Management behavior of indigenous peoples in conserving forest resources – Evidence from East Kalimantan Province (Indonesia)

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Abstract

The study aims to prove the influence of local wisdom, learning, attitudes on the intentions and behavior of indigenous peoples in behaving sustainably or preserving forest resources in East Kalimantan Province. The population in this study is customary law communities, namely groups of people who have local wisdom in protecting and managing the environment sustainably in the province of East Kalimantan. The purposive sampling method was used to select districts and villages as sample areas, namely the districts of Berau, East Kutai, and West Kutai with a total population of 12,483. The sample of customary law communities was taken using the nonprobability sampling technique, which includes incidental sampling and purposive sampling of 387 indigenous respondents. Subsequently, in-depth interviews were conducted with 11 customary law community leaders as informants to produce more facts, complete the study description of the phenomenon being studied, and strengthen the research analysis. As a result, local wisdom has influenced the intentions and behavior of indigenous and tribal peoples to conserve forest resources. Learning can increase intention and influence community behavior to conserve forest resources. The attitude of the customary law community in supporting the preservation of forest resources has no effect on the intention to conserve forest resources and the stronger the intention to conserve forest resources, the more it will affect the behavior of the customary law community in conserving forest resources. Furthermore, the perception of indigenous and tribal peoples is that they are very supportive of the preservation of forest resources, forests are seen as an inseparable part of life due to their very high dependence on the economy.

Key words: local wisdom, SEM, interviews, indigenous peoples, forest sustainability.

Introduction

Forest is one of the natural resources that has high economic, ecological and social value (Alam & Hajawa, 2009). This is why the existence of forests in Indonesia must be maintained for the last 3 decades because Indonesia's forest resources have become the main capital of national economic development, giving a positive impact on increasing the country's foreign exchange, employment, encouraging regional development and national economic growth.

Forests for the people of East Kalimantan have become life support. Customary law community groups have strong interactions with the forest as a source of livelihood and land for living (Forestry Council of East Kalimantan Province, 2010). The impact of climate change on natural and human systems remains largely uncertain. However, we know that if forest loss is faster than we can recover, the people living

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in and around the forest will be the first to be affected. This is due to their very high dependence on forests, both for the provision of food, shelter, medicine and other daily necessities.

The livelihoods of the people living around these forests will be more difficult, if there is a side effect of forest loss, such as reduced access to quality water and food, ongoing extreme flooding or drought, and subsequent climate change (RECOFTC of Indonesia, 2012).

As a community whose daily life behavior is very close to the natural environment, indigenous peoples have rules on how to protect and manage the environment in a sustainable manner which has been passed down from generation to generation. One of the indigenous peoples in East Kalimantan is the 'Dayak' tribe. In the context of forest resource management based on traditional wisdom, basically, 'Dayaks' have certain ways of treating forest areas. Bamba (1996) illustrates that 'Dayaks' see nature not as an asset or wealth but as a common house. The concept of a shared house is seen in every ceremony that precedes certain activities related to utilizing the forest, where there is always an element of excuse or asking permission from forest dwellers to be worked on.

The theory of behavior popularized by Bandura (1982) known as "Social Cognitive Theory" defines that according to him, the environment does shape behavior, and behavior shapes the environment. Human behavior is influenced by various factors. From the opportunities in previous studies that have been done before, several factors influence human behavior to protect the environment, including learning, attitudes, and intentions. Steg & Vlek (2009) presented that environmental quality is highly dependent on human behavior patterns. Then, it is also in line with studies conducted by Winter & Koger (2004), Gardner & Stern (2002), and Vlek & Steg (2007).

In addition, related to behavior patterns in communities in certain territories, Morris et al. (2012) linked behavioral theories and models to behavior change. In general, some of their central elements and cross-cutting themes are that of theories and models of human behavior coming from all social science disciplines.

1. Problem statement and objectivity

Indigenous peoples are very important and strategic partners in conserving forest resources. Their role is one of the essential aspects that affect the preservation of forest resources. The results and impacts of education and assistance programs on forest management carried out by the government and non-profit organizations (NGOs) do not always achieve the targets as planned at the beginning of their implementation. This is because many things are caused by environmental conditions, regulatory support as well as support from human resources, and other things that influence it. For this reason, an in-depth search and study of the factors that influence the behavior of indigenous and tribal peoples in conserving forest resources are needed to maximize future results so that the results can be better.

Referring to the phenomena previously described, this research focuses on in-depth efforts regarding the factors that influence the behavior of indigenous and tribal peoples in conserving forest resources through theoretical approaches as a result and impact of education and assistance programs on forest management (environment) that have been implemented. implemented by NGOs and government organizations (KPH). Furthermore, we also strive to prove the perspective of indigenous and tribal peoples in conserving forest resources so that they behave sustainably (sustainably) in East Kalimantan Province, Indonesia.

Material and methods

Framework and hypothesis

On a similar occasion, Indrawardana (2012) estimates that 'Kanekes', like other 'Sundanese' people, see that the natural environment is not something that must be subdued but must be respected, nurtured, and cared for. On the one

hand, Kongprasertamorn (2007) found that a community research and development method can stimulate local wisdom to protect the environment and develop a society in a number of ways.

Knowledge of the process of economic maintenance and its disruption to the environment has been investigated by Arbuthnott (2008) through the role of human activities is very important. This means, especially to motivate changes in values, attitudes, and behavior, it is closely related to education for sustainable development (ESD). Frisk & Larson (2011) reported that in achieving a sustainable future, it is necessary to consider individuals to adopt different values, attitudes, habits, and behaviors so that they can be learned and instilled from an early age.

Furthermore, a framework for the relationship between variables is prepared. Figure 1 identifies the relationship between variables with the Structural Equation Modeling (SEM) model and the Smart PLS 3.2.6 software. Then, to deepen the results of the research, qualitative methods are used which serve to prove, deepen, weaken, and invalidate quantitative data that has been obtained at an early stage. Conceptually, the behavior of customary law communities (MHA) in conserving forest resources will be studied from the aspects of the influence of local wisdom, learning, attitudes, intentions as intervening. These variables are identified through theoretical studies and empirical studies which indicators are then obtained which will then be used as references in this research activity.

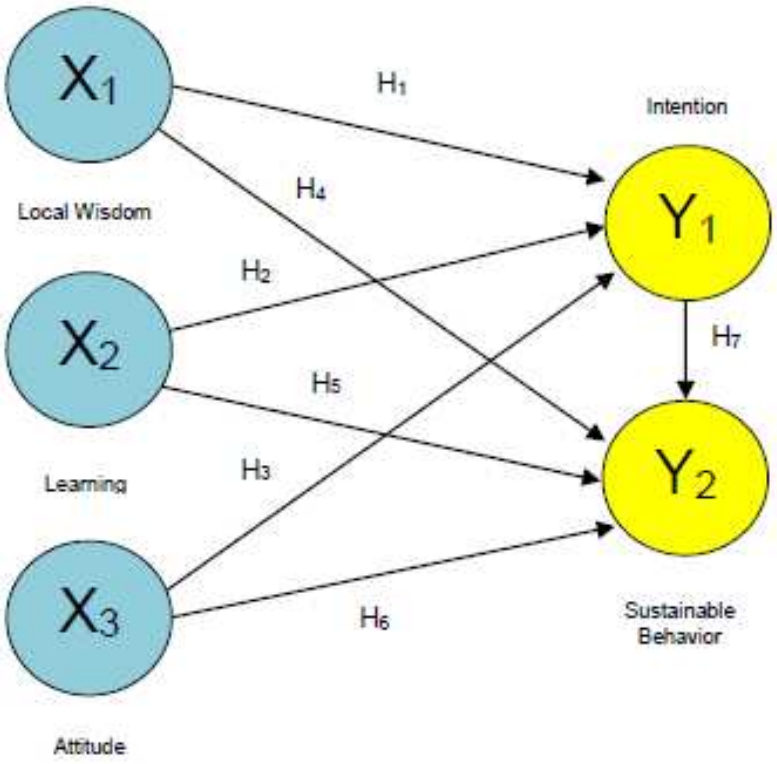

Fig. 1– Variable arrangement
Source: created by author.

This study includes a new variable, namely local wisdom through the human ecological theory approach as a new theoretical development in predicting behavior, namely the behavior of indigenous and tribal peoples in conserving forest resources, which was developed through various literature studies. The location is carried out in customary law communities in selected areas (East Kalimantan Province).

The conceptual framework also explores the unidirectional relationship between variables,

which is indicated by an 'arrow'. This one-way relationship system is called a recursive model. This relationship pattern shows that the intentions and behavior of indigenous and tribal peoples in conserving forest resources are influenced by local wisdom, learning, and attitudes. The points in the proposed hypothesis are as follows:

H1: Local wisdom affects the intention to behave in a sustainable manner by customary law communities.

H2: Learning affects the intention to behave sustainably in customary law communities.

H3: Attitudes affect the intention to behave in a sustainable manner in customary law communities.

H4: Local wisdom affects the sustainable behavior of indigenous peoples.

H5: Learning affects sustainable behavior in customary law communities.

H6: Attitudes have an effect on sustainable behavior in indigenous peoples.

H7: Intention has an effect on sustainable behavior in indigenous peoples.

H8: Local wisdom influences the sustainable behavior of indigenous and tribal peoples through intention.

H9: Learning affects the sustainable behavior of indigenous and tribal peoples through intention.

H10: Attitudes influence the sustainable behavior of indigenous and tribal peoples through intention.

Data set

The data collection technique was carried out by purposive sampling, which was used to select districts and villages as sample areas, namely the area around the forest area where indigenous peoples have local wisdom.

The consideration of selecting districts and villages as sample objects are based on areas that have received or are currently receiving assistance and learning from non-profit organizations (government partners) and the government regarding efforts to protect, manage and utilize forest or natural resources in a sustainable manner. There are 3 districts and 12 selected villages that become provisions (see Table 1).

Table 1 – Selected sample

Districts	Villages	Sampel
Berau	Long Keluh (Boy), Leong Beliu (Gie), Lesan Dayak, Long Duhung	40
East Kutai	Nehas Liah Bing, Long Wehea, Dea Beq, Diaq Lay	208
West Kutai	Tering Lama, Dempar, Linggang Melapeh, Temula	139
Total		387

Source: author data.

The number of respondents has been determined as many as 387 indigenous peoples. That way, it is expected to fulfill the normal distribution. According to the proportion of the customary law community in each village, the number of respondents in each area was ready to participate during the observation. The location range is presented in Figure 2.

Furthermore, to obtain qualitative data that acts as evidence, deepens, weakens, and invalidates the quantitative data that has been obtained, in-depth interviews are conducted with selected informants. Customary law community leaders as the initial process, because they are considered to know the social conditions of the community in the local village. The key informants in this study were 11 people.

Variables and instruments

Types of variables are divided into dependent variables (predictable) and independent variables (predict). Independent variables include variables of local wisdom, learning, and attitudes. Meanwhile, intention and sustainable behavior act as dependent variables (Ilmi et al., 2020).

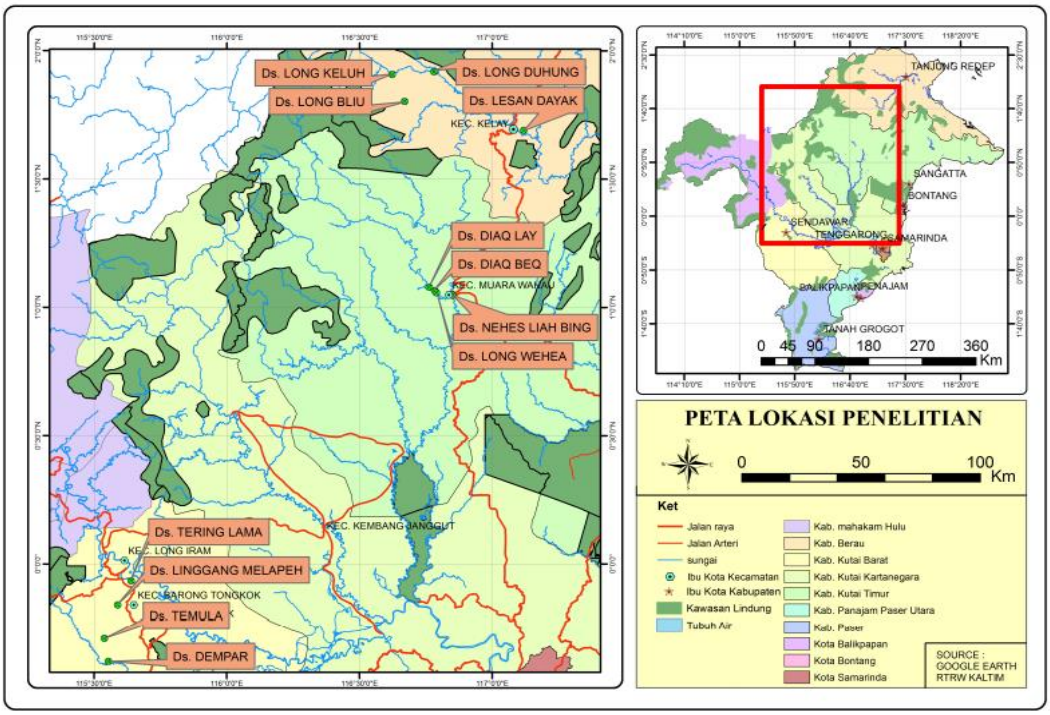

Fig. 2 – Location detail map
Source: created by author.

The measuring tool to complete the explanation appropriately is measured through a questionnaire (questionnaire list) which will have an interval scale of 1-5 so that it can quantify the data obtained from these questions. Alternative answers use a scale with intervals and are scored as follows:

1) Answer (a) is given a score of 1 = 'strongly disagree'
2) Answer (b) is given a score of 2 = 'disagree'
3) Answer (c) is given a score of 3 = 'doubtful'
4) Answer (d) is given a value of 4 = 'agree'
5) Answer (e) is given a value of 5 = 'strongly agree'

Data processing

Quantitative data analysis is presented through the SEM method with SmartPLS software. SmartPLS is the reference standard because this software does not require an assumption of normality (normally distributed data). In addition, this tool can also be used for a relatively small number of samples, so that it can be done to explain the direct or indirect effects of a set of variables as a cause for another set of variables as a result (Rahmawati et al., 2021).

Results and discussion

Respondent profile

In general, the size of respondents in the Berau District includes 6 people in Long Keluh (Boy) Village, 26 people in Long Beliu (Gie) Village, 4 people in Lesan Dayak Village, and 4 people in Long Duhung Village. Then, the samples spread for East Kutai Regency were divided into Nehas Liah Bing Village with 128 people, Long Wehea Village with 48 people, Dea Beq Village with 15 people, and Dea Lay Village with 17 people. Furthermore, the third area, namely West Kutai District, consisting of 25 people in Tering Lama Village, 25 people in Dempar Village, 32 people in Temula Village, and 57 people in Linggang Melapeh Village. Of the 387 sets of questionnaires that were given to them, all returned according to the time specified.

The largest respondent unit is in East Kutai district at 54%, West Kutai at 36%, and the least is in Berau Regency at 10%. The profile of respondents based on age was dominated by

those aged 41 years – 50 years reaching 141 people (36%). Meanwhile, the gender of the respondents for men was 87% compared to women, namely 13%. Overall, the average level of education only reaches primary school or around 60%. For the main occupation, 89% of the best status are garden farmers who own land for farming.

Table 2 – Demographics

Characteristics	Total
Age (years)	
<20	13
21 – 30	45
31 – 40	96
41 – 50	141
>50	92
Gender	
Male	337
Female	50
Education level	
Primary school	232
Junior high school	78
Senior High School	73
Diploma	2
Bachelor	2
Master	0
The main job	
Government employees	6
Farmer	344
Others	37
N = 387	

Source: author data.

Eligibility on the questionnaire

Valid or not an instrument (questionnaire) can be determined by comparing the Pearson product-moment correlation index and it is declared valid if the magnitude of the correlation coefficient *r* is > 0.3 (Asih et al., 2020). Meanwhile, reliability testing is carried out by calculating the CA coefficient and if α > 0.60, the research instrument is said to be realistic (Rainsch, 2004).

Table 3 – Suitability of validity, reliability, and mean scores

Variables	Indicators	Correlation	CA	Mean
LW	LW-1	0.582		4.74
	LW-2	0.555		4.81
	LW-3	0.816		4.64
	LW-4	0.812		4.80
	LW-5	0.789	0.868	4.78
	LW-6	0.664		4.88
	LW-7	0.482		4.82
	LW-8	0.695		4.83
	LW-9	0.672		4.87
	LW-10	0.676		4.86
L	L-1	0.585		4.08
	L-2	0.840	0.758	4.12
	L-3	0.846		4.23
	L-4	0.764		4.48
A	A-1	0.802		4.45
	A-2	0.867	0.805	4.40
	A-3	0.834		4.39
	A-4	0.682		4.26
I	I-1	0.741		4.43
	I-2	0.843		4.43
	I-3	0.794	0.811	4.25
	I-4	0.481		3.95
	I-5	0.659		4.50
	I-6	0.755		4.57
SB	SB-1	0.723		4.54
	SB-2	0.830		4.60
	SB-3	0.800	0.844	4.55
	SB-4	0.812		4.59
	SB-5	0.715		4.66
	SB-6	0.650		4.68

Source: author data.

Table 3 interprets that the indicator has a correlation coefficient value (Pearson correlation) of ≥ 0.3 so it can be stated that all indicators in the research instrument are valid. The reliability test results show that the Cronbach Alpha (CA) value exceeds the reference value (0.60 or α> 0.60), so it can be stated that all variables are realistic. The lowest CA value is the learning variable with a gain of 0.758, while the highest CA is in the local wisdom variable, where the achievement is 0.868.

Table 4 also interpreted that the majority of respondents tended to answer questions on a scale of 4 to 5. That way, they considered the question items towards 'agree' and 'strongly agree', so that the respondents fully understood what the researcher asked with insight and fairly broad knowledge.

Measurement model

The benchmarks for the success of the SEM method are supported by three stages, Average Variance Extracted (AVE), Discriminant Validity (DV), and Composite Reliability (CR). The AVE generated by all reflective constructs each is greater than 0.50 so that it can meet the requirements of the convergent validity test (Hair et al., 2020). If AVE is 0.5, it means that the latent variable can identify an average of more than half (50%) of the variance of the indicators. Second, the CR of each variable produced by the construct is greater than 0.70. It can be concluded that all the reflective construct indicators used in this study already have good reliability (Darma et al., 2020). In general, the results of the evaluation of the reflective construct measurement model indicate that this model has met the test standards.

Table 4 – Evaluation for AVE and CR

AVE root	Variables	L	A	I	SB
0.726	LW	-0.201	0.149	0.281	0.215
0.847	L			0.282	
0.861	A	0.489			-0.024
0.822	I			0.307	
0.866	SB	0.232		0.358	

Source: author data.

Table 4 shows that for the AVE root value of the reflective construct, the result is greater than the correlation value of this construct with other constructs. This indicates that the model built in this study already has discriminant validity that meets basic provisions.

Table 5 – Evaluation for R-Square (R2)

Variables	R2	Remarks
I	0.183	Lemah
SB	0.224	Lemah

Source: author data.

The R2 value shows how much influence exogenous latent variables have on endogenous variables, or the ability of exogenous constructs to explain changes in endogenous constructs. Hair et al. (2009) divided the three criteria from R2, namely 0.75 (good), 0.50 (moderate), and 0.25 (weak). The R-Square value of the exogenous variables in this study can be seen in Table 5 which presents that the R-Square magnitude for the intention variable can be explained by the exogenous construct of 18.3%, while the rest is explained by other variables

outside the one understudy. Meanwhile, the variability of the behavioral constructs was caused by the exogenous constructs of 22.4%.

Empirical review

Hypothesis testing is done by checking the loading path or path coefficient and the probability value (p-value). For significance testing with an error rate of α = 5%, then the p-value < 0.05. Meanwhile, for the error rate α = 10%, then the p-value < 0.1. Specifically, for this study, ten hypotheses were tested. Tests were carried out for both the seven direct effects described in Table 6, as well as for the three indirect effects (see Table 7).

Table 6 – Direct impact testing

Hypothesis	Relationship	Coef. path	P-value	Decisions
H1	LW -> I	0.261	0.000	Significant
H2	L -> I	0.206	0.006	Significant
H3	A -> I	0.168	0.372	Not significant
H4	LW -> SB	0.175	0.002	Significant
H5	L -> SB	0.287	0.005	Significant
H6	A -> SB	-0.287	0.177	Not significant
H7	I -> SB	0.317	0.000	Significant

Source: author data.

Apart from testing the direct effect, this study also tested the indirect effect played by the mediating variable. The intention has a significant effect in mediating the relationship between local wisdom and the sustainable behavior of indigenous peoples. The intention has a significant effect in mediating the relationship between learning and the sustainable behavior of indigenous and tribal peoples. The intention has no significant effect in mediating the relationship between attitudes and sustainable behavior of indigenous peoples.

The most critical part of this finding is related to the determinants of the sustainable behavior of indigenous and tribal peoples. Determination of the determinant variables in this study using a trimming model or method, which is an explicit result based on empirical facts in the field. The trimming method is a method used to improve a path analysis structure model by removing from the model exogenous variables whose path coefficients are not significant (Maria et al., 2020). So, the trimming model occurs when the path coefficient is tested as a whole, it turns out that there are variables that are not significant.

Table 7 – Indirect impact testing

Hypothesis	Relationship	P-value	Decisions
H8	LW -> I -> SB	0.000	Significant
H9	L -> I -> SB	0.006	Significant
H10	A -> I -> SB	0.188	Not significant

Source: author data.

The involvement of customary law communities as partners in actions to conserve forest resources is a strategic step towards realizing sustainable forest resources. As a community whose daily life is in direct contact with and dependent on forest products, the sustainable behavior of indigenous and tribal peoples has an important role in achieving sustainable forest resources, because the positive impacts that will be obtained are not only for the community itself but will also have an impact. significantly on global climate change.

In relation to the perceptions of the customary law community, the scheme to conserve forest resources is a concrete and

complete program, namely a program that creates alternative livelihood solutions for the development and enhancement of economic and social welfare along with supporting facilities and infrastructure, so that the objective is to obtain resources (Dmytro, & Peter, 2017). Sustainable forest power through sustainable behavior of customary law communities can be achieved.

Discussions and Conclusions

This model only discusses the relationship between local wisdom factors, learning, attitudes, and intentions as variables to predict the sustainable behavior of indigenous and tribal peoples. There is still a need for further testing of other models and variables outside of this study and the determination of the indicators used in the model being built.

Local wisdom has a positive and significant effect on the intention to behave in a sustainable manner among the customary law communities in East Kalimantan Province, this means that the affirmation of local wisdom will affect the intention of the customary law community to conserve forest resources. For customary law communities, the forest is a storehouse of life, therefore it must be preserved so that natural damage does not occur and it has negative consequences for humans themselves.

Learning has a positive and significant effect on the intention to behave in a sustainable manner among customary law communities in East Kalimantan Province, this means that providing lessons can increase people's intention to conserve forest resources. For the customary law community, the lessons that have been given by good learning through counseling, training, and mentoring carried out by the government and NGOs are very useful in adding insight and skills to conserving forest resources.

Attitudes do not have a significant effect on the intention to behave in a sustainable manner among customary law communities in East Kalimantan Province, this means that the attitude of the community to realize and support the preservation of forest resources does not guarantee that individual indigenous peoples intend to conserve forest resources. The facts revealed by the community actually support forest resource conservation activities, because the lives of indigenous peoples are very dependent on forests but the motivation for awareness and support of indigenous peoples to conserve forest resources has decreased due to the lack of support from the government for customary law communities. and conserving forests, but not supported by adequate supporting facilities and infrastructure.

Local wisdom has a positive and significant effect on the sustainable behavior of customary law communities in East Kalimantan Province, this means that the enforcement of local wisdom will affect the behavior of customary law communities in conserving forest resources. The results of testing the indirect effect of local wisdom through the intention to behave sustainably as a mediating variable also found a significant relationship. Local wisdom regarding the preservation of forest resources as an inheritance which is inherited from their ancestors is still closely maintained as a regulator of the behavior of community life in the use of forest resources, which is regulated through customary law and there are sanctions that are received if violations of these customary laws are found.

Learning has a negative and significant impact on the sustainable behavior of customary law communities in East Kalimantan Province, this means that providing lessons can improve community behavior to conserve forest resources. The results of testing the indirect effect of learning through the intention to behave sustainably as a mediating variable also found a significant relationship. Indigenous and tribal peoples understand the learning objectives provided, namely to build awareness and increase community motivation on the importance of protecting and conserving forest resources, as well as the benefits that will be obtained if forest sustainability can be maintained.

Attitudes do not have a significant effect on the sustainable behavior of indigenous and tribal peoples, this means that the attitude of the community remains aware of and supports the preservation of forest resources but does not guarantee that indigenous peoples will behave in a sustainable manner. The results of testing the indirect effect of attitude through the intention to behave sustainably as a mediating variable also did not find a significant relationship. The customary law community stated that they support activities to conserve forest resources because the lives of indigenous peoples are very dependent on forests. However, indigenous peoples feel disappointed because their customary forest areas have been converted into production forest areas (HPH) and oil palm plantations and also because of the lack of government support for customary law communities to improve their livelihoods, namely improving the economy, including in the form of alternative livelihoods. with the supporting facilities and infrastructure.

The intention has a positive and significant effect on the sustainable behavior of customary law communities in East Kalimantan Province, this means that the stronger the intention to conserve forest resources will affect the sustainable behavior of indigenous peoples.

Based on the perceptions of indigenous and tribal peoples, the scheme used for sustainable management of forest and environmental resources is a concrete and complete program, namely a program that creates alternative livelihood solutions for the development and improvement of economic and social welfare along with supporting facilities and infrastructure, so that the goal of obtaining sustainable forest resources through sustainable behavior of customary law communities can be achieved.

The sustainable behavior of indigenous and tribal peoples is a strategic approach to preserving the environment, in this case, forest resources, because in addition to preventing and reducing deforestation and forest degradation, it will also have an impact on improving the global climate. Therefore, concrete and holistic support from all parties is needed, especially the government and environmental movement activists such as local, national, and international NGOs.

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