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The Gender Wage Gap in Fisheries Labour Market: The Analysis of Sociodemographic and Work-Related Factors in Indonesia

Yulinda Nurul Aini[1*]

[1] Demography and Population Studies, University of Southampton, Southampton – United Kingdom

***Corresponding Author:**
email: yulindaaini@gmail.com - University Road Southampton SO17 1BJ, United Kingdom

Abstract: Income inequality is a challenge in the workplace, particularly in the fisheries subsector. Women are exploited, undervalued, and have limited educational opportunities. Age, education, employment position, duration of employment, and hours worked all contribute to this discrepancy. This study investigates how sociodemographic and work-related factors affect the gender wage gap in Indonesia's fisheries subsector. 7,574 samples from the 2019 National Labour Force Survey were utilized. In this investigation, multiple linear regression analysis was employed. We find that age ($p<0.001$), working hours ($p<0.001$), and years worked ($p<0.001$) have a positive and significant association with earnings. In all categories, women earn less than men on average. The discrepancy in income depending on age, hours worked, and years worked ranges between 350 and 600 thousand rupiahs. The interaction of education and job status is likewise significant ($p<0.02$). This interaction also demonstrates the correlation between education level and wealth gap. Inequality in income ranges from 450 to 800 thousand rupiahs for formal workers with a low level of education to a bachelor's degree, and from 450 to 550 thousand rupiahs for informal workers. For this reason, increasing education and empowering women are important factors in reducing income inequality and realizing the SDGs target to achieve decent work. Furthermore, government programs and policies at both the community and national levels need to adopt the norms, roles, and involvement of women in the fisheries subsector.

Keywords: fisheries; gender wage gap; labour market; multiple regression

Abstrak: Ketimpangan pendapatan merupakan salah satu permasalahan di dunia kerja, termasuk di sektor perikanan. Perempuan mengalami eksploitasi, kontribusi kurang dihargai, dan keterbatasan akses terhadap pendidikan. Ketimpangan tersebut disebabkan karena berbagai faktor seperti usia, pendidikan, status pekerjaan, lama kerja, dan jam kerja. Untuk itu, studi ini bertujuan untuk melihat pengaruh faktor sosiodemografi dan pekerjaan terhadap ketimpangan pendapatan pekerja sektor perikanan di Indonesia. Penulis menggunakan data SAKERNAS 2019 dengan total 7.574 sampel. Studi ini menggunakan analisis multiple linear regression. Berdasarkan hasil studi, variabel usia ($p<0,001$), jam kerja ($p<0,001$), dan lama kerja ($p<0,001$) berasosiasi positif dan signifikan terhadap pendapatan pekerja. Secara umum, pendapatan perempuan selalu lebih rendah dibandingkan laki-laki pada setiap kategori. Ketimpangan pendapatan

berdasarkan usia, jam dan lama kerja berkisar antara 350-600 ribu rupiah. Model interaksi antara pendidikan dan status pekerjaan juga berpengaruh signifikan (p<0,02). Hasil interaksi ini juga menunjukkan bahwa ketimpangan pendapatan berbanding lurus dengan tingkat pendidikan. Pada pekerja formal, ketimpangan pendapatan berkisar antara 450-800 ribu rupiah dari pekerja berpendidikan rendah hingga sarjana, sementara pada pekerja informal, gap berkisar antara 450-550 ribu rupiah. Untuk itu, peningkatan pendidikan dan pemberdayaan perempuan merupakan faktor penting dalam mereduksi ketimpangan pendapatan dan mewujudkan target SDGs untuk mencapai decent work. Selain itu, program dan kebijakan pemerintah juga perlu mengadaptasi norma, peran, dan keterlibatan perempuan di sektor perikanan baik ditingkat komunitas maupun daerah

Kata Kunci: perikanan; ketimpangan pendapatan; pasar kerja; *multiple regression*

A. Introduction

The engagement of women in all aspects of life is evidence of their emancipation and empowerment.[1] Gender equality is the achievement of the rights, opportunities, and equitable treatment of men and women across all age groups and stages of life, especially in the workplace.[2] Gender equality does not mean that men and women are equal, but their rights, responsibilities, and access to resources are the same.[3] Significantly, gender equality adds to the Sustainable Development Goals (SDGs) of "poverty reduction and food and nutrition security".[4] Gender equality has the potential to boost household productivity, income, and nutritional satisfaction in the subsector of fisheries.[5]

In actuality, there are various gender disparities in the Indonesian fisheries subsector, including a salary gap between male and female employ-

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[1] Anna Baranowska-Rataj and Anna Matysiak, "Family Size and Men's Labor Market Outcomes: Do Social Beliefs About Men's Roles in the Family Matter?," *Feminist Economics* 28, no. 2 (2022): 93–118, https://doi.org/10.1080/13545701.2021.2015076.

[2] Abhinandan Kashyap, Samar Jyoti Chutia, B S Yashwanth, et al., "Gender Issues in the Fisheries Sector of India," *Aquaculture* 23, no. 4 (2019): 30–31.

[3] European Commission - Directorate-General for Justice, *Barcelona Objectives: The Development of Childcare Facilities for Young Children in Europe with a View to Sustainable and Inclusive Growth* (Luxembourg: Publications Office of the European Union, 2013).

[4] UNDP, *Sustainable Development Goals (SDGs)* (California: United Nations, 2017).

[5] Care - FAO, "Gender Equality and Women's Empowerment in the Context of Food Security and Nutrition - A Scoping Paper – September 2020," 2020, https://www.fao.org/fileadmin/templates/cfs/Docs1920/Gender/GEWE_Scoping_Paper-FINAL040ct.pdf.

ees.[6] According to the International Labour Organization (ILO), women earn 23% less than men's income.[7] Men dominate high-paying positions as well. ILO Convention No. 100 of 1951 on equal pay for equal work for men and women; ILO Convention No. 111 on the prohibition of discrimination and equal opportunity and treatment in work based on origin and gender; and ILO Convention No. 183 of 2000 on women's right to 14 weeks of leave apply.[8] In addition, the Labour Law No. 13 of 2003 in Indonesia specifies that men and women have equal rights and opportunities when it comes to choosing, performing, or switching occupations, as well as receiving sufficient compensation.

Despite their substantial role and devotion to the domestic economy and society, women in the fisheries sector are overworked and their efforts are undervalued.[9] Furthermore, they are frequently underpaid and exploited by employers.[10] According to Dr. Cynthia McDougall, the gender team leader at WorldFish, several restrictions, such as social, economic, policy, and ecological difficulties, wealth and poverty, ethnic and caste affiliation, education, and other criteria, limit women's participation and effect in the fisheries sector.[11] Women earn 31% less than men after factoring for education, experience, employment situations, and a range of other factors, according to a European study.[12]

Typically, female employees are illiterate or have a lower degree of education than I do.[13] Two-thirds of the 900 million illiterate people are

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[6] Ngadi Ngadi et al., "Gender Inequality in the Indonesian Labor Market," in *Women Empowerment and Well-Being for Inclusive Economic Growth* (IGI Global, 2021), 24–44, https://doi.org/10.4018/978-1-7998-3737-4.ch002.

[7] UN Women Indonesia, "Infographic: Gender Pay Gaps in Indonesia," 2020.

[8] International Labour Organization, *Gender Equality and Decent Work: Selected ILO Conventions and Recommendations That Promote Gender Equality as of 2012*, 3rd ed. (Geneva: Bureau for Gender Equality & International Labour Standards Department, 2012).

[9] Rebecca Elmhirst et al., "Gender Issues in Large Scale Land Acquisition: Insights from Oil Palm in Indonesia" (Washington D.C, 2017).

[10] Muhammad Syukri, "Gender Equality in Indonesian New Developmental State: The Case of the New Participatory Village Governance," SMERU Working Paper, 2021.

[11] KP3A, "Pentingnya Keadilan dan Kesetaraan Gender di Indonesia," kemenpppa.go.id, 2017, https://www.kemenpppa.go.id/index.php/page/read/31/1374/pentingnya-keadilan-dan-kesetaraan-gender-di-indonesia.

[12] Paula Rodríguez-Modroño and Purificación López-Igual, "Job Quality and Work—Life Balance of Teleworkers," *International Journal of Environmental Research and Public Health* 18, no. 6 (2021): 3239, https://doi.org/10.3390/ijerph18063239.

[13] International Labour Organization, *Equality In Employment: Key Concepts And Principles (Book 1) - Practical Guidelines for Employers for Promoting Equality and Preventing Discrimination at Work in Indonesia* (Jakarta: International Labour Organization, 2013).

women, according to research.[14] In addition, women are more susceptible to disease and have less opportunities to enhance their abilities and gain access to education and training.[15] A second issue is the perception that fishing is largely a male occupation and that women perform more post-harvest chores.[16]

Differences in male and female productivity depend on age, job status, position, and a variety of other occupational factors.[17] Consequently, this study will use these sociodemographic factors as an explanatory variable in measuring productivity, which is proxied by income levels. Several studies have investigated female income inequality, with one finding that education had a significant impact on income disparity.[18] According to a research conducted in Vietnam, the primary causes of the gender wage disparity are education, job, and geography.[19] Furthermore, work-related factors are important in interpreting worker income disparities.[20]

This study aims to investigate how sociodemographic parameters (such as gender, age, educational level, and household size) and work-related factors (such as job status, working hours, and years worked) affect the income level of Indonesian fisheries workers. Then, this research estimate the income inequality between male and female workers with different characteristics. Comprehensive information on gender inequality in the labour market is a

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[14] Liz Ford, "Two-Thirds of World's Illiterate Adults Are Women, Report Finds," The Guardian, October 20, 2015, https://www.theguardian.com/global-development/2015/oct/20/two-thirds-of-worlds-illiterate-adults-are-women-report-finds.

[15] Joko Mariyono et al., "Marketing Aspects of Vegetables: Comparative Study of Four Regions in East Java and Bali," *Agriekonomika* 7, no. 1 (2018): 46–56, https://doi.org/10.21107/agriekonomika.v7i1.3410.

[16] Asian Development Bank, *Gender Equality in the Labor Market in the Philippines* (Manila: Asian Development Bank - ILO, 2013).

[17] Naoko Otobe, *Resource Guide on Gender Issues in Employment and Labour Market Policies: Working towards Women's Economic Empowerment and Gender Equality* (Geneva: International Labour Organization, 2014).

[18] Eko Wicaksono, Hidayat Amir, and Anda Nugroho, *The Sources of Income Inequality in Indonesia: A Regression-Based Inequality Decomposition* (Tokyo: Asian Development Bank Institute, 2017).

[19] Duc Hong Vo et al., "The Determinants of Gender Income Inequality in Vietnam: A Longitudinal Data Analysis," *Emerging Markets Finance and Trade* 57, no. 1 (2021): 198–222, https://doi.org/10.1080/1540496X.2019.1609443.

[20] Michaela Fuchs et al., "Where do women earn more than men? Explaining Regional Differences in the Gender Pay Gap," *Journal of Regional Science* 61, no. 5 (2021): 1065–86, https://doi.org/10.1111/jors.12532.

critical issue that necessitates time and consistent work.[21] Because both men and women are crucial in achieving the full potential of fisheries and fostering equitable and sustainable economic growth.[22] In addition, the findings of this study can help policymakers in developing policies for vulnerable people, notably in the subsector of fisheries.

B. Methods

Data Collection

Data from the August 2019 edition of Indonesia's National Labour Force Survey (SAKERNAS) were used in this study.[23] This data was provided by the Indonesian Central Bureau of Statistics (CBS). The respondents were workers in the fisheries sector between the ages of 15 and 64, with a total of 7,574 weighted samples out of a population of 1,749,684. In this study, the response variable is income, whereas the explanatory factors are age, gender, years worked, hours worked, education, household size, and job status. This research classifies job status as formal or informal. Informal activities are economic activities organized by companies without a standard structure, account transactions, or seasonal or personal employment relationships (without contracts).[24] Table 1 shows the variable used in this research and their categorical value.

According to CBS, there are three proxies for distinguishing between formal and informal labour. In this study, however, we use the first proxy, which is the classification of formal and informal workers based on job status. Workers are classified as "formal" if they are attempting to be assisted by permanent or paid workers (code 3) or workers/employees (code 4). Other codes, on the other hand, are classified as "informal." This proxy is also used in

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[21] International Labour Organization, *Equality in Employment: Key Concepts and Principles (Book 1) - Practical Guidelines for Employers for Promoting Equality and Preventing Discrimination at Work in Indonesia*.

[22] Asian Development Bank, *Good Global Economic and Social Practices to Promote Gender Equality in the Labor Market* (Manila: Asian Development Bank - ILO, 2013).

[23] Badan Pusat Statistik, "Keadaan Angkatan Kerja di Indonesia Agustus 2019," 2019, https://www.bps.go.id/publication/2019/11/29/96138ece33ccc220007acbdd/keadaan-angkatan-kerja-di-indonesia-agustus-2019.html.

[24] Badan Pusat Statistik, *Analisis SE06 mengenai Ketenagakerjaan* (Jakara: Badan Pusat Statistik, 2009).

Key Indicators of the Labour Market (KILM), Issue 7 of the Labour Market Indicator Publication.[25] Based on some of the literature in the preceding subchapter, the hypothesis of this study is that men with more than one year of work experience, who work more than 35 hours per week, who have a high school education or higher, who have a larger household size, and who are formal workers have a greater chance of earning better incomes than their counterparts. Utilizing a statistical model will aid in answering the hypothesis's questions.

Table 1
Data and Variables Used in the Analysis

Variable	Data Type/Scale	Description
Dependent Variable		
Income	Numeric/Ratio	In Rupiahs
Independent Variables		
Age	Numeric/Ratio	
Gender	Categoric/Nominal	- Women - Men
Years Worked	Categoric/Nominal	- Less than one year - More than one years
Hours Worked	Numeric/Ratio	
Education	Categoric/Ordinal	- No Schooling - Elementary School - Junior High School (JHS) - Senior High School (SHS) - Diploma - Bachelor+
Household Size	Numeric/Ratio	
Job Status	Categoric/Nominal	- Informal - Formal

Data Analysis

In the early phases, an association test was performed between the explanatory variables and the response variables using the Pearson correlation, ANOVA test, or Spearman rank, adjusted for the data scale. This test aims to

[25] International Labour Organization, *Key Indicators of the Labour Market (KILM) - Seventh Edition* (Geneva: International Labour Organization, 2021).

calculate and understand the impact of a linear or nonlinear relationship between two variables. Pearson correlation is used for data with an interval or ratio scale; the ANOVA test is used for data with a nominal scale; and the Spearman rank is used for data with an ordinal scale.[26] If the correlation value has a p-value of less than 5%, it is determined that the variables are correlated.

Because the response variable has a ratio scale, this study used multiple linear regression (MLR) to assess the relationship between worker sociodemographic characteristics (X) and income (Y). The resulting regression equation is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \cdots + \beta_n X_n + \varepsilon \qquad (1)$$

When n is the number of explanatory variables, β_0 is the y intercept, $\beta_{1\ldots n}$ is the variable's coefficicient, and ε is the error term.

Several measures, including adjusted R-square (R^2), the F-test, and parameter significance, will be used to assess the goodness of the generated regression model. Aside from MLR, we also utilize descriptive statistics in tables and graphs to examine variable distributions and summarize data.[27]

C. Results

Characteristics of Man and Woman Engage in Fishery Occupation

Figure 1 and Table 2 show the income distribution by gender and other sociodemographic variables. According to Figure 1, the average income of male workers is higher than that of female workers. Meanwhile, men have a wider income interquartile range than women. The first and third quartiles for men are around 1 million and 2.6 million, respectively, while the values for women are around 600,000 and 1.8 million, respectively. Persistent income disparities between men and women will have an impact on economic performance in the future. As a result, we must identify sources of inequality in order to close the income distribution gap in fishery occupations.

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[26] Thomas Cleff, *Applied Statistics and Multivariate Data Analysis for Business and Economics: A Modern Approach Using SPSS, Stata, and Excel* (Cham: Springer, 2019).

[27] Cleff.

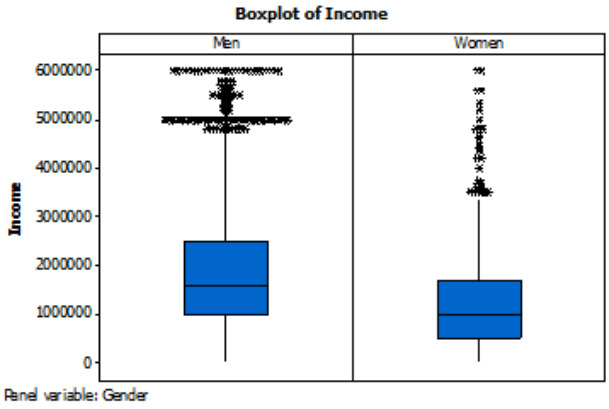


Figure 1
Distribution of Income Based on Gender

In general, the biggest proportion of all employees included in the sample was in the age ranges 35–44 (one-fourth) and 25–34 (one-fourth) (Table 2). More than one-third of the samples have a primary school education, while the other one-fourth did not study at all. Meanwhile, only one percent more people hold a college degree or above. Two-thirds of this sample have four to five family members. In terms of employment, two-thirds of them work in the informal sector for less than 30 hours per week and have been employed for more than a year. The trend of this fraction is nearly identical for male and female workers.

We examine the income distribution based on the sociodemographic parameters of workers. For males, workers aged 35–44 years (about 2.3 million), those with a diploma (approximately 5.4 million), and households with 1-2 individuals (around 1.6 million) had the highest average income. Workers in the formal sector earn more than those in the informal sector. Furthermore, people who work more than 54 hours per week and have been employed for more than a year earn more than other categories.

The salary distribution for female employees follows a very similar pattern to that of male employees, with the highest income going to those who are 35 to 44 years old, have 1-2 family members, are formal, work more than 54 hours per week, and have been employed for more than a year. In contrast, women with a bachelor's degree or higher earn the most money compared to

Table 2
Distribution of Income Based on Sociodemographic Variables

Variables	Men		Women		Total	
	%	Mean Income	%	Mean Income	%	Mean Income
Age Group						
15-24	16.56	1,668,889	9.18	932,709	15.41	1,610,029
25-34	24.46	2,014,240	17.95	1,426,657	23.45	1,966,421
35-44	26.82	2,323,068	30.08	1,553,520	27.33	2,221,799
45-54	19.49	1,991,831	24.47	1,396,719	20.26	1,900,787
55-64	9.87	1,991,864	12.93	1,420,964	10.35	1,902,934
>64	2.79	1,519,658	5.38	1,309,950	3.2	1,463,564
Education						
No schooling	24.16	1,861,665	34.31	1,308,048	25.74	1,762,112
Elementary School	37.20	1,888,280	33.02	1,332,349	36.55	1,836,419
Junior High School	20.37	3,867,927	16.21	1,935,092	19.73	3,520,356
Senior High School	17.15	2,174,740	14.95	1,582,743	16.80	2,104,990
Diploma	0.27	5,429,183	0.52	1,117,336	0.31	4,356,736
Bachelor+	0.85	2,940,830	0.99	2,502,566	0.87	2,832,034
Household Size						
1 - 2 person/s	8.66	1,630,827	13.17	881,455	9.36	1,428,363
3 - 5 persons	63.96	1,531,885	62.06	671,598	63.67	1,393,208
6 - 8 persons	23.93	1,352,384	22.73	824,648	23.74	1,267,633
More than 8 persons	3.45	1,153,285	2.04	821,222	3.23	1,118,529
Job Status						
Informal	38.53	1,439,889	17.45	726,033	35.25	1,082,961
Formal	61.47	1,495,665	82.55	749,163	64.75	1,122,414
Hours Worked						
<30	24.81	1,109,428	48.82	448,478	28.54	935,142
30-34	7.50	1,247,845	8.05	730,080	7.59	1,165,808
35-39	10.12	1,393,103	10.83	1,010,606	10.23	1,328,373
40-44	11.41	1,619,610	10.98	1,043,823	11.35	1,533,581
45-49	12.25	1,605,276	7.14	1,075,781	11.45	1,544,656
50-54	4.87	1,489,683	2.10	1,118,654	4,44	1,460,887
>54	29.03	1,878,090	12.09	1,271,630	26.40	1,829,119
Years Worked						
Less than 1 year	9.54	1,287,369	11.24	611,836	9.80	1,153,083
More than 1 year	90.46	1,495,750	88.76	761,094	90.20	1,376,531
N		1,477,714		271,970		1,749,684

those with lower levels of education. Surprisingly, though, women consistently earn less than men in all job categories. In the same category and across all categories, male workers make approximately twice as much money as female workers. For instance, in informal employment, women typically earn 750 thousand rupiahs, whereas men in the same position can earn up to 1.5 million. These descriptive findings have demonstrated a substantial salary gap between male and female workers in the fisheries subsector.

The average income of women is half that of men, according to other research, which supports this finding.[28] Another study found that women work fewer hours than men on average.[29] Women must divide their work time because, in addition to working, they also serve as housekeepers. This finding is consistent with the findings of other research, who discovered that women work 18.8% fewer hours than men.[30]

Bivariate Association between Income and Demographic Factors

Table 3 shows the statistical association test results for income and socio-demographic characteristics. According to Table 3, at the 5% level of significance, gender, years worked, education, and hours worked have a positive and significant association with income.

Table 3
Bivariate Association between Income and Sociodemographic Variables

Correlation Test	Variables	Coefficient	P-value
ANOVA (F-test)	Gender	158.83	<0.001*
	Years Worked	35.2	<0.001*
	Job Status	2.22	0.137
Pearson	Household Size	0.025	0.071**
	Age	0.013	0.347
	Hours Worked	3.75	<0.001*
Spearman Rank	Education		

Note: *Significant at alpha of 5%, **Significant at alpha of 10%

[28] Soedati Surbakti and Theresa Devasahayam, *Women and Girls in Indonesia: Progress and Challenges* (Jakarta: UNFPA Indonesia, 2015).

[29] Otobe, *Resource Guide on Gender Issues in Employment and Labour Market Policies: Working towards Women's Economic Empowerment and Gender Equality*.

[30] Otobe.

Meanwhile, household size has a positive and significant association with income (using an alpha of 10%). Other variables, such as job status and age, have p-values of 0.137 and 0.347, respectively, indicating that they are not significant because the p-value exceeds 0.05. Although not statistically significant, we include these two variables in the model because, according to the literature, job status and age contribute to the wage disparity between male and female fishermen.

Multiple Linear Regression of Income and Demographic Factors

In this part, we use OLS regression to analyze the factors influencing workers' income in the fisheries subsector, with income as the dependent variable. We enter all explanatory variables into the model in the first stage (diagnostic residuals are shown in Figure 2.a). The residuals are not normally distributed based on the normality test results since they have a p-value greater than the 5% level of significance. Furthermore, a visual diagnostic check using the scatterplot between the residuals and the fitted values reveals the funnel shape, indicating that the model violated the homoscedasticity condition

To address these issues, the variable income is changed to lambda = 0.37 using the Box-Cox transformation. The residuals, as shown in Figure 2.b, reveal a normal line with a p-value of 0.15 (more than 0.05). The versus fits also show scattered dots that do not form a funnel shape, thus satisfying the assumption of homoscedasticity.

In addition to transformation, integrating interaction effects into the model can help with the heteroscedasticity problem. In this study, we are interested in the interaction between job status and education. According to the ILO, highly educated workers are likely to enter the formal sector, while less educated people tend to enter the informal sector.[31] The projected value between education and job status, which forms a parallel line, served as the inspiration for developing this interaction model (see Figure 3).

Table 4 shows the results of the transformation regression model with interaction patterns. Except for the diploma category parameter in the

[31] International Labour Organization, *The Informal Economy and Decent Work: A Policy Resource Guide Supporting Transitions to Formality* (Geneva: International Labour Organization, 2013).

(a) Initial Model (b) Transformation Model

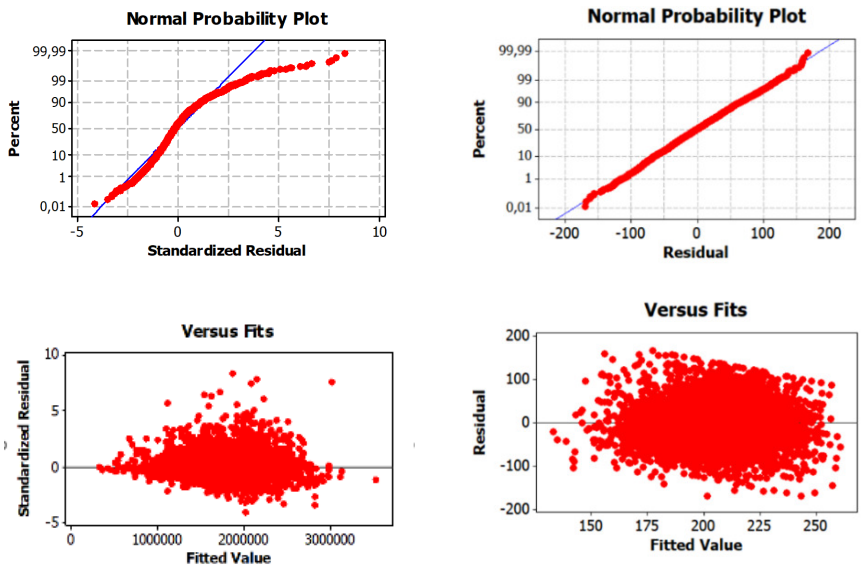


Figure 2
Residual Diagnostic for the Initial Model

(a) Women (b) Men

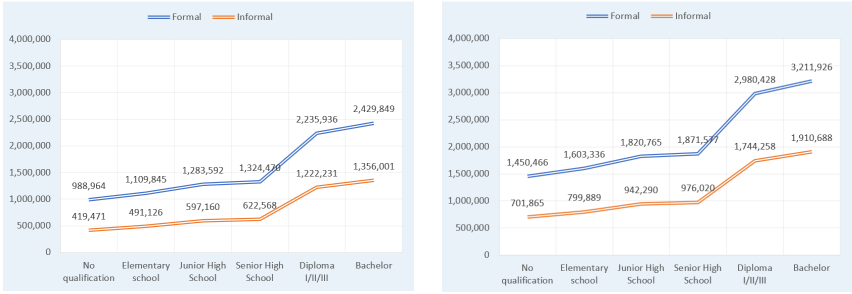


Figure 3
Association Between Women's Job Status and
Education before Interaction

education variable and the interaction between diplomas and informal workers, almost all parameters in the model are significant at the 5% level of interest. As a result, we performed a joint F-test on the insignificant variables. The joint F-test on these two variables yields F-tests of 17.735 (p-value<0.001) and 2.685 (p-value 0.020), indicating that all variables are significant at the 5% level of interest. The addition of interaction causes the previously insignificant job status variable to become significant. This model has an adjusted R2 of 13.9%, which means that all explanatory variables in the model can only explain 13.9% of the total variation in income.

Table 3
Income and Sociodemographic Regression Model with Interaction

Term	Coef	SE Coef	T	P	95%	CI
Constant	219.302	10.416	21.055	<0.001*	(198.883;	239.721)
Gender						
- Women	-27.040	2.103	-12.860	<0.001*	(-31.162;	-22.917)
Years Worked						
- More than 1 years	17.042	2.278	7.481	<0.001*	(12.576;	21.508)
Job Status						
- Informal	-48.172	16.452	-2.928	0.003*	(-80.426;	-15.919)
Hours Worked	0.585	0.032	18.274	<0.001*	(0.523;	0.648)
Age	0.335	0.057	5.851	<0.001*	(0.223;	0.447)
Household Size	-0.357	0.358	-0.997	0.319	(-1.059;	0.345)
Education						
- No Schooling	-70.172	10.307	-6.808	<0.001*	(-90.378;	-49.966)
- Elementary	-62.434	10.179	-6.133	<0.001*	(-82.389;	-42.478)
- JHS	-52.186	10.283	-5.075	<0.001*	(-72.345;	-32.027)
- SHS	-49.903	10.314	-4.838	<0.001*	(-70.123;	-29.683)
- Diploma	-7.528	18.159	-0.415	0.678	(-43.128;	28.071)
Interaction of Job Status*Education						
- No Schooling*Informal	46.396	16.706	2.777	0.006*	(13.646;	79.146)
- Elementary*Informal	49.380	16.604	2.974	0.003*	(16.829;	81.931)
- JHS*Informal	50.326	16.724	3.009	0.003*	(17.540;	83.112)
- SHS*Informal	46.060	16.705	2.777	0.006*	(13.646:	79.146)
- Diploma*Informal	-2.979	32.410	-0.092	0.927	(-66.516;	60.558)
Goodness of Fit Model						
F-test	57.978			<0.001*		
R-squared	0.142					
Adjusted R-squared	0.139					
Joint F-test						
F-test of Interaction	2.685			0.020*		
F-test for Education	17.735			<0.001*		

$$Y^{0,37}=219.302 - 27.040 \text{ Women} + 17.042 \text{ More than 1 years} - 48.172 \text{ Informal} + 0.585 \text{ Hours Worked} + 0.335 \text{ Age} - 0.357 \text{ Household Size} - 70.172 \text{ No Schooling} - 62.434 \text{ Elementary} - 52.186 \text{ JHS} - 49.903 \text{ SHS} - 7.528 \text{ Diploma} + 46.396 \text{ No Schooling} * \text{Informal} + 49.380 \text{ Elementary} * \text{Informal} + 50.326 \text{ JHS} * \text{Informal} + 46.060 \text{ SHS} * \text{Informal} - 2.979 \text{ Diploma} * \text{Informal} \quad (1)$$

Based on Table 4, we may construct a regression equation similar to Equation 2. We can see that the parameter coefficients for age, hours worked, and years worked are all positive, implying that every year of age, hour of labour, and year of work increases workers' income. The regression coefficient for household size, on the other hand, is negative, indicating that the larger the family, the lower the workers' income. Figure 4 compares the incomes of female and male workers using the regression results' margins of error.

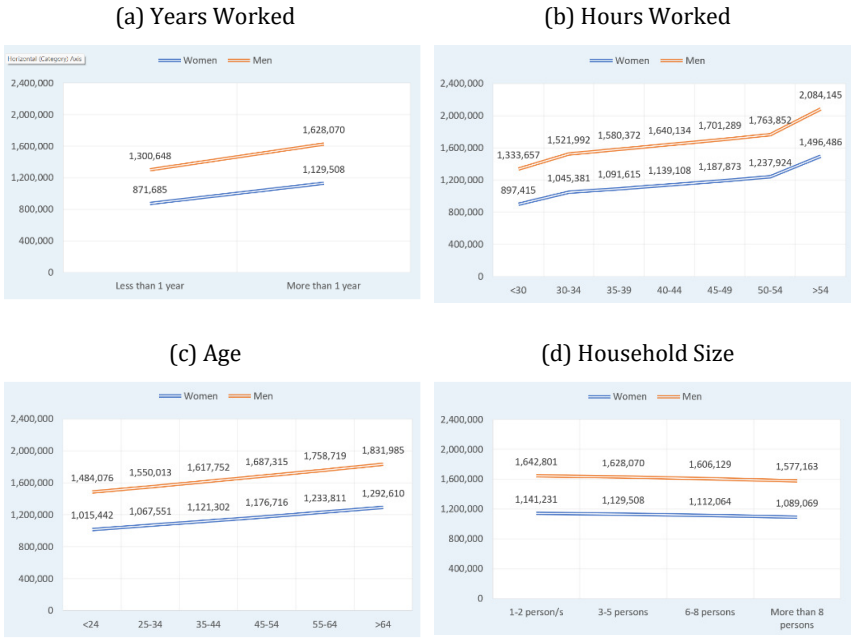


Figure 4
Margins Plot of Years Worked, Hours Worked, Age, and Household Size of Women and Men's Income

In all categories, women's incomes are consistently lower than men's. For the varying years worked, women who worked more than one year saw an average pay rise of 400 thousand rupiahs, while men saw an increase of 300 thousand rupiahs. The opposite was observed for the age variable, with women aged >64 earning 300 thousand rupiahs more than those aged 24 compared to around 400 thousand for men. For the hours worked variable, the difference in income for women working hours >54 and 30 is roughly 600 thousand rupiahs, while the difference for men is around 700 thousand rupiahs. Meanwhile, workers with a family of more than eight individuals are likely to have a wage that is less than 100 thousand lower than those with a household size of 1-2 person/s, for both men and women.

Figure 4 similarly depicts significant income discrepancies between men and women in the fisheries subsector. Women with less or more than one year of experience, for example, have a 500 thousand lower salary than men. The income disparity between men and women is more than 400 thousand at the age of 24 years and more than 500 thousand at the age of >64 years. Men and women have a pay discrepancy of more than 400 thousand for working hours less than 30 hours and about 600 thousand for working hours greater than 54 hours.

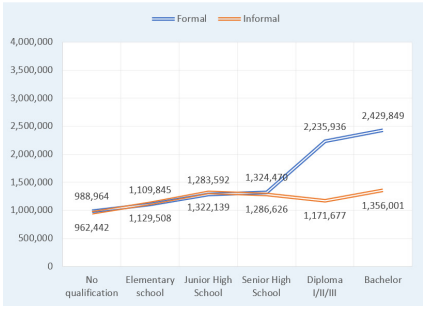
Meanwhile, a line plot, as shown in Figure 5, can help us detect patterns of interaction between job status and education for men and women. The results of the interaction regression model demonstrate changes in the patterns of informal sector workers across all education levels, with the lines no longer paralleling those of the formal sector. More educated workers will generally have more knowledge, which will lead to a greater salary, and vice versa. Formal workers have a greater income than informal workers in the no-education category. Informal workers, on the other hand, catch up from elementary to JHS; but their income reduces again at SHS and diploma, widening the pay disparity between formal and informal workers. Income in the bachelor category increased somewhat, in keeping with the increase in formal workers. As a result, the higher the level of education of fishery occupation workers, the greater the wage disparity.

Although the pattern of interaction between job status and education is the same for men and women, the amount of income in each interaction is different. This demonstrates that, despite their significant participation, women

in the fisheries sector obtain lower yields and income than males and are left in a bad position.[32]

Figure 5 demonstrates that workers with no education earn the least compared to other education levels. In the informal sector, women with a bachelor's degree earn less than males with no education. Furthermore, in the formal sector, women with SHS education levels earn less than males with no schooling. This is corroborated by evidence from other research, which demonstrates that women earn 30–40% less than men for the same type and status of job.[33] Another study found that men have a greater degree of education than women due to women's limited access to education and training.[34] Because of this limitation, women are more likely to work in low-wage employment in the informal sector.[35]

(a) Women



(b) Men

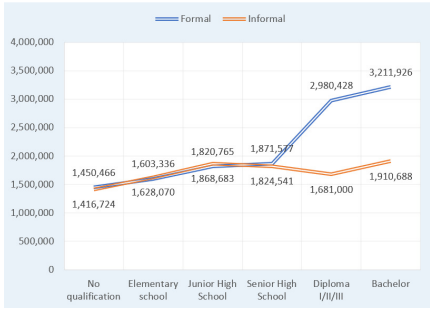


Figure 5
Association between Job Status and Education after Interaction

[32] Jackelline Siles et al., *Advancing Gender In The Environment: Gender In Fisheries—A Sea Of Opportunities* (Washington: International Union for Conservation of Nature, 2019).

[33] Florence Bonnet, Vicky Leung, and Juan Chacaltana, *Women and Men in the Informal Economy: A Statistical Picture* (Geneva: International Labour Organization, 2018).

[34] Kiyoshi Taniguchi and Alika Tuwo, *New Evidence on the Gender Wage Gap in Indonesia* (Manila: Asian Development Bank, 2014).

[35] Aekapol Chongvilaivan and Jungsuk Kim, "Individual Income Inequality and Its Drivers in Indonesia: A Theil Decomposition Reassessment," *Social Indicators Research* 126, no. 1 (2016): 79–98, https://doi.org/10.1007/s11205-015-0890-0.

D. Discussion

The Effect of a Better Education to the Gender Wage Gap

Young women and men have distinct times of transition into maturity. They are more likely to get married and to reside with their spouses, therefore they have less education and are less inclined to be employed.[36] Women with low levels of education are more likely to have informal employment with poor pay. However, since the mid-1980s, more women than males have entered higher education institutions. A better education assists a woman to obtain a prestigious position at work.[37]

Increasing educational attainment is one strategy for reaching economic equality between men and women in the fisheries sector.[38] ILO argues that Women's increased education level helps to a reduction in economic inequality. Equal access to education might increase human capital by enhancing skills, hence affecting future labour market results.[39]

The Effect of Work-Related Characteristics to the Gender Wage Gap

In addition to education, additional obstacles limit women's involvement and responsibilities in the fisheries subsector, contributing to the issue of gender inequality. Women have distinct roles, activities, knowledge, and information; thus, their access to and control over resources differ.[40] According to the above MLR analysis, hours worked, job status, and years worked have a

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[36] Cheryl Doss et al., "Women in Agriculture: Four Myths," *Global Food Security* 16 (2018): 69–74, https://doi.org/10.1016/j.gfs.2017.10.001.

[37] Hongfei Du, Ronnel B. King, and Peilian Chi, "Income Inequality Is Detrimental to Long-Term Well-Being: A Large-Scale Longitudinal Investigation in China," *Social Science & Medicine* 232, no. July (2019): 120–28, https://doi.org/10.1016/j.socscimed.2019.04.043.

[38] Francine D. Blau and Lawrence M. Kahn, "The Gender Wage Gap: Extent, Trends, and Explanations," *Journal of Economic Literature* 55, no. 3 (2017): 789–865, https://doi.org/10.1257/jel.20160995; Bonnet, Leung, and Chacaltana, *Women and Men in the Informal Economy: A Statistical Picture*.

[39] Yulinda Nurul Aini and Yanti Astrelina Purba, "Analisis Penyerapan Tenaga Kerja dan Program Link & Match pada Lulusan Sekolah Menengah Kejuruan (SMK) Program Kelautan & Perikanan," *Jurnal Kebijakan Sosial Ekonomi Kelautan dan Perikanan* 12, no. 1 (2022): 23–37, https://doi.org/10.15578/jksekp.v12 i1.10339; Zuzana Stofkova and Viera Sukalova, "Sustainable Development of Human Resources in Globalization Period," *Sustainability* 12, no. 18 (September 17, 2020): 7681, https://doi.org/10.3390/su12187681.

[40] Food and Agriculture Organization, *The State of World Fisheries and Aquaculture 2020* (Rome: Food and Agriculture Organization, 2020), https://doi.org/10.4060/ca9229en.

considerable effect on a worker's income. Other studies have found that work-related parameters, such as occupation, sector, and hours worked, account for more than fifty percent of the gender wage disparity.[41]

A study states that the income gap between men and women is only 15% in early careers.[42] Because job experience and skill acquisition are still at a minimum at this this stage, educational qualifications and school experiences are regarded as the most significant.[41] However, in advanced careers, work-related characteristics such as job status and the number of hours worked are important.

Job status might impact the income of fisheries. Those with formal worker status are paid more than those with informal worker status do.[43] This is one of the consequences of global integration and progress.[44] In addition, men were more likely than women to work in professional occupations, while women continued to hold traditionally female jobs.[45]

Male workers are physically more robust than female employees. Consequently, they generally participate in physically demanding jobs, such as fishing.[46] In contrast, women are deemed more suited for light and low-risk work.[47] They are more dexterous, hardworking, and precise, therefore they focus on post-production tasks, such as processing fishery products and packing, among others.[48]

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[41] Fuchs et al., "Where do women earn more than men? Explaining Regional Differences in the Gender Pay Gap."

[42] Margaret Mooney Marini, "Sex Differences in Earnings in The United States," *Annual Review of Sociology* 15, no. 1 (1989): 343–80, https://doi.org/10.1146/annurev.so.15.080189.002015.

[43] Edward Webster, Katherine Joynt, and Thabang Sefalafala, "Informalization and Decent Work: Labour's Challenge," *Progress in Development Studies* 16, no. 2 (2016): 203–18, https://doi.org/10.1177/1464993415623152.

[44] Hong Vo et al., "The Determinants of Gender Income Inequality in Vietnam: A Longitudinal Data Analysis."

[45] Blau and Kahn, "The Gender Wage Gap: Extent, Trends, and Explanations."

[46] Carolina T. Freitas et al., "Resource Co-Management as a Step towards Gender Equity in Fisheries," *Ecological Economics* 176 (2020): 106709, https://doi.org/10.1016/j.ecolecon.2020.106709.

[47] Kurniawati Hastuti Dewi et al., "Roles and Voices of Farmers in the 'Special Purpose' Forest Area in Indonesia: Strengthening Gender Responsive Policy," *Asian Journal of Women's Studies* 26, no. 4 (2020): 444–65, https://doi.org/10.1080/12259276.2020.1844972.

[48] Lydia C L Teh and U R Sumaila, "Contribution of Marine Fisheries to Worldwide Employment," *Fish and Fisheries* 14, no. 1 (2013): 77–88, https://doi.org/10.1111/j.1467-2979.2011.00450.x.

Even when they are working, women are frequently allocated low-paying employment.[49] In the meanwhile, skills are becoming a greater indicator of income. Men are more concentrated in higher-paying jobs, and women are more concentrated in lower-paying professions, according to another study.[50]

The FAO and World Fish Aquaculture Big Numbers research reveal that in developing nations such as Indonesia, more than forty percent of women are engaged in freshwater, cage, and household-based aquaculture.[51] According to the results of previous research, women are more likely to engage in consumer-facing activities, such as trading fish catch, processed fish, and other fisheries goods.[52] This disparity in job is also a contributing element to the salary discrepancy. This assumption is substantiated by research indicating that occupation accounts for 22% of the wage gap between men and women.[53]

In numerous developing Asian nations, similar to Indonesia, women perform post-harvest jobs such as fish handling, sorting, processing, drying, and marketing.[54] In China and Bangladesh, women catch fish alone or in tandem with men.[55] Due to the fact that the roles and relations of men and women are complimentary, assistance must be concentrated on these two roles in order to achieve objectives.

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[49] Heejung Chung and Tanja van der Lippe, "Flexible Working, Work–Life Balance, and Gender Equality: Introduction," *Social Indicators Research* 151, no. 2 (2020): 365–81, https://doi.org/10.1007/s11205-018-2025-x.

[50] Emilie Le Caous and Fenghueih Huarng, "Economic Complexity and the Mediating Effects of Income Inequality: Reaching Sustainable Development in Developing Countries," *Sustainability* 12, no. 5 (2020): 2089, https://doi.org/10.3390/su12052089.

[51] Sean C. Anderson et al., "Benefits and Risks of Diversification for Individual Fishers," *Proceedings of the National Academy of Sciences* 114, no. 40 (2017): 10797–802, https://doi.org/10.1073/pnas.1702506114.

[52] International Labour Organization, *World Employment and Social Outlook: Trends for Women 2017* (Geneva: International Labour Organization, 2017); Nhuong Tran et al., "Indonesian Aquaculture Futures: An Analysis of Fish Supply and Demand in Indonesia to 2030 and Role of Aquaculture Using the AsiaFish Model," *Marine Policy* 79 (2017): 25–32, https://doi.org/10.1016/j.marpol.2017.02.002.

[53] Marini, "Sex Differences in Earnings in The United States."

[54] Ifan Ariansyach, "Fisheries Country Profile: Indonesia," SEAFDEC - Southeast Asia Fisheries Development, 2017, http://www.seafdec.org/fisheries-country-profile-indonesia/.

[55] Kyoko Kusakabe, "Gender Issues in Small Scale Inland Fisheries in Asia: Women as an Important Source of Information," fao.org, 2021, https://www.fao.org/3/ad070e/ad070e08.htm#TopOfPage.

The Effect of Individual Characteristics to the Gender Wage Gap

According to the FAO, the majority of fisheries production activities in Indonesia are conducted within the scope of the household, with family members, including women, participating in fishing activities[56] In addition to educational and work-related factors, family formation, such as motherhood and marriage affects women's labour force participation and income inequality. According to a survey, women with children earn less than women without children. This criterion does not apply to men, as there is no income equivalent for fathers or single men.[57]

In the domestic domain, women play three roles: reproductive, community, and productive. Productive jobs include the production of commodities or services to satisfy household need. In terms of labour force reproduction, reproductive roles include childrearing, family care, etc. In contrast, community duties involve the maintenance and provision of common consumption, including health care, education, and housing requirements, among others.[58] Despite the fact that both men and women have various duties, males can accomplish their occupations sequentially while women conduct their jobs concurrently. In addition, women's working hours are shorter than men's due to their diverse roles. According to a research, women must divide their time between working, caring for children and elderly parents, and managing the household.[59] In contrast, these roles are not assigned to men.[60]

Another reason for women's lower income compared to men is that working women are seen as disrupting family norms, where men should act as the main breadwinners in the family.[61] In the fisheries sector, women generally

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[56] Food and Agriculture Organization, *The State of World Fisheries and Aquaculture 2020*.

[57] Zachary Van Winkle and Anette Eva Fasang, "Parenthood Wage Gaps Across the Life Course: A Comparison by Gender and Race," *Journal of Marriage and Family* 82, no. 5 (2020): 1515–33, https://doi.org/10.1111/jomf.12713.

[58] Abhinandan Kashyap, Samar Jyoti Chutia, Yashwanth B.S., et al., "Gender Issues in the Fisheries Sector of India," Network of Aquaculture Centres in Asia-Pasific, 2019, https://enaca.org/enclosure/?id=1070.

[59] Surbakti and Devasahayam, *Women and Girls in Indonesia: Progress and Challenges*.

[60] International Labour Organization, *Gender Equality and Decent Work: Selected ILO Conventions and Recommendations That Promote Gender Equality as of 2012*.

[61] James M. Raymo et al., "Marriage and Family in East Asia: Continuity and Change," *Annual Review of Sociology* 41, no. 1 (2015): 471–92, https://doi.org/10.1146/annurev-soc-073014-112428.

do unpaid work (helping their husbands), such as preparing fishing equipment, selling fish catch, and various other jobs.[62] Meanwhile, men are generally engaged in paid work.[63] With this status, women are mostly positioned in supporting roles, while the responsibility and decision-making are carried out by men.[64]

In addition, women are unable to follow the vocations or careers of their preference.[65] This state is a result of culture or ideology that has determined which occupations are suitable for women[66]. It is believed that women's participation in the labour field erodes men's role as the major breadwinners in their households.[66] Meanwhile, according to a research, women's participation in economic activities is a kind of emancipation and empowerment.[67] Social transformation through construction and gender roles can equalize the roles of men and women, both in the labour and domestic markets.

Gender equality is required since it is essential for making significant contributions to the fisheries sector. It has the potential to bring about several advantages, including increased fisheries output and household income.[68] Thus, women can contribute to the attainment of the Sustainable Development Goals (SDGs) by fostering equitable and sustainable economic growth and ensuring that everyone has access to adequate available jobs.[69] To sustain women's position in

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[62] Fuat Edi Kurniawan and Yulinda Nurul Aini, "Mapping of Changes in the Utilization of Marine Resources in the Small-Scale Fisheries Subsector in Indonesia (2008-2017)," *Jurnal Perikanan Universitas Gadjah Mada* 24, no. 1 (2022): 21–29, https://doi.org/10.22146/jfs.68659.

[63] World Fish Center, "Why Gender Equality Matters in Fisheries and Aquaculture," worldfishcenter.org (World Fish Center, 2016), https://worldfishcenter.org/pages/why-gender-equality-matters-fisheries-aquaculture/.

[64] Luna K. C., Gemma Van Der Haar, and Dorothea Hilhorst, "Changing Gender Role: Women's Livelihoods, Conflict and Post-Conflict Security in Nepal," *Journal of Asian Security and International Affairs* 4, no. 2 (2017): 175–95, https://doi.org/10.1177/2347797017710743.

[65] Funmi (Olufunmilola) Ojediran and Alistair Anderson, "Women's Entrepreneurship in the Global South: Empowering and Emancipating?," *Administrative Sciences* 10, no. 4 (2020): 87, https://doi.org/10.3390/admsci10040087.

[66] Baranowska-Rataj and Matysiak, "Family Size and Men's Labor Market Outcomes: Do Social Beliefs About Men's Roles in the Family Matter?"

[67] A. M. M. Chandrika, "Feminism and Emancipation: Influence of Feminist Ideas on Women's Socio-Economic and Political Liberation in Sri Lanka," *Sociology Mind* 09, no. 04 (2019): 302–15, https://doi.org/10.4236/sm.2019.94020.

[68] Dewi et al., "Roles and Voices of Farmers in the 'Special Purpose' Forest Area in Indonesia: Strengthening Gender Responsive Policy."

[69] WWF, "Fisheries Management and Gender," 2012.

economic activities, human capital, such as education and competitiveness, must also be enhanced. Ultimately, an increase in education, full-time labour market experience, and occupational status will lessen the wage gap between men and women.

E. Conclusion

According to the above study, the average Indonesian fisherman is between 35 and 44 years old, has a primary school education, lives in a family with three to five members, is working in the informal sector, and works fewer than 30 hours per week. The workers with a diploma in education between the ages of 35 and 44 with the greatest average income are those with an educational degree. In all variable categories, descriptive data reveal a wage discrepancy between women and men. The same conclusion is reinforced by multiple linear regression analysis. The MLR model also indicates that age, working hours, and years worked have a positive and statistically significant relationship with worker compensation. In addition, the interaction model between education and job status generates important factors. However, there is a gap in income between men and women at all interaction points, despite the same pattern. In addition to schooling, job status also produces a gender-based wage disparity, with formal and informal women employees earning less than males, particularly at the diploma level and higher. This issue is one of the causes of gender inequality, which results in women's subordination to males, work at lower levels, longer hours, and lower wages. In the fisheries sector, for instance, women are assigned to unpaid/household-based and low-paying positions. The role and contribution of women in fishing are fairly significant. All operations in the fisheries sector can accomplish strategies and interventions for growth and improved management by acknowledging the role of women. In addition, increasing women's educational attainment is essential and needs to be complemented with expanded involvement in the labour market. The government program and policy formulation must be adapted to the needs and roles of women in the fisheries sector at both the community and government levels. In addition, women should participate in all levels of decision-making, including resource management, integration into fisheries development, and others.

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