



Traditional Sustainable Forest Management Practices among the Applai Kankana-ey Community of Bas-ang Tadian Mountain Province

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ABSTRACT

This research contributes to the documentation of the indigenous knowledge and social practice of the Kankana-ey in Bas-ang. This study determined the socio-demographic profile of the respondents and assessed their level of awareness and extent of knowledge on TSFMP, quantified the effectiveness of the adoption of TSFMP, and determined the significance of practicing the distinct TSFMP of Bas-ang. The data collected from a total of 234 respondents has been interpreted and analyzed using descriptive statistics. Results show that most respondents are aged 41-45, while those aged 71-75 are the lowest. In terms of gender, 60.17% are male. In civil status, 92.17% are married. In addition, many did not finish college degrees, and a few did not receive formal education. Given their educational background, some are construction workers. Painters, mechanical technicians, and OFWs were determined to be the lowest respondents. The challenges met by the respondents, however, were poor information dissemination on factors affecting TSFMP and knowledge in performing “id-idew” and marking of trees (gitabam).

INTRODUCTION

“Applai” is the indigenous people of the Western Mountain Province residing in the Municipalities of Besao, Sagada, and parts of Sabangan, Bauko, and Tadian. The Kankana-ey people are one of the indigenous groups in the Cordillera Administrative Region, which includes the Mountain Province. They primarily inhabit the municipalities of Sagada, Sabangan, Bauko, and Tadian. The Kankana-ey are known for their agricultural practices, intricate weaving traditions, and unique rituals and customs. They have a strong connection with their ancestral lands and have preserved their cultural practices over generations (Gamatero, 2014).

About 14 to 17 million people in the Philippines are indigenous, making approximately 110 ethnolinguistic groups. These people are mostly concentrated in Northern Luzon (33%) and Mindanao (61%), with a smaller number of tribes in the Visayas region (UNDP, 2010). Many of these indigenous peoples live in isolated, steep, forested uplands, as Molintas (2004) highlighted. Some have

also been successful in holding their ground and preserving a strong connection to their ancestry. Numerous native populations in the Philippines, like the Ifugaos in the Cordillera Mountains, have managed to survive and prosper in their rather isolated and self-sufficient settlements. As evidenced by their music, dances, ceremonies, folklore, woodcarving, and agricultural and forestry methods, they were able to preserve their traditions. For example, they think that numerous endemic trees, like *Ficus* spp., are connected to spirits (anito), which is why they were preserved (Lim et al. 2012). Additionally, the indigenous peoples uphold the customary laws that serve as the cornerstone for equity, harmony, and harmony among their tribes.

The Bas-ang community (Bantey, Batayan, and Sumadel) is rich in culture, tradition, and is a beautiful tourist destination. It was surrounded by rice fields and had a scenic view of their rice terraces, known as “Taba-an rice terraces” located at Bantey. Rice is the staple crop of the community. As of today, people are engaged in rice terraces

farming as their means of livelihood. Along with other agricultural crops, they produced sweet potatoes, corn, and rice. According to Agshan (2016), the Cordilleran people's forests allowed the indigenous people to exist for decades into this generation. As a result, they developed their own methods of managing forests, such as the "Batangan system" in Tadian, Mountain Province, that can meet the needs of future generations. Similar to the imong of Kalinga, lapat of Abra and Apayao, muyong of Ifugao, and kejoyan of Benguet is the batangan system. The community's term for the forest is batangan, which they also use to refer to their approach to managing the forest. Because they open doors to sustainable livelihoods and food security, forests are crucial to the survival of indigenous peoples (FAO, 2019).

The government's plan to resurrect the nation's forests aligns with the efforts being made to chronicle the forest conservation practices of IPs like Batangan, according to Augusto Lagon, Regional Technical Director of DENR Forest Management Service (Agshan, 2016). Based on the joint documentation of DENR and NCIP, it was known that one type of *Batangan* is the *komon* or mossy forest, which is owned by the whole community. However, a *lakon* or pine forest is managed by a clan or family. Also, *taban*, or the area which is immediately located above or surrounding the rice fields, is privately protected by a clan that owns the farm.

In addition, the community protects rivers and lakes, but individual families oversee irrigation systems and water resources. The people who "own" the forest area in the Batangan system are responsible for managing it responsibly and making use of its riches. Furthermore, according to the paperwork, it is possible to solve forest devastation and violations, such as illegal clearing and occupancy, unauthorized timber harvesting, and forest fires, by adhering to the Batangan system's stated principles. Galatis is one such custom, wherein the community provides free labor or services to put out a forest fire (Brucha, 2014).

Family representatives actively participate in the routine foot patrols under the Batangan that are carried out to avoid forest fires. Typically, male villagers are tasked with continuing firefighting operations late into the night and early in the morning. The Applais refer to this custom as

mandepdep. In addition to that, at community meetings the LGU, the council of elders, and the villagers run campaigns or offer counselling. One such reminder is to stay away from burning summertime grass on farmland in order to prevent fires. There are restrictions on the amount of wood that may be cut down for firewood because the villagers are only permitted to chop down the lower part of the tree. Within certain locations, chopping young trees is likewise absolutely forbidden. Thus, harvesting of lumber in the community forest is controlled (Gautam et al., 2021; Sudhakar, 2022).

Furthermore, the non-community members are forbidden to harvest forest products unless permitted and under the supervision of the elderly and barangay officials. The gathering of minor forest products, such as leaves, grasses, and bamboo are also for the community members only unless there is available stock for outsiders. Additionally, getting forest products for the purpose of commercialism is firmly not allowed since community members are generally assured of their fair share of forest products. For water resources, it must also be used for domestic and agricultural purposes only (Gaab, 2016).

Lagon claims that some of the elements endangering the practice of batangan include the growing population in Tadian and the younger generation's shifting perspectives because of the fast-paced world. As a result, the kids who are supposed to carry out the custom are leaving the neighborhood. One of the things that makes the lakon/saguday system, which is comparable to batangan forest management, weaker is the taxation regulations, according to research titled *Lakon/Saguday: An Indigenous Forest Establishment and Management System in Western Mountain Province*. Certain locals express dissatisfaction with the fees they must pay to register the trees they plant, the increased real property tax on timberlands, the need for a permit, and the collection of forest charges. For this reason, they favored planting agricultural crops that don't require charges (Gaya, 2016).

Furthermore, the elders' involvement in community matters like forest conservation has been eroded by the passivity of ato/ator/dap-ay in modern times. Subsequently, there appeared to be a decline in cultural values, with community members becoming more indifferent, egocentric,

and cash-minded. However, the Applai tribe has developed traditional-based resolutions for any kind of forest infringement. The elder council and the village head will deal with violators. As a result, they have the right to charge the offender with appropriate penalties. Typically, the fine takes the form of native livestock. If the offense is severe or substantial, the perpetrator will have to replace the property and, in the worst-case scenario, face eviction from the community. Like many other tribes in the Cordillera, the Applais regard nature as an integral element of their identity that requires careful preservation. They tackle the challenges that come their way using their own special methods of problem-solving. All groups, whether they are called batangan, imong, lapat, muyong, or kejowan, have the same goals: to create, preserve, and safeguard the forest; to maintain the supply of water and wood; and to guarantee a more livable environment. However, whether you are an IP or not, we all have an equal obligation to safeguard the environment (Agshan, 2016).

According to Ryser (2011), indigenous knowledge is roughly defined as the information that a local indigenous community has accumulated throughout generations of living in a specific area. Indigenous forestry knowledge systems are mostly made up of regional innovations, technologies, know-how, skills, customs, and beliefs that bring the community together to protect the forest's resources and cultural values. Over thousands of years of direct human interaction with the environment, these have evolved (Armstrong et al. 2006). A broader manifestation of knowledge that links a people or peoples to "time-honored" concepts and customs connected to an individual or family is commonly referred to as traditional knowledge (Nepal, 2024; Rúser, 2011). This knowledge encompasses information about biodiversity, traditional lifestyles, and natural resources in addition to expertise, skills, innovations, practices, procedures, learning, and teaching (WIPO, 2008). Although there are some differences between the terms' meanings, there is also a good deal of overlap, which is why indigenous knowledge is frequently used synonymously with traditional knowledge, local knowledge, indigenous practices, indigenous knowledge systems, and traditional forestry practices.

Several studies have detailed the various indigenous knowledge systems for managing natural resources, such as the muyong and ala-a systems used by the indigenous people in the Philippines' Cordillera (Ifugaos, Isneg, Tingguians, and Ikalahans) (Dolinen, 1995; Camacho et al., 2012). Traditional forestry methods that support sustainable forest management are still in place in the Philippines, despite the transition of many indigenous knowledge systems. Studies on the value of these indigenous techniques and knowledge for the sustainable management of indigenous forests are, nevertheless, few. Therefore, the purpose of this study was to discover and characterize these indigenous practices and knowledge.

This study aimed to determine and assess the Traditional Sustainable Forest Management Practices (TSFMP) among the Applai Kankana-ey community of Bas-ang Tadian, Mountain Province. Specifically, it aimed to achieve the following: (1) determine the socio-demographic profile of selected respondents; (2) assess their level of awareness and extent of knowledge of TSFMP; (3) assess the effectiveness of the adoption of Sustainable Forest Management; (4) determine the significance of practicing the unique TSFMP.

MATERIALS AND METHODS

Research Design

The descriptive research design was used in this study. In each barangay, 50% of the total households were selected as respondents, with the household head being the primary target respondent.

Sources of Data

There were 465 total household populations in the selected three barangays in Bas-ang, Tadian, Mountain Province (PhilAtlas, 2020). A total of 234 respondents from the three barangays in this study were selected. In Bantey, there were 149 total households with a total respondent of 75; in Batayan, there were 141 total households with 71 respondents; and in Sumadel, there were 175 total households with a total respondent of 88.

Research Instrument

A standard type of questionnaire was distributed to the respondents of the study. The data were collected through a questionnaire supplemented by an interview. The survey

questionnaire was divided into 4 main sections: demographic profile of the respondent, level of awareness and extent of knowledge of the respondent, effectiveness of adoption of respondents in TSFMP, and significance of practicing the TSFM practices in the three barangays.

Data Collection Procedure

Before the survey was conducted, a communication letter was sent to barangay captains to ensure proper coordination in the conduct of the study. Furthermore, permission requests were sent to the leaders of the cultural communities or elders, allowing the study to be conducted. Additionally, consultation with the research office of the school campus was conducted to acquire research ethics certification and a prior permit to conduct the study on Indigenous Cultural Communities (ICC) from the Local Government Unit (LGU) of Tadian, Mountain Province. Moreover, a consent letter was developed for respondents, allowing them to participate in the conduct of the survey.

Before the conduct of the study, research questions were tested through the application of quantitative and qualitative survey instruments. A period of approximately one month was spent on the pre-testing at Masla, Tadian, Mountain Province, with 20 respondents, which allowed for the development of appropriate survey

questionnaires to address the research questions, testing of the survey with the local community, and cultural adjustment to the survey based on results from trials. The pre-testing showed that there are additional TSFMP added by the respondents, specifically in the awareness and extent of knowledge of the respondents with regard to TSFMP, such as performing “id-edew” (ritual) before cutting a tree and tree marking (gitabam).

Data Analysis

The data gathered was arranged, tabulated, presented, and analyzed using descriptive statistical tools such as average, mean, grand mean, frequency counts, and percentage. The statistical treatment was grouped into four groups. The ratings value was derived through a statistical formula called the Likert Scale ($i = \frac{4-1}{4}$), where the highest number is subtracted from the lowest number from the rating scale (Table 1), with a class interval of 0.75.

The degree of awareness of the respondent on TSFMP, the effectiveness of the adoption of TSFMP, and the significance of practicing their unique TSFMP in the Bas-ang community, was gauged with the following scale presented in Table 1. Index scores were also derived as the summation of four indicators (Table 2) according to their relative weights. The scores were further interpreted based on the interpretations stated in Table 3.

Table 1. Rating Scale used in the Study

Rating Scale	Rating Value	Description		
		Awareness and level of knowledge of TSFMP	Effectiveness of adoption of TSFMP	Significance of practicing TSFMP
4	3.28-4.00	Very aware	Very effective	Very significant
3	2.52-3.27	Aware	Effective	Significant
2	1.76-2.51	Moderately aware	Moderately effective	Moderately significant
1	1.00-1.75	Not aware	Not effective	Not significant

Table 2. Components variables for the Bas-ang community awareness to Traditional Sustainable Forest Management Practices

Variables	Weight	Possible values (code and Descriptive Equivalents)	Sub-index Score
Educational Background	10%	1- No formal Education	1= 0 points
		2- Elementary Level	2= 1.25 points
		3- Elementary Graduate	3= 2.50 points
		4- High School Level	4= 3.75 points
		5- High School Graduate	5= 5 points
		6- College Level	6= 6.25 points
		7- College Graduate	7= 7.50 points
		8- Vocational Graduate	8= 8.75points
		9- Master's or above	9= 10 points
Awareness and extent of knowledge about TSFMP	20%	1- Not Aware	1= 5 points
		2- Moderately Aware	2= 10 points
		3- Aware	3= 15 points
		4- Very Aware	4= 20 points
Effectiveness of the adoption of TSFMP	40%	1- Not effective	1= 10 points
		2- Moderately effective	2= 20 points
		3- Effective	3= 30 points
		5- Very effective	4= 40 points
Significance of practicing TSFMP	30%	1- Not significant	1= 0 points
		2- Moderately significant	2= 10 points
		3- Significant	3= 20 points
		4- Very significant	4= 30 points

Table 3. Interpretation of the index score

Index Score	Interpretation
1-25	Not knowledgeable
26-50	Moderately Knowledgeable
51-75	Knowledgeable
76-100	Highly Knowledgeable

RESULTS AND DISCUSSION

Socio-demographic Profile of the Respondents

A significant proportion of respondents across the three barangays belong to the age group of 41 to 45 years (31.63%), followed by those aged 46 to 50 years (18.73%). A small difference is observed in the 36 to 40-year age group (17.77%), while respondents aged 25 to 30 (7.40%) and 31 to 35 (7.33%) represent a relatively smaller fraction. Furthermore, there were very few respondents in the 61 to 65 age group (2.67%), followed by those aged 66 to 70 (1.67%) and 71 to 75 (0.43%).

Additionally, there was a notable gender distribution difference among respondents in the three barangays. Bantey and Sumadel had a higher number of male respondents, whereas Batayan had

more female respondents. In Bantey, a substantial majority of respondents were male (58.7%), while females constituted 41.3%. Conversely, Batayan recorded a majority of female respondents (52.1%), while males accounted for 47.9%. In Sumadel, the male respondents dominated at 73.9%, while female respondents comprised 26.1%. Overall, the survey revealed a significant male majority (60.17%) compared to female respondents (39.83%) among household heads.

In terms of civil status, the majority of respondents in Bantey (96%) and Sumadel (93.2%) were married. The proportion of widowed individuals was relatively low at 2.7% in Bantey, 5.7% in Sumadel, and 9.9% in Batayan. Separated individuals were even fewer, with 1% in Bantey, 1.1% in Sumadel, and 2.8% in Batayan. The data indicate that marriage is the predominant civil status across all three barangays, with an overall mean of 92.17%, followed by widowed (6.1%) and separated (1.73%) respondents.

Regarding educational attainment, Bantey had the highest proportion of respondents at the college level (33.3%), followed by college graduates (24%)

and high school graduates (20%). In Batayan, the majority were high school graduates (36.6%), while Sumadel had a balanced distribution between college graduates (30.7%) and high school graduates (28.4%). Notably, vocational education was absent in Bantey, and only a small fraction of respondents in Batayan and Sumadel had elementary-level or no formal education, indicating potential areas for educational interventions.

Occupational trends were consistent across the three barangays, with many respondents engaged in labor-related work (23.83%) or housekeeping (23.1%). Farmers comprised 22.9%, while government workers accounted for 19.97%. Store owners represented 5.13%, and those in buying and selling constituted 2.53%. Additionally, occupations such as painting, mechanical work, and caretaking each comprised 0.83%, reflecting the occupational diversity within the surveyed barangays.

Awareness and extent of knowledge of the respondent in TSFMP (customary or local laws associated with Batangan)

Table 4 reveals that respondents are highly aware of forest protection and the prohibition of commercialization within the Bas-ang community. This is likely due to the Batangan System's customary laws practiced by the Indigenous

Cultural Community (ICC) in Mountain Province (Dictaan-Bang-oa, 2010). Most respondents also recognize the elderly as key decision-makers, with decisions made and confirmed during social gatherings. The dap-ay system maintains the elders' respected role in resource management and community governance (Gaab, 2015; Prill Brett, 1997).

Respondents understand that tree cutting for events requires the dap-ay or village elders' approval, without fees or taxes imposed by traditional institutions (Fernandez, 2012). They are also aware that communal land and water resources are non-alienable and that ancestral domains are protected under the Indigenous Peoples Rights Act (R.A 8371, 1997). The community prohibits commercialization to prevent environmental degradation from activities like mining and logging (Reddy, 2002). Respondents know their rights to kaingin and penalties for unauthorized timber gathering, rooted in customary practices (CIFOR, 2011). However, respondents lack awareness of tree marking (gitabam) and performing "id-idew" before tree cutting. They attribute this to practices from other barangays in Tadian, though elders in Masla claim to practice "id-idew" before tree cutting, and neighboring barangays also observe this ritual.

Table 4. Awareness and extent of knowledge by the Bas-ang community in Traditional Sustainable Forest Management Practices.

A. Traditional Sustainable Forest Management Practices	Awareness and Extent of Knowledge							
	Bantey		Batayan		Sumadel		Overall	
	\bar{X}	DE	\bar{X}	DE	\bar{X}	DE	\bar{X}	DE
A1. Elders are the most respected decision makers about the management; thus, the transfer is announced and confirmed during a social gathering.	3.84	VA	3.87	VA	3.72	VA	3.81	VA
A2. Approval of the dap-ay or village elders has to be solicited in the cutting of trees for occasions/feasts, and no fees and taxes are imposed by the traditional social institution.	3.64	VA	3.71	VA	3.60	VA	3.65	VA
A3. Communal land and water resources are non-alienable to community members; corporate land or forest is devolved to the next generation, outparcelled, and aliened.	3.48	VA	3.49	VA	3.48	VA	3.48	VA

A4. Commercialization is prohibited.	3.76	VA	3.75	VA	3.73	VA	3.75	VA
A5. Protection of the forest and trees supporting the springs.	3.85	VA	3.86	VA	3.86	VA	3.86	VA
A6. The right of members of the community to make and own kaingin in communal forests to a communal status, and penalizing timber product gatherers without permission from owners, and those who cause damage to forests.	3.58	VA	3.3	VA	3.28	VA	3.39	VA
A7. Performing id-idew (ritual) before cutting down trees.	2.36	MA	1.69	NA	2.27	MA	2.11	MA
A8. Marking of trees (gitabam).	2.29	MA	1.70	NA	2.30	MA	2.10	MA
Grand Mean	3.35	VA	3.17	VA	3.28	VA	3.27	VA

\bar{X} - Weighted Mean; DE- Descriptive Equivalent; NA- Not Aware; MA- Moderately Aware; A-Aware; VA- Very Aware

Awareness and extent of knowledge by the respondents in the factors affecting the Batangan System

Table 5 shows that the three barangays are highly aware of the need for cutting permits and forest charges for timber on private land. According to PD No. 705, sec. 77, unauthorized cutting or possession of timber from any land incurs penalties under the Revised Penal Code (Articles 309 and 310). Indigenous individuals cutting trees on communal or private lots face penalties unless they have a cutting permit from the Department of

Environment and Natural Resources or a council of elders under sustainable traditional practices (Dizon, 2022).

The study found a lack of awareness regarding the rule that areas with slopes of 18% and above are not alienable and disposable public land, likely due to poor information dissemination. Local communities reported not being informed about this regulation. Improved strategies are needed to enhance community understanding of land-use rules (Corriga et al., 2013).

Table 5. Awareness and extent of knowledge by the Bas-ang community in factors affecting the Batangan System.

B. Factors affecting Traditional Sustainable Forest Management Practices (TSFMP)	Awareness and Extent of Knowledge							
	Bantey		Batayan		Sumadel		Overall	
	\bar{X}	DE	\bar{X}	DE	\bar{X}	DE	\bar{X}	DE
B1. Declaration of areas 18% in slope and above as not alienable and disposable in a public domain.	1.63	NA	1.38	NA	1.51	NA	1.51	NA
B2. Imposition of cutting permits and forest charges on forest products gathered even for timber that are privately owned lands	3.73	VA	3.82	VA	3.75	VA	3.77	VA
Grand Mean	2.68	A	2.60	A	2.63	A	2.64	A

\bar{X} - Weighted Mean; DE- Descriptive Equivalent; NA- Not Aware; MA- Moderately Aware; A-Aware; VA- Very Aware

Effectiveness of the adoption of the belief associated with the Batangan/Lakon System

Table 6 reveals that most respondents from the Bas-ang community view “inayan” as the most effective traditional sustainable forest management practice (TSFMP) in their barangay. “Inayan” promotes discipline and self-restraint in natural resource use, discouraging destructive practices (Bengwayan, 2020; Tee et al., 2014). Additionally, protecting trees and forests that sustain springs is another highly adopted TSFMP, rooted in the local culture's reverence for these natural features (Siswo et al., 2019).

However, practices like “boyon” or “sapo” and reverence for sacred mountains are the least adopted TSFMPs. While ancestors practiced “boyon” or “sapo”, it is not followed by the current generation (Banasan, 2007). Respondents noted the absence of sacred mountains in their barangays, unlike neighboring areas like Besao with Mt. Mogao, where annual rituals are performed (Banasan, 2007). Traditional beliefs play a crucial role in forest conservation and management, proving effective in maintaining natural resources (Mulyade et al., 2022; Guebas et al., 2021).

Table 6. Effectiveness of the adoption of the belief associated with Lakon/Batangan by the Bas-ang community

A. Traditional Sustainable Forest Management Practices (Lakon)	Effectiveness of the Adoption							
	Bantey		Batayan		Sumadel		Overall	
	\bar{X}	DE	\bar{X}	DE	\bar{X}	DE	\bar{X}	DE
A1. Lawa (doing bad acts and is punishable by unseen spirits)	3.64	VE	3.72	VE	3.70	VE	3.69	VE
A2. Inayan (Connotes ill/evil things that may happen as a result of doing unfair practices to others)	3.90	VE	3.87	VE	3.89	VE	3.89	VE
A3. Sapata (Swearing to the supernatural, asking to punish the guilty)	3.48	VE	3.58	VE	3.58	VE	3.55	VE
A4. Boyon or sapo or withcraft	3.37	VE	3.56	VE	3.55	VE	3.49	VE
A5. Trees/forest sustain springs	3.87	VE	3.77	VE	3.78	VE	3.81	VE
A6. There are unseen beings or tree/forest spirits	3.35	VE	3.62	VE	3.58	VE	3.52	VE
A7. Sacred trees	3.48	VE	3.58	VE	3.55	VE	3.54	VE
A8. Sacred mountains	3.39	VE	3.34	VE	3.33	VE	3.35	VE
A9. There are trees unfit for use	3.57	VE	3.63	VE	3.61	VE	3.60	VE
Grand mean	3.56	VE	3.63	VE	3.62	VE	3.60	VE

\bar{X} - Weighted Mean; DE- Descriptive Equivalent; NE- Not Effective; ME- Moderately Effective; E- Effective; VE- Very Effective

Effectiveness of the adoption of TSFMP by the respondent (practices associated with Batangan/Lakon System)

Table 7 shows that “galatis” is the most adopted traditional forest management practice among the three barangays. “Galatis” involves community participation in sustainable environmental management, which ensures continuous protection of natural resources (Samoda, 2022). Foot patrolling by family representatives (mandepdep) to prevent forest fires and curb illegal activities is also common (Bi et al., 2019). Timber

cutting for firewood is limited to lower portions of trees to ensure sustainable growth (Raya, 2020). Cutting young trees within identified areas is strictly prohibited, as mandated by PD 705 of 1975, which penalizes unauthorized cutting of timber from any land (Articles 309 and 310 of the Revised Penal Code).

Non-community members are forbidden from harvesting forest products without permission and supervision by elders and barangay officials (Raya, 2020). Gathering minor forest products is restricted to community members unless excess materials are available (Kusters et al., 2001). The least adopted

TSFMP is commercial harvesting of forest products, as the community ensures fair distribution among members while maintaining the obligation to protect the forest (Hall et al., 1993).

Table 7. Effectiveness of the adoption of TSFMP (practices associated with the Batangan System) by the respondent

B. Traditional Sustainable Forest Management Practices (Batangan)	Effectiveness of the Adoption							
	Bantey		Batayan		Sumadel		Overall	
	\bar{X}	DE	\bar{X}	DE	\bar{X}	DE	\bar{X}	DE
B1. Free service or labor rendered by the community to kill a fire that occurred in the forest (galatis).	3.92	VE	3.92	VE	3.88	VE	3.91	VE
B2. Foot patrolling is conducted to prevent the occurrence of forest fires, which is actively participated in by family representatives (mandepdep).	3.95	VE	3.89	VE	3.83	VE	3.89	VE
B3. Cutting timber for firewood purposes has limitations since the villagers are only allowed to cut the lower portion of the tree.	3.91	VE	3.87	VE	3.85	VE	3.88	VE
B4. Cutting young trees within identified areas is also strictly prohibited.	3.80	VE	3.86	VE	3.82	VE	3.83	VE
B5. Non-community members are forbidden to harvest forest products unless permitted and under the supervision of the elders and barangay officials.	3.88	VE	3.85	VE	3.84	VE	3.86	VE
B6. Gathering of minor forest products such as leaves, grasses, and bamboos is also for the community members unless there is available stock for outsiders.	3.81	VE	3.86	VE	3.81	VE	3.83	VE
B7. Getting Forest Products for the purpose of commercialism is firmly not allowed since community members are generally ensured of their fair share of forest products.	3.77	VE	3.82	VE	3.78	VE	3.79	VE
Grand Mean	3.86	VE	3.87	VE	3.83	VE	3.86	VE

\bar{X} - Weighted Mean; DE- Descriptive Equivalent; NE- Not Effective; ME- Moderately Effective; E Effective; VE- Very Effective

Significance of practicing the TSFMP by the respondent

Table 8 shows that the three barangays find adopting traditional sustainable forest management practices (TSFMP) to local conditions highly significant for improving impact and sustainability. The World Bank (2010) highlights that using Indigenous Knowledge (IK) can enhance eco-friendly development. Chiwanza (2013) adds that TSFMP adoption provides valuable insights for local resource management. Respondents also believe that understanding TSFMP significantly increases community knowledge and awareness (Parrota et al., 2016). Sharing TSFMP knowledge

across communities enhances cross-cultural understanding and promotes cultural development (World Bank, 2010).

Additionally, the barangays see TSFMP as providing problem-solving strategies for issues like forest fires and illegal logging (Bodegom, 2000). They also view TSFMP as a significant factor in community development, contributing to basic services and social cohesion (Kumsap et al., 2016; Eg, 2023). Although learning from TSFMP to improve understanding of local conditions is rated lowest, it is still considered very significant. Overall, TSFMP holds high historical and traditional importance in the Bas-ang community.

Table 8. Significance of practicing the TSFMP by the Bas-ang community

B. Traditional Sustainable Forest Management Practices	Significance							
	Bantey		Batayan		Sumadel		Overall	
	\bar{X}	DE	\bar{X}	DE	\bar{X}	DE	\bar{X}	DE
A1. Traditional Sustainable Forest management practices provide problem-solving strategies for local communities.	3.89	VS	3.90	VS	3.86	VS	3.88	VS
A2. Traditional Sustainable Forest Management Practices help in the development process of the community.	3.84	VS	3.86	VS	3.83	VS	3.84	VS
A3. Learning from TSFMP can improve understanding of local conditions.	3.87	VS	3.85	VS	3.77	VS	3.83	VS
A4. Understanding TSFMP can increase knowledge of local communities about TSFMP.	3.92	VS	3.90	VS	3.86	VS	3.89	VS
A5. Adopting TSFMP to local conditions can improve the impact and sustainability of our work.	3.93	VS	3.89	VS	3.88	VS	3.90	VS
A6. Sharing of TSFMP knowledge within and across communities can enhance cross-cultural understanding.	3.95	VS	3.87	VS	3.86	VS	3.89	VS
Grand mean	3.90	VS	3.88	VS	3.84	VS	3.87	VS

\bar{X} - Weighted Mean; DE- Descriptive Equivalent; NE- Not Effective; ME- Moderately Effective; E- Effective; VE- Very Effective

Awareness Index to TSFMP

Table 9 shows the awareness index of the three barangays regarding TSFMP. Bantey and Sumadel each scored 90 out of 100, indicating high knowledge of TSFMP. Batayan scored 89 out of

100, also reflecting high knowledge. Overall, the three barangays have a total awareness index of 90 out of 100, implying they are highly knowledgeable in TSFMP.

Table 9. Extent of knowledge and adoption index on the TSFMP total weight

Indicators	Bantey		Batayan		Sumadel		Overall	
	AM	SIS	AM	SIS	AM	SIS	AM	IS
1. Educational Attainment	5	5	4	4	5	5	5	5
2. Awareness and extent of knowledge in Traditional Sustainable Forest Management	3	15	3	15	3	15	3	15
3. Effectiveness of the adoption of Sustainable Forest Management Practices of the Bas-ang community; and	4	40	4	40	4	40	4	40
4. Significance of practicing the unique TSFM practices of the Bas-ang community	4	30	4	30	4	30	4	30
Total	90		89		90		90	

AM-Average mean; SIS-Sub-index score; IS-Index score

Figure 1 shows the extent of knowledge and adoption of TSFMP in the three barangays. Bantey and Sumadel scored 90, indicating high knowledge, while Batayan scored 88.75. The higher scores in Bantey and Sumadel are associated with more male respondents, as men typically hold more influence in forest management practices (Kiptot, 2015; Mulyoutami et al., 2015). Figure 2 reveals that male respondents scored 90, slightly higher than female respondents who scored 89 (Banasan, 2007; Marin et al., 2017).

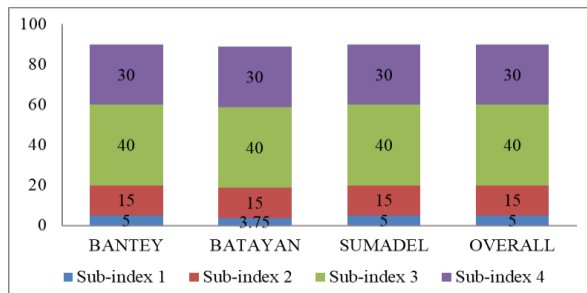


Figure 1. Extent of Knowledge and Adoption Index to TSFMP by the three barangays

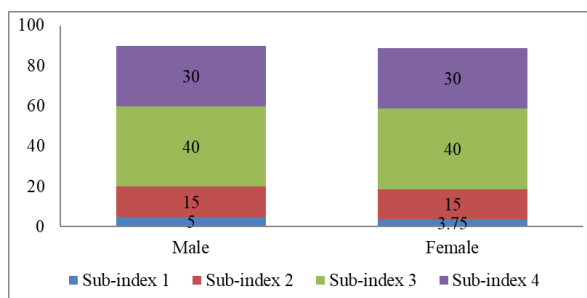


Figure 2: Extent of Knowledge and Adoption of TSFMP by Gender

Figure 3 indicates that respondents aged 56–65 had the highest score of 92.5, while those aged 25–35 had the lowest at 87.5. Older adults generally possess more knowledge about indigenous forest management practices (Huang et al., 2021). Respondents aged 36–45 and 66–75 both scored 90, showing high knowledge (Haji et al., 2020).

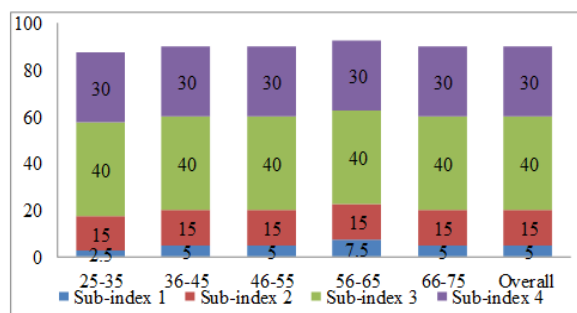


Figure 3. Extent of Knowledge and Adoption of TSFMP by age

Figure 4 displays scores based on occupation. Painters scored the highest at 93.75, followed by government workers at 92.75, and mechanical technicians at 91.25. Higher education levels correlate with a deeper understanding of sustainable forest management (Smith et al., 2018). Laborers and store owners scored 90, while those involved in buying and selling had the lowest score of 78.75, reflecting the impact of education on TSFMP knowledge (Harisha et al., 2020). OFWs, housekeepers, and farmers scored 88.75.

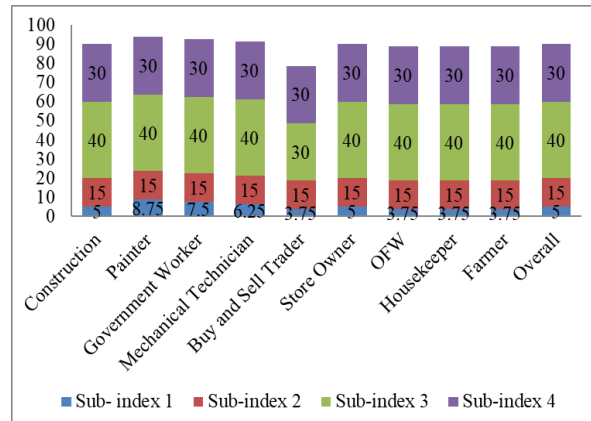


Figure 4. Extent of Knowledge and Adoption of TSFMP by Occupation

CONCLUSION

The findings of the study indicate that a great majority (60%) of the respondents were male, and most of them were laborers (24%). In terms of educational attainment, most respondents from the three barangays reached the college level (29%), and almost all the respondents were married (92.17%). Awareness was high regarding factors affecting the Batangan System, such as cutting permits and forest charges, but was lacking regarding the declaration of areas with a slope of 18% and above as not alienable and disposable. The respondents adopted various practices of the Lakon and Batangan Systems, with “inayan” and “galatis” being highly adopted, while the commercial exploitation of forest products was prohibited. The respondents from the three barangays determined the significance of the TSFMP as very significant, and the overall awareness index of the respondents regarding the TSFMP was 90 out of 100.

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