sustainability points in two dimensions. A rotation process is used to project points onto a horizontal line, with the worst point scored as 0% and the best point scored as 100%. The index value can help in assessing the sustainability of fisheries resource utilization in Parigi Moutong, Moutong Regency.

The index that measures the sustainability of agribusiness, referred to as B, is determined by a numerical rating between 0 and 100. A shrimp agribusiness with a B score higher than 50 is labeled as 'sustainable', while anything below 50 is classified as 'unsustainable'. According to Kavanagh et al. (2004) in Pitcher et al. (2013), this study has identified four different categories to classify the status of sustainability: if the B score is less than 24.9, the fishery is labelled as 'unsustainable', if it falls between 25 and 49.9, it is considered 'less sustainable', if it is between 50 and 74.9, it is deemed 'moderately sustainable', and if it is above 75, it is classified as 'sustainable'.

Calculating the change in root mean square (□RMS) when excluding an attribute from the analysis can help determine its significance in terms of sustainability dimensions. A greater RMS value suggests greater sensitivity of the attribute, while a lower value suggests less sensitivity. Attributes that show the highest sensitivity within a dimension are considered critical factors influencing sustainability, and should therefore be prioritised by fisheries managers. This examination will cover six stages, namely: determination and review of attributes, attribute scoring, Rapfish ordination, sustainability status index scale, sensitivity analysis, and Monte Carlo analysis.

Result and Discussion

Research Results

The Parigi coastal area of Moutong Regency is well-positioned for shrimp farming due to its advantageous natural, social, and economic resources. Implementing sustainable management practices is crucial for supporting the vaname shrimp industry in this region. An evaluation of the sustainability of shrimp farming in Parigi is necessary, particularly concerning production and marketing, to ensure farmers have a reliable income and contribute to regional growth. The majority of farmers in the 12 sub-districts of Parigi depend on shrimp farming as their primary source of income, which can potentially alleviate poverty and protect the environment. The sustainability of this industry should be analysed considering ecological, economic, social, institutional, and technological factors, with characteristics that align with field data (Hermawan & Rahayu, 2024).

Ecological Dimension Sustainability Status

The ecological aspect is outlined through 10 characteristics including pond pollution, land appropriateness, areal carrying capacity, water purity, waste control, pond supervision, disease outbreak, restoration of mangroves, quality of production, and productivity of ponds. These characteristics depict the state of shrimp resources overseen in Parigi Moutong Regency.

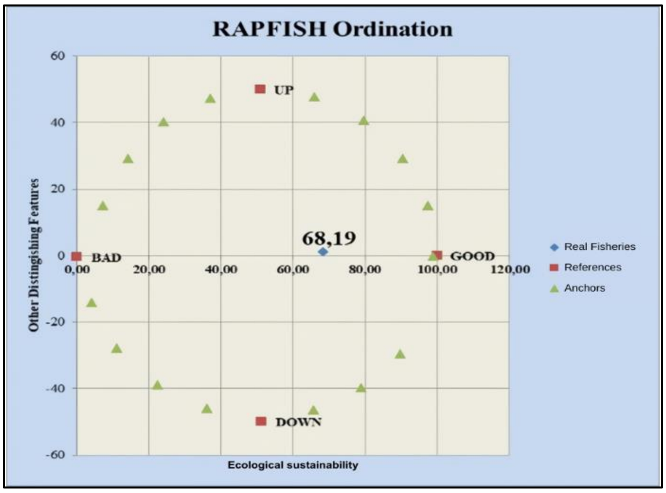

Figure 1. Position of index value and sustainability status in the ecological dimension

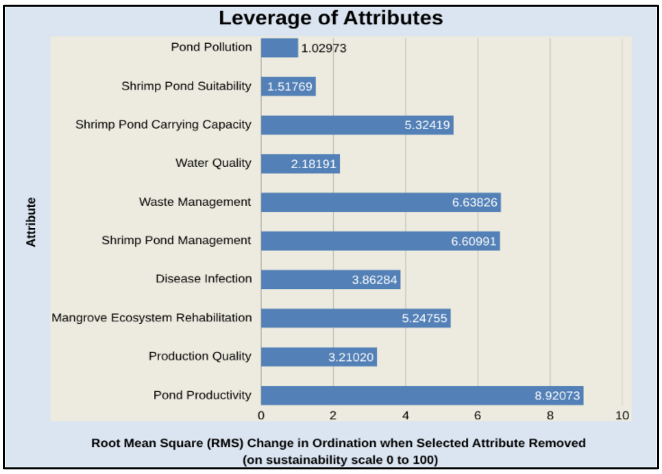

Figure 2. Sensitivity values of ecological dimension attributes expressed in roat mean square (RMS) changes on a 0 - 100 sustainability scale

The evaluation of tiger shrimp arrangement displayed a sustainability index of 68.19 for the ecological aspect. This falls within the range of 50.00 - 75.00, as illustrated in Figures 1 and 2. It appears from these findings that the control of shrimp resources by farmers in Parigi Moutong Regency has proven to be successful. The ecological perspective shows a reasonably sustainable status. The sensitivity analysis was conducted to understand how it impacts the sustainability rating of resources on the ecological front, using the leverage analysis approach. Out of the 10 attributes considered, 3 were found to be the most sensitive: pond productivity, pond management, and waste treatment. Waste management has become the primary concern affecting the long-term viability of shrimp farming in the coastal region of Parigi Moutong Regency. Modifications in these three critical factors will greatly affect the sustainability index value regarding the environmental factor. The examination of leverage suggests that water pressure, with an RMS value of 8.92, is a key factor in ensuring the ecological sustainability of shrimp resource management. This is backed by the expansion of pond areas and the consistent increase in production levels over the years as evidenced by the data from 2022 and previous years. Moreover, farmers' proficiency and knowledge in employing effective fish farming techniques (CBIB) and timing cultivation have contributed to the overall success.

Economic Dimension Sustainability Status

The economic dimension of sustainability reflects the role of factors such as economic growth, decent work, and resource efficiency in supporting sustainable development (Dosinta et al., 2024). While not always individually significant, this dimension remains a crucial contribution when integrated with social and environmental aspects in a holistic manner (Litasari, 2019).

The Economic Aspect of Sustainability Status identified 11 characteristics to evaluate the state of shrimp farm management in the research area. These include aspects such as sales processes, shrimp sales strategies, shrimp production methods, employee compensation, overall earnings, expenses, profit margin, business viability, and failure rate.

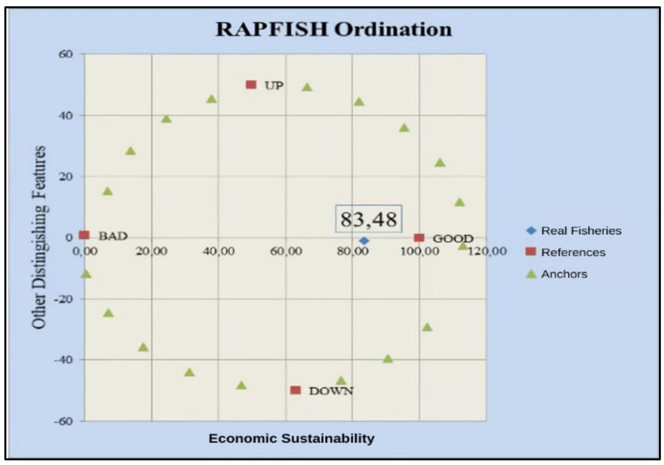

Figure 3. Index value position and sustainability status in the economic dimension

The economic aspect of the Rapfish software indicated that fishermen had a sustainability index of 83.48, which falls into the very good category (75.00 - 100.00). Leverage analysis revealed that the attribute of business income level had the highest RMS value (6.11), followed by business viability (4.48), which showed a large influence on the economic sustainability of shrimp farming management. Fluctuating income, influenced by price and productivity, reflects economic dynamics that depend on both factors. High levels of income are beneficial for tenant farmers, who have a significant impact on the economic development of the coastal region in Parigi Moutong Regency. The focus on utilizing shrimp resources aims to enhance the well-being of farmers, boost the local economy, generate employment opportunities, and increase regional earnings. Local government involvement in the provision of production facilities, skills improvement, and support for the agribusiness sector is needed to encourage the sustainability of shrimp farming and improve community welfare.

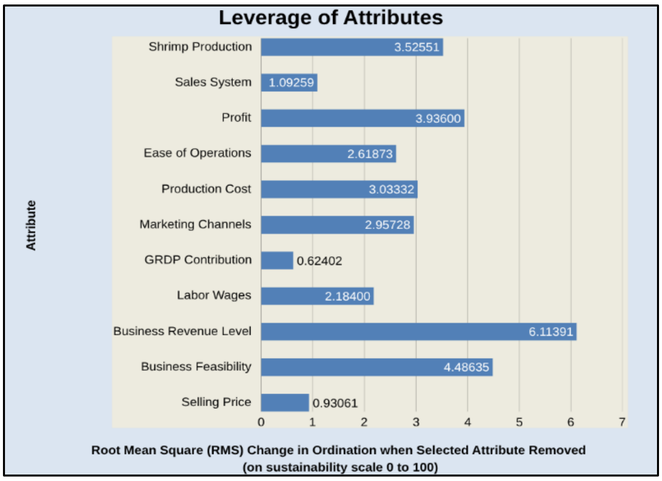

Figure 4. Sensitivity values of economic dimension attributes expressed in roat mean square (RMS) changes on a sustainability scale of 0 - 100

Social Dimension Sustainability Status

The concept of sustainability encompasses aspects of community training and social engagement (Nurliza et al., 2022), education that promotes participation (Fitrianti et al., 2025), as well as issues of labor and land conflicts between local actors and corporations (Herdiansyah & Majesty, 2024; Kurniawan et al., 2023). Economic stability is supported by agricultural contracts, certification, and labor incentives (Inanda et al., 2025), while inclusive governance strengthens access to information, social security, and poverty alleviation.

Based on the findings from the Rapfish software, the sustainability index score for the social aspect stands at 72.51. A closer look at the leverage analysis reveals that the conflict of interest factor tops the list with an RMS value of 11.10, followed by sales security and employment with RMS values of 8.35 and 5.73 respectively. This suggests that these attributes have the most significant impact on shrimp resource management sustainability from a social perspective. Aquaculture areas in Parigi Regency of Moutong Regency, cultivated by coastal communities, play a crucial role. The majority of fishermen reside in this area, with most land owned by outsiders and the workforce mainly consisting of non-locals.

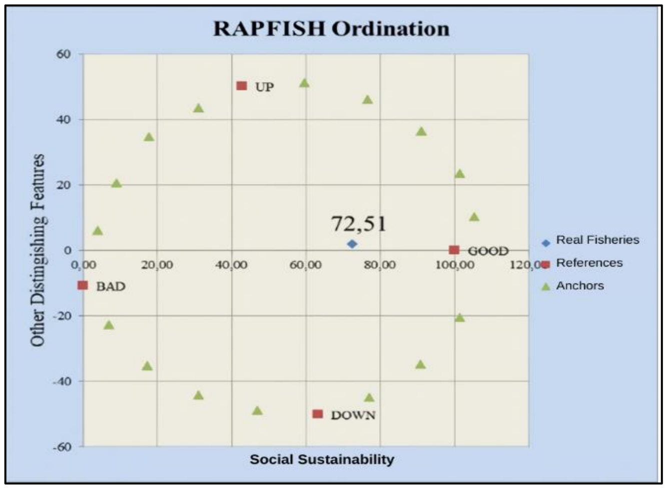

Figure 5. Index value position and sustainability status in the social dimension scoring value of each attribute in each social dimension

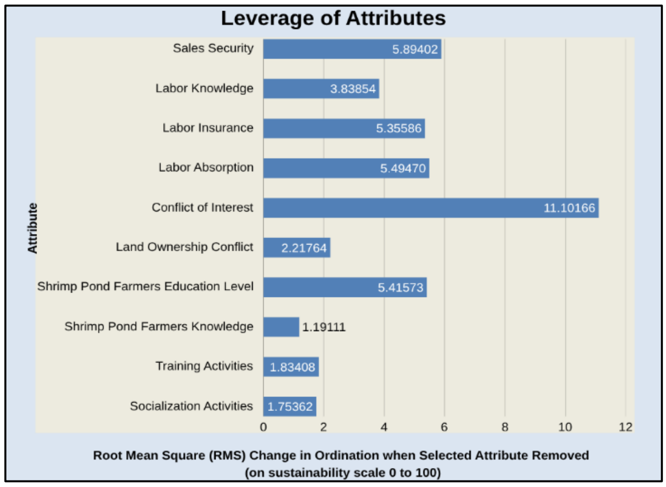

Figure 6. Sensitivity values of social dimension attributes expressed as changes in roat mean square (RMS) on a sustainability scale of 0 - 100

Institutional Dimension Sustainability Status

There are five attributes of the community institutional dimension, namely partnerships with farmer groups, government, customary institutions, fisheries cooperatives, and fisheries extension institutions.

The institutional dimension sustainability index showed a value of 76.71, which is in the excellent category (75.00-100.00). Leverage analysis showed that the banking involvement attribute had the greatest influence with an RMS value of 11.85, followed by fish farming company involvement (8.35) and law enforcement (5.73). This indicates that these factors influence the sustainability of shrimp farming, including business security and protection. The presence of banks and fish farming companies in Parigi, Moutong District is essential for the sustainability of shrimp farming. Farmers rely on financial support from banks to expand their businesses, and they also benefit from companies that purchase and process their products quickly for sale. Awareness of the importance of regulations governing prices, healthy seeds, and control of cultivated land is key to making shrimp farming safe and profitable.

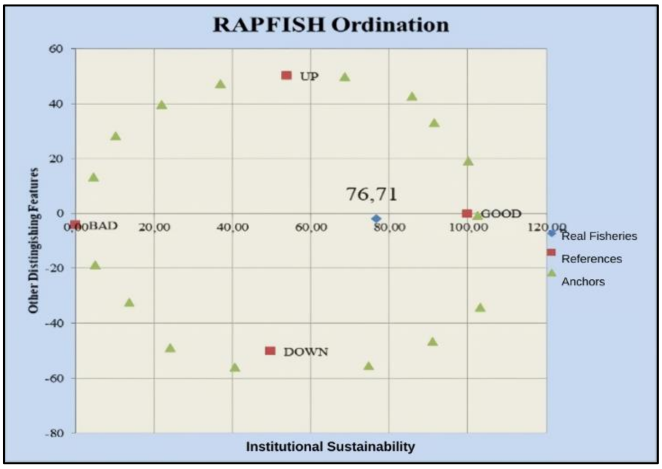

Figure 7. Position of index value and sustainability status in the institutional dimension

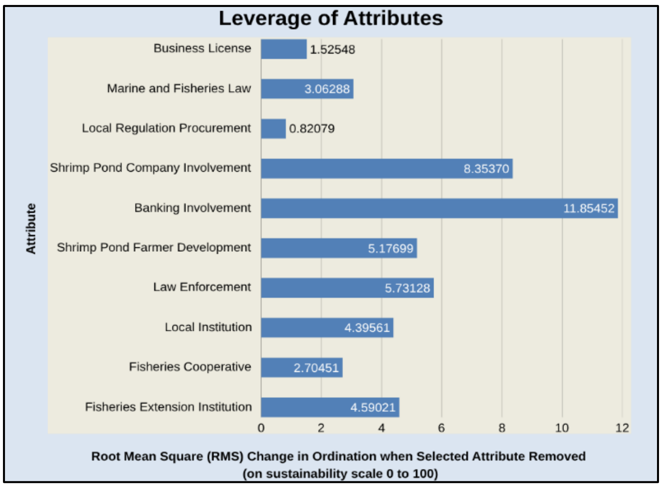

Figure 8. Institutional dimension attribute sensitivity values expressed in roat mean square (RMS) changes on a 0-100 sustainability scale

Sustainability Status of Technology Dimension

In the realm of technology, the sustainability aspect is reflected in eleven specific operational technical characteristics that outline the state of technology and available amenities. Support for businesses in the coastal area of Parigi Moutong Regency encompasses various facets such as fertilization, shrimp harvesting techniques, marketing strategies, disease detection, managing sick shrimp, implementing HACCP, administering chemical/antibiotics, sewage treatment technologies, aerator usage, feeding practices, and pond water quality control.

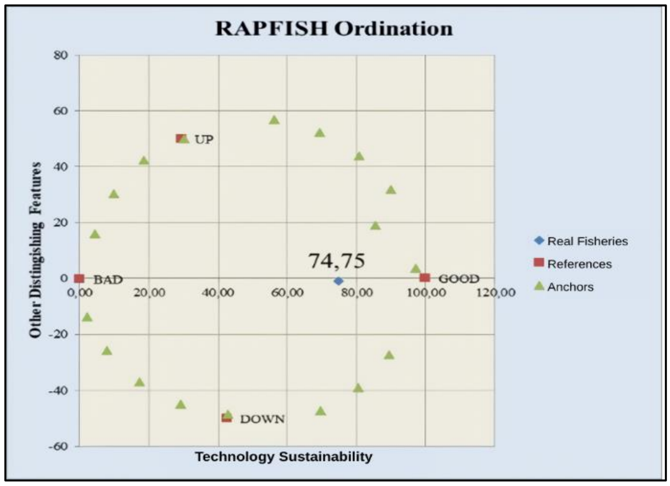

Figure 9. Position of index value and sustainability status in the technology dimension

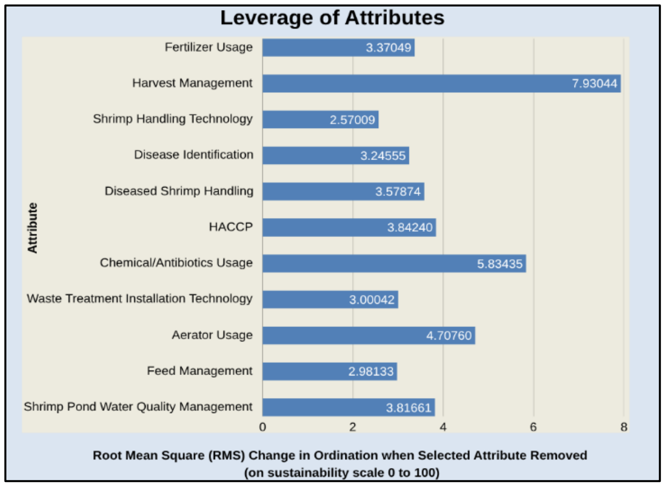

Figure 10. Technology dimension attribute sensitivity values expressed in roat mean square (RMS) changes on a 0 - 100 sustainability scale

Rapfish software reveals a sustainability index value of 74.75 for the Technology dimension, falling within the range of 50.00 - 75.00. By conducting a sensitivity analysis utilizing the leverage analysis approach on 11 characteristics within the realm of technology, it was found that the handling of crops, chemical/antibiotics usage, and aerator use are the three most sensitive attributes. Any alterations in these leverage factors can significantly impact the sustainability index value of the technology dimension.

Multidimensional Sustainability Status

The findings from examining sustainability with the Rap-VANS method indicate that the shrimp agribusiness in coastal Moutong Regency is fairly sustainable, with index values ranging from 50-100%. This evaluation takes into account five aspects of sustainability: ecological, economic, social, institutional, and technological. Certain key factors which impact sustainability could be enhanced to raise the sustainability index, particularly in areas like ecological and economic dimensions which are more at risk, although other less crucial factors should not be overlooked.

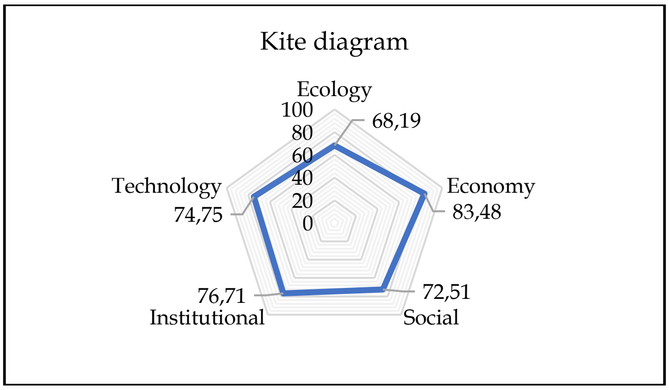

Figure 11. Kite Diagram of multidimensional sustainability of shrimp agribusiness in parigi moutong regency

In order to evaluate the sustainability and oversee the management of shrimp resources, it becomes essential to establish benchmarks within the realm of shrimp agribusiness growth in Parigi Moutong. The sustainability of agribusiness encompasses five main dimensions, with the ecological aspect being a key factor in maintaining productivity and environmental sustainability (Heryono et al., 2024; Zidni et al., 2019). In pond fish farming, water quality (Nada et al., 2025; Rusmadania et al., 2023), pond maintenance, and waste management play a crucial role in supporting a clean and productive environment (Arviani et al., 2023; Dhuha et al., 2024; Listriyana et al., 2023). Water quality pressure also occurs in estuarine areas due to waste from various sectors (Danurrachman et al., 2023), while erosion and changes in coastline demand integrated coastal environmental management (Irsadi et al., 2019). The economic dimension requires increasing farmers' income and developing supporting facilities such as cold storage, as well as the role of government in providing facilities and regulating the price of shrimp commodities. The social dimension of fisheries resource management focuses on reducing conflicts of interest related to land use and strengthening regulations to support the sustainability of these resources. Active involvement of local communities has proven effective in reducing conflicts and enhancing compliance with regulations (Afriandi et al., 2024; Yuliaty & Priyatna, 2014). Additionally, institutional aspects such as financial institutions and businesses provide support through financing and market access that enhance the capacity of farmers and fishermen in managing resources sustainably (Mujanah et al., 2024; Simanjuntak & Ruzikna, 2024). As such, the integration of social and institutional dimensions is key to achieving sustainable and inclusive fisheries management. On the technological dimension, improved mastery of technology, data availability, and infrastructure such as cold storage are essential to support the development of shrimp agribusiness. Training and mentoring efforts are also needed to improve the ability of shrimp farmers to adopt new technologies.

The system's sustainability was evaluated by examining each attribute's capacity to elucidate and enhance it through an analysis of the coefficient of determination (R 2) across all dimensions explored. Table 1 showed the Sustainability Index Values and Statistical Parameters of Rap-VANS Method for Vaname Shrimp Cultivation in Parigi Moutong. Sustainability index values are categorized based on the classification by Kavanagh & Pitcher (2004) as cited in Pitcher et al. (2013): values <50% are categorized as unsustainable, 50-70% as moderately sustainable, and >70% as sustainable. A stress value <0.25 indicates a good model fit, while a coefficient of determination (R^2) ≥95% indicates a model's very strong contribution to the data.

Table 1. Rap-VANS Analysis for Stress Values and Coefficient of Determination (R 2)

Size	Index Value	Emphasising	R 2	Number of Iterations
Ecology	68.19	0.172	0.936	2
Economic	83.48	0.146	0.958	2
Social	72.51	0.192	0.932	2
Institutional	76.71	0.159	0.952	2
Technology	74.75	0.162	0.947	2

Source: Research Results, 2024
Index values 68,19,78 - 83. 48 is categorised as fair & good
A voltage value of <0.25 means the suitability
R 2 value 95% or >95%: very good contribution

In this study, we employed the Rap-VANS method as a modification of the RAPFISH method (Rapid Appraisal for Fisheries) developed by Pitcher et al. (2001). This modification was carried out by adjusting the variables and indicators in RAPFISH to be more relevant to the context of the vannamei shrimp cultivation in Parigi Moutong Regency. Therefore, the term Rap-VANS is consistently used throughout the manuscript to indicate this specific adaptation. The use of this term aims to emphasize that, although based on the RAPFISH concept, the Rap-VANS approach accommodates unique local characteristics and conditions.

According to Alder et al. (2000) in Adiga et al. (2015), stress is seen as beneficial when it falls below 25% (S<0.25), and the average coefficient of determination (R2) usually hovers around 0.95 with a confidence interval of 95%. The data on the table indicates that the sustainability of shrimp farming is not fully supported by all dimensions, with only economic and institutional factors being prominent. The stress value and coefficient of determination demonstrate the effectiveness of these dimensions in promoting sustainability. The findings suggest that the variables used in the research effectively represent the actual data and how well they align in MDS, providing insights into the long-term viability of shrimp cultivation in the coastal region of Parigi Moutong, within Moutong Regency.

Table 1 demonstrates that the MDS index remains fairly consistent when considering the results of the Monte Carlo analysis within the 95% confidence interval. This indicates that scoring inaccuracies, fluctuations in scores, the reliability of the repeated MDS analysis procedure, and mistakes in data entry or deletion do not have an impact.

Table 2. Differences in Sustainability Index Values in Monte Carlo Analysis and Rap-VANS Analysis

Size	Rapf Fish	Monte Carlo	The difference (MC)
Ecology	68.19	60.05	8.14
Economic	83.48	81.27	2.21
Social	72.51	70.48	2.03
Institutional	76.71	70.30	6.41
Technology	74.75	66.39	8.36

Source: Research Results, 2024

The analysis of Rap-VANS indicates that all dimensions of sustainability in vannamei shrimp cultivation have index values above 50%, namely ecological (68.19%), economic (83.48%), social (72.51%), institutional (76.71%), and technological (74.75%). According to Kavanagh et al. (2004) cited in Pitcher et al. (2013), this suggests that all these dimensions fall within the categories of sufficiently to highly sustainable. The economic and institutional dimensions have the highest values, reflecting their dominant roles in supporting the sustainability of cultivation, although this does not mean that other dimensions contribute less. A stress value of <0.25 and $R^2 \geq 95\%$ confirm that the Rap-VANS model is sufficiently reliable in depicting the sustainability status of vannamei shrimp cultivation.

Table 2 displays the differences in sustainability index values between Monte Carlo and Rap-VANS analyses, with Monte Carlo yielding lower values in some dimensions. These discrepancies indicate the presence of uncertainty and model sensitivity to parameter variations considered in Monte Carlo, which are not fully captured in the more deterministic Rap-VANS approach. This underscores the importance of considering variability and risk in the management of vannamei shrimp aquaculture, particularly in the context of environmental changes and market fluctuations. Therefore, the Monte Carlo results provide a conservative perspective that complements the Rap-VANS findings and enhances confidence in the sustainability analysis conducted.

The economic dimension reveals the highest sustainability index (83.48%), reflecting the strength of the vannamei shrimp cultivation sector in Parigi Moutong, supported by stable productivity, a growing market, and government policies that support aquaculture investment. The institutional dimension is also high, reflecting the role of local institutions and relatively good regulations in supporting cultivation management. Discrepancies between Monte Carlo and Rap-VANS results arise because Monte Carlo takes into account random parameter variations, thus reflecting uncertainty and sensitivity to fluctuating real conditions. This is crucial in adaptive management decision-making. These results are consistent with a study by Basurto & Ostrom (2009) emphasizing the importance of economic and institutional roles in fisheries sustainability.

Conclusion

Parigi Moutong Regency's vaname shrimp industry is reportedly thriving and showing signs of sustainability, with sustainability index scores across five different areas: ecological (68.19), economic (83.48), social (72.51), institutional (76.71), and technological (74.75). The vaname shrimp industry in Parigi Moutong Regency has shown a relatively strong performance in terms of sustainability, with high sustainability index values in five main dimensions: ecological, economic, social, institutional, and technological. These findings indicate that the management of fisheries resources in this region tends to be positive, although there is still room for improvement. To maintain and enhance sustainability in the future, integrated efforts are required that encompass strengthening institutions, modernizing technology, increasing community participation, and providing adequate infrastructure support. With a comprehensive and sustainable management strategy, the vaname shrimp agribusiness in Parigi Moutong has the potential to become a competitive example of sustainable fisheries practices at both national and international levels.

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Conceptualization, methodology, validation, formal analysis, investigation, resources, M.A. & A.L.; data curation, writing—original draft preparation, writing—review and editing, visualization, M.N. All authors have read and agreed to the published version of the manuscript.

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The authors have no conflicts of interest to disclose.

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