

# The Effect of Vannamei Shrimp Cultivation Sustainability on Labor Absorption And Welfare of Farmers in Fisheries on The Island of Bangka Belitung

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**Abstract.** Vannamei shrimp cultivation in Indonesia has grown fast in fishery production centers around the country. Currently, vannamei shrimp farming production ranges from 10 to 50 tons per hectare per cycle, depending on the cultivation model created in response to technology developments from semi-intensive to super-intensive systems. The labor absorption in this province's vannamei shrimp farming industry is based on the shrimp farming firm's ability to employ local citizens, and increasing the welfare of fish farmers is a priority to get out of the terrible position caused by the pandemic.

**Keywords:** Sustainability, Vannamei Shrimp, Cultivation, Labor Absorption, Farmers Welfare

## 1. Introduction

The entire indicated land area in Indonesia is 17.2 million hectares, and its enormous aquaculture resource potential is estimated to be worth USD 250 billion annually. A fraction of its potential, specifically for the growth of water cultivation payau, might reach 2.8 million hectares. However, it is projected to be used for about 21.64% of its total area, or 605,000 hectares, with just 242,000 hectares of that area being used productively for shrimp farming[1]

Vannamei shrimp farming is the aquaculture industry's mainstay and a primary goal for Indonesian development in order to boost the country's economy. Between 2012 and 2018, the value of shrimp exports contributed 36.27% to the value of Indonesian fishery exports. [2]

In the next five years, the government wants to double the country's current shrimp production. (2019-2024). This objective requires support from many different sources, one of which is the employment of digital technology. The Fourth Industrial Revolution, also referred to as Industry 4.0, and the usage of digital technology are closely intertwined. The creation of Millennial Shrimp Farming (MSF), or the millennial generation of shrimp beetles, is one of the CCP's efforts that helped shape Industry 4.0. The government launched the program in an effort to engage millennials in developing shrimp farming. In terms of how easy it would be to nurture this paradigm in the present, it is thought to be appropriate for the millennial generation[4]

The Bangka Belitung Islands are also expanding vannamei shrimp farming. A group of islands in the province of Babel, it has a land area of 16,424.15 km<sup>2</sup> and an ocean area of 81,725.15 km<sup>2</sup>. As the belt that surrounds the coastal area has great potential for the development of vannamei shrimp culture, the coastline is 2,375.95 km long. The Province of Babel contains 35 Coastal Districts, and the waters there are in good enough condition for the development of

Vannamei shrimp. This is because there is no industrial pollution in the area. The possibility exists to expand vanaamei shrimp farming in Belitung Regency, Bangka Belitung Islands Province [5]

Based on the amount of non-living vannamei shrimp-related products sold in Babel in 2018. Vannamei shrimp aquaculture has increased significantly in the Babel. Many entrepreneurs who formerly worked in tin smelting or other sectors are now considering beginning a vannamei shrimp farming operation.[6]

The acceptability of workers to do duties as they should, or the existence of a circumstance that specifies the availability of workers or occupations that job seekers can fill, are what the work force sees as the absorption of labor force [7]. The ability of the plant to hire local citizens as labor force is referred to as the plant's ability to absorb labor force in this province. The size of the land, the number of harvests per year, and the income are the three factors that might have an impact on the business of straw straw in relation to the absorption of labor. The first factor from stake stake Vannamei that might affect the stake of stake against the absorption of labor force is [8]

The second indicator is the amount of cranberries gathered in a year, which can be harvested up to three times in one year (75%) and is governed by the amount of time required to harvest the crop and the availability of water. Every step up to harvest shrimp requires the labor of others, therefore as more shrimp are harvested, more workers from the shrimp industry are frequently absorbed. The third indicator is income. The owner of the most straw has an income in one harvest of between Rp.11,000,000 and Rp.20,000,000, which is enough to support 8 people (50%) each time the harvest is done [9]

In addition, the continuity of the crop cultivation efforts of udang vanamei is expected to increase the income and well-being of farmers. The government of the region encouraged the development of public power plants for the improvement of the economy of the community. program of freshwater fishing plants among them plants can be the source and the economic foundation of the society that is being hit by a new coronavirus pandemic. Buddhist groups can be empowered to develop caterpillars in the area, in addition, they can also double third parties as funders involving society [10]

Improving the well-being of pearl farmers is a priority to get out of a difficult situation as a result of a new coronavirus pandemic. Enrichment of communities is crucial, not only in the fisheries sector but also in other sectors that are capable of increasing incomes and improving the well-being of the communities. The parameter to measure how great the welfare of farmers in a region is by using the Exchange Value of Farmers. [11] The Central Statistics Agency recorded the farmers' exchange rate (NTP) in Bangka Belitung Province in July 2022 as 111.22, or 8.04 percent lower than the previous month's NTP. The dip was caused by a 7.83 percent drop in the price index received by farmers (It), while the price index paid by farmers (Ib) grew by 0.24 percent. NTP subsector (NTP-P) 110,74, catch fisheries group (NTN) 111,44, and power fishing group (NPTi) 90,81 [12]

Thus the vannamei shrimp farming business must be able to have a positive impact on the business actors and the vannamei shrimp farming farmers by paying attention to and prioritizing the factors that affect the sustainability of the vannamei shrimp farming business such as the increasing domestic price of shrimp, the level of public fish consumption. high and conducive investment climate for the vannamei shrimp farming sector in the Bangka Belitung Islands province.

## **2. Literature Review**

## 2.1 Vannamei Shrimp Cultivation

It is possible to grow vannamei shrimp (*Litopenaeus vannamei*) in ponds due to its unique abilities to survive in a variety of salinity ranges, adapt to low temperatures, have a high survival rate, and have good disease resistance [13]

The corrugated body of the white vaname shrimp is uncommon, as is its propensity of changing its exoskeleton (moulting). Body parts provide a variety of functions, including eating, moving, burrowing, maintaining gills, and supporting sensory organs like as antennae. The vaname shrimp has white legs and a yellowish-white chitin skin that is thin and rigid. The vaname shrimp is smaller in size than the tiger shrimp or jrebug shrimp. The antennae, mandible (lower jaw bone), and two pairs of maxillae (upper jaw bone) comprise the vannamei shrimp's head. Furthermore, vannamei shrimp heads feature five pairs of locomotor legs (peripods) and three pairs of feeding maxillipeds [15]

## 2.2 Labor Absorption

Absorption of labor refers to the acceptance of labor to perform duties (jobs), alternatively it refers to the existence of vacant positions that job seekers can fill. The absorption of labor, in general, demonstrates how much labor a business absorbs to generate a good. Each industry has a different capacity to absorb employees [16].

The rise in consumer demand for the goods and services the firm generates determines the increase in labor demand for the business. A derived demand for labor is one such demand [17]

## 2.3 Welfare of Farmers

Farmers' welfare is explained through numerous characteristics of household welfare that are dependent on farmers' income level. Farmers' income that is insufficient to cover household expenses will affect the household's level of living. [18]

Farmers' exchange rates are computed as a percentage difference between the price index they get and the price index they pay. Farmers' price index is a price index that tracks the evolution of farmer output producer prices. Farmers' price index is a pricing index that depicts the progression of prices for farmer family necessities, which includes both household consumption and agricultural producing operations [19]

## 3. Methods of investigation

The data in this study was analyzed using inferential statistics and panel data regression analysis. According to the level of explanation, the research method used in this study is associative research. Associative study seeks to identify the association between two or more variables. Depending on the type of data and quantitative data analysis [20]. Data processing in this study used E-views 10. The model form of regression equations from the above panel data is as follows:

$$Y = \alpha + \beta X_t + \epsilon_t$$

Y = Labor Absorption and Welfare of farmers

X = Vannamei Shrimp Cultivation

$\alpha$  = Constant

$\epsilon_t$  = Term error

$\beta$  = Variable Regression Coefficient

## 4. Results and Discussion

### 4.1 The Impact of Sustainability of Vannamei Shrimp Cultivation on Labor Absorption in The Babel Island

**Table 1. Regression Results Model 1**

Dependent Variable: **LABOR?**  
 Method: Pooled Least Squares  
 Date: 04/25/23 Time: 14:19  
 Sample: 2019 2022  
 Included observations: 8  
 Cross-sections included: 5  
 Total pool (balanced) observations: 40

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1885.710	15.22992	123.8161	0.0000
<b>Ln_VANNAMEI?</b>	<b>21.59642</b>	<b>2.495463</b>	<b>8.654275</b>	<b>0.0000</b>
Fixed Effects (Cross)				
_BANGKA--C	16.80744			
_BANGKABRT--C	6.178005			
_BANGKATGH--C	5.917977			
_BANGKASLTN--C	5.521930			
_PANGKALPINANG--C	-0.810471			
<b>Effects Specification</b>				
<b>Cross-section fixed (dummy variables)</b>				
<b>R-squared</b>	<b>0.867777</b>	Mean dependent var	2017.500	
Adjusted R-squared	0.851862	Durbin-Watson stat	1.834508	
Prob(F-statistic)	0.000000			

Source: processed by Eviews 8

With a determination coefficient of 86.77%, Table 1 demonstrates that the cultivation of vanamei had a considerable and favorable impact on the absorption of labor in the province of Babylon.

### 4.2 The Impact of Vannamei Shrimp Cultivation Sustainability on Farmer Welfare In The Babel Island

**Table 2. Regression Results Model 2**

Dependent Variable: **WELFARE?**  
 Method: Pooled Least Squares  
 Date: 04/25/23 Time: 14:30  
 Sample: 2019 2022  
 Included observations: 8  
 Cross-sections included: 5  
 Total pool (balanced) observations: 40

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.396582	0.219686	33.66896	0.0000
<b>Ln_VANNAMEI?</b>	0.719274	0.036264	19.83430	<b>0.0000</b>
<b>Fixed Effects (Cross)</b>				
_BANGKA--C	0.257757			
_BANGKABRT--C	0.220653			
_BANGKATGH--C	-0.124299			
_BANGKASLTN--C	-0.116367			
_PANGKALPINANG--C	-0.237743			
<b>Effects Specification</b>				
<b>Cross-section fixed (dummy variables)</b>				
<b>R-squared</b>	<b>0.891970</b>	Mean dependent var		11.75210
Adjusted R-squared	0.890789	Durbin-Watson stat		1.956072
Prob(F-statistic)	0.000000			

Source: processed by Eviews 8

With a determination coefficient of 89.19%, Table 2 reveals that vanamei cultivation has a considerable and favorable impact on the well-being of fisher farmers in the province of Babel.

## 5. Conclusion

Studies demonstrated that Vannamei Shrimp production had a considerable and favorable impact on labor absorption in the Babel Islands. Vannamei production has a major and favorable impact on farmers' livelihoods in the Babel Islands.

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