# 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 the welfare of coastal communities in the District of Kabila Bone, Bolango District, for 5 months, since 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 were done by using observation, interview techniques, documentation techniques. Based on the model developed from the relevant theory, then tested on a model using the Structural Equation Model *(SEM)* based on *SMART PLUS*. The results of the analysis of business diversification models suggest that the utilization of environmental services does not affect the welfare of coastal communities.

*Keywords: diversification; SEM-PLS; welfare; environmental sustainability.*

## Introduction

Diversification of businesses in several coastal areas needs to be carried out, so that the efforts of coastal communities not only focus on fishing but can also be directed to other businesses outside the fishing field. Diversification is expected to be able 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 there is another income that can sustain their lives. Increased incomes from other sectors as part of the diversification of coastal community businesses are expected to encourage communities not to damage the coastal environment and indirectly have helped in the recovery

of coastal areas from exploitation that has been done before. The economic structure in Bone Bolango Regency until 2014 was 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 is expected to be stronger. At the beginning of the 2010 RPJMD period, the role of the manufacturing sector was 12.21%, but at the end of the 2014 period the contribution declined to 11.58. The shift in the role of the economic sector 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 smallest role was still in the mining and quarrying sector, which was between 0.64% - 0.67 % in the period 2010-2014. The role of the tertiary sector, among others, the financial and service sectors as well as the transportation and communication sector has not experienced a significant increase in contributions in the last five years. Supriharyono (2000b) suggested applying the concept of tourism with the principle of *low number high value*, meaning that the number of tourist visits does not need much but tourists must be of good quality of funds, and care for the environment. Zahri *et al*. (2003), shows that the role of women in relation to their contribution to family opinion is closely related to the time spent making a living that is equal to 28% of their potential. Other researchers see the context of business diversification from the role of family members, especially women, in an effort to increase family income, for example research conducted by Jume'edi (2005) shows a very important role in helping family income where women's income is highly dependent on the position of women in fishing strata where the lowest strata that is, the hunt actually has a significant contribution in contributing to family income. According to Ruddle, K., & Satria, A. (2010), Managing Coastal and Land Bodies "indicates that a good management system must take into account cultural, ecological, economic, political and social context factors to achieve their goals.

Aryani (1994) further emphasizes the reason that 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. Based on the origin of the occurrence of damage to coastal ecosystem ecosystems are grouped outside the system and within the system. Outside the system, namely pollution and transmission from activities both in *land up* and on the coast. The problem faced is that the choice of fishing business types becomes an issue that must be carefully considered according to the capabilities of the fishermen and especially the designation of the area. In connection with the designation of the area, research conducted on the Semarang coast by Widodo (2005) shows that the economic aspect is the main 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 basically 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 level of income inequality (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 the context of community empowerment.

Previous research by Ramadhan, A., & Hafsari dewi, R. (2017), the effect of environmental changes on the socio-economic life of coastal communities, 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 one of the important components in the farming system in various places in Indonesia. Even though the basic life of the farm family is filled with food crops, livestock production is often important for farmers to be able to get cash, or as capital savings, supply of manure, and animal power and is a high quality food ingredient for household members. Previous research by Hakim, M., Hakim, A., Hakim, L., & Harahab, N. (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 management

coastal tourism villages, namely the perception of coastal communities and coastal ecotourism. According to Riegl, B. *et al* (2009), it was emphasized that understanding the restructuring of coastal population structures, social relations and the housing market was very important to advance the debate about social segregation and divided societies, particularly in the context of changing national welfare and housing benefit policies.

This happens because of the limited fishing area around the coast causing low production and income of fishermen which will impact on the level of welfare of the fishing community itself (Odriyatun, SN (2013). The relationship between the potential of coastal areas with prosperity is explained in the form of diversification of business carried out by the community Coastal diversification is expected to be able to improve the welfare of coastal communities because their income is not only sourced from one business that is a fishing business but can also be obtained from other businesses namely livestock business and environmental management.

From 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 so that problems 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 carefully put the approach pattern, the most important is to consider the socio-cultural conditions and carrying capacity of the coastal environment , therefore it is necessary to find a diversification model that is suitable and the approach that is suitable 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 the form of business diversification in the coastal areas of Bone Bolango Regency. The chosen variable is a variable based on theory and facts that directly affects 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) is determined by measuring the effect of welfare and diversification efforts on indicators of coastal environmental sustainability.

The independent variables will be chosen according to consideration based on the empirical conditions of the coastal area, 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 is based on the consideration that the condition of the welfare of coastal communities is very much determined by the decision in determining the pattern of business undertaken. This welfare improvement is closely related to the income obtained

from the business carried out by fishermen to meet the needs of fishermen. 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 in an effort to increase family income | The issue of the relationship between business diversification and fishermen welfare | The success of the diversification business is 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 | Diversification is a business that is carried out without breakthrough but only follows what has been done |

**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 the welfare of fishermen households on the sustainability of the coastal and marine environment.

**RESEARCH METHODS**

**Sampling Method**

Population is a combination of all elements in the form of events, things or people who have similar characteristics that are the center of attention of researchers (Ferdinand, 2006). Whereas Sugiono (2007) population is a generalization area consisting of objects or subjects that have the qualities and characteristics of course applied by researchers to be studied and then drawn conclusions. The population in this study 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 $15 \times 10 = 150$ are obtained, so 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 *non probability sampling*, where all elements in the population do not have the same opportunity to be selected as 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 that becomes a latent variable is determined by several indicator variables obtained through literature review and field observations. Community involvement in formulating objectives and identifying indicators is very important 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 are determined, 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 relative interrelation of sociological and psychological variables (Kerlinger, 2006). In doing so, the survey research in this dissertation was carried out using descriptive and structural explanatory methods. Descriptive research was conducted to describe 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.

**Data analysis**

Based on the above model, which was developed from a relevant theory, the model was tested using *PLS* -based Structural Equation Model (SEM). The choice of this model is based on the ability of this analysis tool that is able to accommodate multi-dimensional research, because its ability to analyze more than one relationship at a time compared to other multidimensional analysis tools such as multiple regression analysis that is only able to analyze one relationship at a time or can only testing one dependent variable through several independent variables (Ferdinand, 2006b). Steps SEM analysis as follows: This study was survei which uses methods / techniques infrensial statistical analysis, to test the hypothesis of 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. Ghozali (2005) states that structural equation modeling (SEM) is a combination of two separate 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 is reflected through six indicators: income (Y1.1), labor (Y1.2), education (Y1.3), home (Y1.4), home facilities (Y1.5), and health (Y1 .6). Evaluation of the outer model or measurement model can be seen from the outer loading value of each welfare variable indicator. The following is the outer loading value for welfare construct in Table 2.

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

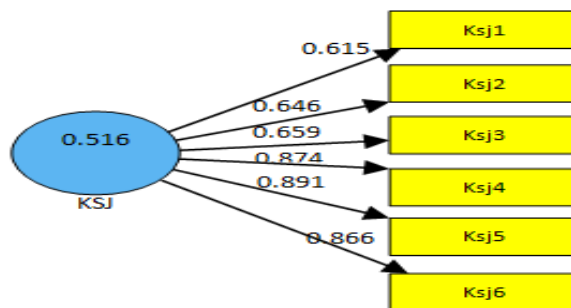| Indicator | Outer Loading | t-statistics | t-table $\alpha = 5\%$ |
|---|---|---|---|
| KSJ1 <- KSJ | 0.614584 | 4.962165 | 1,960 |
| KSJ2 <- KSJ | 0.646412 | 3.141292 | 1,960 |
| KSJ3 <- KSJ | 0.659272 | 4.891431 | 1,960 |
| KSJ4 <- KSJ | 0.874387 | 3.175848 | 1,960 |
| KSJ5 <- KSJ | 0.891404 | 3.323201 | 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 the value of loading the welfare variable (KSJ), where the loading factor is on the ksj1 indicator; ksj2; and ksj3, namely 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 greater 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 greater 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 results of data analysis, 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, that is, the house facilities indicator is 0.8914, so that the indicator is able to explain the welfare variable (Y1) better than other indicators. The next loading factor of the house indicator is 0.874, the health indicator is 0.866; education indicators 0.6592; the work calm 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 is the strongest is used to measure the welfare variable because the largest 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 important indicator in reflecting Increase the welfare variable.

The results showed that most of the coastal communities sampled in the study were of an average age of 40-55 years, this shows that, in fact they are at the peak of productive age with sufficiently mature experience where the average has had experience go to sea between 6-7 years, the highest education is high school and the most is 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 being able to follow 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. It was further said that 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), the design of which is adapted to the oceanographic fishing ground conditions, biological characteristics of the target fish, as well as the life cycle and dynamics of fish populations.
3. Fishing vessels that are 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. The ideal conditions described above are certainly very far away when compared to the real conditions of coastal communities in Bone Bolango Regency, for coastal communities what they get from sea products is only subsistence and not production-oriented, which is obtained that day only enough for them to eat, there is no desire to increase production capacity. Business capital is a significant obstacle, not all people are able to improve fishing gear or procure new boats that have greater 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 often get caught in the trap of moneylenders, which actually adds to the burden due to very high interest. Ironically, the borrowed funds are not only used to improve the

capability of the fishing fleet but are also used for various other purposes both for consumption during the western season, or for education needs of family members and customary affairs.

The reason for 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 to be done by considering various things. If these elements are integrated in the fishing business, the fishermen business organization should be put more emphasis on 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 can't get a better income. In this transaction process the law of demand applies, when the price of an item rises, the demand for that item decreases with the assumption that people's income and the price of other goods are fixed. According to Hakim, M., Hakim, A., Hakim, L., & Harahab, N. (2018), two variables have a significant effect on 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 the development of independent coastal tourism villages, and the management of coastal tourism villages is a strong mediator for developing independent coastal tourism villages. Even though tourism has gone on, it has not yet had a significant impact on the well-being of fishing households 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 greatly impedes the community in managing their environment. The implementation is still as individual and is still done traditionally so that it does not provide significant benefits for coastal communities in an effort to improve their welfare. According to Kearney, J., Berkes, F., Charles, A., Pinkerton, E., & Wiber, M (2007), to strengthen and develop community participation in ICOM, nine initiatives are recommended: (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 must have an awareness of environmental sustainability to prevent environmental degradation and the emergence of hazards, such as abrasion and rob. As we know that environmental management efforts have insignificant relationship with the welfare of coastal communities and these results indicate that environmental utilization efforts are not able to make a very significant contribution to welfare. The contribution of utilizing environmental services such as tourism is very much determined by how much the business is carried out by the coastal community, the better the management, the greater the income from this business, but the limitations of technology and capital are obstacles that must be resolved so that the business can provide maximum results for coastal communities. For coastal communities, coastal natural resources are assets. Therefore, there are two main things that must be done to empower them, namely to secure access to natural resources and provide capital for businesses (Qodriyatun, SN (2013).

**Effect of Environmental Management Efforts on Environmental Sustainability Through Welfare**

The results of the analysis 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 the business of 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 Kab. Bone Bolango was rejected. According to Yapanto, L.M & Modjo, M.L (2018), the level of awareness of the people of Biak Papua 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. In this case, individual adaptations undertaken to diversify the household economy begin the process of reducing social differentiation in coastal communities (Idrobo, CJ, & Davidson-Hunt, IJ 2012).

**Acknowledgment**

**Conclusion**

The relationship between diversification of fishermen's business and welfare of fishermen.
The results of the analysis illustrate that fishing and environmental utilization efforts affect the welfare of coastal communities. The influence of business diversification and fishermen welfare on environmental sustainability. Coastal and coast statistically the relationship between the independent variables of fishery business, livestock business, environmental management and fishermen's welfare on the sustainability of coastal environments shows a variable effect where of these four variables are only fishing, environmental management, fisherman welfare variables, show significant results on the sustainability of the coastal environment, whereas the livestock business variable has no effect.

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