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ANALYSIS OF FACTORS AFFECTING THE LEVEL OF SURVIVAL OF FISHERMEN IN JANGKA DISTRICT, BIREUEN REGENCY

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ABSTRACT

Indonesia's fisheries and marine resources have a very important role, but abundant marine resources are not matched by the better life of coastal communities. Limited access and loss of living assets are serious problems faced by poor people in coastal areas, thus affecting their livelihoods. This research was conducted in Masa District, Bireuen Regency from July to November 2022. Purposive determination of the location of the study considering that the sub-district is one of the areas with the highest number of fishing households in Bireuen Regency. The population of capture fishermen was 9,432 people, and the number of samples obtained was 120 fishermen. The sampling method uses accidental sampling techniques. The data in this study will be analyzed with the SEM (*Structural Equation Modeling) Model*. The purpose of this study is to analyze the factors that affect the level of sustainability of fishermen's lives in Masa District, Bireuen Regency, and analyze the relationship between vulnerability, life assets, strategies and the sustainability of fishermen's lives. Based on the results of the study, it was found that the factors that affect the sustainability of fishermen's lives are life strategies and ownership of living assets. The fourth relationship is that increased vulnerability positively affects fishermen's living assets, increasing the availability of living assets positively affects fishermen's life strategies. Increasing ownership of living assets positively affects the sustainability of fishermen's lives and increasing life strategies positively affects the sustainability of fishermen's lives.

Keywords: Sustainability of life; Fishermen; Jangka District

INTRODUCTION

Fisheries resources in Indonesia have a very important and strategic role for the nation's national development both from economic, social, security and ecological aspects. Judging from the total volume of Indonesian fisheries production in 2019 as much as 23,006,152 tons / year. From capture fisheries, subtotal production reached 6,981,935 tons / year and from aquaculture as much as 16,114,217 tons / year (Dinas Kelautan dan Perikanan Aceh, 2019). However, abundant marine resources are not matched by the better life of coastal communities. There are 6771 fishermen in Bireuen Regency, and of these there are 4767 people whose permanent jobs are as fishermen, and 901 people as side jobs and there are 1103 fishermen owners (BPS, 2019). Masa sub-district is one of the sub-districts in Bireuen regency which has the third highest number of fishermen out of 10 other sub-districts.

However, it is generally known that fishing communities are faced with limited access and the loss of living assets is a serious problem for the poor in coastal areas. In addition, low education can also contribute to increased vulnerability due to them not being able to have high efficiency and not being able to compete to achieve a better life (Lisna et al. 2012). Government policies towards development that are less pro-poor also cause them to be increasingly marginalized so that there is no opportunity to also make decisions in resource management and increasingly difficult with natural conditions that are less conducive and the threat of various disease outbreaks and natural disasters that can come at any time causing threats to the sustainability of their lives.

Community life can be said to be sustainable if it is able to overcome and deal with various forms of vulnerability. But the reality is that until now many people living in coastal areas have not been able to cope and face various forms of vulnerability, so they are still trapped in poverty so that the level of sustainability of their lives is still inadequate (Slamet Widodo, 2011). Fisherman/coastal villages in the form of social, economic, ecological and cultural entities, which are the boundary between land and sea, in which there is a collection of people with certain patterns of life and behavior and characteristics (Rosni, 2017) and are always faced with the problems of their lives. In

short, the preservation of life is when they are able to overcome obstacles and losses that arise at any time, both anticipated and unthinkable beforea (Sati & Vangchhia, 2017).

Like other fishing communities, fishermen in Masa District, Bireuen Regency also experience various types of vulnerabilities and asset limitations. Where this situation can affect the sustainability of life both economically and socially. This situation will certainly have an impact on the welfare of fishermen's families in Masa District, Bireuen Regency. Life sustainability cannot be realized if coastal communities have not been able to overcome various forms of vulnerability and limited access to various living assets owned by fishermen.

With regard to the problem of the sustainability of fishermen's lives, one of the approaches used to determine the characteristics of fishing communities while assessing the sustainability of life is the approach (Sustainable Livelihood Approach (SLA)). This approach has been widely used by other researchers, but not many have used quantitative methods, especially with *Structural Equation Modeling* (SEM). While the research conducted by (Sahri, M., Mashudi, & Sukoharsono, 2011) and Naning (2013) more emphasis on one asset accessibility factor. This approach explains that there are several factors that affect the sustainability of life, including vulnerability factors, living assets and strategies used to get a sustainable life. This study will analyze simultaneously the four factors. Therefore, it is necessary to conduct research

The objectives of this study are (1) Analyzing factors that affect the level of sustainability of fishermen's lives in Bireuen District, and (2) Analyzing the relationship between vulnerability, life assets, strategies and life outcomes (life sustainability) of fishermen.

RESEARCH METHOD

This research was conducted in Bireuen District, Aceh Province, namely in Masa District, Bireuen Regency. The determination of the location of the study was carried out purposively or deliberately with the consideration that the sub-district is one of the areas with a considerable number of fishing households in Bireuen Regency, which is as many as 659 households. This study was conducted from July to November 2022. The total population of capture fishermen in Bireuen Regency is 9,432 people, using the Taro Yamane formula, the number of samples is obtained as many as 120 fishermen. The sampling method uses Accidental Sampling technique, which is a technique of determining samples by chance. This study used primary data obtained directly through interviews and questioners from fishermen. Secondary data are obtained from the Marine Service, Central Statistics Agency, Agricultural Extension Center and other related agencies

The data in this study will be analyzed with the SEM Model (*Structural Equation Modeling*) or Structured Equation Model (MPB). MPB is used to analyze the relationship between the various assets owned by fishermen, the strategies carried out and the livelihoods they obtain. This research will use a structured equation method which is a combination of factor analysis and regression.

Measurement Model

The determination model known as factor validation analysis is a process that allows researchers to use several indicators to obtain independent variables called latent factors or latent constructs. This model of determination contains constructs that have no causal relationship and correlation between them. Each latent variable is modeled as the underlying factor of the related variable (Andriani, 2013) dan (Byrne, 2016). Loading factors that relate latent variables to known variables are labeled λ ("lambda"). The error in the measurement model is denoted by ξ (ksi). The measurement model can be illustrated in Figure 1.

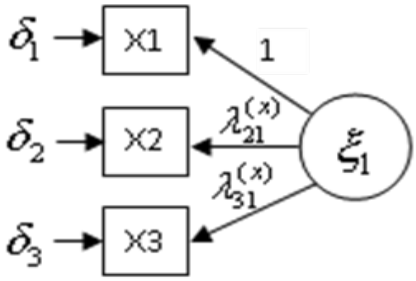

Figure 1
SEM Measurement Model

Structural Model

Structured models emphasize relationships between latent variables. In the determination model this relationship refers to the relationship between factors and indicators. Conversely, structured models can show the relationship between the independent variable and the dependent variable in multiple regression analysis (Santoso, 2011).

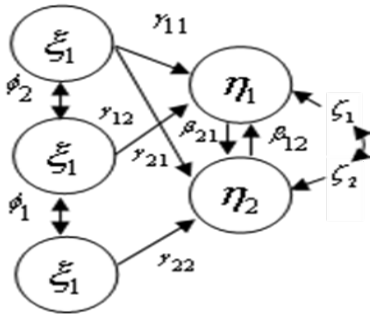

Figure 2
The SEM Structural model drawing follows, and will be analyzed using model SEM.

This study uses the following study framework:

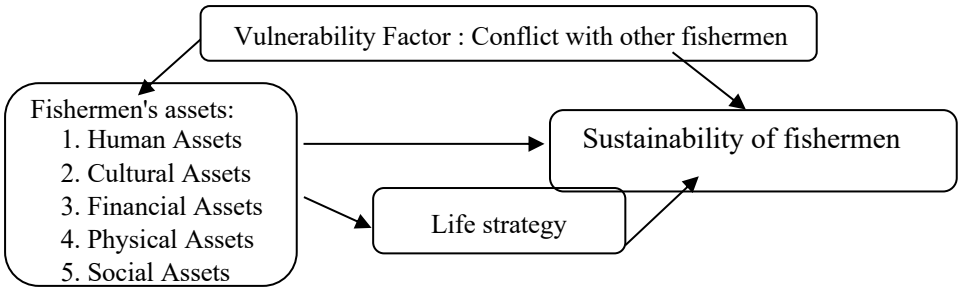

Figure 3
Study Analysis Framework

RESULTS AND DISCUSSION

Testing of Determinants of Fishermen's Life Sustainability

In accordance with the research model that has been developed, this study was conducted to test the determinants of fishermen's survival using a structural equation model (SEM). Full model analysis conducted to test the hypothesis of the determinants of the sustainability of fishermen's lives, using the AMOS (Analysis of Moment Structure) program whose results can be seen in the following figure :

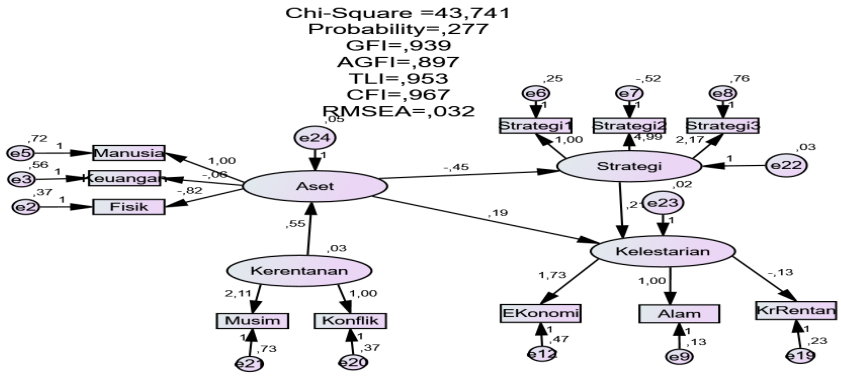

Figure 4
Early models of Structured Equations

Model Conformity Test

The results of the model conformity index analysis can be seen in Table 1. The chi square value (43.741) is already relatively low, indicating that the observed covariance matrix differs markedly from the predicted one and this results in a probability smaller than the significance level (0.277). However, because the Chi Square value is very sensitive to the number of samples, it is necessary to look at other index values (Sati & Vangchhia, 2017), (McDonald & Marsh, 1990) and (Byrne, 2016). Most model conformance indices have met the required cut-off values (RMSEA, GFI, TLI and CFI, AGFI and CMIN/DF), and only AGFI shows marginal acceptance. The results of this model conformity index indicate that the model is adequate.

Table 1
Conformity Index Results Initial model of Structured Equations

Goodness of fit Index	Cut-off value	Analysis results	Evaluation
Chi square	Diharapkan kecil	43,741	Good
Probability	≥ 0,05	0,277	Good
RMSEA	≤ 0,08	0,032	Good
GFI	≥ 0,90	0,939	Good
AGFI	≥ 0,90	0,897	Marginal
CMIN/DF	≤ 2,00	1,122	Good
TLI	≥ 0,95	0,953	Good
CFI	≥ 0,95	0,967	Good

Source : primary data, processed (2022)

Therefore, the value of the modification index is seen as a consideration of whether the developed model needs to be modified or not (Carrasco, 2010). Based on the output of the AMOS program, the modified index values can be seen in the following table.

Table 2
Covariances: Modification Index

			M.I.	Par Change
e20	<-->	e23	4,409	,037
e9	<-->	e20	4,279	,046
e8	<-->	e20	4,353	-,080
e3	<-->	e21	4,998	,140
e2	<-->	e19	4,319	-,055

Source : primary data, processed (2022)

Shown in Table 2 the value of MI is quite small, but there appear three times, namely e20. Based on these values, these variables are tried to be connected, the results of which can be seen in the following figure:

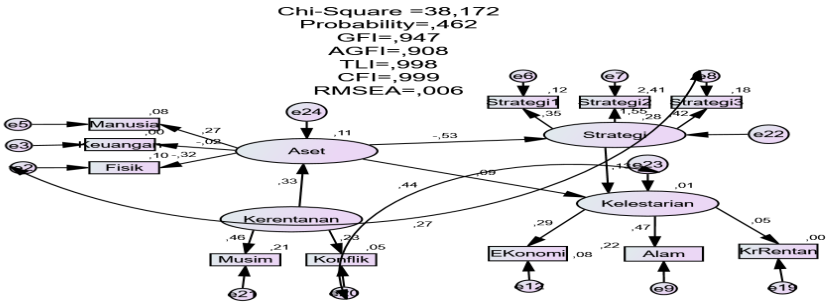

Figure 5
Modified Model of Structured Equations

Based on Figure 5, it can be seen that the conformity index value of all indexes has met the cut-off value standard, and the probability value is above 0.05 and the AGFI value still shows the marginal acceptance value, which is more in the following table:

Table 3
Results of the Conformity Index of the Structured Equation Modification Model

Goodness of fit Index	Cut-off value	Analysis results	Evaluation
Chi square	Diharapkan kecil	38,172	Good
Probability	≥ 0,05	0,462	Good
RMSEA	≤ 0,08	0,006	Good
GFI	≥ 0,90	0,947	Good
AGFI	≥ 0,90	0,908	Good
CMIN/DF	≤ 2,00	1,005	Good
TLI	≥ 0,95	0,998	Good
CFI	≥ 0,95	0,999	Good

Source : primary data, processed (2022)

The results of the estimation (regression weight) for the benefit of hypothesis testing after modification of the model can be seen in the following table:

Table 4
Regression Weights After Model Modification

			Estimate	S.E.	C.R.	P
Assets	<---	Vulnerability	,549	,687	2,800	,040
Strategy	<---	Assets	,408	,424	2,963	,035
Sustainability	<---	Assets	,073	,456	2,160	,033
Sustainability	<---	Strategy	,131	,298	2,439	,040
Physical	<---	Assets	-,847	,380	-2,229	,026
Finance	<---	Assets	-,073	,284	-,258	,797
Human	<---	Assets	1,000			
Strategy 1	<---	Strategy	1,000			
Strategy 2	<---	Strategy	5,187	2,526	2,054	,040
Strategy 3	<---	Strategy	2,193	,442	4,964	***
Economics	<---	Sustainability	1,128	,871	2,294	,036
Vulnerability	<---	Sustainability	,120	,526	,227	,820
Conflict	<---	Sustainability	1,000			
Season	<---	Sustainability	2,954	3,753	2,787	,031
Nature	<---	Sustainability	1,000			

Source : Primary data, processed (2022)

Hypothesis Test Results

There are four hypotheses proposed in this study, namely two hypotheses to see the influence of living assets, and life strategies on the sustainability of fishermen's lives. The other two hypotheses are to look at the effect of vulnerability on living assets, and the influence of living assets on life strategies. The results of testing the hypothesis can be seen from the estimation of regression weight parameters (McDonald & Marsh, 1990). Based on the regression weights value in Table 4, the test results of the five hypotheses proposed can be described as follows:

Hypothesis 1: Increased vulnerability positively affects fishermen's living assets. The results of statistical testing of hypothesis 1 show an estimated parameter value of 0.549; standard error value 0.687; critical ratio value 2.800; with a probability value of 0.040. Using a significance level (alpha) of 0.05, it can be concluded that there is enough empirically strong evidence to reject H0 and accept Ha. This means that increased vulnerability has a positive and significant effect on the decline in living assets (Kumala et al., 2013). This shows that the more frequent the storm or rainy season, the more influential it is on the decrease in the number of fish catches, and this is related to fishermen's financial assets. This research is in line with (Adhiana, 2016) where in the study found that vulnerability is directly related to financial assets.

Hypothesis 2: Increased availability of living assets positively affects fishermen's life strategies. The results of statistical testing of hypothesis 1 show an estimated parameter value of 0.408; standard error value 0.424; critical ratio value 2.963; with a probability value of 0.035. Using a significance level (alpha) of 0.05, it can be concluded that there is enough empirically strong evidence to reject H0 and accept Ha. This means that an increase in ownership of fishermen's living assets has a positive and significant effect on fishermen's life strategies, in line with research (Khuswati et al., 2022), and (Hidalgo & Cuesta, 2018). This shows that with the increase in ownership of human assets, physical assets in the form of fishing gear and financial assets in the form of sufficient capital to go to sea, it increasingly affects the life strategy carried out by fishermen. The strategy carried out by fishermen is to increase various activities, such as drying small fish caught, making salted fish, and others, as well as attending various trainings to improve fishermen's ability to do business. This research is in line with (Adhiana et al., 2019), Where the ownership of farmers' living assets affects their life strategy. The results of this study are almost the same as (Rosni, 2017), Roslina, (2009), (Sahri, M., Mashudi, & Sukoharsono, 2011) which gets a connection between strategy and life assets.

Hypothesis 3: Increased ownership of living assets positively affects the sustainability of fishermen's lives. The results of statistical testing of hypothesis 1 show an estimated parameter value of 0.073; standard error value 0.456; critical ratio value 2.160; with a probability value of 0.033. Using a significance level (alpha) of 0.05, it can be concluded that there is enough empirically strong evidence to reject H0 and accept Ha. This means that increasing the ownership of fishermen's living assets has a positive and significant effect on the sustainability of fishermen's lives. This shows that an increase in the ownership of human assets such as an increase in the level of education and experience, an increase in the ownership of financial assets with the availability of working capital, and the ownership of physical assets in the form of fishing equipment in the form of outboard motor boats and 5-10 GT motorboats used to catch fish and fishing equipment such as props, docks, nets, and bubu will improve the sustainability of fishermen's lives, in line with research (Sati & Vangchhia, 2017), and (Mukherjee et al., 2002).

Hypothesis 4: Improved life strategies positively affect the sustainability of fishermen's lives. The results of statistical testing of hypothesis 1 show an estimated parameter value of 0.131; standard error value 0.298; critical ratio value 2.439; with a probability value of 0.040. Using a significance level (alpha) of 0.05, it can be concluded that there is enough empirically strong evidence to reject H0 and accept Ha. This means that improving fishermen's life strategies has a

positive and significant effect on the sustainability of fishermen's lives, and is in line with research (Novianti et al., 2016). The strategy carried out by fishermen includes various activities that can increase income, including drying excess fish, making salted fish, participation in courses and job exercises that can increase knowledge in capture fisheries, in line with research (Sati & Vangchhia, 2017). Turasih et al. (2012) In his research found that the livelihood strategy applied by potato farming households is to increase agricultural land use and the two-type livelihood model strategy. The two-way model strategy consists of activities to become farm laborers, clothing merchants, tailors, horse-drawn carriage pullers, laborers, vegetable traders and potato wholesalers. Hussen and Nelson (1998), found that people who settled in rural areas used life strategies including crop diversity, population movement, and agricultural strengthening. Twomlow (2002) in the results of his study stated that in agriculture farmers use strategies to increase agricultural yields in the short term, or strategies to improve and conserve soil in the long term.

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CONCLUSION

Based on the processed data with SEM, it was found that the factors that affect the sustainability of fishermen's lives are life strategies and ownership of living assets. The strategy carried out by fishermen includes various activities that can increase income, including drying excess fish, making salted fish, participation in courses and job exercises that can increase knowledge in capture fisheries. Ownership of living assets in the form of human, financial and physical assets. The increase in human assets such as increasing the level of education and experience, increasing the ownership of financial assets with the availability of working capital, and ownership of physical assets in the form of the availability of fishing equipment in the form of outboard motor boats and 5-10 GT motorboats used to catch fish and fishing equipment such as props, docks, nets, and bubu will improve the sustainability of fishermen's lives. The relationship between the four latent variables is that increased vulnerability positively affects fishermen's living assets, increased availability of living assets positively affects fishermen's life strategies. Increasing ownership of living assets positively affects the sustainability of fishermen's lives and increasing life strategies positively affects the sustainability of fishermen's lives.

REFERENCES

Adhiana, A. (2016). Analisis Tingkat Kerentanan Masyarakat Petani Pasca Tsunami Di Aceh. *Agrifo: Jurnal Agribisnis Universitas Malikussaleh*, *1*(2), 71–95. Google Scholar

Adhiana, A., Shamadiyah, N., & Praza, R. (2019). *Analysis of Determination Factors Outcome of Livelihood of Farmer Post-Tsunami in Aceh*. Google Scholar

Byrne, B. M. (2016). Structural Equation Modeling with Amos: Basic Concepts, Applications, and Programming, Third edition. In *Structural Equation Modeling with Amos: Basic Concepts, Applications, and Programming, Third edition*. Google Scholar

Carrasco, J. L. (2010). Structural Equation Model. *Encyclopedia of Biopharmaceutical Statistics*, *8*(3), 1300–1305. Google Scholar

Dinas Kelautan dan Perikanan Aceh. (2019). Profil Peluang Usaha dan Investasi Kelautan dan Perikanan Provinsi Aceh. *Kementrian Kelautan Dan Perikanan Republik Indonesia*, 1–25. Google Scholar

Elia Patar Karunia Silaban, S. S. and K. P. (2021). The Livelihood Strategy of Rubber Tapper Households. *SOCA: Jurnal Sosial Ekonomi Pertanian*, *15*(3), 427–438. Google Scholar

Farrington, J. (2001). Natural Resource perspectives The new architecture of aid. *ODI Natural Resource Perspectives*, *69*(69), 1–4. Google Scholar

Hidalgo, H. A., & Cuesta, M. (2018). Remodeling Livelihood Vulnerability Indicators for The Informal Food Microentrepreneurs. *SEAS (Sustainable Environment Agricultural Science)*, *2*(1), 1–9. Google Scholar

Khuswati, R., Pudjiastuti, A. Q., & Sumarno, S. (2022). Sustainability of the Kawasan Rumah Pangan Lestari (A Sustainable Food House Area Program) in Pasuruan Regency. *SOCA: Jurnal Sosial, Ekonomi Pertanian*, *16*(1), 28. Google Scholar

Kumala, A. Z., Agustini, H. N., & Rais. (2013). Dinamika Kemiskinan Dan Pengukuran Kerentanan Kemiskinan Dalam Upaya Melindungi Anak-Anak Dari Dampak Kemiskinan (Studi Kasus pada Rumah Tangga di Pulau Jawa Tahun 2008-2010). *Child Poverty and Social Protection Conference*, *1776*, 1–35. Google Scholar

McDonald, R. P., & Marsh, H. W. (1990). Choosing a multivariate model: Noncentrality and goodness of fit. *Psychological Bulletin*, *107*(2), 247–255. Google Scholar

Mukherjee, N., Hardjono, J., & Carriere, E. (2002). *People, Poverty and Livelihoods: Links for Sustainable Poverty Reduction in Indonesia*. *January 2002*. Google Scholar

Novianti, K., Wardilah, H., & Wahyono, A. (2016). Perubahan Iklim dan Ketahanan Pangan Masyarakat Pesisir. *Jurnal Penelitian Kesejahteraan Sosial*, *15*(3), 203–218. Google Scholar

Rosni, R. (2017). Analisis Tingkat Kesejahteraan Masyarakat Nelayan di Desa Dahari Selebar Kecamatan Talawi Kabupaten Batubara. *Jurnal Geografi*, *9*(1), 53–66. Google Scholar

Sahri, M., Mashudi, & Sukoharsono, E. (2011). Analisis Faktor-Faktor yang Mempengaruhi Aksesibilitas Sosial Ekonomi Nelayan Kecil di Jawa Timur. *Jurnal Ilmu Sosial*, *18*(1), 43–53. Google Scholar

Salvestrin, H. (2016). *Sustainable livelihoods approach and community development in practice in engineering organisations Sustainable Livelihoods Approach And Community Development In Practice In Engineering Organisations by Helen Salvestrin July 2006 University of Technology . August 2006*. Google Scholar

Santoso, S. (2011). *No TitleStructural equation modeling (SEM) : Konsep dan aplikasi dengan AMOS 18*. Jakarta : Elex Media Komputindo, 2011. Google Scholar

Sati, V. P., & Vangchhia, L. (2017a). *Sustainable Livelihood Approach to Poverty Reduction*. *January 2001*, 93–100. Google Scholar

Sati, V. P., & Vangchhia, L. (2017b). *Sustainable Livelihood Approach to Poverty Reduction*. *January 2001*, 93–100. Google Scholar

Serrat, O. (2017). The Sustainable Livelihoods Approach. *Knowledge Solutions*, *November*, 21–26. Google Scholar

Slamet Widodo. (2011). Srategi Nafkah Berlanjutan bagi Rumah Tangga Miskin di Daerah Pesisir. *Program Studi Agribisnis, Fakultas Pertanian, Universitas Trunojoyo, Bangkalan 69162, Indonesia*, *15*(1), 10–20. Google Scholar