International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

https://ijpsat.org/
Vol. 49 No. 1 February 2025, pp. 142-148

Analysis Of Factors Affecting The Production Of Vaname Shrimp Ponds (Litopenaeus Vannamei) Intensively In PT. Pyramide Paramount Indonesia Ponds Pandeglang District Banten Province

Ilhamdi[1], Ikrar Ritual[2], Hendra Kusuma[3], Fitrina Nazar[4]

[1]Aquaculture Technology Study Program
Politeknik Ahli Usaha Perikanan Jakarta
Indonesia
ilhamdicaneago@gmail.com

[2]Aquaculture Technology Study Program
Politeknik Kelautan dan Perikanan Sidoarjo
Indonesia

[3]Aquaculture Study Program
Universitas Bung Hatta Padang
Indonesia
hendra.kusuma@bunghatta.ac.id

[4]Aquaculture Technology Study Program
Politeknik Ahli Usaha Perikanan Jakarta
Indonesia
fitrina.rifqi@gmail.com

Abstract—Indonesia is one of the largest shrimp producers in the world. The development of shrimp farming is one of the priorities in developing aquaculture in Indonesia. Indonesia's total shrimp production in 2022 reached 1.19 million tons with a composition of 77.5% coming from aquaculture production and 22.5% coming from catch production. The purpose of this study was to analyze the factors that affect the production of vanname shrimp ponds. The research method used is quantitative method using Cobb Douglas function. The results of the F test showed that the factors of pond area, fry, feed, and stocking density together significantly affect the production of shrimp ponds with a significance value of α 0,003 <0.05. While the results of the t test obtained the factors of pond area, fry, feed, and stocking density partially have a significant effect on the amount of production of vaname shrimp ponds at PT. Pyramide Paramount Indonesia Pandeglang Regency Banten Province.

Keywords---Production factors; Ponds; Vanname Shrimp

International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

https://ijpsat.org/
Vol. 49 No. 1 February 2025, pp. 142-148

I. INTRODUCTION

Vaname shrimp or white leg shrimp was first introduced in Indonesia in 2001 and now its production reaches more than 75% of Indonesia's total shrimp production. The shrimp market is predicted to grow at 4.01 percent per annum in the period 2022-2027 which is expected to increase to USD 6.49 billion. Some of the factors influencing the growth of the shrimp market include increasing public awareness about the health benefits of shrimp, producer initiatives to increase shrimp production, and the increasing number of shrimp-based product varieties.[1]

Shrimp is one of the export commodities from the fisheries sub-sector that has high economic value. One type of shrimp that is in high demand both at home and abroad is vaname shrimp (Litopenaeus vannamei). Vanname shrimp was officially released in Indonesia in 2001 and since then the role of vanname shrimp is very real to replace the tiger shrimp agro-industry (Penaeus monodon) which is the original Indonesian shrimp that has decreased and failed production due to technical and non-technical factors.[2] Indonesia is one of the largest shrimp producers in the world.[3] The development of shrimp farming is one of the priorities in developing aquaculture in Indonesia.[4] Indonesia's total shrimp production in 2022 reached 1.19 million tons with a composition of 77.5% coming from aquaculture production and 22.5% coming from catch production.[5] Vaname shrimp or white leg shrimp was first introduced in Indonesia in 2001 and now its production reaches more than 75% of Indonesia's total shrimp production.

Based on Pangestu's research[6], vaname shrimp have several advantages compared to other shrimp species, including being more capable of living at high densities, resistant to disease attacks, can live at salinities of 5 to 30 ppt, and have a survival rate (SR) or graduation of life and high feed conversion.

Vaname shrimp is the favorite of seawater species farmers in ponds because it has various advantages including responsiveness to feed / high appetite, good immunity to pathogen attacks or more tolerant of poor environmental quality, faster growth, high survival rate, high stocking density and relatively short maintenance time which is about 90-100 days per cycle.[7]

The cultivation system applied to vaname shrimp farming is extensive, semi-intensive, intensive and super intensive cultivation systems. Intensive cultivation system is to develop a fairly modern cultivation system with a high stocking density of 100 heads/m^2.[8] Other characteristics of intensive farming are using good quality seeds taken from hatcheries, adequate nutrition, managed with modern management and technology.

The high demand for vaname shrimp can be met by increasing production through intensive cultivation. This is in accordance with the statement Saputra [9] intensive cultivation is very profitable because it uses a high stocking density, thereby increasing the production of vaname shrimp. PT Pyramide Paramount Indonesia is a private company that produces vaname shrimp for quality consumption and the company is committed to implementing good fish farming methods (CBIB). PT. Pyramide Paramount Indonesia is one of the vannamei shrimp enlargement businesses that has implemented an intensive cultivation system.

The results of research by Rizki et al. [10] production factors that affect Vannamei shrimp production are land area, feed, stocking density of fry, labor, and technology. Ramadhani et al. [11] Factors affecting Vanname shrimp production are fry, feed, waterwheels, and large ponds. Damanik [12] production factors affecting Vannamei shrimp production are pond area, number of fry, labor, feed, electricity, and medicines. Referring to previous research, the production factors that influence Vanname shrimp production are land area, stocking density of fry, feed, labor, and waterwheels.

Suseno [13] said that the area of the pond, the number of fry, crumble feed, and pellet feed are production components that affect the shrimp farming business. Andriyanto[14] stated that some factors affecting production are labor, fertilizer, feed, and stocking density. Based on the description put forward, the formulation of the problem that can be taken namely: how production factors in Kaliwungu District Kendal Regency influenced by production factors such as the area of the pond, the number of seeds, the amount of feed, and the amount of labor.

PT Pyramide Paramount Indonesia is a private company that produces vaname shrimp for quality consumption and the company is committed to implementing good fish farming methods (CBIB). With the above considerations, the author intends to

International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

https://ijpsat.org/
Vol. 49 No. 1 February 2025, pp. 142-148

know more deeply to analyze the factors that affect the production of intensive vaname shrimp ponds (Litopeaus vannamei) in the ponds of PT Pyramide Paramount Indonesia Pandeglang Regency, Banten Province.

II. RESEARCH METHOD

This research was conducted at PT Pyramide Paramount Indonesia, Pandeglang Regency, Banten Province. for three months starting from January to March 2024. This research is included in quantitative research. Quantitative research is research that uses numbers in data presentation and analysis using statistical tests. Quantitative research is research that is guided by certain hypotheses, in which one of the objectives of the research conducted is to test a previously determined hypothesis.[15]

Data collection is in the form of primary data and secondary data. The primary data that will be taken include vaname shrimp production data, financial data on vaname shrimp farms and factors that affect vaname shrimp production. While secondary data is data obtained from literature sources, books and journals or other sources that will be taken including information data related to the place of installation, facilities and infrastructure owned. Data processing techniques are through editing, coding, tabulating and analyzing.

The data analysis used is multiple linear regression analysis, with the following formula equation:

$$Y = a + \beta 1\ X1 + \beta 2\ X2 + \beta 3X3 + \beta 4X4 + e$$

Description:

Y = Vaname shrimp production per harvest period (Kg/PP)

a = constant

X1 = Pond area per production period (Ha/PP)

X2 = Number of fry per production period (tail/PP)

X3 = Amount of feed per production period (Kg/PP)

X4 = Total stocking density per production period (HKO/PP)

e = Error β1- β5 = Elasticity value

Multiple linear regression analysis in this study using Cobb-douglas production function. This multiple linear regression analysis uses the F test and t test to predict the independent variable factors (pond area, fry, feed, and stocking density) that affect the dependent variable (Vanname shrimp pond production at PT. Pyramide Paramount Indonesia Pandeglang Regency, Banten Province). The tool for data processing is SPSS version 24.

International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

https://ijpsat.org/
Vol. 49 No. 1 February 2025, pp. 142-148

III. RESULTS AND DISCUSSION

1. Total Harvest Data

Table 1. Total Vaname Shrimp Production

Pond	ABW (gr)	Size	Population (tail)	Tonnage
D1	5,24	191,00	67.680	358
D3	8,83	113,30	188.514	1.740
Total				2.098

Source: Primary Data

Based on table 1 above, the total vaname shrimp production data is 2,098 tons in one harvest cycle period.

2. Multiple Linear Regression Analysis

Table 2. Results of Multiple Linear Regression of Factors Affecting Vaname Shrimp Production in PT Pyramide Paramount Indonesia farms

No	Factors	Multiple Linear Regression Coefficient
1	Pond area (X1)	0,13
2	Fry (X2)	0,64
3	Feed (X3)	0,36
4	Stocking density (X4)	0,02
5	Constant	0,42

Source: Primary Data

Based on table 2 above, the production function model obtained in this study is:

$$Y = e^{0,42}X1^{0,13}X2^{0,64}X3^{0,36}X4^{0,22}$$

$$Y = 1,52X1^{0,13}X2^{0,64}X3^{0,36}X4^{0,22}$$

International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

https://ijpsat.org/
Vol. 49 No. 1 February 2025, pp. 142-148

3. F test

Table 3. Results of F Test of Vaname Shrimp Production in the ponds of PT. Pyramide Paramount Indonesia

Model		Sum of Squares	df	Mean Square	F_{count}	Sig.	F_{table}
1	Regression	1,209	4	,302	8,400	,003	3,48
	Residual	,360	10	,036			
	Total	1,569	14				

Source: Primary Data

Based on Table 3 above, it can be seen that the calculated F value is 8.400 while the F table value is 3.48 with a significance of 0.003. The value of F count is greater than the F table which is 8.400 > 3.48 and the significance value is smaller than α (0.05) which is 0.003 < 0.05. So it can be seen that the independent variables (pond area, fry, feed and stocking density) together affect the dependent variable (Vanname shrimp production).

4. T-test

Table 4. The results of the t test of Vaname Shrimp Production in the ponds of PT. Pyramide Paramount Indonesia

No	Factors	t count
1	Pond area	1,193
2	Fry	1,358
3	Feed	0,696
4	Stocking density	0,801

Source: Primary Data

Table 4 above shows the t test to see the effect of production factors partially on vaname shrimp production with 95% confidence (α = 0.05). The following is the explanation.

a. Pond area

Pond area variable has a calculated t value of 1.193>from t table which amounted to 0.692. With a significance of α = 0.05, the variable area of the pond affects the production of vaname shrimp. This is in line with research conducted by Damanik [12] and Darmawan et al [16] that the area of the pond affects production in vaname shrimp ponds.

b. Fry

Seed variable has a t value of 1.358> from t table which amounted to 0.692. With a significance of α = 0.05, the seed variable affects vaname shrimp production. This is in line with research conducted by Fuadah [17] and Zam et al [18], that the number of fry affects production in vaname shrimp ponds.

c. Feed

Feed variable has a calculated t value of 0.696>from t table which amounted to 0.692. With a significance of α = 0.05, the feed variable affects the production of vaname shrimp. This is in line with research conducted by Hasna et al [19] and Ramadhani et al [11], that feed affects production in vaname shrimp ponds.

d. Stocking density

Variable stocking density has a calculated t value of 0.801>from t table which amounted to 0.692. With a significance of α = 0.05, the variable stocking density affects the production of vaname shrimp. This is in line with research conducted by Utami et al [20], that stocking density affects production in vaname shrimp ponds.

IV. CONCLUSIONS

1. Based on the results of linear regression F test where the value of F count greater than the value of F table is 8.400 > 3.48 with α 0.003 where it can be concluded that the factors of pond area, fry, feed and stocking density together affect the production of vanname shrimp.
2. Based on the results of the t test where on all independent variables the value of t count is greater than the value of t table so it can be concluded that all factors, namely pond area, fry, feed and stocking density partially significant effect on vaname shrimp production.

V. ACKNOWLEDGMENTS

Thanks to PT Pyramide Paramount Indonesia Pandeglang Regency Banten Province for allowing and facilitating facilities and infrastructure in this research.

REFERENCES

[1] Tech Navio. (2023). Shrimp Market by Product, Distribution Channel, and Geography - Forecast and Analysis 2023-2027. Canada

[2] Nababan, E., Putra I. dan Rusliadi, (2015). Pemeliharaan udang vaname (Litopenaeus vannamei) dengan persentase pemberian pakan yang berbeda. Jurnal Ilmiah Perikanan dan Kelautan, 3(2).

[3] FAO. (2023). GLOBEFISH Highlights – International markets for fisheries and aquaculture products – Second issue 2023, with January–December 2022 Statistics. GLOBEFISH Highlights, No. 2–2023. Rome

[4] Keputusan Menteri Kelautan dan Perikanan Nomor : KEP.28/MEN/2004 tentang Pedoman Umum Budidaya Udang di Tambak.

[5] Satu Data KKP. (2023). Kementerian Kelautan dan Perikanan

[6] Pangestu, R. W. (2022). Pemberian Pakan Udang Vaname (Litopenaeus Vannamei) Metode Blind Feeding Doc. Hal; 1-35. (Doctoral dissertation, Politeknik Negeri Lampung).

[7] Purnamasari, I., Purnama, D., dan Utami, M.A.F., (2017). Pertumbuhan Udang Vannamei (Litopenaeus Vannamei) di Tambak Intensif. Jurnal Enggano. 2(1), Hal; 58-67

[8] Badan Sertifikasi Nasional (BSN), (2014). SNI 7981:2014 Konstruksi Tambak HDPE (High Density Poly Ethelyne). Jakarta

[9] Saputra. (2014). Teknik Budidaya Udang Vaname Secara Intensif, Badan Pengembangan SDM Kelautan dan Perikanan. Jawa Timur.

[10] Rizki et al

[11] Ramadhani, I et al. (2018). Analisis Faktor-Faktor Yang Mempengaruhi Produksi Pada Budidaya Tambak Intensif Udang Vannamei Di Kecamatan Punduh Pedada Kabupaten Pesawaran Lampung. Jurnal Agribisnis, 12 (1). Hal; 61-74.

[12] Damanik, A.A. (2019). Analisis Faktor-Faktor Yang Mempengaruhi Produksi Udang Vannamei (Litopenaeus Vannamei) Pola Intensif (Studi Kasus : Kecamatan Teluk Mengkudu Kabupaten Serdang Bedagai). Skripsi. Fakultas Pertanian Universitas Muhammadiyah Sumatera Utara.

[13] Suseno, D.A.N et al. (2021). Analisis Faktor Produksi Budidaya Udang Vaname (Litopenaeus vaname) Di Tambak HDPE (High Density Polyethilene) Pulokerto Pasuruan. Jurnal Chanos chanos. Politeknik Kelautan dan Perikanan Sidoarjo. 19(1), Hal: 99-104.

[14] Andriyanto, F., Efani, A dan Riniwati, H. (2013). Analisis Faktor-Faktor Produksi Usaha Pembesaran Udang Vaname (Litopenaeus vannamei) Di Kecamatan Paciran Kabupaten Lamongan Jawa Timur; Pendekatan Fungsi CobbDouglass. Jurnal ECSOFiM. Vol. 1, No. 1; Hal: 82-96.

[15] Saebani, B.A. (2008). Metodologi Penelitian. Bandung: Pustaka Setia

[16] Darmawan, A. I. (2024). Faktor Yang Mempengaruhi Produksi Pembesaran Udang Vaname *(Litopenaeus vannamei)* Di Kecamatan Kaliwungu Kabupaten Kendal. MEDIAGRO. 20 (1). Hal; 52-61

[17] Fuadah, L. (2019). Analisis Produksi Dan Pendapatan Usaha Budidaya Udang Vaname *(Litopenaeus Vanamei)* di Kecamatan Pasir Sakti Kabupaten Lampung Timur. Skripsi. Fakultas Pertanian Universitas Lampung Bandar Lampung.

[18] Zam, W et al. (2024). Faktor-Faktor yang Mempengaruhi Produktivitas Usaha Budidaya Udang Vaname *(Litopenaeus vannamei)* Di Kabupaten Pangkep. Jurnal Galung Tropika. 13 (3). Hal; 303-310. DOI: https://doi.org/10.31850/jgt.v13i3.1085

[19] Hasna et a. (2022). Pengaruh Jumlah Pakan Terhadap Laju Pertumbuhan Udang Vaname *(Litopenaeus Vannamei)* di PT. Gosyen Global Aquaculture Bulukumba Sulawesi Selatan. Journal of Applied Agribussiness and Agrotechnology. 01(02). Hal; 1-12

[20] Utami, R et al. (2013). Analisis Faktor-faktor yang Mempengaruhi Produksi Tambak Udang Sistem Alam dan Sistem Intensif (Studi Kasus: Kecamatan Secanggang, Kabupaten Langkat). Skripsi Fakultas Pertanian Universitas Sumatera Utara. https://repositori.usu.ac.id.handle/123456789/53651