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Community Attitude and Behavior Toward Village Forest Management Plan in Central Sulawesi, Indonesia

(Sikap dan Perilaku Masyarakat terhadap Rencana Pengelolaan Hutan Desa di Sulawesi Tengah)

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ABSTRACT

Social forestry programs, including village forest schemes, were anticipated to increase the local community income, but the implementations often differed from the plans. Therefore, this research aimed to determine the attitude and behavior of LPHD members toward village forest management in Central Sulawesi by analyzing their beliefs and evaluation values. The results showed that the forest attribute had the highest value, which indicated that the village forest offered numerous opportunities to enhance the community's welfare. In addition, the attitude value was consistent with the behavior analysis, resulting in a positive value of 0.74. This value indicated that LPHD members agreed with the village forest management in Central Sulawesi and actively participated in the implementation.

INTISARI

Program Perhutanan Sosial yang salah satunya adalah skema hutan desa yang diharapkan dapat meningkatkan pendapatan masyarakat lokal. Namun, seringkali pelaksanaan pengelolaan hutan desa berbeda dengan yang direncanakan. Tujuan penelitian ini adalah untuk mengetahui sikap dan prilaku anggota LPHD terhadap rencana pengelolaan pengelolaan hutan desa di Sulawesi Tengah dengan mengkaji nilai kepercayaan dan evaluasi terhadap perencanaan dan pelaksanaan pengelolaannya. Hasil penelitian menunjukkan bahwa atribut keberadaan hutan menunjukkan nilai tertinggi. Hal tersebut menunjukkan bahwa anggota LPHD percaya bahwa hutan desa memberikan banyak peluang bagi masyarakat untuk meningkatkan kesejahteraan. Nilai sikap ini konsisten dengan hasil analisis nilai perilaku yang bernilai positif sebesar 0.74 yang menunjukkan bahwa anggota LPHD setuju dan berpartisipasi aktif dalam pengelolaan hutan desa di Sulawesi Tengah.

Introduction

The Minister of Environment and Forestry Regulation No.9 of 2021 defined village forests as state forests without a right or permit attribute, managed by the village and utilized for its welfare. Therefore, the management should provide access for the community to sustainably utilize resources, particularly in protected and production forest areas. Village forest is one of the schemes of the Social Forestry policy to combat deforestation and degradation by involving the community in the management activities (Kumar 2015; Laksemi et al. 2019). The motivation behind the policy was to promote community legal access to state forests (Ramadhan et al. 2022) because it had led to unsustainable utilization of forest resources (Ragandhi et al. 2021). As a reference, around 80% of forest areas in Meghalaya, the state of India, are owned and managed by indigenous institutions and the local community (Mir et al. 2022).

Communities often have limited participation in legal state forest management. Therefore, the village forest scheme became one of the government incentives to stimulate community participation, primarily through activities to improve their livelihood. Putting the community as the subject of development is crucial to facilitate their involvement in planning, implementing, monitoring, and evaluating forest dynamics, specifically within the scheme (Sadono 2013).

The development of the village forest consisted of three steps. The first step is conducting training and Focus Group Discussion activities to disseminate information about access rights, the responsibility of the village forest Management Institution (LPHD), and the benefits for stakeholders obtained from Forest Village. Second, the central government hand over the village forest permit (Minister of Forestry Decree) to the head of the regency and a decree on rights and responsibilities of the management by the Village-Owned Enterprises or LPHD to the provincial government. Third, preparation of planning documents, including village forest work and annual plans (Firnawati et al. 2021).

The village forest scheme in Central Sulawesi could improve the community's welfare. However, it depends on the attitude toward the village forest management plan (Guncoro et al. 2021). Perdana et al. (2021) suggested that the lack of human resources capacity hindered forest development and led to poverty surrounding the forest areas. The previous study indicated that the average LPHD institutional readiness fell in the medium category regarding rights clarity, organizational structure, human resource quality, and regulation availability. In contrast, the area security and funding source fell into the low category (Guncoro et al. 2021; Rachman et al. 2021). Meanwhile, the average institutional readiness of the LPHD is in the medium category.

This research aimed to analyze the LPHD members' attitudes and behavior toward the village forest management plan in Central Sulawesi. This research adopted the psychological approach using cognitive, affective, and conative methods to measure attitude and behavior (Chanifah et al. 2021; Sok et al. 2021). The attitude score consisted of the presence, involvement, and utilization attributes, while those for behavior consisted of environment, government, and life necessities. Comparing beliefs and evaluation scores could indicate the consistency of LPHD attitude and behavior toward the village forest plans (Putri 2019; Rossmann 2021; Andry Herawati et al. 2022).

Material and Method

Time and Location

The research duration was within six months, from June to November 2021. The locations of this

research were in village forests spread over five regencies in Central Sulawesi Province, consisting of:

1. Sigi Regency, Lonca, Namo, and Tangkulowi village forest
2. Banggai Regency, Balean village forest
3. Touna Regency, Kajulangko village forest
4. Donggala Regency, Nupabomba village forest
5. Buol Regency, Air Terang, and Boilan village forest

Material and Tool

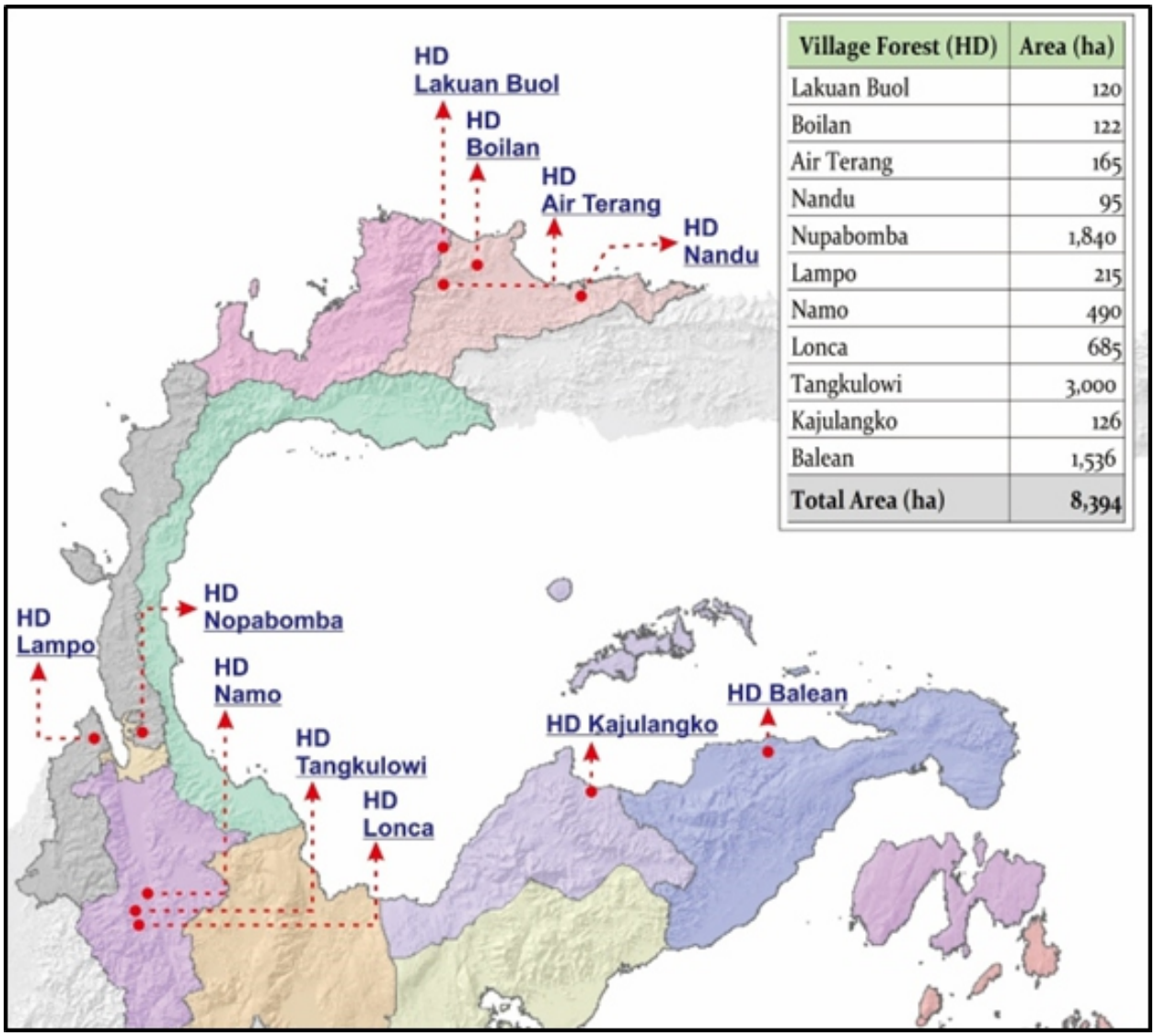
This research used questionnaires to guide structured interviews, which employed pens, notebooks, cameras, and recorders.

Sampling Technique

This research applied proportional random sampling to select the respondents. Around 80% of the LPHD members in each village forest became the respondents. Each LPHD member of the associated village forest had similar opportunities. This study interviewed 181 respondents out of 217 LPHD members in five village forests. Table 1 shows the distribution of respondents in each village forest.

Attitude and Behavior Analysis

1. This research defined attitude as an expression of inner feelings, such as happiness or



Village Forest (HD)	Area (ha)
Lakuan Buol	120
Boilan	122
Air Terang	165
Nandu	95
Nupabomba	1,840
Lampo	215
Namo	490
Lonca	685
Tangkulowi	3,000
Kajulangko	126
Balean	1,536
Total Area (ha)	**8,394**

Figure 1. Study Location Map

Table 1. The distribution of respondents in each village forest

Name of village forest	Number of LHPD members (person)	Number of respondents (person)
Lonca	15	13
Namo	15	13
Tangkulowi	25	20
Kajulangko	20	17
Balean	25	20
Air Tenang	25	20
Boilan	20	17
Lakuan Buol	15	13
Nandu	17	15
Nupabomba	25	20
Lampo	15	13
Total	**217**	**181**

unhappiness, likes or dislikes, agreement or disagreement, never or often, and beliefs or disbeliefs toward the village forest management plan. Furthermore, it employed the Fishbein model to measure beliefs and their evaluation scores (Simamora 2008; Putri 2019)

1. *Fishbein Model for Attitude Analysis*

Attitude could be positive, neutral, or negative. The strength of beliefs regarding the outcomes of the performed behavior and the evaluation of the potential outcomes could influence the LPHD members' attitude toward the village forest management plan. In this research, behavioral beliefs referred to three attributes: presence, involvement, and utilization. Presence is the level to which the public is aware of the existence of village forests and LPHD. Involvement indicates the extent to which the community is involved starting from the determination, management, implementation, and utilization plans describing the degree to which the community benefits from the village forest. Each attribute had three questions, as shown in Table 2. The evaluation of the potential outcomes, referred to as attributes, consisted of three questions, as shown in Table 3.

The behavioral beliefs and evaluation scores ranged from one (do not know/strongly disagree/ never) to three (very knowing/agree/often). This study used the following formula to calculate the attitude of LHPD members toward the village forest management plan (Simamora 2008).

$$A_b = \sum_{i=1}^{n} b_i e_i$$

Remarks:

A_b = the attitude towards the village forest management plan

b_i = the belief level that the management plan will lead to certain results

e_i = the Evaluation of the results obtained

n = the number of relevant references is 181 (number of respondents)

2. *Fishbein Model for Behavior Analysis*

The behavioral intention became the proxy of the LPHD members' behavior toward the village forest management plan, which could describe the conducted activities. This study defined behavioral intention as the seriousness of intent and purpose in managing a village forest. In addition, it used the following formula to calculate the behavioral intention of LHPD members toward the village forest management plan.

$$W1 = \frac{GMAb}{GMAb + GMSN}$$

$$W2 = \frac{GMSN}{GMAb + GMSN}$$

$$B \approx BI = W1(AB) - W2\,(SN)$$

Table 2. The attributes, questions, and scores of behavioral beliefs in the Fishbein model

Attributes	Questions	Beliefs score		
		1	2	3
Presence	Do you know the status of the nearby forest?	Do not know	Know	Familiar
	Do you know that a village forest exists in your area?	Do not know	Know	Familiar
	Are you aware of the existence of LPHD administrators?	Do not know	Know	Familiar
Involvement	Do you participate in the village forest proposal plan development?	Never	Ever	Often
	Do you participate in the village forest management plan formulation?	Never	Ever	Often
	Do you participate in the execution of the village forest management activities?	Never	Ever	Often
Utilization	Did you utilize the forest before it was designated as a village forest?	Never	Ever	Often
	After being designated to the village forest, did you take advantage of the forest's existence?	Never	Ever	Often
	In addition to using forests for your benefit, have you ever participated in forest conservation efforts?	Never	Ever	Often

Table 3. The attributes, questions, and scores for the evaluation of the potential outcomes in the Fishbein model

Attributes	Questions	Evaluation score		
		1	2	3
Presence	Have you ever been exposed to the dissemination of the village forest proposal?	Never	Ever	Often
	Have you ever received information about village forest designation in your location?	Never	Ever	Often
	Have you ever received information regarding LPHD's establishment?	Never	Ever	Often
Involvement	Are you in agreement with the village forest proposal and designation?	Strongly disagree	Disagree	Agree
	Do you concur with the village forest management plan?	Strongly disagree	Disagree	Agree
	Are you in agreement with the execution of the village forest management activities?	Strongly disagree	Disagree	Agree
Utilization	Do you believe that the forests' utilization before the designation of the village forests can improve welfare?	Strongly disagree	Disagree	Agree
	Do you believe that the forests' utilization after the designation of the village forests can improve welfare?	Strongly disagree	Disagree	Agree
	Is it important to maintain forest sustainability?	Strongly disagree	Disagree	Agree

Remarks:

B = the behavior of LPHD members

BI = the behavior intention

Ab = the respondents' attitude towards the village forest management plan

SN = the subjective norm

GMAb = Grand Median Ab

GMSN = Grand Median Subjective Norm

W1 and W2 = constants that show the relative weight of each attribute

The respondents' attitudes agreed with their behavior toward the village forest management plan when $B \approx BI > 0$. In contrast, the attitude disagreed with their behavior toward the village forest management plan when $B \approx BI \leq 0$. The attitude (Ab) and the subjective norm (SN) influence the value of B≈BI or behavior. Furthermore, attitudes are affected by two variables, the respondents' beliefs (bi) and the evaluation of the consequences (ei). Meanwhile, the respondents' normative beliefs towards other people or the surrounding environment (NBj) and motivation (MCj) influenced the subjective norm (SN). When the attitude is higher than the subjective norm, the respondents agreed with their behavior toward the village forest management plan. Otherwise, the respondents disagreed with their behavior toward the village forest management plan.

Subjective norm was one of the components in measuring behavior. It was the driving factor formed from normative beliefs and motivations toward village forest management plan, including environment, government, and life necessities. This study defined the environment as the degree to which the public had confidence in determining village forest and LPHD. Regarding ideas, management, and evaluation, the government was the extent to which the community decided to engage with the connected parties. Life necessities entailed the degree to which village forests could provide for the community's welfare. Each subjective norm consisted of three questions representing normative beliefs and motivation, as shown in Table 4, and the scores ranged from one (agree/often) to three (strongly disagree/never). This study used the following formula to calculate the subjective norm of LPHD members toward the village forest management plan (Simamora 2008).

$$SN = \sum_{j=1}^{n} (NB_j)(MC_j)$$

Remarks:

SN = the subjective norm of LPHD members toward the village forest management plan

NB_j = the normative notion that personal

Table 4. The attributes, questions, and scores of the normative beliefs in the Fishbein model

Attributes	Questions	Normative Beliefs Score		
		1	2	3
Environment	Did you believe that once designated, the village forests can prevent forest devastation?	Strongly disagree	Disagree	Agree
	Did you concur with the selection of LPHD members?	Strongly disagree	Disagree	Agree
	Were you receptive to managing and protecting the potential of the village forests?	Strongly disagree	Disagree	Agree
Government	Did you concur with the government or other parties that assist in the administration of the determination of the village forest?	Strongly disagree	Disagree	Agree
	Were you receptive to collaborating with the government or related parties on the administration of the village forest?	Strongly disagree	Disagree	Agree
	Regarding the evaluation of the village forest management, were you amenable to collaborating with the government or related parties?	Strongly disagree	Disagree	Agree
Life necessities	Could the presence of the village forest fulfill the requirements of domestic life?	Never	Ever	Often
	Before being determined as a village forest, did you rely solely on the forest for sustenance?	Never	Ever	Often
	After being assigned to the village forest, did you depend entirely on it to survive?	Never	Ever	Often

Table 5. The attributes, questions, and scores of the individual motivation in the Fishbein model

Attributes	Questions	Individual Motivation Score		
		1	2	3
Environment	Could you offer advice on village forest settings?	Strongly disagree	Disagree	Agree
	Could you provide members of LPHD with advice?	Strongly disagree	Disagree	Agree
	Could you provide village forest management advice?	Strongly disagree	Disagree	Agree
Government	Would the government or related parties assist with the administration of the village forest?	Strongly disagree	Disagree	Agree
	Would the government or associated parties assist with the evaluation of the village forest?	Strongly disagree	Disagree	Agree
	Would the government or parties clarify plans to support the village forests?	Strongly disagree	Disagree	Agree
Life necessities	Did the government suggest the establishment of the village forest to improve welfare?	Strongly disagree	Disagree	Agree
	Could community members suggest the village forest management to improve welfare?	Strongly disagree	Disagree	Agree
	Did members of LPHD advise you to engage in village forest management to improve welfare?	Strongly disagree	Disagree	Agree

(organizational) references desire the attitude subject to perform from action

MC_j = individuals' motivation to follow the recommendations of personal and group references

n = the number of relevant references is 181 (number of respondents)

Result and Discussion

Village forest in Central Sulawesi

Village forests in Central Sulawesi consisted of production (45%), protected (28%), and limited production (27%) forests. The community realized that forests played crucial roles in maintaining the hydrological system and ecosystem functions and providing tangible benefits. However, the community could only utilize non-timber forest products, such as bamboo, rattan, pine resin, honey, and copal. The main activities of village forests in Buol and Tojo Una-Una Regencies were planting and securing the forest areas. There were no community activities to utilize the village forest products for their livelihood. Table 6 summarizes the size and forest types of village forests in Central Sulawesi.

The main activities in the village forest were rehabilitation to improve the condition of previously critical lands. The community utilized timber for construction (fences and poles) and non-timber forest products or NTFPs (honey, rattan, and copal). Several village forests also hosted minerals, rivers, and waterfalls that could become energy sources, environmental services, and ecotourism areas.

Village forest management plan

The village forest management plan covered 8 to 9 years of activities, as shown in Table 7. The interviews revealed that the most prominent conservation activities in the village forest included site checks, land preparation, nurseries, and planting. Meanwhile, protection and security activities consisted of boundary marking, patrolling, and zoning. The cultivation activities included seedling production, planting, tending, harvesting, post-harvest processing, and marketing the products of multi-purpose tree species. These included *Bambuseae sp*, *Coffea*, *Gnetum gnemon Linn*, *Durio zibethinus*, *Lansium parasiticum, Calamus, Arenga pinnata*, *Areca catechu L*, *Gnetum gnemon*, and *Hevea brasiliensis*. The NTFPs contributed to respondents' income but were not the primary source of income. Furthermore, the village forest should provide opportunities for the community to improve their livelihood. The traditional utilization of forests resulted in an insignificant contribution to their income (Samsudin & Wanitaningsih 2019).

Table 6. The size and forest types of the village forest in Central Sulawesi

Regency	Districts	Village forest	Forest types	Area (ha)
Sigi	Kulawi	Namo	Protected Forests	490
		Lonca	Protected Forests	685
		Tangkulowi	Protected Forests	3,000
Tojo Una-una	Ampana Tete	Kajulangko	Production Forests	126
Banggai	Lobu	Balean	Limited Production Forests	1,536
Buol	Tiloan	Air Terang	Production Forests	165
		Boilan	Production Forests	122
	Laksa	Lakuan Buol	Production Forests	120
	Gadung	Nandu	Production Forests	95
Donggala	Tanantovea	Nupabomba	Limited Production Forests	1,840
	Banawa Tengah	Lampo	Limited Production Forests	215
		Total		**8,394**

Table 7. The activity plans of the village forests in Central Sulawesi

Activity plan	Description of activities
Forest Conservation, Protection and Observation	Conservation Protection and Observation
Utilization and Collection NTFPs	Cultivated Forests Harvest of NTFPs
Utilization of Environmental Services	Nature and Waterfall Tour Camping Ground Trekking tour Homestay Management Treehouse Tour
Institutional development	Capacity Development Discuss Village forest Development Annual Meeting LPHD Monitoring and Evaluating forest village sceme Coordination and communication with the government

Attitude toward village forest management plan

The LPHD prepared the village forest management plan well based on observations and interviews. This situation was the case in the existence of village regulations governing forest management and the preparation of short-term and long-term planning reports. The plans involved LPHD members and the community surrounding the village forest. The analysis of LHPD members' attitudes toward the village forest management plan resulted in differences between the beliefs and evaluation average scores, as shown in Table 8.

Table 8 indicated that the total score of LHPD members' attitudes toward the village forest management plan was 17.41. In the behavior beliefs and evaluation, the presence attribute had the highest score of 2.80 and 2.80, respectively. These indicated that the LPHD members believed and perceived that the presence of the village forest provided many opportunities for welfare improvement. These beliefs and evaluations resulted in consistent positive scores regardless of the benefits from the village forest, such as in Buol and Tojo Una-Una Regencies. Granting permits to the community could secure long-term access to state forest lands, stimulate investments in land, and provide opportunities to diversify household income sources, including from NTFPs and ecotourism (Roy et al. 2021).

The average behavioral beliefs and evaluation involvement scores were 2.00 and 2.00, respectively. These scores indicated that the LPHD members were actively involved. However, they only partially participated in preparing the village forest proposal, plan report, and management activities. The average behavioral beliefs and evaluation utilization scores were 2.68 and 2.08, respectively. These scores indicated that the respondents benefitted from the forest before and after its designation as a village forest. However, these benefits did not necessarily improve welfare.

Behavior toward village forest management plan

Less-educated farmers tended to expand their agricultural lands to forest areas to increase income

Table 8. The scores of LHPD members' attitudes toward village forest management plan in Central Sulawesi

Attribute	The average score of Beliefs (bi)	The average score of Evaluation (ei)	Attitude score (Aij)
Presence	2.80	2.80	7.84
Involvement	2.00	2.00	4.00
Utilization	2.68	2.08	5.57
	Total		**17.41**

Table 9. The score of the subjective norm of the LPHD members towards village forest management plan in Central Sulawesi

Attribute	The average score of Normative Beliefs (NB_i)	The average score of Individual Motivation (MC_i)	Subjective Norm (SN)
Environment	2.80	2.36	6.61
Government	2.64	3.00	7.92
Life Necessities	1.72	1.24	2.13
	Total		**16.66**

even though they were aware of the access or land legality risks (Jaya et al., 2020). The community surrounding the forest areas played crucial roles in the Social Forestry program, specifically in Social Forestry and village forest schemes. The Social Forestry revitalization aimed to promote broader impacts of forest management, primarily on household income and food security (Umar et al. 2021; Pribadi et al. 2021). This study defined community behavior as individual involvement in decision-making and physical activities, including permit acquisition, resource utilization, and evaluation.

According to Table 9, the score of the subjective norm of the LPHD members towards the village forest management plan in Central Sulawesi was 16.66. The average normative beliefs and individual motivation environment scores were 2.80 and 2.36, respectively. The respondents believed in the village forest establishment and LPHD management but were not interested in providing advice on the management plan.

The average normative beliefs and individual motivation government scores were 2.64 and 3.00, respectively. The respondents disagreed with the determination of the village forest because the area designated was different from the proposed areas for the village forest. However, the community was motivated to participate in activities conducted by the government related to social forestry.

The average normative beliefs and individual motivation life necessities scores were 1.72 and 1.24, respectively. The respondents had not utilized the village forest as their primary income source because they still owned or managed large land areas without assistance.

Behavior was an action taken by the LPHD members resulting from the overall scores of attitude and subjective norm. Furthermore, the attitude and subjective norms created the LPHD members' behavior toward the village forest management plan. The following was the calculation of behavior using the Fishbein model.

$$GMAb = \frac{\text{Total score of Beliefs} + \text{Total score of Evaluation}}{2 \text{ x Attribute}} = \frac{1354 + 1245}{2 \text{ x } 3} = 433$$

$$GMSN = \frac{\text{Total score of Normative Beliefs} + \text{Total score of Individual Motivation}}{2 \text{ x Attribute}} = \frac{1296 + 1195}{2 \text{ x-}3} = 415$$

$$W1 = \frac{GMAb}{GMAb + GMSN} = \frac{433}{433 + 415} = 0.51 = 51\%$$

$$W2 = \frac{GMSN}{GMAb + GMSN} = \frac{415}{433 + 415} = 0.49 = 49\%$$

$$\text{Therefore, } B \approx BI = W1\ (AB) - W2\ (SN)$$
$$= 0.51(17.41) - 0.49(16.66)$$
$$= 8.89 - 8.15$$
$$= 0.74$$

The analysis resulted in a behavior score B≈BI of 0.74, which meant a positive or more than zero. Furthermore, the behavior of LPHD members was in agreement with attitude, and it positively impacted the village forest. The LPHD members and the relevant government should maintain the factors that influence attitude and behavior while paying close attention to the dimensions of belief, evaluation, normative beliefs, and individual motivation on the village forest scheme's attributes. According to (Laksemi et al. 2019), positive community behavior could contribute to sustainable village forest management and improve community welfare. However, this was not always the case. It depends on social variables, economic status, education, and public image. The high community participation could lead to the high economic value of forests. However, the high economic value of forests could not guarantee sustainable forest management, mainly because of a direct mismatch of economic benefits (Yulihartika 2017; Rohmayanto et al. 2019; Jabbar et al. 2021).

Conclusion

The total area of village forest in Central Sulawesi is 8,394 ha, with a high potential for community welfare improvement. The analysis of attitudes toward the village forest management plan showed that the LPHD members had high expectations to improve community welfare. The analysis of behavior toward the village forest management and development activity plan resulted in a positive score (0.74), indicating that their attitude was in agreement with their behavior. Stakeholders participated actively in several village forest management initiatives, including nurseries, the utilization of NTFPs, and joint gatherings.

Concerning the limitations, this research did not compare the community behavior toward the management activity plan and the development of other social forestry schemes. However, this research was sufficient to answer the community's attitude and behavior toward the village forest management plan.

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