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ANALYSIS OF DETERMINANT FACTORS AFFECTING WOMEN'S INCOME IN THE SEAWEED INDUSTRY IN PANTAI AMAL, TARAKAN CITY

Kartini[1*]; Dedy Rahmatullah[2]; Rahmi Nur Islami[3]

[1]Department of Economy Development, Faculty of Economic, Universitas Borneo Tarakan
[2]Department of Economy Development, Faculty of Economic, Universitas Mulawarman
[3]Department of Management, Faculty of Economic, Universitas Borneo Tarakan

***Corespondent Author: kartini96@borneo.ac.id**

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ABSTRACT

Purpose: *This study aims to examine the socioeconomic factors that influence women's income in the seaweed industry in Pantai Amal, Tarakan City.* ***Methodology:*** *A quantitative approach was used by distributing surveys to 68 female seaweed workers. The data were analyzed using multiple regression analysis to determine the effect of several independent variables on income.* ***Results:*** *The analysis found that family dependents, working hours, and length of employment significantly affect women's income. In contrast, age did not show a statistically significant effect.* ***Findings:*** *These findings indicate that women's income in the coastal seaweed industry is strongly influenced by the intensity of labor and family responsibilities, rather than by demographic factors such as age.* ***Novelty:*** *The novelty of this study lies in its focus on women in the seaweed sector—a local industry that has received limited academic attention, especially in the context of gendered income analysis.* ***Originality:*** *This research offers original insights into the economic role of women in coastal communities, particularly within a specific geographic setting in Tarakan City.* ***Conclusion:*** *Empowering women through employment in coastal industries is key to improving household income and regional economic resilience.* ***Type of Paper:*** *Case Study Research Paper.*

INTRODUCTION

Income is one of the key indicators in measuring the well-being of individuals and families. Various factors can influence a person's income level, including education, work experience, access to capital, skills, and market conditions. For women, social and cultural factors also play a significant role in determining their income level. In many economic sectors, women often face challenges such as limited access to resources, wage gaps, and the dual role of managing both domestic and economic responsibilities. This situation leads to lower income levels for female workers, especially in the informal sector.

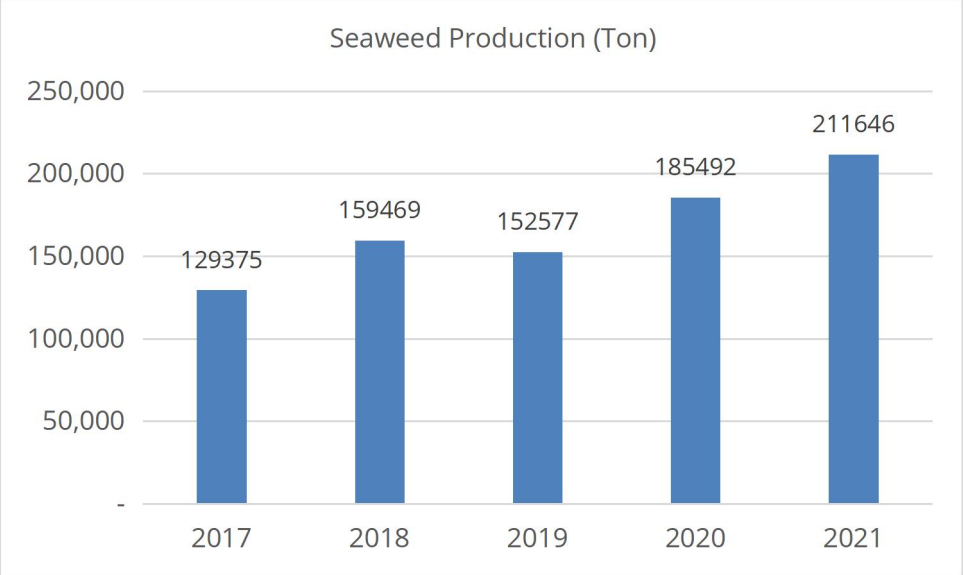
In the context of coastal economies, resource-based industries such as fisheries and marine agriculture provide opportunities for women to participate in economic activities. One of the

growing industries in coastal areas is the seaweed industry, which involves a significant number of female workers in cultivation, processing, and marketing. Women's involvement in this industry not only increases household income but also strengthens their position in decision-making and enhances access to education and healthcare services.

Seaweed is one of the potential export commodities for further development. Currently, Indonesia remains one of the key exporting countries in Asia, as seaweed grows and spreads across almost all Indonesian waters. Seaweed has become a leading commodity and plays a significant role in absorbing labor. The future development of the seaweed processing industry is a highly strategic effort with promising prospects for fostering economic growth (pro-growth), increasing employment opportunities (pro-employment), and reducing poverty in the country (pro-poor). Tarakan City was formerly a regional government center and was officially established on December 15, 1997. The city's total area is approximately 657.33 km², consisting of around 250.80 km² of land and 406.33 km² of water. This means that about 61.8% of Tarakan's area is covered by seawater.

Given this geographical condition, Tarakan City has significant potential to enhance its capacity in the fisheries sector as a key source of income for its residents. Seaweed is one of the leading fishery products, alongside fish, shrimp, and crabs, that has great potential for development. Pantai Amal Subdistrict is one of the main seaweed production centers in Tarakan City. According to BPS (Statistics Indonesia) data from the past five years, seaweed production in Tarakan City is as follows:

Figure 1. Seaweed Production Data in Tarakan City (2017-2021)



Based on Figure 1, it can be concluded that seaweed production in Tarakan City has experienced fluctuations. In 2021, production increased, reaching 211,646, whereas from 2020 to 2017, it showed a decline. These fluctuations in seaweed production were caused by the spread of the COVID-19 virus, unstable weather and climate conditions, pest attacks, and suboptimal seaweed management.

This research focuses on Amal Beach, Tarakan City because Pantai Amal in Tarakan City was chosen as the research site due to its unique characteristics, making it an ideal case study for examining women workers in the seaweed industry. **First**, Pantai Amal is one of the main seaweed-producing areas in North Kalimantan, with many women involved in farming, processing, and marketing activities. **Second**, the area is still dominated by informal labor systems, where female

workers often have limited access to social protection and labor regulations. This provides an opportunity to explore employment conditions in greater depth.

Third, Pantai Amal has distinctive socio-economic dynamics, where women play a crucial role in household economies but still face various challenges, such as low wages, dependence on third parties for market distribution, and limited access to skill training and business capital. By studying this area, the research can provide more specific and relevant insights into the conditions of female workers in the seaweed industry and offer policy recommendations that can be directly applied to regions with similar characteristics. By addressing these research gaps and selecting Pantai Amal as the study location, this research can make a significant contribution to understanding the challenges faced by women workers in the seaweed industry and proposing more effective solutions to improve their well-being. Increasing welfare can be done through increasing income.

Income is the total revenue, whether in the form of money or goods, received from others or generated from an industry, assessed based on the monetary value of assets at that time. Income serves as an individual's financial resource to meet daily needs and is crucial for survival and livelihood. Explains that income is one of the indicators for achieving or improving community welfare **Error! Bookmark not defined.** . The three main sources of household income are the husband, the wife, and other sources.

The low household income often necessitates women taking on a role in fulfilling financial needs. Income can be used as a tool to measure the economic condition of an individual or household. According to **Error! Bookmark not defined.**, a common economic issue within families is the inability to meet their needs, which are fundamentally supported by income. Generally, women's involvement as housewives in the public sphere as income earners is driven by economic demands or the desire to support household finances.

A woman's primary role as a wife or mother requires her to provide care and energy to her family. However, when a household faces income short ages, women often take on work to help increase the family's earnings. The main driving factor for most women to work is economic necessity helping support the family's finances when the husband's income is insufficient. When women work, it contributes additional income to the family. This additional income serves as a financial contribution from women that can be used to meet household needs, ultimately improving family welfare. Furthermore, working provides added value to their lives, both within the family and in society, as women play a significant role in supporting the household economy.

Women's participation in seaweed farming in Sri Lanka has improved household welfare **Error! Bookmark not defined.**. The findings of this study are consistent with cases in Tanzania and Zanzibar, where women play a key role in seaweed farming **Error! Bookmark not defined.** and **Error! Bookmark not defined.**. A global study on the socio-economic impact of seaweed farming shows that this industry contributes to poverty reduction in many coastal communities **Error! Bookmark not defined.**; **Error! Bookmark not defined.**.

As a person ages, their income level is affected, as skills in a particular field generally improve along with physical strength, leading to increased earnings. However, once a person reaches an older age, their productivity tends to decline, reducing their earning potential. This indicates that age plays a crucial role in informal sector jobs that rely heavily on physical abilities, making age a significant variable in determining productivity **Error! Bookmark not defined.** . An increase in the number of children and dependents raises the financial burden on a family. This is supported by **Error! Bookmark not defined.**, who state that a high number of dependents in a household, without a corresponding economic improvement, often forces other family members besides the head of the household to seek employment. The greater the number of dependents, the more financial contributions are needed to support the family's income. Increasing working hours leads to higher income, as extended work hours allow for greater earnings. The more hours a person works, the better they can meet household needs. Additionally, work experience over time can improve income,

as longer job tenure enhances skills and knowledge, making workers more efficient and, in turn, increasing their earnings.

Although various studies have discussed the role of women in the seaweed farming industry, several research gaps still need to be explored further. One of the main gaps is the lack of studies that specifically analyze the factors influencing income disparities between female and male workers in this sector. Many studies focus more on women's contributions to the production chain without exploring how socio-economic aspects, labor policies, and access to resources affect their income. Additionally, insufficient research on the impact of labor policies on the well-being of women in the seaweed industry is a significant gap. Most female workers in this sector operate under informal conditions without adequate legal protection, yet few studies evaluate the effectiveness of labor protection policies and how they can be improved to enhance their welfare.

Another gap is the limited research on alternative employment models that could help improve the well-being of female workers in seaweed farming. Most studies still focus on farming techniques and supply chains without exploring innovative solutions such as cooperatives, community-based work, or solidarity-based economic models that could strengthen women's bargaining power in this industry. Moreover, existing research has not sufficiently addressed how cultural and social norms influence women's economic opportunities in seaweed farming. In many coastal communities, women face restrictions in accessing capital, decision-making, and land ownership, which directly impact their income levels. However, there are still very few studies that discuss how these social barriers can be overcome through policy interventions or economic empowerment strategies. This study, titled "Determinant Factors Influencing Women's Income in the Seaweed Industry: A Case Study in Pantai Amal, Tarakan City" aims to identify the most dominant factors influencing the income of female seaweed workers.

METHOD

In this study, purposive sampling is used as the sampling method, requiring special considerations to ensure that the selected sample is appropriate for the research. The specific consideration in this case is female workers in the seaweed sector. In this study, the sample will be determined using the Lemeshow formula as follows:

$$n = \frac{Za^2.\ P.Q}{L^2}$$

Explanation:

n = Minimum required sample size
Za = Confidence level (95% = 1.96 and 90% = 1.645)
P = Outcome prevalence; since data is not yet available, 50% is used
Q = 1-P
L = Degree of bias deviation 10% (0.10)

Thus, based on the application of the formula above, the required sample size is determined as follows:

$$n = \frac{Za^2.\ P.Q}{L^2}$$

$$= \frac{1{,}645^2\ .\ (0{,}5).\ (1-0{,}5)}{(0{,}1)^2}$$

$$= \frac{0{,}6765}{0{,}01}$$

$$= 67{,}65\ dibulatkan\ 68$$

Based on the calculation results above, it is determined that the sample size for this study is 68 samples

Research Data Analysis

In this study, the collected data will be analyzed using a quantitative approach to obtain objective and measurable results. The data analysis process begins with the examination and processing of data to ensure that the data used in the study meets the necessary requirements for further analysis. The initial stage of data analysis includes checking the completeness and consistency of the data obtained from respondents. Incomplete or inconsistent data will be eliminated or corrected if possible. Next, the collected data will be entered and processed using statistical software to facilitate further analysis.

Once the data processing is complete, the next step is to conduct statistical analysis to examine the relationships between the studied variables. Before proceeding with hypothesis testing, an evaluation of the research instrument's quality is carried out through validity and reliability tests. Additionally, to ensure that the regression model used meets statistical requirements, a classical assumption test is performed. This data analysis aims to obtain valid and reliable results so that the conclusions drawn in this study can be scientifically justified. The stages of data analysis are as follows:

1. Validity Test

Valid data refers to data that is "consistent" between the actual conditions observed in the research object and the data reported by the researcher. The validity test is used to determine whether the items in a questionnaire used to define a variable are appropriate for use. These questionnaire items typically support a specific set of variables. Each question must undergo a validity test.

The degree of freedom (df) is calculated as df = n - 2, with a significance level of 5%. The result of the table correlation coefficient (r-table) is then compared with the calculated correlation coefficient (r-calculated). If r-table is greater than r-calculated, the questionnaire item is considered valid **Error! Bookmark not defined.**.

The validity test is conducted using the Product Moment correlation technique, applying the following formula:

$$r = \frac{n\sum xy - (\sum x)(\sum y)}{\sqrt{[n\ \sum x^2 - (x)^2][n\ \sum y^2 - (\sum y)^2]}}$$

Explanation:

r = Correlation coefficient
Σx = Sum of item scores
Σy = Sum of total scores
n = Number of samples
Σxy = Sum of the product of item scores and total scores
Σx^2 = Sum of squared item scores (X)
Σy^2 = Sum of squared total scores (Y)

Based on the results, the data is considered invalid if the calculated correlation coefficient (r-calculated) is less than the table correlation coefficient (r-table), i.e., r-calculated < r-table. Conversely, the data is considered valid if the calculated correlation coefficient (r-calculated) is greater than or equal to the table correlation coefficient (r-table), i.e., r-calculated ≥ r-table.

2. Reliability Test

Reliability is a measure of the stability and consistency of respondents in answering questions related to the constructs of a variable, which are structured in the form of a questionnaire. The reliability test can be conducted collectively for all question items.

If the Cronbach's Alpha value is greater than 0.60, the questionnaire is considered reliable. The formula used for the reliability test is as follows:

$$r = \left[\frac{k}{(k-1)}\right]\left[1 - \frac{\sum \sigma_t^2}{\sigma_t^2}\right]$$

The criterion used to determine the level of reliability is the Cronbach's Alpha value. In this research instrument test, the questionnaire is considered reliable if the Cronbach's Alpha value is greater than 0.60.

3. Classical Assumption Test

a. Normality Test

One of the requirements for conducting a parametric test is that the data must have a normal distribution. Therefore, the normality test is essential. This test is conducted to determine whether the residual values are normally distributed. A good regression model requires residuals to be normally distributed. To assess this, the distribution of data in the Regression Standardized Normal P-P Plot is examined:

a. If the data points are scattered around and follow the diagonal line, the residuals are normally distributed, and the regression model is valid for predicting independent variables.
b. If the data points deviate significantly from the diagonal line, the residuals are not normally distributed, indicating that the model may not be appropriate.

b. Multicollinearity Test

Multicollinearity occurs when there is a perfect or near-perfect linear relationship among some or all independent variables in a regression model. In such cases, the regression model is considered to have multicollinearity if there is a strong linear correlation between independent variables. The Variance Inflation Factor (VIF) and Tolerance values can be used to identify the presence of multicollinearity. If VIF < 10 and Tolerance > 0.1, then no multicollinearity is present **Error! Bookmark not defined.**.

c. Heteroscedasticity Test

If the variance of residuals is not constant across all observations in a regression model, it is called heteroscedasticity. The Glejser Test is used to detect heteroscedasticity. In this test, independent variables are regressed against the absolute residual values. The absolute residuals refer to the predicted Y variable residuals, where all values are converted into positive numbers. No heteroscedasticity is present if the significance value between the independent variables and the absolute residuals is greater than 0.05.

Multiple Linear Regression Analysis

Multiple linear regression is chosen in this study because it can analyze the influence of several factors on women's income in the seaweed industry both partially and simultaneously. In the context of this research, various factors such as age, number of family dependents, work experience, and number of working hours are assumed to contribute to variations in the income received by women in this sector. This method allows researchers to measure the extent to which each independent variable affects income and to identify the factors with the most significant impact. Moreover, multiple linear regression can control for confounding variables that may influence the relationships between variables, ensuring more accurate and reliable results.

Compared to alternative statistical methods such as simple linear regression or logistic regression, multiple linear regression is more appropriate because the relationship between income and the economic factors studied is quantitative and tends to be linear. Additionally, this model is easier to interpret compared to more complex methods, such as non-linear models or other multivariate analyses. Given the appropriate assumptions, such as linearity and the absence of strong multicollinearity, multiple linear regression provides clearer results in explaining how determinant factors influence women's income in the seaweed industry. This, in turn, can serve as a basis for more effective policy recommendations.

This study uses multiple linear regression analysis with a quantitative data approach **Error! Bookmark not defined.** . The variables used in this research include income, age, number of family dependents, working hours, and length of employment. Based on the explanation above, the regression equation for this study is as follows:

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

Explanation:

Y = Income
X1 = Age
X2 = Number of Family Dependents
X3 = Working Hours
X4 = Length of Employment
α = Constant
β = Coefficient
e = Standard Error

RESULTS AND DISCUSSION

Validity Test Results

Based on the research results, the validity test results are as follows:

Tabel 1. Validity Test Results

Variable	r calculated	r table	Conclusion
Income (Y)	0,322	0,235	Valid
Age (X1)	0,959	0,235	Valid
Number of Family Dependents (X2)	0,673	0,235	Valid
Working Hours (X3)	0,521	0,235	Valid
Length of Employment (X3)	0,890	0,235	Valid

Source: Stata, primary processed data 2024

It is known that the values obtained from the 4 question items for the independent variable (X) indicators in the questionnaire are declared valid. The results show that the corrected correlation (r-calculated) is greater than the r-table value, indicating that the results are valid.

Reliability Test Results

Reliability refers to the consistency and stability of a measurement instrument in producing accurate and reliable results. A questionnaire is considered reliable if it consistently provides similar results when tested multiple times under the same conditions. In this study, reliability testing was conducted using Cronbach's Alpha coefficient to determine whether the questionnaire items used for each variable were reliable. Based on the research results, the reliability test results are as follows:

Tabel 2. Reliability Test Results

Reliability Statistics	
Cronbach's Alpha	**N of Items**
,621	5

Source: Stata, primary processed data 2024

The test results show that the value 0.621 > 0.60 with a sample size (n) of 68 and 5 variables, indicating that the questionnaire items are reliable.

Classical Assumption Test Results

1. **Normality Test**

The normality test is an essential step in regression analysis to ensure that the residuals of the model are normally distributed. A good regression model requires residuals to follow a normal distribution, as this affects the validity of statistical inferences and hypothesis testing results. Based on the normality test results, the findings are as follows:

Table 3. Normality Test Results

One-Sample Kolmogorov-Smirnov Test	
	Unstandardized Residual
N	68
Test Statistic	,083
Asymp. Sig. (2-tailed)c	,200[d]

Source: Stata, primary processed data 2024

Based on the normality test results, the significance value is 0.200. Since 0.200 > 0.05, it can be concluded that the residuals are normally distributed.

2. **Multicolinierity Test**

Table 4. Multicolinierity Test Results

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
Age (X1)	0,373	2,683
Number of Family (X2)	0,857	1,168
Working Hours (X3)	0,387	2,583
Length of Employment (X4)	0,934	1,071

Source: Stata, *primary* processed data 2024

Based on the multicollinearity test results shown in the table above, it can be seen that the VIF value for each variable is lower than 10. Therefore, it can be concluded that there is no multicollinearity among the independent variables.

3. Heteroskedasticity Test

Table 5. Heteroskedasticity Test Results

Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	0,176	0,089		1,977	0,052
Age (X1)	0,000	0,002	-0,021	-0,105	0,917
Number of Family (X2)	0,007	0,014	0,063	0,479	0,634
Working Hours (X3)	0,002	0,010	0,024	0,191	0,849
Length of Employment (X4)	0,006	0,005	0,250	0,314	0,301

Source: Stata, primary processed data 2024

Based on the test results, it can be concluded that the significance value (sig) between the independent variables and the absolute residuals is greater than 0.05, indicating that heteroskedasticity does not occur.

Multiple Linear Regression Analysis Results

Table 6. Hypothesis Test Results

Model	Coefficient values	p-value
(Constant)	13,498	0
Age (X1)	-0,004	0,318
Number of Family (X2)	0,076	0,003
Working Hours (X3)	0,024	0,013
Length of Employment (X4)	0,021	0,033
F Statistic	5,322	0,001
R-Square	0,253	
Adjusted R Square	0,205	

Source: Stata, primary processed data 2024

Based on the output from the table above, the multiple linear regression equation in this study is as follows:

$$Y = 13{,}498 - 0{,}004X_1 + 0{,}076X_2 + 0{,}024X_3 + 0{,}021X_4$$

Based on the test results of age (X1) on the income of female seaweed workers (Y), a significance value of 0.318 was obtained. From this comparison, it is evident that the probability value is greater than the significance level (0.318 > 0.05). Therefore, it can be concluded that, partially, age (X1) does not have a significant effect on the income of female seaweed workers.

Based on another test result, the effect of the number of family dependents (X2) on the income of female seaweed workers (Y) obtained a statistical value of 3.054 with a probability value of 0.003 at a significance level of 0.05. From this comparison, it is evident that the t-statistic is

greater than the t-table value (3.054 > 1.998) and the probability value is less than the significance level (0.003 < 0.05). Thus, it can be concluded that, partially, the number of family dependents (X2) has a significant effect on the income of female seaweed workers.

Furthermore, the effect of working hours (X3) on the income of female seaweed workers (Y) obtained a probability value of 0.013. Since the probability value is less than the significance level (0.013 < 0.05), it can be concluded that, partially, working hours (X3) have a significant effect on the income of female seaweed workers. The last variable, Length of Employment, obtained a probability value of 0.033 in relation to the income of female seaweed workers (Y). Therefore, it can be concluded that, partially, Length of Employment has a significant effect on the income of female seaweed workers.

Based on the table 6, it shows that the significant F value (0.001) is less than α = 0.05. This indicates that age (X1), number of family dependents (X2), working hours (X3), and length of employment (X4) simultaneously influence the income (Y) of female seaweed workers. Another result, based on the coefficient of determination test. the Adjusted R Square value is 0.205. This means that 20.5% of the dependent variable, namely the income of female seaweed workers (Y), is influenced by age (X1), number of family dependents (X2), working hours (X3), and length of employment (X4). Meanwhile, the remaining 79.5% is explained by other independent variables that were not observed in this research model.

DISCUSSION

1. The Effect of Age on the Income of Female Seaweed Workers

In this study, the analysis results indicate that the age variable does not have a significant influence on the income of female seaweed workers. The insignificance of the effect of age on income may be due to several factors. One of them is that an increase in age does not always correlate directly with an increase in productivity or income. In the seaweed industry, skills and work experience tend to be more determining factors than age alone. Additionally, other factors such as education level, access to resources, and labor market conditions may play a greater role in determining workers' income. These findings suggest that age is not the primary factor in determining the income of female seaweed workers. Therefore, further research is recommended to consider other variables, such as skills, work experience, and other socio-economic factors that may have a greater impact on the income of female seaweed workers. This research is supported by **Error! Bookmark not defined.** and **Error! Bookmark not defined.**

Social and structural factors also play a role in hindering the relationship between age and income. For example, in coastal communities, women's access to capital, marketing networks, and the persistent influence of domestic roles may have a greater impact on their income than age. If women across different age groups face the same limitations in expanding their businesses or increasing productivity, age variation will not significantly affect their income. Thus, although age can influence experience, in this sector, other factors such as access to resources and economic opportunities are more decisive in determining the income level of female workers.

The study titled *"Analysis of Street Vendors' Income in the Informal Sector in Semarang Tengah District"* also states that the age variable does not have a significant effect on income **Error! Bookmark not defined.** . These findings indicate that age is not always a primary determinant in determining an individual's income level, especially in the informal sector. Similarly, the study titled *"Analysis of Factors Affecting the Income of Street Vendors in Belu Regency"* found that the age of vendors does not significantly affect income **Error! Bookmark not defined.**. Interestingly, this study shows that vendors aged 55 and above actually have higher incomes compared to those in the productive age category. These findings suggest that age is not always a decisive factor in an individual's income. Other factors, such as work experience, skills, capital, and working hours, may play a more dominant role in influencing a person's income level.

Research on the role of women in seaweed farming businesses shows that age is not always a significant factor influencing their income. For example, a study in Lamalaka Village, Bantaeng Regency, found that women actively participate in various stages of seaweed production, from pre-production to post-harvest activities such as setting up lines, tying floats, attaching seedlings, harvesting, and drying. This role directly contributes to household economics but is not specifically linked to age as a determining factor **Error! Bookmark not defined.**.

2. The Effect of the Number of Family Dependents on the Income of Female Seaweed Workers

Based on the hypothesis test results, the variable of the number of family dependents has a significant influence on the income of female workers in Pantai Amal Village. This is because the more family members there are, the greater the needs that must be met. This condition encourages the people of Pantai Amal Village, especially female workers, to work harder to fulfill their daily needs.

The effect of the number of family dependents on income can be explained through greater economic pressure. Workers with more dependents tend to have higher financial burdens, which drives them to work longer hours or seek additional opportunities to increase their income. In the context of seaweed workers, this can be realized through increased work intensity, job diversification, or seeking broader market access for their production results. This research shows that the number of family dependents is one of the factors influencing the income level of female seaweed workers. Therefore, policies that support increased access to business capital, skills training, and income diversification can be solutions to help workers with large family responsibilities achieve better economic well-being.

Several recent international studies have examined the impact of the number of family dependents on income. For example, a study titled "Family Size and Household Income Dynamics in Developing Countries" found that an increase in the number of family members is associated with a decrease in household per capita income, especially in developing countries by **Error! Bookmark not defined.**. Similarly, a study titled "Household Composition and Economic Well-being: Evidence from Asian Economies" showed that households with more dependents tend to experience greater financial pressure, which negatively affects their income and economic well-being by **Error! Bookmark not defined.**.

In addition, a study titled "The Impact of Dependent Family Members on Labor Supply and Earnings in Latin America" indicated that workers with a higher number of family dependents tend to work longer hours or seek additional jobs to meet their financial needs, although this does not always directly correlate with an increase in total income by **Error! Bookmark not defined.**. These studies support the view that the number of family dependents has a significant impact on household income, as an increase in dependents often requires adjustments in labor participation and the distribution of economic resources within the family.

3. The Effect of Working Hours on the Income of Female Seaweed Workers

Based on the hypothesis test results, the working hours variable has a significant influence on the income of female workers in Pantai Amal Village. This is because the longer they work within an adequate time frame, the more needs they must fulfill. This condition encourages the people of Pantai Amal Village, especially female workers, to work harder to meet their daily needs. This research finding is supported by the study conducted by **Error! Bookmark not defined.** and **Error! Bookmark not defined.** The relationship between working hours and income can be explained through increased productivity and output. Workers who spend more time on seaweed cultivation, processing, or marketing have a greater opportunity to increase production volume and earnings. In

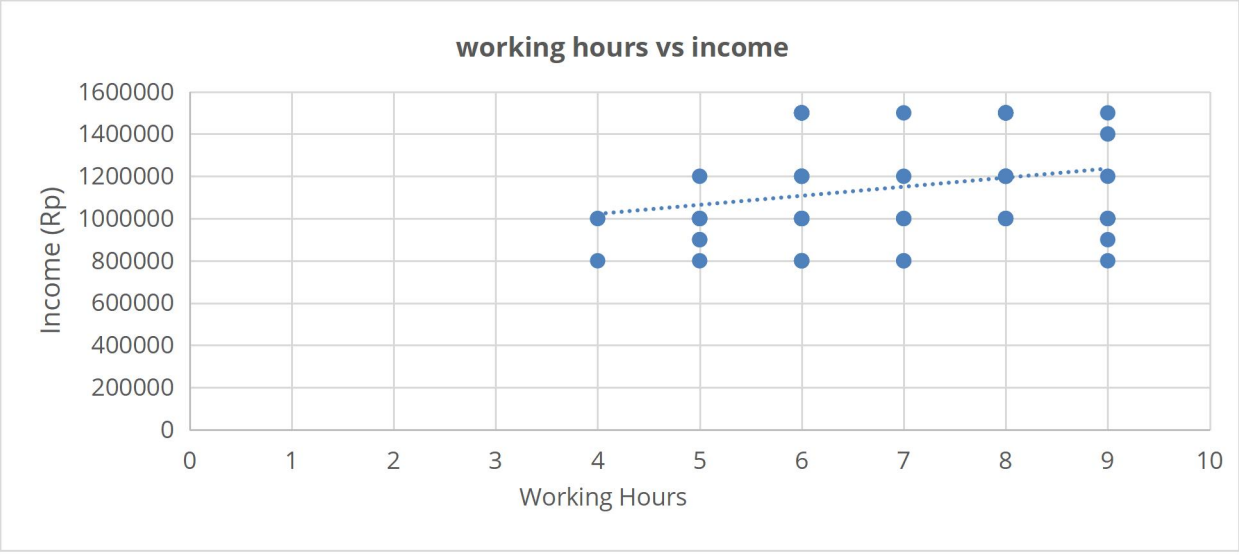
the seaweed industry, processes such as drying, cleaning, and marketing the harvested seaweed require a sufficient time allocation, so the longer someone works, the more they can produce and sell.

Additionally, workers who work longer hours often have greater access to economic opportunities, such as side jobs in the fisheries sector or trading processed seaweed products. This further strengthens the positive relationship between working hours and income. Thus, the findings of this study confirm that working hours are one of the key factors determining the income level of female seaweed workers. Therefore, policies that support the optimization of working hours, increased production efficiency, and access to technology that can speed up work processes can be effective strategies to improve the well-being of female seaweed workers. Several international studies have shown that working hours have a significant impact on workers' income across various sectors. A study titled "Working Hours and Income Growth: A Global Perspective" found that an increase in working hours is positively correlated with higher income, especially for workers in the informal and agricultural sectors. This research highlights that workers with longer working hours have greater opportunities to enhance their productivity and earnings **Error! Bookmark not defined.**.

Additionally, research in the article "Labor Supply, Working Hours, and Earnings: Evidence from Developing Economies" also indicates that in developing countries, workers with longer working hours tend to earn higher incomes. This is due to the economic structure, which still relies heavily on manual labor, meaning that the longer a person works, the more output they can produce. However, this study also highlights that the impact of working hours on income may vary depending on the employment sector and labor efficiency **Error! Bookmark not defined.** .Another study titled "The Role of Working Hours in Income Determination: Insights from Latin America" found that workers with longer working hours tend to have higher incomes, but at the cost of increased fatigue (**Error! Bookmark not defined.** . In the context of female seaweed laborers, the more time they spend cultivating, processing, and marketing seaweed, the greater the likelihood of increasing their income through higher production and sales.

These studies indicate that working hours are a crucial factor in determining workers' income. However, although increasing working hours can boost earnings, there must be a balance between work hours and worker well-being to maintain optimal productivity. Therefore, policies that support efficient time management and enhance workers' skills can help improve income without excessively increasing workloads.

Figure 2. Working Hours Vs Income



Source: Stata, primary processed data 2024

The figure above illustrates the relationship between working hours per day and income of workers in the seaweed industry. From the graph, it can be observed that as working hours increase, income tends to rise as well, although with considerable variation. The scattered data points suggest that there are other factors besides working hours that may influence income. The trend line shown in the graph indicates a positive correlation between working hours and income. This means that, in general, working longer hours is associated with higher income, although not always significantly. This could be due to other factors such as work experience, individual productivity, or access to production resources.

However, the wide dispersion of data also suggests that some workers with the same number of working hours have different income levels. This indicates that working hours alone do not determine income, and other variables, such as work efficiency, skills, or market conditions, also play a role. Overall, this graph provides insight that while longer working hours may contribute to higher income, other factors must be considered to fully understand income variation in this industry.

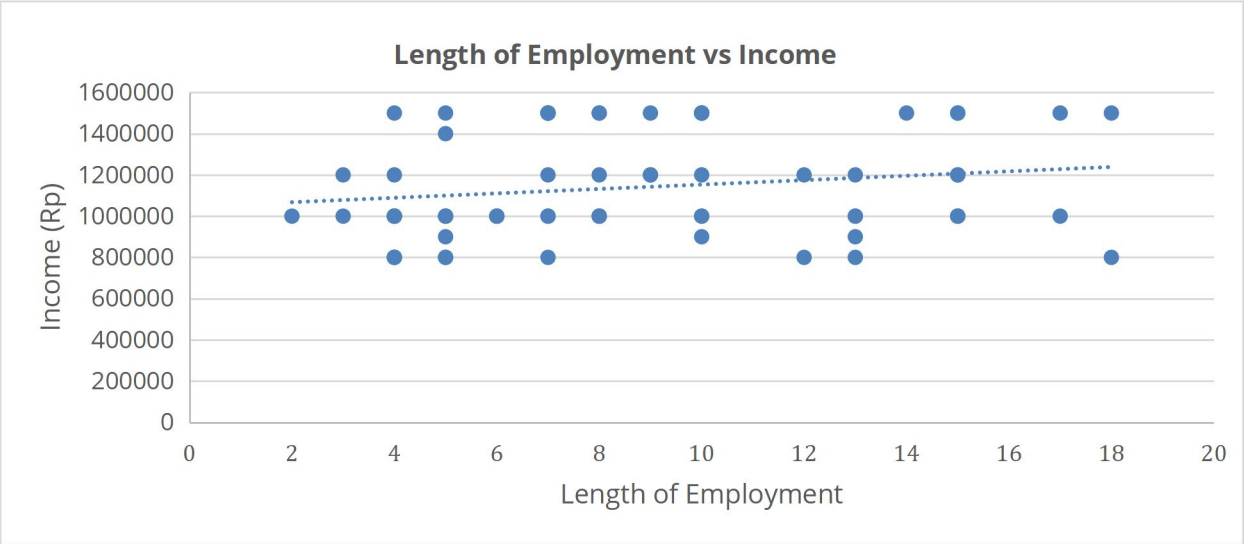
4. The Effect of Length of Employment on the Income of Female Seaweed Workers

Based on the hypothesis test results, the length of employment variable has a significant influence on the income of female seaweed workers in Pantai Amal Village. The longer they work, the more needs they must fulfill, which encourages the people of Pantai Amal Village, especially female workers, to work harder to meet their daily necessities. This research finding is supported by the study conducted by **Error! Bookmark not defined.**

The relationship between length of employment and income can be explained through the accumulation of knowledge and skills over time. Workers who have been employed for a longer period tend to have a better understanding of seaweed cultivation, processing, and marketing techniques. They also become more proficient in managing their resources efficiently, which helps increase production output and income. Additionally, workers with more experience often have broader social networks and market access. They may have established relationships with buyers or distributors who offer better prices for their products. As a result, a longer work experience can provide greater economic benefits for female seaweed workers. This study confirms that the length of employment is one of the key factors in determining the income level of female seaweed workers. Therefore, policies that support skills training, market access expansion, and product diversification can be effective strategies to improve the economic well-being of female seaweed workers.

Several studies show that the longer a person works, the higher their skill level and efficiency, which ultimately contributes to increased income **Error! Bookmark not defined.** . In addition, this study also highlights how age and education level play a role in determining work productivity. Other research findings reveal that longer work experience not only increases income but also contributes to overall worker well-being **Error! Bookmark not defined.** and **Error! Bookmark not defined.**.

Figure 3. Length of Employment Vs Income



Source: Stata, primary processed data 2024

The figure above illustrates the relationship between length of employment and income in the seaweed industry. From the graph, it can be observed that there is a tendency for income to increase as the length of employment grows. This is indicated by the upward-sloping trend line, suggesting that longer work experience is generally associated with higher income. However, the wide dispersion of data points shows significant variation in income among workers with the same length of employment. This means that, although there is a positive relationship between work duration and income, other factors also contribute to determining earnings. For example, individual productivity, access to resources, or skill levels might play a more dominant role than just work experience alone.

Additionally, some workers with long experience still have relatively low incomes. This could indicate that work experience alone is not always the primary factor in determining earnings. Other supporting factors, such as skills training, market access, or business capital, may also be required. Overall, the graph suggests that while workers with longer experience tend to earn higher incomes, this relationship is not always strong. Other variables still play a role in determining income levels in this industry.

CONCLUSION

Based on the research findings, it was found that, partially, the age variable does not have a significant influence on the income of female seaweed workers in Pantai Amal Village.

On the other hand, the variables of the number of family dependents, working hours, and length of employment have been proven to significantly influence the income of female seaweed workers.

Simultaneous testing results indicate that age, number of family dependents, working hours, and length of employment collectively have a significant influence on the income of female seaweed workers in Pantai Amal Village. This means that although age does not have a significant effect when analyzed individually, when combined with other variables, it can contribute to income levels. This suggests that these factors interact in determining workers' income.

Thus, this study highlights the importance of the number of family dependents, working hours, and length of employment in increasing the income of female seaweed workers. Therefore, a comprehensive approach is needed to improve the welfare of workers, both through policy support and direct interventions that can help them achieve better and more sustainable income levels.

REFERENCES

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