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Do Socioeconomic Factors Determine Chronic Multidimensional Poverty? Evidence from Labor Fishers' Households in Bengkulu Province, Indonesia

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ABSTRACT

Poverty and welfare are multidimensional. Poverty does not only mean economic hardship but also a failure to fulfill fundamental rights and face different treatment, ultimately affecting the ability to lead a dignified life. This research aimed to measure, calculate, and analyze multidimensional chronic poverty using the multidimensional poverty index (MPI) calculation and examine the socio-economic factors determining multidimensional chronic poverty at the household level using a logistic regression model. This research was conducted in the coastal area of Bengkulu and involved 100 labor fishing households that carried out one-day fishing activities. The research results showed that most fishing households experience chronic multidimensional poverty, remain highly dependent on subsidized fuel provided by the Indonesian Government for the poor, and face significant challenges in obtaining clean water, particularly for labor-intensive fishing households. Education level and number of family dependents determine multidimensional chronic poverty. The government and authorities must be able to assist in the form of capital and working tools to working fishermen, enabling them to be independent in carrying out their fishery business, not dependent on others or freeloaders, and escape the status of being the "poorest of the poor."

INTRODUCTION

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Poverty is a condition of inability to fulfill the minimum demands of life. Poverty is a multifaceted, cross-sectoral, and cross-generational problem, therefore efforts to overcome it require a comprehensive, integrated, and sustainable approach (**Rejekiningsih**, 2011). Various correlated factors influence poverty, so it becomes a complex problem with a multidimensional nature. The multifaceted nature of poverty makes it a pervasive problem worldwide, requiring multidimensional problem-solving approaches (Battiston et al., 2013). In contrast, chronic poverty reflects a more fundamental inability to raise long-term living standards (McCulloch & Baulch, 2000),

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so identifying the chronically and transiently poor populations is of paramount importance for policy responses (Lybbert *et al.*, 2004; Barrett & Carter, 2006).

The central government has attempted to reduce poverty levels through various programs. The Sustainable Development Goals (SDGs) are a replacement program. The Millennium Development Goals (MDGs) have made poverty a key agenda item since 2015. Poverty is not only a disability in the economic sector but also a failure in efforts to fulfill fundamental rights in a dignified life, as stated in the National Medium Term Development Plan (RPJMN) 2004-2009. Indonesia faces the problem of poverty, including in Bengkulu Province, situated on the island of Sumatra. Generally, Bengkulu Province occupies the second position as the poorest province on the island of Sumatra. According to data from the Central Statistics Agency (BPS), 14.43% of the population of Bengkulu Province, or approximately 29,179 people, are considered poor. This causes Bengkulu to occupy the second position after Aceh Province as the poorest province on the island of Sumatra (Fig. 1).



Fig. 1. Provincial poverty severity index on Sumatra Island

Bengkulu Province has rich marine potential. This fact is supported by data from the **Ministry of Maritime Affairs and Fisheries (2018)** regarding investment opportunities and business potential in Bengkulu Province. Bengkulu Province has the longest coastline in Indonesia, measuring approximately 525km, and directly borders the potential Indian Ocean. Bengkulu's marine fisheries have the potential of 126,217 tonnes per year, with a utilization of 21,421 tonnes, meaning only 16.97% of the total potential is utilized. Bengkulu Province is a province on the island of Sumatra, comprising one city, nine districts, one town, and six coastal areas that border the sea. Such a strategic location

gives Bengkulu Province great potential in the maritime sector. This should ensure the welfare of the people of Bengkulu, especially those in the fishing profession.

Population growth is continuously increasing, resulting in increasingly narrow land availability. Using the sea and the fishing profession should be a hopeful prospect. Fishermen are a group of people who depend on marine products for their livelihood. Despite having potential marine wealth, poverty persists in the coastal fishing communities of Bengkulu. According to **Retno and Santiasih** (**1993**), although fishermen, in general, cannot be said to be poor, within the agricultural sector, they are classified as the poorest social layer of society, especially fishing workers and traditional fishermen.

Poverty in fishing communities is a complex problem. One cause is that fishers need more certainty about the results of carrying out their business in harsh conditions. Compared to other economic development sectors, fishers' welfare occupies the lowest strata (Rahim & Hastuti, 2016; Mulyasari et al., 2018). Fishermen often receive the nickname "the poorest of the poor" among other marginalized groups due to the severity of their poverty. The coastal fishing community includes several groups and levels of social status, namely land skippers, sea skippers, and labor fishermen. Laborers are active workers who catch fish in the sea to meet their daily needs, but they still require adequate capital and production facilities. Working by utilizing and relying on other people's fishing gear due to the inability to own it personally makes fishermen workers reliant solely on their labor. Hence, laborers are generally the poorest group in the fishing community. There has been considerable research into fishermen's poverty, but few studies have employed a multidimensional approach to address complex poverty issues that encompass multiple dimensions. On this basis, it was necessary to research the poverty of labor fishermen using a multidimensional approach, as well as the factors that influence poverty among labor fishermen in the coastal areas of Bengkulu City, the center of study and capital of Bengkulu Province.

MATERIALS AND METHODS

1. Description of the study area

The location of this research was deliberately chosen (purposive) in Bengkulu City (Fig. 2), as the center and capital of Bengkulu Province. This province is the second poorest on the island of Sumatra and the seventh poorest in Indonesia, with a poverty rate of 14.62% based on 2022 BPS data. According to 2020 Central Statistics Agency data, in 2022, the percentage of poverty among people in Bengkulu City is expected to be higher than in Bengkulu Province, and potentially even higher than the national poverty rate for Indonesia.



Fig. 2. Research area

Fig. (3) also shows that in recent years, the high level of poverty in Bengkulu City has remained relatively high. Therefore, identifying the causes of poverty in Bengkulu City and implementing effective policies to address it is essential. Another consideration was that this location was chosen because it is situated in a coastal area directly bordering the Indian Ocean, where most people work as fishermen. This is supported by the argument of **Pramudyasmono** *et al.* (2012), who explains that the majority of poor people in Bengkulu City have a livelihood as fishers, laborers, or coolies (unskilled workers), as well as small traders (micro-businesses). Apart from that, this location also features a port and a fish auction place (TPI), serving as a hub for economic activities in the fisheries sector, making it an ideal location for research. Research data were collected from coastal areas in Bengkulu City, including Baai Island, Malabro, and Pasar Bengkulu. The study was conducted over three months, from December 2022 to February 2023.





2. Sampling and data collection

Sampling in this research employed accidental sampling. Accidental sampling is a sampling technique that is based on chance; that is, anyone who coincidentally or accidentally meets the researcher can be used as a sample if it is seen that the person they meet by chance is suitable as a data source with the criteria being a working fisherman who is married to daily activities (one-day fishing) and does not own a boat. This technique is used because researchers have limitations in knowing the exact number of a substantial population. The sample size in this research was determined using the MOE formula, with an error rate of 10% for a large population and an unknown number (**Arikunto, 2013**). Therefore, the number of respondents was 100 working fishermen.

Data were collected using a questionnaire containing several written and structured questions to collect information from labor fishers. The questionnaire was divided into three main parts: the first part collected respondents' demographic information, including their age, education level, fishing experience, household size, income, and side jobs. The second part collected the characteristics of the small-scale fishery, including boat power, fishing days, fishing time, fishing distance, catch capacity, fishers' group membership, access to climate information, and access to credit. The final section of the questionnaire assesses chronic multidimensional poverty using the multidimensional poverty index (MPI) indicator.

3. Data analysis

This research employed MPI to analyze chronic poverty among fishing workers in a multidimensional manner. MPI analyzes the universal structure of poverty in terms of education, health, and quality of life, not only from income or consumption, with the opportunity to adapt and develop MPI indicators based on the characteristics of poverty that occur in each country (Alkire & Foster, 2010) as long as they do not conflict with the MPI and MDGs context, a proxy for the implementation of these indicators in Indonesia is carried out (Table 1).

A binary logit model was used to analyze the factors determining the multidimensional chronic poverty of labor fishermen in the coastal area of Bengkulu. Binary logistic regression analysis was employed because the dependent variable in this study is nominal, with two categories: 1 = chronic poor and 0 = not poor or almost poor (Mulyasari et al., 2019). Previous research states that various socio-economic variables and fishery-related attributes influence multidimensional chronic poverty. Table (2) provides a detailed description of these dependent explanatory variables.

Dimension	Indicators	Threshold
Health	Nutrient	Code 1: There are cases of malnutrition in the family KenMenKes RI No:
Tieditii	rutrient	1995/Menkes/SK/XII/2010
	Child	Code 1: Some toddlers die in families within <5 years, OPHI in Prakarsa 2015.
	mortality	
Education	Years of	Code 1: No family member has completed compulsory education for at least 12
	education	years (Elementary School, High School, or High School equivalent), as stated
		in UU No. 20 Tahun 2003 regarding the National Education System in
		Indonesia.
	Child	Code 1: Family members in the student age category (6-21 years) who do not
	School	actively participate in education or attend school, as per Joint Regulation No. 7
	Attendance	of 2014.
Living	Cooking	Code 1: If the household uses cooking fuel in the form of kerosene, LPG 3 kg,
Standards	fuel	briquettes, charcoal, and firewood,
	Access to	Code 1: have inadequate sanitation access conditions, toilets connected to open
	Sanitation	sewers (do not have septic tanks) or have proper sanitary conditions but shared
		with other families, OPHI in Prakarsa 2015
	Access to	Code 1: Having inappropriate access to clean water, namely unprotected
	Water	wells/springs, rivers, and protected water sources within a distance of less than
		10 m from the septic tank, as reported by OPHI in Prakarsa (2015).
	Access to	Code 1: The primary lighting source is not electricity or electricity with a
	Electricity	minimum power of 450 watts, as specified in OPHI & PERMENPERA No. 22
		of 2008, Minimum Service Standards in the Field of Public Housing in
		Provincial and Regency/City Areas.
	Housing	Code 1: The most expensive floor has an unappealing impression, namely the
		type of soil floor or low-quality wood/bamboo, as noted by OPHI in Prakarsa
		2015.
	Asset	Code 1: does not have at least one information asset and at least one asset from
		the mobility asset group or supporting assets.
Source: SUS	SENAS data pi	rocessing results, 2016.

Table 1. Indonesian MPI dimension and indicator weights

Before estimating the binary logit model, it was necessary to determine whether the selected explanatory variables were associated or correlated with each other. This was done using the variance inflation factor (VIF) and contingency coefficient (CC) to assess the multicollinearity effect and any associations between the continuous explanatory variables (Fig. 4). According to Midi et al. (2010), multicollinearity may significantly impact the parameter estimates of the logit model.

Table 2. Description of the variables							
Variables Measurement		Expected	Mean	S.D.			
		Sign					
Years of schooling	Total number of years of formal education	-	7.72	3.16			
Age	The number of years from birth	+/-	43.62	10.54			
Fishing experience	Total number of years as a labour fisher	-	19.39	11.34			
Household Size	Size of respondent's household	+	2.84	1.06			
Side job	Dummy $(1 = \text{have side job}, 0 = \text{no side job})$	-	0.86	0.35			
Fishing distance	The average fishing distance	+/-	11.47	8.70			
Fishing days	Total number of days of fishing activity	+/-	17.43	3.43			

Table 2.	Descrip	tion of	the	variables
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Coefficients ^a						
Model		Collinearity	y Statistics			
		Tolerance	VIF			
	Years_Of_Schooling	,859	1,164			
	Age	,453	2,207			
	Fishing_Experience	,424	2,361			
1	Household_Size	,936	1,068			
	Side_Job	,898	1,114			
	Fishing_Distance	,892	1,120			
	Fishing_Days	,899	1,112			

a. Dependent Variable: Multidimensional Poverty Index

Fig. 4. The result of multicollinearity

4. Characteristics of labor fishers

The socioeconomic characteristics of the respondents and their households include age, years of schooling, fishing experience, household size, fishing income, side jobs, fishing hours, fishing days, and membership in a fishers' group (Fig. 5).





Fig. 5. Percentage of the respondents based on sociodemographic characteristics (source: field survey, 2023): (a) age (years), (b) years of schooling (years), (c) experience (years), (d) household size (person), (e) fishing income, (f) side job, (g) Fishing time (hours), (h) Fishing days (days), and (i) Group membership

RESULTS AND DISCUSSION

Chronic multidimensional poverty of labor fishers' households

The Indonesian version of the multidimensional poverty index (MPI) method used in this research measures chronic poverty. It is designed with characteristics that reflect the needs of poor families worldwide, in both developed and developing countries, and has been adapted for use in Indonesia. Based on the poverty analysis of labor fishers' households on the coast of Bengkulu City using the Indonesian version of the MPI (Fig. 6), most households are categorized as chronically poor (45%).



Fig. 6. Percentage of chronic multidimensional poverty of labor Fisher's households Source: Primary data is processed, 2023

The indicators for measuring poverty in the Indonesian version of the MPI, which indicate the highest percentage of deprivation, are fuel for cooking (100%), access to clean water (70%), and access to healthy nutrition (65%) (Table 3). In the indicator of cooking fuel, all households of coastal labor fishermen in Bengkulu City use government-subsidized 3kg LPG cooking fuel, which is categorized as a poor household. Reporting from the Directorate General of Oil and Gas, Ministry of Energy and Mineral Resources, government-subsidized 3kg LPG gas is included in the category of poor households in the Indonesian version of the MPI calculation because it is based on its designation for poor families and micro-businesses as communities with the lowest level of welfare. Thus, the 3kg LPG gas distribution is a Pertamina PSO product designed for low-income individuals and small entrepreneurs (**Rahmi et al., 2020**).

The second most significant indicator of poverty deprivation generally experienced by poor fishing households in Bengkulu City is the clean water indicator. Deprivation of clean water in the Indonesian version of MPI poverty refers to a household that obtains water from unprotected wells, springs, rivers, or unprotected water sources, or those that are protected but located at a distance of less than 10m from a septic tank, or that lack proper access to clean water. Most labor fishers households on the coast of Bengkulu City use unprotected water sources, which generally come from wells. The use of unprotected clean water sources can impact other aspects of poverty, particularly the health dimension. This means that fishing households on the coast of Bengkulu City will continue to be trapped in multidimensional poverty. This argument is also supported by **Tamana (2018)**. In his research, households with the most access to clean drinking water, namely 13.63%, were predominantly from the wealthy income category and resided in cities. Likewise, with access to clean drinking water, poor

individuals in the ten research areas tend to have less access than their non-poor counterparts.

Health is a fundamental human right and has a strong correlation with poverty. Health nutrition is the third largest indicator of poverty in fishing households on the coast of Bengkulu City, according to the Indonesian version of the MPI. Coastal fishing households in Bengkulu City are classified as poor nutritional households because at least one case of malnutrition is reported in every fishing household. This is based on research by **Rana** *et al.* (2023), who stated that a reciprocal relationship exists between ill health and poverty, where one can exacerbate the other. Poverty is the primary cause of malnutrition in many parts of the world. A household's limitations result in limited food, which is a limited source of nutrition, both in terms of quantity and quality. Cases of malnutrition or undernutrition in this study were identified based on nutritional status, measured by calculating the body mass index (BMI) for adults and the body weight-toheight ratio (BW/U) for children under five.

The other seven poverty indicators of the Indonesian version of the MPI have less than 50% deprivation; however, this remains the main focus in analyzing multidimensional poverty, which must be addressed immediately. Years of education is the highest indicator of poverty deprivation in the education sector, namely at 36%, and non-poverty deprivation at 64%. Poor households deprived of this indicator are fishermen's labor households on the coast of Bengkulu City, where none of the family members has completed a minimum of 12 years of compulsory education or graduated from high school/equivalent level. According to **Susanto and Pangesti (2019)**, the level of education can be used as an indicator to determine a population's welfare and poverty level. The higher a person's level of education, the better the quality of their human resources. Education is the most crucial factor that can help someone escape poverty. The relationship between poverty and education is extensive because education provides the ability to develop through mastery of knowledge and skills (**Suryawati, 2005**).

					1	•	<i>,</i>	
Dimension/Indicator	Chronic Poor		Almost Poor		Not Poor		Σ	
	D	ND	D	ND	D	ND	D	ND
Health Dimension								
Health Nutrition	40	5	10	12	15	18	65	35
Child Mortality	4	41	0	22	0	33	4	96
Education Dimension								
Years of Schooling	24	21	5	17	7	26	36	64
Child School Attendance	12	33	0	22	0	33	12	88
Living Standard Assets								
Access to Water	33	12	13	9	24	9	70	30
Access to Sanitation	11	34	1	21	1	32	13	87
Access to Electricity	2	43	0	22	1	32	3	97
Cooking Fuel	45	0	22	0	33	0	100	0
• Assets	9	36	4	18	0	33	13	87
Housing	5	41	0	22	2	31	7	93

Table 3. Dimension-wise chronic multidimensional poverty (%)

Source: Primary data, 2023. D: Deprived, ND: Non-deprived

Determinants of chronic multidimensional poverty

Binary logistic regression has been used to identify factors determining labor fishers' chronic multidimensional poverty. Labor fishers' poverty is a discrete value (1, 0). One (1) denotes labor fishers who are categorized as chronically poor. In contrast, zero (0) denotes labor fishers categorized as neither poor nor almost poor (the data for binary logistic regression can be found in the supplementary file).

Years of schooling (coefficient = -2.61, P < 0.001) and household size (coefficient = 1.79, P < 0.10) both had a significant effect on chronic multidimensional poverty. The coefficient value for the education variable is negative (Table 4), which means that every year, the increase in the level of education in labor fishers households has the opportunity to reduce the poverty level of labor fishers households on the coast of Bengkulu City by 26.1% provided that the other independent variables are fixed. Education level has a significant impact on poverty. The same point was made by Sari (2012), the higher the education level of the household head, the higher the family's income. Conversely, a lower education level among the household heads will result in a lower household income. Therefore, the education level of the household head has a negative correlation with household poverty. This argument is also supported by the low educational background of fishermen workers on the coast of Bengkulu City (Table 2). It has been proven that the academic level of labor fishermen on the coast of Bengkulu City remains relatively low, with only elementary school completion or incomplete junior high school education, averaging seven years of education. Research by Nurhayani and Hodijah (2018) also indicates that parents' low income contributes to fishermen's low level of education. Hence, they cannot afford to support their children at a higher level of education. This results in fishermen's children having to help earn a living so that working as a fisherman is hereditary, and poverty in fishermen's households will continue.

Variables	Odds ratio	Std. error	Z	$P>\left _{Z}\right $
Cons	3.308	6.852	0.58	0.564 ^{ns}
Years of schooling	0.794	0.070	-2.61	0.009^{***}
Age	0.965	0.031	-1.08	0.280 ^{ns}
Fishing experience	0.999	0.031	-0.05	0.964 ^{ns}
Household size	1.520	0.355	1.79	0.074^{*}
Side job	0.663	0.431	-0.63	0.528 ^{ns}
Fishing distance	0.981	0.027	-0.69	0.491 ^{ns}
Fishing days	1.050	0.072	0.71	0.475 ^{ns}
Number of $obs = 100$				
Log likelihood = -58.859				
LR $Chi^2(7) = 12.97$				
$Prob > Chi^2 = 0.0729^*$				
Pseudo $R^2 = 0.0992$				

Table 4. Results of binary logistic regression of chronic multidimensional poverty

Source: Field survey, 2023. Software: STATA version 15. ns: not significant. ***Significant at 1%. *Significant at 10%.

The coefficient value of the household size variable is positive (Table 4), which means that for every increase of 1 family dependent in a household of labor fishermen on the coast of Bengkulu City, there is an opportunity to increase the household's poverty by 17.9% provided that the other independent variables are fixed. The positive relationship between the number of dependents and household poverty is supported by research by **Nasir** *et al.* (2008), which states a positive relationship between the number of dependents and household poverty. The more family dependents in a fishing household, the higher the expenditure must be incurred to meet the family's needs. With low income and relatively challenging to increase, this will increase poverty in fishing households. The findings by **Mok** *et al.* (2010) similarly indicate that a greater number of dependents in a household—including children, unemployed adults of working age, and elderly members—negatively impacts household welfare and consequently increases poverty.

Overall, variables such as years of schooling, age, fishing experience, household size, side job, fishing distance, and fishing days simultaneously (Prob > Chi^2 , P < 0.1) significantly affected chronic multidimensional poverty with a determinant coefficient of 9.92%.

CONCLUSION

The findings of this study quantify and highlight the chronic, multidimensional poverty of labor fishermen, a phenomenon that has not been previously calculated to assess poverty. Poverty is a matter of income and the in ability to fulfill basic needs, including education, health, and living standards. The results of the analysis indicated that the majority of fishing workers experienced chronic poverty, and some almost experienced chronic poverty. Multidimensional poverty indicators reveal that access to healthy nutrition, water, and cooking fuel is a significant challenge for fishing worker households. Dependence on subsidized LPG gas from the government, intended for lowincome households, suggests that fishing workers' households are limited in their cooking fuel options. Apart from that, fishing workers' households also need proper access to clean water supplies. The use of inadequate clean water sources can impact other aspects of poverty, particularly the health dimension. This means that fishing households on the coast of Bengkulu City will continue to be trapped in multidimensional poverty. The multidimensional chronic poverty of fishing workers is also influenced by socioeconomic factors such as years of schooling and household size. Education level has a significant impact on poverty. Apart from that, the more family dependents there are in a fishing household, the higher the expenditure must be to meet the family's needs. With low income being relatively challenging to increase, this will exacerbate poverty in fishing households.

These findings suggest that measuring poverty using a multidimensional approach yields more comprehensive and accurate calculation results than a single-dimensional approach. These results have implications for policymakers, who can use a multidimensional approach to poverty assessment. The government and NGOs can assist labor fishers with capital and working tools, enabling them to be independent in their business, not dependent on or freeloading from others, and free from the status of being the "poorest of the poor." For the households of labor fishermen on the coast of Bengkulu City, it is hoped that the wives of labor fishermen will be able to participate in work according to their abilities, helping to overcome poverty in their households and prioritizing their children's formal education as an effort to break the cycle of poverty.

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