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The Ecological Behaviour of Community in Preserving Land Use in Coastal Areas of Parepare

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ABSTRACT

In 2011, the number of population of Pare-Pare City is around 130, 582 people which are spread out over four districts in the city of Pare-Pare. Most of the districts are located in the coastal region. The data illustrate that the coastal region in Pare-pare seems increasingly pressured by high population density in coastal areas prone to environmental degradation. From these communities, it seems that they are more likely to behave non-ecologically, such as throwing garbage in water bodies, building a house on the water, diminishing mangrove zones and various trends of environmental degradation which were caused by human action itself. This study use quantitative approach and hypotheses testing combined with survey method that uses questionnaire instruments. Instruments that used in this study were developed by the researchers. They include several questionnaires such as those of community's ecological behavior, their knowledge about environment, local wisdom, locus of control and their environmental attitude. Moreover, based on SEM analysis method, it can be concluded that the variables of environmental knowledge (X1), local wisdom (X2) and locus control (X3) have direct and significant impacts toward the environmental attitude (Y1). Furthermore, those variables also have similar impacts to the ecological behavior (Y2), whereas the variables of environmental attitude (Y1) do not have direct impact to the ecological behavior (Y2). This is shown with the significance value p-value>0.05.

Key words: Ecological behavior, environmental awareness, local wisdom, locus of control, environmental attitudes

INTRODUCTION

Lack of public awareness in managing and preserving the environment is one of the causes of the ongoing environmental crisis in Indonesia especially in South Sulawesi Province. Environmental crisis that occurred in late decades, sourced from the miss management of human behavior and nature exploration errors. This is in line with Chiras (1991) who states that environmental damage caused by human activity that frontier mentality. These frontier mentality human traits are: (1) The view that natural resources are not limited and (2) The view that humans are not part of nature and (3) The view that nature exists to be controlled and used in fulfilling human needs.

There are potential conflicts of interest and the overlap between sectors and other stakeholders in the management and utilization of coastal areas. These conditions appear as a consequence of the existing diversity of coastal resources and coastal characteristics that act as an "open access" to

encourage coastal region which has become one of the prime locations for the activities of several sectors of development (multi-use). Development impacts that arise not only sourced from inside coastal areas but also from the sea and inland areas.

In the developmental policies of the Province of South Sulawesi (Anonymous, 2010), Parepare is designated as the central development region (FGM), the center which serves Barru, Pinrang, Sidrap and Enrekang regency. The strategic position of Parepare experiences high urban development, including the use of coastal areas. Coastal areas Pare-pare stretch from north to south from the border of Pinrang to Barru regency about 26 km. This area have mixed land uses, such as residential urban areas and rural areas, coastal protected areas, tourist areas, the harbor area, the trade and services, as well as fishing areas. Based on the observations conducted in this study, it appears that the use of coastal area tends to decrease the quality of environment which may be affected by the local community behavior in making use of the area. They have lack knowledge about the effects of pollution and environment, low socio-economic, low human resources and their attitude and motivation which can combine economic and ecological interests in utilization the land. The use of coastal area based on environmental knowledge has been neglected by the local community. This situation seems likely maybe caused by poor knowledge of the environment, low community's economic level, limited physical environment based infrastructure and low knowledge of the pollution. This is worsened by negative community behavior such as throwing their waste and garbage to the sea. Besides, based on study that has been reported by Kaiser and Fuhrer (2003) stated that the coastal communities with their various limitations seem to have little motivation to maintain and protect the coastal environment, so that every year, damages to coastal areas increase. Therefore, it is necessary to study the influence of people's behavior based on eco-behavior, so that the coastal area utilization becomes more sustainable.

Formulation of the problem which will be studied is how environmental knowledge, local knowledge and locus of control effect on motivation to preserve the environment which then have effect in ecological behavior of the land use management. Therefore, this study aims to analyze the influence of environmental knowledge, local knowledge and locus of control on motivation to preserve the environment which in further determines its effect on ecological behavior in the land use management of local community in Parepare Regency.

METHODOLOGY

Types of the research: This research included in survey research, as it will examine the influence of environmental knowledge, local knowledge, locus of control, motivation to preserve the environment, toward ecological behavior (eco-behavior) in the land use of coastal areas.

Sampling techniques: The sampling technique used in this study was probability sample-purposive sampling method followed by proportional sampling method. The numbers of samples taken are about 300 the heads of family which is obtained proportionally from 6 districts in the city of Pare-Pare.

Research design: In this study, all the variables were considered homogeneous, where all the independent variables had a direct or indirect relationship to variable dependents. The indirect relationship occurs because there are independent variables namely; in-between variable (Y1/motivation to preserve the environment) and also Y2/attitudes which must be passed before processing with variable dependent/Y2 (ecological behavior toward management of land-use). The research design is shown in Fig. 1.

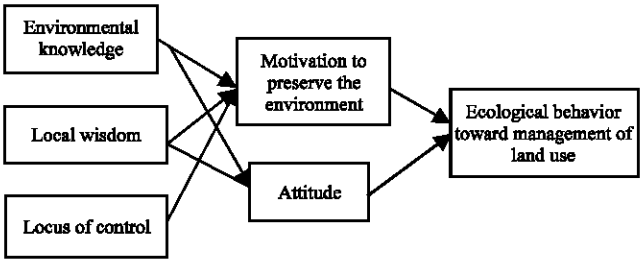

Fig. 1: The relationship between variables

Table 1: Static descriptive analysis of the environment variable (X1), local wisdom (X2), locus of control (X3), environmental attitudes (Y1) and ecological behaviour

Statistics	Knowledge	Local wisdom	LOC	Motivation	Ecology
N Valid	300	300	300	300	300
Missing	0	0	0	0	0
Mean	12.7467	40.7533	50.9267	88.27.62	71.9600
Std.Deviation	2.24632	7.73900	9.22016	10.61803	16.10745
Minimum	6.00	19.00	29.00	57.00	36.00
Maximum	18.00	56.00	85.00	129.00	135.00

Data analysis techniques: The analysis technique used in this study was Structural Equation Model (SEM) which was operated through the program AMOS 4:01. SEM is used in this study as it contains a set of statistical techniques that allow measurement of a relatively complex set of relationships simultaneously. Modeling study through SEM allows a researcher to answer the research questions that are regressive and dimensional i.e to measure the dimensions of a concept (Santoso, 2012).

RESULTS AND DISCUSSION

Descriptive analysis: Descriptive analysis aims to describe the research variables through the interpretation of the whole respondents' frequently distribution answer, both in the number of respondents (people) and the mean value of each of question in the environmental knowledge variable (X1), local wisdom (X2), locus of control (X3), environmental attitudes (Y1) and ecological behavior (Y2) which are calculated based on cumulative questions.

From Table 1, it can be explained that the average cumulative response of environmental knowledge variable (X1) is 12.74 with a minimum cumulative score of 6 and the maximum is 18. The average cumulative response of local knowledge variable (X2) is 40.75 with a minimum cumulative score of 19 and maximum of 56. Moreover, the average cumulative response of locus of control variable (X3) is 50.92 with a minimum cumulative score of 29 and maximum of 85. The average cumulative response of environmental attitude variables (Y1) is 115.06 with minimum cumulative answers questions at 71 and a maximum of 167. The average cumulative response of motivation to preserve the environment variables (Y1) is 88.27 with a minimum cumulative answers question at 57 and a maximum of 129. Finally, the average cumulative response of variable ecological behavior (Y2) is 71.96 with a minimum cumulative answers question at 36 and a maximum of 135.

Result of SEM assumptions: Univariate normality assumption was tested with the help of AMOS software 6. If absolute value of CR univariate data Z is less than 5% which in this case is 1.96, then

Table 2: Assessment of normality (Group No. 1)

Variable	Min	Max	Skew	C.R	Kurtosis	C.R
LOC	29.000	85.000	.816	5.767	.837	2.960
Wisdom	19.000	56.000	-.105	-.743	-.198	-.700
Knowledge	6.000	18.000	-.255	-1.802	.136	.481
Motivation	57.000	129.000	.125	.886	.579	2.047
Ecology	36.000	135.000	.266	1.884	.244	.863
Multivariate					8.405	7.429

the univariate normal assumptions are met, otherwise if the CR-Multivariate value greater than 1.96 then the assumption of univariate normal does not fit. This means that the data are not normal. The following test results show the majority of the absolute value of CR<1.96, then it means that the assumption of normality univariate is fit.

From these results Table 2, it can also be seen that based on univariate value, most of the critical value of variables skewness are not too far from±2:58 (significant at 1%) so that it can be inferred that most of data are near normal distribution. In multivariate, the value 7,429 is the coefficient of multivariate kurtosis with critical value 8,405 and it is just above±2.58. It is proved that the data can be concluded to have multivariate normal distribution, both in univariate and multivariate analyzes.

Goodness of fit test SEM: In theoretical models which used as the conceptual framework of this study, the data is fit if it is said to be supported by empirical data. Results of the goodness of fit models testing, according to the analysis with the help of AMOS program is presented in the following output. Essentially, the goodness of fit test is used to determine the hypothetical model supported by empirical data. The goodness of fit sizes are as follows.

Chi-square: Chi-square was used to test how close a match between the sample covariance matrix S with the model covariance matrix $\Sigma(\theta)$. Researchers sought to elicit a low chi-square significance level resulting in greater than or equal to 0.05. This indicates that the null hypothesis is accepted and the predicted input matrices with real (actual) was not statistically different. However, if the chi-square large and significant level less than 0.05, it means that zero hypotheses are rejected. We do not necessarily state that the predicted input matrices are not the same as the actual input. It should be further investigated how is the level of incompatibility. Chi Square value in this study demonstrates the value that is large enough 4375.199. This may indicate a lack of model fit. But it can be overcome by looking at the size of other goodness of fit of the data.

Goodness of Fit Index (GFI): GFI can be classified as absolute match measure, because basically GFI compares the hypothesized model with no models at all. GFI values range from 0 (poor fit) to 1 (perfect fit) and the value of GFI≥0.90 is a good fit (good fit), whereas 0.80≤GFI<0.90 is often referred to as the marginal fit. In the output, the GFI value produced is about 0.677. This indicates that the model is not a perfect fit but still it can be classified as a good model to be used.

Root Mean Square of Approximation (RMSEA): The RMSEA value of ≤0.05 indicates the close fit, while the value in the range of 0.05 <RMSEA≤0.08 showed good fit (Skinner, 2005) further collaborated this cut point by adding that the RMSEA value as a range between 0.80 until 0:10 to show mediocre (marginal) fit. Furthermore the RMSEA values >0:10 indicates poor fit. In this

Table 3: Goodness of fit test results

Fit index	Recommended value	Values
χ^2 (df)	Less value	2.046
p-value	p-value>0.05	0.153
GFI	GFI≥0.90	0.998
RMSEA	RMSEA≤0.08	0.059
AGFI	AGFI≥0.90	0.952
TLI	TLI≥0.95	0.952
CFI	CFI≥0.90	0.997

Table 4: Regression weights: (Group No. 1-Default model)

Variables	Estimate	S.E	C.R	P	Label
Attitude ← Knowledge	1.746	0.311	5.610	***	par^{-1}
Attitude ← Wisdom	0.249	0.094	2.643	0.008	par^{-2}
Attitude ← LOC	0.240	0.078	3.071	0.002	par^{-3}
Ecology ← Motivation	0.471	0.094	5.013	***	par^{-8}
Ecology ← Knowledge	0.235	0.368	0.638	0.523	par^{-9}
Ecology ← LOC	0.199	0.092	2.150	0.032	par^{-10}
Ecology ← Wisdom	0.678	0.107	6.321	***	par^{-11}

Table 5: Standardized regression weights: (Group No. 1-Default model)

Variables	Estimate
Attitude ← Knowledge	0.299
Attitude ← Wisdom	0.147
Attitude ← LOC	0.169
Ecology ← Motivation	0.310
Ecology ← Knowledge	0.033
Ecology ← LOC	0.114
Ecology ← Wisdom	0.326

model, it is obtained RMSEA value of 0.085 and classified as marginal fit. It can be concluded that the model is good enough to be used.

Adjusted Goodness of Fit Index (AGFI): Similar with GFI, AGFI values range from 0 to 1 and the value of AGFI ≥0.90 indicates good fit. Moreover, 0.80≤GFI<0.90 is often referred to as the marginal fit. Of this model, the obtained AGFI value is about 0.648. Although, this value cannot yet be classified as a perfect fit but this model is good enough to be used.

Comparative Fit Index (CFI): The CFI values will range from 0 to 1. The CFI values ≥0.90 indicate good fit, whereas the 0.80≤FI<0.90 is often referred to as the marginal fit. Of this model, the obtained CFI value is about 0.760. Although, it cannot yet be classified as a perfect fit but this model is good enough to use.

From table 3, the results of the overall goodness of fittest showed that all criteria are excellent models.

Inferential analysis

Structural model analysis: The structural model is essentially the research hypothesis testing. There are three types of effects will be presented in this structural model which are the direct effect,

the indirect effect,and the total effect. Hypothesis testing in direct influence test is conducted with Critical Ratio (CR) test at each point partially. If the value of CR>1.96 or p values>0.05, it can be concluded that there are significant influences. On the other hand, if the value of CR<1.96 or p values>0.05, it can be concluded that there is no effect. The complete analysis of the results, given in the results of SEM analysis can be found below.

Table 4 presents the results of hypothesis testing effect (direct effect).

From Table 4 and 5, it can be analyzed that the knowledge of environmental variables (X1), local wisdom (X2) and locus of control (X3) have direct and significant impact on environmental attitudes (Y1). This is indicated by the significant value p-value<0.05. The environmental knowledge variable (X1), local wisdom (X2) and locus of control (X3) also have affected directly and significantly to the ecological behavior (Y2). However, the environmental attitudinal variable (Y1) has no direct influence on ecological behavior (Y2). This is indicated by the significant value p-value>0.05 level.

Next, we conducted a test to the indirect effect data. In the indirect effect test, we use some direct effect test results. The indirect effect coefficient was not directly obtained from the product of the direct effect coefficients. The indirect effect can be assumed to be significant if the two direct effects that have been used are significant. The complete indirect influence test results are presented Table 6.

From table 6, it can be seen that there are significant indirect environmental knowledge among variables (X1), local wisdom (X2) and locus of control (X3) on ecological behavior (Y2) which are equal to 0.092, 0.032 and 0.040, respectively. It means that there is no influence direct positive environmental knowledge among variables (X1), local wisdom (X2) and locus of control (X3) on ecological behavior (Y2).

Hypothesis testing and discussion: Based on the above presentation, the hypothesis can be analyzed as follows: The influence of environmental knowledge, local wisdom and locus of control toward the attitude of environment followed by ecological behavior in land management.

H_o 1: There is no significant effect of environmental knowledge, local wisdom and locus of control toward the attitude of environment followed by ecological behavior in land management.
Ha 1: There is significant effect of environmental knowledge, local knowledge and locus of control toward the attitude of environment followed by ecological behavior in land management.

Based on the results of SEM structural model analysis, the relationship of environmental knowledge, local wisdom and locus of control on environmental attitudes is at 1.746, 0.249 and 0.240 with the value of Critical Ratio (CR) of 5,610, 2,643, 3,071 and probability (p) of 0.000, 0.002 and 0.008, respectively. As the value of CR>1.96 and a value of p<0.05, so that it can be explained that there is a significant direct environmental knowledge, local wisdom and locus of control on environmental attitudes which directly influence the coefficient of community behavior. The result of the environmental knowledge, local knowledge and locus of control was effecting on environmental attitudes which in this research are positive. They are at 0.299, 0.147 and 0.169.

Table 6: Standardized indirect effects (Group No. 1-Default model)

Variables	LOC	Wisdom	Knowledge	Attitude
Motivation	0.000	0.000	0.000	0.000
Ecology	0.092	0.032	0.040	0.000

Table 7: Indirect effects (Group No. 1-Default model)

Variables	LOC	Wisdom	Knowledge	Attitude
Attitude	0.000	0.000	0.000	0.000
Ecology	0.160	0.066	0.283	0.000

These show that there is a positive contribution of the environment, local wisdom and locus of control to the environment. That is, the better knowledge of the environment, local wisdom and locus of control, the higher the environmental attitudes.

Moreover, the influence of environmental attitudes toward ecological behavior in land use is at-0.032 while CR values and probability (p) are-0.422 and 0.673 respectively. This suggests a negative relationship between environmental attitudes toward ecological behavior in land management. However, it shows no significant effect.

In fact, the variable of environmental attitude bridges the influence of environmental knowledge, local wisdom and locus of control to ecological behavior indirectly in land management which are shown in Table 7.

CONCLUSION

Based on the results of data analysis and statistical calculations as described in the preceding discussion, the findings of this study were as follows:

- The environmental knowledge has a positive direct effect on motivation to preserve the environment and also has a positive direct effect on ecological behavioral in the coastal land-use management
- Local wisdom has direct positive effect on environmental attitudes. It is also has a positive direct effect on ecological behavioral in the coastal land management
- Locus of control has a positive direct effect to the environmental attitudes and it has a positive direct effect on ecological behavior in coastal land management
- The knowledge of environment has an indirect influence toward ecological behavior via the motivation to preserve the environment in coastal land use management
- Local wisdom has an indirect influence toward ecological behavior via the motivation to preserve the environment in coastal land management
- Locus of control has an indirect influence toward ecological behavior via the motivation to preserve the environment in coastal land use management

Based on the above findings, it can be concluded that the ecological behavior in coastal land management is affected directly and indirectly by environmental knowledge, local wisdom and locus of control and also motivation to preserve the environment does not affect the ecological behavior in land management. However, the variable of environmental attitude becomes the one that bridges the influence of environmental knowledge, local wisdom and locus of control variables to the ecological behavior indirectly in the coastal land management.

In this study all the variables were considered homogeneous, where all the independent variables had a direct or indirect relationship to variable dependents. The indirect relationship occurs because there are independent variables namely; in-between variable (Y1/motivation to preserve the environment) and also Y2/attitudes which must be passed before processing with variable dependent/Y2 (ecological behavior toward management of land-use). The research design is shown Fig. 1.

Source: Results of the synthesis of theory which is made for the purposes of this research (Skinner, 2005; Tan and Lau, 2011; Levine and Strube, 2012; Esa, 2010).

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