

The coastal communities and the alternative income (*Case study in Tomini Bay*)

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Abstract

This study aims to assess the household diversification of coastal fishing on coastal communities' welfare in the District of Kabila Bone, Bolango District, for five months, from August 2019 - November 2019. Samples of the coastal community of 200 people, making do with a survey method. The data collected are primary data and secondary data using observation, interview techniques, documentation techniques. The model developed from the relevant theory, then tested on a model using the Structural Equation Model (SEM) based on SMART PLUS. The analysis of business diversification models suggests that the utilization of environmental services does not affect coastal communities' welfare.

Keywords: diversification; SEM-PLS; welfare; environmental sustainability, Tomini Bay

Introduction

Diversification of businesses in several coastal areas needs coastal communities' efforts to focus on fishing directed to other businesses outside the fishing field. Diversification to provide added value to coastal communities and environments where, with efforts to diversify communities, especially fishermen, have the opportunity to increase their income if they do not go to sea because another income can sustain their lives. Increased incomes from other sectors as part of the diversification of coastal community businesses to encourage communities not to damage the coastal environment and indirectly have helped recover coastal areas from exploitation before. The economic structure in Bone Bolango Regency until 2014 still dominated by the agriculture, livestock, forestry, and fisheries sectors with a contribution of 39.89% - 40.07 in the last five years. Relatively, regional economic development is still strongly influenced by the role of the primary sector. The role of the industrial sector expected to be stronger. At the beginning of the 2010 RPJMD period,

the manufacturing sector's role was 12.21%, but at the end of the 2014 period, the contribution declined to 11.58. The shift in the economic sector's role, whose trend is getting stronger, occurred in the construction sector from 4.78% in 2010 to 6.42% at the end of the 2014 period. The minor role was still in the mining and quarrying sectors, which was between 0.64% - 0.67 % in 2010-2014. The tertiary sector's role, among others, the financial and service sectors, and the transportation and communication sector has not experienced a significant increase in contributions in the last five years. Supriharyono (2000b) suggested applying tourism with the principle of *low number high value*, meaning that tourist visits do not need much. However, tourists must be of good quality of funds and care for the environment. Zahri et al. (2003) show that women's role in their contribution to family opinion is closely related to the time spent making a living, equal to 28% of their potential. The Other researchers see the context of business diversification from family members' role, especially women, to increase family income. For example, Jume'edi (2005) shows a vital role in helping family income where women's income is highly dependent on women's position in fishing strata. The lowest strata are; the hunt has a significant contribution in contributing to family income. According to Ruddle, K., & Satria, A. (2010), Managing Coastal and Land Bodies "indicates that a sound management system must consider cultural, ecological, economic, political, and social context factors to achieve their goals.

Aryani (1994) further emphasizes why women and other family members fall due to inadequate husband's income to meet family needs. The issue of the relationship of business diversification with the quality of the coastal environment. The ecosystems are grouped outside the system and within the system. Outside the system, namely pollution and transmission from activities both *inland up* and on the coast. The problem faced is that the choice of fishing business types becomes an issue. According to the fishermen's capabilities and especially the designation of the area. In connection with the area's designation, research conducted on the Semarang coast by Widodo (2005) shows that the economic aspect is the primary consideration for all alternative development options. This choice is also very dependent on the policy, where the basis for implementing activities or decision-making is choosing alternatives (Suryadi and Rahmadani, 1998).

During the years 2011 to 2015 showed fluctuating conditions in which in 2011 and 2012, the condition of the Gini ratio of Bone Bolango Regency was at <40, which means it has a low level of inequality, whereas, in 2013 and 2014, the Gini ratio > 40 which means to have the level of moderate inequality is 0.4314. In 2015 the Gini ratio declined again and was <40, which is 0.34, which shows a low-income inequality level (BPS, Bone Bolango Regency, 2015. The same above, Mikkelsen (2003: 8) illustrates that the micro-level and macro-level models. Apart from being referred to as part of a fieldwork approach that can provide input in a policy context, the macro level is more inclined to the historical dimension as part of community empowerment.

Previous research by Ramadhan et al., (2017), the effect of environmental changes on coastal communities' socio-economic life, shows that the level of welfare can affect environmental changes in terms of economic and social aspects. According to Knipscheer et al., (1987), livestock is an essential component in the farming system in various places in Indonesia. Even though the farm family's essential life with food crops, livestock production is often essential for farmers to get cash or as capital savings. Supply of manure, and animal power is a high-quality food ingredient for household members, according to Hakim et al., (2018) concerning the model of coastal tourism management towards the development of an independent tourism village in Central Lombok District, Indonesia. Where two variables have a significant effect on the management of coastal tourism villages, namely the perception of coastal communities and coastal ecotourism, according to Riegl et al. (2009), it emphasized that understanding the restructuring of coastal population structures, social relations. The housing market was significant to advance the debate about social segregation and divided societies, particularly in changing national welfare and housing benefit policies.

The happens because of the limited fishing area around the coast causing low production and fishermen's income, which will impact the fishing community's level of welfare itself (Odriyatun, SN

(2013). The relationship between coastal areas' potential with prosperity in the form of diversification of business carried out by the community Coastal diversification. It is expected to improve coastal communities' welfare because their income from one business is a fishing business and from other businesses, namely livestock business and environmental management.

The results of the field survey found several gaps in the Bone Bolango coastal community, among others, as follows:

- (1) Lack of capital and capital assistance
- (2) Traditional fishing gear
- (3) Management of coastal areas, especially tourist areas, although based on the community, but the implementation is not effective and hit the target to occur in the community.
- (4) Lack of adequate facilities and infrastructures
5. There are different perceptions in managing the environment.
6. The implementation of the program that has been running has not affected the income of the community, especially fishermen.

Regarding the business diversification model in the coastal area of Bone Bolango Regency, it is necessary to put the approach pattern carefully; the most important is to consider the coastal environment's socio-cultural conditions and carrying capacity. Therefore it is necessary to find a suitable diversification model and the suitable approach for the wishes of the coastal community.

Problem Formulation

Based on the identification of the problem, this research is limited to the relationship between environmental sustainability, community welfare, community income, and the utilization of available natural resources in business diversification in the coastal areas of Bone Bolango Regency. The chosen variable is a theory and facts that directly affect the welfare of the community and the preservation of the coastal environment; in this case, the dependent variable is determined the welfare of the coastal community (Y1) by measuring income from diversification efforts and their impact on the indicators that determine welfare. The dependent variable for the sustainability of the coastal environment (Y2) the determined by measuring welfare and diversification efforts on coastal environmental sustainability indicators.

The independent variables will consider based on the coastal area's empirical conditions, the ability of researchers, and the availability of supporting theories and characteristics of the study area (Supranto, 2004). The independent variables chosen are the income of the coastal community from the fishing business (X1), the income of the coastal community from the livestock business (X2), and coastal community income from environmental management efforts (X3).

The selection of the variables above as the object of research considering that the decision very much determines the welfare of coastal communities in determining the pattern of business undertaken. This welfare improvement is closely related to the business's income carried out by fishermen to meet fishermen's needs. The description of the problem at the research location is as follows:

1. GAP Research in the Coastal Communities of Bone Bolango Regency

Gap Research	Issues Research	Findings
Emphasis on the role of families, especially women, to increase family income	The issue of the relationship between business diversification and fishers welfare	The success of the diversification business also determined by the role of other family members especially women.
Diversification is closely related to the policies taken by		

fishermen and the impact on the environment and welfare. The issue of the relationship of business diversification with the quality of the coastal and marine environment and welfare

Research purposes

1. To examine how much influence the welfare of coastal communities on the preservation of the coastal environment.
2. To assess how much influence fishermen households' welfare on the sustainability of the coastal and marine environment.

RESEARCH METHODS

Sampling Method

The population is a combination of all elements in the form of events, things, or people with similar characteristics that are the center of researchers' attention (Ferdinand, 2006). Simultaneously, Sugiono's (2007) population is a generalization area consisting of objects or subjects with the qualities and characteristics of course applied by researchers to be studied and then drawn conclusions. This study population is a fisherman household that has a side job as a farmer and environmental management.

Sample

The sample is a sub-population consisting of several members of the population (Ferdinand, 2006). Because this study uses the PLS research method of structural equation analysis (SEM), which is a minimum multiplied by 5 to 10, the number of indicators used, in this study, there are 15 indicators so that $15 \times 10 = 150$, the size of the sample is 184 respondents who meet the criteria as respondents. In SEM testing sensitive to the number of samples, it takes a good number of samples ranging from 100 to 200 samples (Ferdinand, 2006).

Sampling technique

The sampling technique uses *nonprobability sampling*, where all elements in the population do not have the same opportunity to a sample (Ferdinand, 2006). According to Arikunto (2006), the meaning of *Purposive Sampling* is the technique of taking samples not based on random, regional, or stratum, but based on the existence of considerations that focus on the specific objectives.

The independent variable of this study consisted of three latent variables, namely environmental management. Each independent variable becomes a latent variable determined by several indicator variables obtained through literature review and field observations. Community involvement in formulating objectives and identifying indicators is significant by first recognizing what has been done by the community (Mikkelsen, 2003). Through the feasibility test (*script analysis*) by conducting an indication test and a test of quarantine, the indicator variables of each latent variable, namely:

- 1) Coastal community income from environmental management (X3)
- 2) The dependent variable is the welfare of coastal communities (Y1)
- 3) Environmental preservation (Y2)

Method of collecting data

Based on the type, this dissertation research belongs to non-experimental research (survey). Survey research studies large populations and small populations by selecting selected samples from these populations to find the incidence, distribution, or close interrelation of sociological and psychological variables (Kerlinger, 2006). The survey research in this dissertation using descriptive and structural explanatory methods. Descriptive research describes the profile, characteristics, or relevant aspects of the variables observed in the study, whether related to humans, organizations, industry, or others (Sekaran & and Roger Bougie, 2013). The data used in the study are primary and secondary.

Data analysis

Based on the above model developed from a relevant theory, the model using *PLS* -based Structural Equation Model (SEM). The model based the ability of this analysis tool that can accommodate multidimensional research. More than one relationship at a time compared to other multidimensional analysis tools, such as multiple regression analysis, can only analyze one relationship at a time or only test one dependent variable through several independent variables (Ferdinand, 2006b). Steps SEM analysis as follows: This study was a survey that uses methods/techniques inferential statistical analysis to test the hypothesis of an association between independent variables and fixed variables to test the hypothesis using *Structural Equation Model (SEM)* based *PLUS*. *SEM* using *PLS* only allows the model of relationships between variables that are recursive (unidirectional) only. Ghazali (2005) states that structural equation modeling (SEM) combines two different statistical methods, namely factor analysis developed in psychology and psychometrics and simultaneous equation modeling developed in econometrics. The general structural equation model consists of two parts, namely (a) the measurement part. The linking of the observed variables to the latent variables is through the factor converter model, (b) the structural part, which links the latent variables through a system of simultaneous equations.

Results and Discussion

Evaluation of Welfare Variable Measurement Model

The measurement of welfare variables reflected through six indicators: income (Y1.1), labor (Y1.2), education (Y1.3), home (Y1.4), home facilities (Y1.5), and health (Y1 .6). The evaluation of the outer model or measurement model from each variable welfare indicator's outer loading value. The following is the outer loading value for the welfare construct in Table 2.

Table 2. Calculation Result of Outer Loading Constructive Welfare (KSJ)

Indicator	Outer Loading	t-statistics	t-table $\alpha = 5\%$
KSJ1 <- KSJ	0.614584	4.962165	1,960
KSJ2 <- KSJ	0.646412	3.141292	1,960
KSJ3 <- KSJ	0.659272	4.891431	1,960
KSJ4 <- KSJ	0.874387	3.175848	1,960
KSJ5 <- KSJ	0.891404	3.323201	1,960
KSJ6 <- KSJ	0.865737	3.697818	1,960

Source: Data processed, 2019

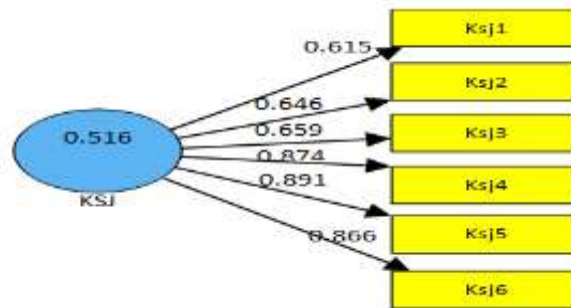


Figure 1: Test Results of Outer Loading Welfare Variables

Table 2 explains are the value of loading the welfare variable (KSJ), where the loading factor is on the ksj1 indicator; ksj2; and ksj3. The namely of income, labor, and education amounting to 0.615; 0.646; 0.659, which is less than the critical limit of 0.700; but it is still above the tolerant value of 0.6 with a confidence level of 95% where the t-statistic indicators of income, labor and education are more significant than t-table (1,960). Next, in the ksj4 indicator; ksj5; and ksj6, namely the house, home facilities, and health, the factor loading value respectively 0.874; .891; 0.866, which is greater than the critical limit of 0.700, with a confidence level of 95% where the t-statistic indicators of houses, home facilities, and health are more significant than t-tables (1,960). Thus the welfare variable (Y1) has been able to be formed or well explained by indicators of income, labor, education, housing, housing facilities, and health or can be said to be validly valid on that indicator. Based on the data analysis results, when viewed from the estimated value of the outer loading for each indicator, the indicator of home facilities is the most important in reflecting the welfare variable. The analysis shows that the highest loading factor is in the ksj5 indicator. The house facilities indicator is 0.8914 so that the indicator can explain the welfare variable (Y1) better than other indicators. The following loading factor of the house indicator is 0.874; the health indicator is 0.866; education indicators 0.6592; the work clear indicator is 0.6464, and the smallest one is in the income indicator of 0.615. On the other hand, the t-value that can indicate the level of significance that the income indicator shows the strongest to measure the welfare variable because the most prominent value obtained is 4.962, which is significant at the 95% confidence level (1,960) compared to other indicators. Thus it can be concluded that the income reflected from the profits from fishing, livestock business, and environmental management business with an increase in sales volume is the most critical indicator in reflecting Increase the welfare variable.

The results showed of the coastal communities sampled in the study were of an average age of 40-55 years. Shows that they are at the peak of productive age with sufficiently mature experience. The average has had experience go to sea between 6-7 years, the highest education is high school and the most is an elementary school with more than 50%. Ideally with peak productive age and sea experience above the average of five years, they should be more productive in the fishing effort, but in reality, this is not the case. One obstacle is the low educational factor that results in not following the development of fishing technology, let alone not supported by training and technical guidance. Monintja (2001) illustrates that fisheries development is a process or human activity to increase production in the field of fisheries and, at the same time, increase fishermen's income through the application of better technology. The capture fisheries business system nationally requires a breakthrough program for this to be done several things:

1. Optimization between the availability of fish resources (stock) with the level of fishing (effort) in each fishing area. This is important to ensure an efficient and profitable capture fisheries business system in a sustainable manner

2. Development of capture technology that is selective, efficient, and environmentally friendly (eco-friendly), adapted to the oceanographic fishing ground conditions, biological characteristics of the target fish, and the life cycle and dynamics of fish populations.
3. Fishing vessels designed according to oceanographic fishing ground conditions, the biological characteristics of the target fish, and the life cycle and dynamics of fish populations.
4. There is a need for regulations governing responsible fisheries management. . Business capital is a significant obstacle; not all people can improve fishing gear or procure new boats with more excellent capabilities. Not all financial institutions are willing to provide loans, there are indeed revolving funds from the government, but not all coastal communities can get them. This lack of capital causes the public to get often caught in the trap of moneylenders, which adds to the burden due to very high interest. Ironically, the borrowed funds to improve the fishing fleet's capability and for various other purposes, both for consumption during the western season or educational needs of family members and daily affairs.

The absence of venture capital is the basis for coastal communities to never think about developing a business in a more profitable direction, even though capital should not be the only reason if the coastal community can be helped. The same principle with other farming businesses, to foster fishing businesses need by considering various things. Suppose these elements into the fishing business. In that case, the fishermen's business organization should emphasize creating a structure from upstream to downstream of the fishing business, which includes production, production facilities, marketing, availability of capital institutions, and post-harvest businesses. Another obstacle is the absence of a fish landing place as a trading/marketing center for fishing. As a result, the price of fish is very much determined by the intermediary traders. They can buy all catches at an agreed price if the amount of catch is small, then the price can be determined higher, but if the catch is quite a lot, then the price of fish is bought very cheaply, so people still cannot get a better income. In this transaction process, the law of demand applies; when an item's price rises, the demand for that item decreases with the assumption that people's income and other goods' price. According to Hakim, M., Hakim, A., Hakim, L., & Harahab N. (2018), two variables significantly affect the management of coastal tourism villages, namely the perception of coastal communities and coastal ecotourism.

Furthermore, the management of coastal tourism villages has a significant influence on developing independent coastal tourism villages. The management of coastal tourism villages is a potent mediator for developing independent coastal tourism villages. Even though tourism has gone on, it has not yet had a significant impact on fishing households' well-being on the coast of Bone Bolango Regency. The problem found was that assistance was only in the form of equipment facilities managed by a group of people selected by the local government, causing social jealousy for other communities. The problem of capital is one of the indicators that significantly impedes the community in managing their environment. The implementation is still as individual and traditionally does not provide significant benefits for coastal communities to improve their welfare. According to Kearney et al., (2007), to strengthen and develop community participation in ICOM, nine initiatives: (1) paradigm shifts, (2) address 'territorial protection,' (3) ensuring compliance with objectives. (4) ensuring adequate information, (5) dealing with internal community stratification, (6) creating cross-scale relationships, (7) creating a participatory policy environment, (8) building community capacity, and (9) monitoring and assessment of local-level initiatives.

According to Arifiani, NA., & Mussadun, M (2016), increasing public awareness about environmental cleanliness is very important to apply. The community have an awareness of environmental sustainability to prevent environmental degradation. The emergence of hazards, such as abrasion and rob, as we know that environmental management efforts have an insignificant relationship with coastal communities' welfare. These results indicate that environmental utilization efforts are not able to make a very significant contribution to welfare. The business very much determines the contribution of utilizing environmental services such as tourism. The better the management, the higher the business's income, but the limitations of technology and capital are obstacles that must provide maximum results coastal communities. For coastal communities, coastal natural resources are assets. Therefore, two main things

must be done to empower them: secure access to natural resources and provide capital for businesses (Qodriyatun, SN. 2013).

Effect of Environmental Management Efforts on Environmental Sustainability Through Welfare

The analysis results show that the path coefficient of the indirect effect of environmental exploitation efforts on environmental sustainability through welfare obtained a value of -0.021 on the t-statistic 0.226. These results prove that environmental exploitation has no significant effect on environmental sustainability through welfare mediation. The path coefficient marked negative can be interpreted that the relationship between environmental management and environmental sustainability through welfare is not unidirectional. Thus there is not enough empirical evidence to reject the hypothesis (H0) and accept the hypothesis (H1), that the higher the efforts of environmental exploitation, will reduce the level of environmental sustainability through increasing the welfare of the people in the coastal areas of Bone Bolango Regency. According to Yapanto, L.M & Modjo, M.L (2018), the level of awareness of Biak Papua's people in maintaining the coral reef environment by utilizing the tourism environment as a source of income. Environmental management is very potential on the coast of Bone Bolango regency. If developed by utilizing the existing potential, supported by empowering coastal communities through human resource development, it will be the right choice for coastal communities in Bone Bolango District, especially fishermen in increasing income as well as as a fisherman. According to Kelly, PM, & Adger, WN. (2000).

Continuous responses, we argue, must also address the underlying causes of social vulnerability, including unequal distribution of resources. Technology is a new field of practice that creates and limits livelihood diversification opportunities. Individual adaptations to diversify the household economy reduce social differentiation in coastal communities (Idrobo, CJ, & Davidson-Hunt, IJ 2012).

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Conclusion

The relationship between diversification of fishermen's business and welfare of fishers.

The analysis results illustrate that fishing and environmental utilization efforts affect coastal communities' welfare—the influence of business diversification and fishers welfare on environmental sustainability. The Coastal and coast statistically the relationship between the independent variables of fishery business. The livestock business, environmental management, and fishermen's welfare on the sustainability of coastal environments show a variable effect of which these four variables are only fishing, environmental management, fisherman welfare variables, and show significant results on the coastal environment's sustainability. In contrast, the livestock business variable does not affect.

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