PAPER • OPEN ACCESS

Alternative income of Tomini Bay Coastal Communities (case study in Bone Bolango District, Gorontalo Province, Indonesia)

To cite this article: Lis M Yapanto *et al* 2021 *IOP Conf. Ser.: Earth Environ. Sci.* **819** 012082

View the article online for updates and enhancements.

Alternative income of Tomini Bay Coastal Communities (case study in Bone Bolango District, Gorontalo Province, Indonesia)

Lis M Yapanto[1]*, Nuddin Harahab[2], and Dahniar Th. Musa[3]

[1]Faculty of Fisheries and Marine Science, State University of Gorontalo, 96128, Indonesia
[2]Faculty of Fisheries and Marine Science, Brawijaya University, Malang, 65145, Indonesia
[3]Faculty of Social Sciences and Poltical Science, Tanjungpura University,78124. Indonesia

*lizrossler@ung.ac.id

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 October 2019-December 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.

1. 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 District 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 [21], the role of the manufacturing sector was 12.21%, but at the end of the 2014 period the contribution declined to 11.58. This choice is also very dependent on the policy where the basis for implementing activities or decision making is basically choosing alternatives [7]. 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 [22]. The same above, [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 [40].

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 [2]. 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 [8], 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 [19], concerning the Model of coastal tourism management towards the development of an independent tourism village in Central Lombok District, Indonesia [10], where two variables have a significant effect on management coastal tourism villages, namely the perception of coastal communities and coastal ecotourism. [34], 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 [4].

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 [6]. 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 [2].

2. Material and Methods

This research. using a sampling technique with purposive sampling. Sense is: the technique of taking samples with not based on random, regions or strata, but based on the consideration that focuses on specific objectives and population research areas have high levels of diversity are the same then determined to select a sub-district Kabila Bone, with consideration a high diversity that is the majority of people have a job Fishermen have fishing gear, Breeders and utilization of environmental services, then selected six villages that have criteria that is from the village Botutonuo, Olele, Molotabu, with the number of respondents 184.

Household fishermen who represent criteria for respondents with determination respondent criteria are as follows: coastal fishing communities by having fishing gear, coastal communities keeping livestock, coastal communities have the utilization of environmental services, as well as coastal communities that have a sideline as fishermen, ranchers, environmental services. Methods of site selection and sample using purposive sampling method/technique inferential statistical analysis [33], to test the hypothesis of an association between independent variables and fixed variables to test the hypothesis using Structural Equation Model (SEM) based PLUS [33]. SEM uses to allow the PLS model of the relationship between variables recursive (Sarah) only.

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. 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 [20].

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 [11]. 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 [40].

3. Results and Discussion

3.1 Average Variance Extracted (AVE) and square root of AVE (Root of AVE)

Average variance extracted (AVE) or AVE roots are used to measure the reliability of component scores of latent variables. The value of AVE or AVE root which is greater than 0.500 indicates that discriminant validity has been achieved, that is the indicator used has been able to explain the variables formed rather than other variables. The following are presented in table 23 are the results of the calculation of the value of AVE and square root of average variance extracted (root of AVE). If the value of the square root of average variance extracted (root AVE) of each latent variable is greater than the value of the latent variable AVE, then the instrument variable is also said to be valid discriminant.

Table 1. AVE Value and AVE Root Research Variables

Variable	AVE	Root AVE
Fishing Business (X1)	0.529881	0.727929
Animal Husbandry Business (X2)	08800824	0.894888
Business management of the environment (X3)	0.740556	0.860556
Welfare (Y1)	0.514253	0.717114
Environmental Sustainability (Y2)	0.592674	0.769853

Source: Data processed, 2019

The test results in table 1 show that the square root value of the average variance extracted (AVE root) of all variables designed in this study is greater than the AVE value, so the instrument of each variable is said to be valid discriminant. In addition, the root value of AVE both from fishing business, animal husbandry business, environmental management business, welfare and environmental sustainability are above the tolerance limit of 0.50. This can mean that fishing, livestock business, environmental management, welfare and environmental sustainability have good discriminant validity. Thus, the research instrument used to measure all constructs or latent variables in this study meets the discriminant validity criteria.

The measurement model (outer model) is used to test the construct validity and instrument reliability. Validity test is conducted to determine the ability of research instruments to measure what should be measured. While the reliability test is used to measure the consistency of measuring instruments in measuring a concept or can also be used to measure the consistency of respondents in answering statement items in a questionnaire or research instrument. The convergent validity of the measurement model can be seen from the correlation between the indicator score and the variable score. The indicator is considered valid if it has a AVE value above 0.5 or shows that all outer loading dimensions of the variable have a loading value> 0.5 so that it can be concluded that the measurement meets the convergent validity criteria.

3.2 Composite Reliability and Cronbach Alpha

Composite reliability and Cronbach alpha are used to test the value of reliability or reliability among the indicators of the construct that constitutes it. Value of composite reliability and Cronbach alpha is

said to be good, if the value is above 0.60. In other words, the value of composite reliability and Cronbach alpha was good indicates that the discriminant validity has been reached. The following table 2 is the result of testing the composite reliability and Cronbach alpha measurement models in this study.

Table 2. Value of composite reliability and Cronbach alpha research variables

Variable	Composite Reliability	Cronbach Alpha
Fishing Business (X1)	0.838070	0.765145
Animal Husbandry Business (X2)	0.951988	0.934880
Business Utilization of Environmental Services (X3)	0.933815	0.908740
Welfare (Y1)	0.855374	0.791060
Environmental Sustainability (Y2)	0.793659	0.698550

Based on table 2 it can be seen that the composite reliability value of the fishing business variable (X1) is 0.838; livestock business variable (X2) of 0.952; Business environment management variable (X3) of 0.934; welfare variable (Y1) of 0.855 and environmental sustainability variable (Y2) of 0.794 and of value greater than the limit value of 0.600. This can be interpreted that the latent variables used have good composite reliability. In addition, the Cronbach alpha value of the fishing business variable (X1) was 0.765; livestock business variable (X2) of 0,935; Business environment management variable (X3) of 0.909; welfare variable (Y1) of 0.791; and environmental sustainability variable (Y2) of 0.699 and a value greater than 0.600 and it can be said that the latent variable has high reliability.

Thus, all instruments used in this study have met the criteria or are suitable for use in the measurement of all latent variables, namely: fishing business, animal husbandry business, environmental management business, welfare, and environmental sustainability variables, because they have good validity and reliability or high reliability. The results of convergent validity and discriminant validity evaluations of indicators or variables as well as composite reliability and Cronbach alpha for indicators or variables, it can be concluded that indicators as gauges of latent variables, respectively, are valid and reliable gauges. Thus, evaluation of inner models or structural model measurements, namely goodness of fit or R-square and Q-square values can be known.

3.3 Hypothesis Testing Direct Effects

Direct hypothesis testing on the influence of fishing businesses, animal husbandry businesses, environmental promotion efforts on welfare and the influence of fishing businesses, animal husbandry businesses, environmental management efforts on environmental sustainability can be seen in table 1, The results of testing the direct effect between research variables in addition to being shown by the path coefficient and t-statistics, can also be seen in the path diagram in Figure 1.

Table 3. Path coefficient results and hypothesis testing for direct effects

Exogenous Variables	Endogenous Variables	Path coefficient	t-statistics tcritic = 1,960	Result
Fishing Business (X1)	Welfare (Y1)	0.718953	3,832844	Significant
Fishing Business (X1)	Environmental Sustainability (Y2)	0.636038	2.532659	Significant
Animal Husbandry Business (X2)	Welfare (Y1)	0.038136	0.354644	Not significant
Animal Husbandry Business (X2)	Environmental Sustainability (Y2)	-0.100301	0.925829	Not significant
Business Utilization of Environmental Services (X3)	Welfare (Y1)	-0.033821	0.239015	Not significant

Environmental Management Business (X3)	Environmental Sustainability (Y2)	0.288143	3,326990	Significant
Welfare (Y1)	Environmental Sustainability (Y2)	0.610206	2.985647	Significant

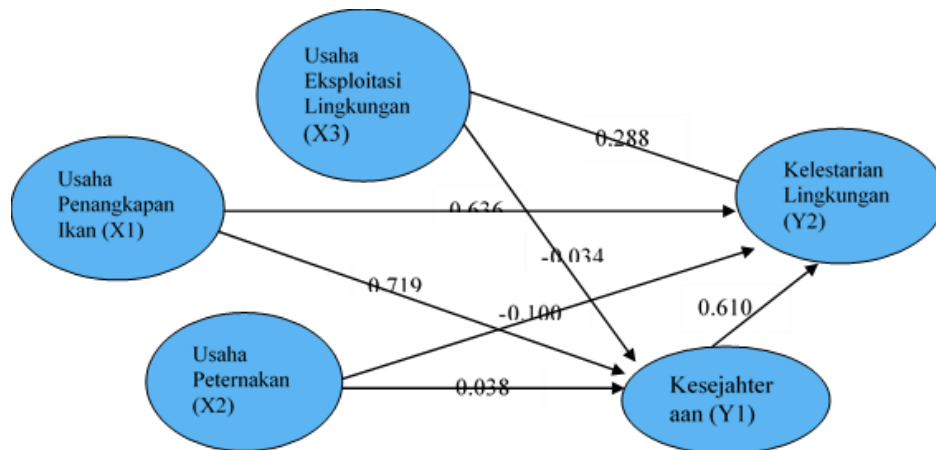*Source: Data processed, 2019*

Figure 1. Path coefficient diagram and hypothesis testing for direct influence
Note: s = significant; ts = insignificant
Source: Data processed, 2019

This literature review aims to identify and analyze the trends, datasets, methods and frameworks used in the topic of attribute independence assumption assumptions on NB between 2010 and 2018. Based on the inclusion and exclusion criteria designed, it shows 71 study studies of attribute independence assumptions on the published NB between January 2010 and December 2018 are investigated in this literature review have been conducted as a review of systematic literature.

Based on the analysis results as shown in table 8 and figure 1, it appears that the direct influence between the research variables is both significant and not significant. Of the six direct influences between the variables tested, there are three direct influences that have a significant effect and three direct influences that have no significant effect. Fishing business variables (X1) significantly influence welfare (Y1), and environmental sustainability (Y2). Business variable utilization of environmental services (X3) has a significant effect on environmental sustainability (Y2). Variables that have no significant effect are livestock business variables (X2) on welfare (Y1) and environmental sustainability (Y2) and business services utilization variables (X3) on welfare (Y1).

The measurement model is used to test the validity and reliability, while the structural model is used to test causality (hypothesis testing with predictive models). [19], explained 45 that PLS is an analytical method that is soft modeling because it does not assume the data must be of a certain scale measurement, which means the number of samples can be small (under 100 samples). The fundamental difference between PLS which is SEM based variant with LISREL or AMOS which is covariant based is the intended use. Compared to covariance based SEM (which is represented by AMOS, LISREL and EQS software) component based PLS is able to avoid two major problems faced by covariance based SEM, namely inadmissible solution and indeterminacy factor [34].

The testing of the direct influence path coefficient and the research hypothesis aims to answer whether the proposed hypothesis can be accepted or rejected. The results of testing the direct effects and hypotheses, can be explained, if the value of the critical ratio (CR) is greater or equal to 2, it can be concluded that the resulting factor loading coefficient is significant [28]. The significance shown by each indicator variable explains that each indicator variable determines the fisheries business. These indicators are indicators that are built based on theories that explain the relationship between variables

and capture fisheries business. These indicators explain the phenomena associated with fishing efforts undertaken by coastal communities. As a community group, coastal communities also depend their lives on fishing efforts both done using modern and traditional equipment.

The greater the size of the fleet does not always show a positive relationship because the smallest index value actually occurs in the fleet [21], the development of fishing businesses based on fleet class would be better if it was developed in two classes, namely less than 5 GT or 11-30 GT[16] ; [22]. The capture fisheries business itself is a business that requires linkages between certain components so that the results obtained can be maximized, if the components that are required in the capture fisheries business are not fulfilled, the produced production will not be maximized. [34], argued that the components that play a role in the capture fisheries system are, the community, production facilities, production processes, port infrastructure, fish resources, processing, marketing and legal aspects. This shows that in a capture fishery the relationship between these indicators will greatly determine the level of success of the fishing effort.

Knowledge about fishing is only obtained from generation to generation based on the experience of their predecessors, so experience is a measure of their success as fishers who are able to divide their time with other efforts to increase their income. The size of one's experience and whether or not is also determined by the length of time a person works as a fisherman, the longer a person engages in the profession as a fisherman, the empirical experiences in the field will largely determine the success or failure of the person, the ability to read sea conditions, movement of fish and seasons at sea, is very much determined by experience. However, this experience is not directly proportional to the changing socio-economic conditions of the coastal communities.

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. 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 [43]. It was further said that the capture fisheries business system nationally requires a breakthrough program for this to be done several things:

a. 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

b. 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.

c. 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.

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 [5]. 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. [19], 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 District. 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 [37].

3.4 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 Bone Bolango Regency was rejected.

[34], 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 District, 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 a fisherman. Continuous responses, we argue, must also address the underlying causes of social vulnerability, including unequal distribution of resources [25]. 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 [13]. Following is a summary of testing the indirect effect (mediation) hypothesis as presented in table 4.

Table 4. Summary of Testing for Indirect Influence Hypotheses

Exogenous Variables	Mediation Variable	Endogenous Variables		Hypothesis	Decision
Fishing business	Well-being	Environmental Sustainability	H8	the higher the fishing effort, the more it will improve the environment through increasing welfare	Received

Livestock Business	Well-being	Environmental Sustainability	H9	the higher the livestock business, will increase environmental sustainability through increased welfare	Rejected
Environmental Management Business	Well-being	Environmental Sustainability	H10	the higher the fishing effort, the lower the level of environmental sustainability by increasing welfare	Rejected

Source: Results of analysis, processed 2019

4. 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.

References

[1]   Alberti, M. 2010. Maintaining Ecological Integrity and Sustaining Ecosystem Function in Urban areas. pp 279-286. DOI:https://doi.org/10.1016/j.cossut.2010.06.007
[2]   Olii, A.H. Yapanto, L.M., S.A, Akili., 2019. The efficiency Handline Fishing Gear in Gorontalo Regency. Indonesia. Asian Journal of Fisheries and Aquatic Research. 4 (4), 1-10
[3]   Aryani, F. 1994. Work Analysis and Contribution of Fishermen's Family Revenue in Economic Activities in Coastal Villages: Case Study in Desa Pasisr Baru Ke. Cisolok Sukabumi Regency. Bogor Agricultural University. 7 (1) pp
[4]   Power, A. S., & Mercer, D., 2003. The role of fishers knowledge in implementing Ocean Act initiatives in Newfoundland and Labrador. Putting Fishers' Knowledge to Work: Conference Proceedings. https://doi.org/10.3354/meps07876
[5]   Arifiani, N.A., Mussadun, M., 2016. Study of Community Perception on the Level of Sustainability of the Sarang District Coastal Area. Regional and Environmental Journal, 4(3), https://doi.org/10.14710/jwl. 4.3. 171-186
[6]   Aryono, B. 2004.   Study of the Role of Maritime Tourism Development against Fishermen Welfare. Undip Postgraduate Semarang. 47-51
[7]   Sutton-Grier, A. E., Wowk, K., & Bamford, H. 2015. Future of our coasts: The potential for natural and hybrid infrastructure to enhance the resilience of our coastal communities, economies and ecosystems.Environmental Science and Policy, 51. https://doi.org/10.1016/j.envsci.2015.04.006
[8]   Regional Planning and Development Agency of Bone Bolango Regency., 2006. Preparation of Gorontalo Province Sea and Land Fisheries Development Master Plan. Bappeda District of Bolango. BPS. 5, 47-52
[9]   Brunbjerg, A.K., Borchsenius, F, Eiserhardt.W, L et al., 2012a. Disturbance drives of phylogenetic community structures in coastal dune vegetation. J Veg. Sci 23,1082–94. Google Crossref Scholar
[10]   Baharsyah, S. 1990. Business Opportunities that remain Broad in the Prisma agriculture sector No. 2. 1-86. LP3S
[11]   Chambers, R. 1991. Shortcut and Participatory Method for Gaining Social Information for Projects, M Putting People First Ociological Variables in Rural Development. Oxford University. 22 (10), 1437-1454. https://doi.org/10.1016/0305-750X(94)90030-2

[12] Dahuri, R., Rais, J., Ginting, S.P. & M.J. Sitepu,. 2001. Pengelolaan Sumberdaya Wilayah Pesisir dan Lautan Secara Terpadu (Integrated coastal and ocean resources development). Second edition. Jakarta, Pradnya Paramita Publishers. 2 (1), 328.

[13] Rosari, B.B., Sri Widodo., and Masyuri., 2002. Variable Food Consumption in NTT Communities. Journal of Argosains Periodical Postgraduate Research in Agricultural Sciences UGM.15 (1). 143-158

[14] Aini, E. N., Isnaini, I., Sukamti, S., & Amalia, L. N., 2018. The Influence of the Level of Education on the Level of Community Welfare in Kelurahan Kesatrian Kota Malang. Technomedia Journal, 3 (1). https://doi.org/10.33050/tmj.v3i1.333

[15] Bennett, N. J., Dearden, P., & Peredo, A. M., 2015. Vulnerability to multiple stressors in coastal communities: a study of the Andaman coast of Thailand. Climate and Development. https://doi.org/10.1080/17565529.2014.886993

[16] Hakim, M., Hakim, A., Hakim, L.,Harahab, N., 2018. Coastal Tourism Management Model toward Developing Independent Tourist Village in Central Lombok District, Indonesia. Resources 2018. 7, 69.

[17] Department of Fisheries and Ocean Department Bone Bolango. 2018. Book of Capture Fisheries Statistics District Bone Bolango. Department of Fisheries and Ocean Department Bolango. 4,156- 159

[18] Dwiyanto, K. 2003. Technology Innovations for Handling the Impact of Drought on Animal Husbandry Development Paper on National Seminar on Development of Animal Husbandry with Environmental Insights. Faculty of Animal Science IPB. 3, 315-322

[19] Freeman III, A.M. 1994. The Measurement of Environmental and Resources Values Theory and Methods. Resources for the Future, Washington, DC. 515

[20] Fromentin, J.M., Powers, J.E., 2005. Atlantic bluefin tuna: population dynamics, ecology, fisheries and management Fish and Fisheries, 6. 281-306.

[21] Gilbert, Alan.,Ward, Pater., 1984. Community Anticipation in Upgrading Irregular Sattlement the Community Response. World Development.12 (8), 769-782

[22] John, K., Fikret B., Anthony, C., Evelyn, P., & Melanie, Wiber., 2007. The Role of Participatory Governance and Community-Based Management in Integrated Coastal and Ocean Management in Canada, Coastal Management, 35 (1). 79-104, DOI: 10.1080 /10.1080/08920750600970511

[23] Jager, W., Janssen, M, A., De Vries., H,J,M., De Greef J, Vlek, C,A,J., 2000. Behavior in Commons Dilemmas: Homo Economicus and Homo Psychologic in an Ecological-Economic Model. Ecological Economic, 35, 357-379

[24] Johansson,P.O., B, Kristrom., and K.G, Maler., 1989. Welfare Evaluation in Contingent Valuation with Discrete response data: Comment, American Journal of Agricultural Economics. 71, 10054-1056

[25] Jager, W., Janssen, M.A., De Vries, H.J.M., De Greef, J., Vlek, C.A.J., 2000. Behaviour in Commons Dilemmas: Homo Economicus and Homo Psychologicus in an Ecological-Economic Model. Ecological Economic, 35, 357-379

[26] Holthuijsen, L. H. (2007). Waves in oceanic and coastal waters. In Waves in Oceanic and Coastal Waters. https://doi.org/10.1017/CBO9780511618536

[27] Katz, M.L., H.S Rosen., 1994. Microeconomics Second Edition. Richard D Irwin, Inc. Kay, R. Coastal Planning and Management EFN Sponge. London, UK and New York,USA..

[28] Kesteven, G.L, 1973. Manual of Fisheries Science: Part I An Introduction to Fisheries Science. FAO Fisheries Technical Paper. 18, 231

[29] Knipscheer., H.C.A.J, De Boer., M, Sabrani., T.O, Soedjana., 1987. The Role of Economic Livestock Goat and Sheep in Indonesia, A Study Case Jawa Barat in P.S. Hardjosworo, JM Levine (Editor) Animal Husbandry Development in Indonesia (Role Model System) Jakarta Obor Indonesia Foundation. 19 (3),112-134pg

[30] J, Kearney., F, Berkes., A, Charles., E, Pinkerton., & M, Wiber.,2007. The role of participatory

governance and community-based management in integrated coastal and ocean management in Canada. Coastal Management. 35 (1), 79-104.

[31] Howard, J., Sutton-Grier, A., Herr, D., Kleypas, J., Landis, E., Mcleod, E.,Simpson, S., 2017. Clarifying the role of coastal and marine systems in climate mitigation. Frontiers in Ecology and the Environment, 15 (1). https://doi.org/10.1002/fee.1451

[32] A.B.E., Prasetyo., dan Rianto., 2002. Acceptance of Profits and Profitability of Ettawa Cross-breed Goat Business to Members of the Livestock Farmers Group in Purworedjo Regency. Jurnal Pengembangan Peternakan Tropikal. 27 (4), 177-185

[33] Hair, J. F., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. Journal of Business Research, 109, 101–110. https://doi.org/10.1016/j.jbusres.2019.11.069

[34] Lee F., Yok, Shiu., 1994. Community Based Urban Environmental Management Local NGOs as Catalys. Regional Development Dialogue. Autumn 15 (221). Ministry of Maritime Affairs and Fisheries. 2001. General Guidelines for Coastal Community Economic Empowerment. Jakarta

[35] Ministry of Maritime Affairs and Fisheries. 2003. Guidelines for Management and Planning of Coastal and Marine Spatial Planning. DG of Coastal and Small Islands. Jakarta. 7, 64-72

[36] Ministry of Maritime Affairs and Fisheries. 2005. Preparation of Spatial Planning for Marine, Coastal and Small Islands Border Area with Timor Leste. DG P3K and the Gorontalo Province Fisheries and Maritime Affairs Office. 4,128-131

[37] Maarten, B., Svein, Joeri, S., 2018. Fisheries as social struggle: A reinvigorated social science research agenda, Marine Policy. 94, 2018, 46-52, ISSN 0308-597X, https://doi.org/10.1016/j .marpol.2018.04.026.

[38] Murray, A.,Rudd, Mark.,Dickey-Collas. Et al., 2018. Ocean Ecosystem-Based Management Mandates and Implementation in the North Atlantic. Frontiers in Marine Science 5. 76 (1), 41–44

[39] Pinkerton, E., Keithlah, N., 1990. "Innovations by the Inter-Tribal Fisheries Management Cooperative: UBC Center for Human Settlements". In The Point No Point Treaty Council [Google Scholar], 1521-0421

[40] Pemoroy, R.,Berkes, F., 1997. To Two Tango: The role of Government in Fisheries Co-Management. Marine Police 1997. 21 (5) pp, 465-480. DOI 10.1016 / S0308-597X (97) 00017-1. ISSN 0308-597X

[41] Ruddle K., Satria, A., 2010. Managing coastal and inland waters: Pre-existing aquatic management
       Systems in Southeast Asia. In Managing Coastal and Inland Waters: Pre-existing Aquatic Management Systems in Southeast Asia. 76-89. https://doi.org/10.1007/978-90-481-9555-8

[42] Qodriyatun, S.N., 2013. Increasing Coastal Community Welfare in Batam City through Community Empowerment. Journal of Aspirations, 4 (2), 91-100.

[43] Supriharyono. 2000a. The Problem of Coastal And Marine Resources Management in Indonesia. Journal of Coastal Development. 4 (1), October 2000. P: 7

[44] Suharsimi, Arikunto, 2006. Research Procedures for a Practical Approach, (Jakarta: Rineka Cipta, 2006). Cet. 13, p. 139

[45] Tawakkal, G. T. I., & Kistanto, N. H., 2017. Coastal community: Local wisdom versus bureaucratic logic (fishermen's welfare fund in Pati district). Advanced Science Letters, 23 (10). https://doi.org/10.1166/asl.2017.10352

[46] Lin, X., Lu, C., Song, K., Su, Y., Lei, Y., Zhong, L., & Gao, Y., 2020. Analysis of Coupling Coordination Variance between Urbanization Quality and Eco-Environment Pressure: A Case Study of the West Taiwan Strait Urban Agglomeration, China. Sustainability, 12 (7). https://doi.org/10.3390/su12072643

[47] Yapanto, L.M., & Modjo, M.L., 2018. Assessing public awareness levels on the preservation of coral reefs (The case study in Biak Numfor, Papua, Indonesia). Ecology, Enviroment and

Conservation. Copyright @ EM International. 24 (4), 1931-1939