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ECOLOGICAL PRODUCTIVITY POTENTIALS AND PROPAGATION PROTOCOLS OF ALMACIGA (*Agathis philippinensis* Warb.) FOR SUSTAINABLE CONSERVATION AND RURAL LIVELIHOOD DEVELOPMENT IN APAYAO, PHILIPPINES

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Abstract

This study dwelt on the existence of Almaciga (Agathis philippinensis Warb.) Apayao Province in Northern Philippines. The study consisted of five components, namely: 1) mapping and inventory of almaciga stand, 2) characterization of the ecological habitat; 3) estimation of carbon stock and resin yield; 4) development of propagation protocols for almaciga and 5) socioeconomic characteristics, knowledge, attitudes and practices, existing interventions and skills training and livelihood preferences of communities near the stands. Almaciga stands are found on moderately sloping to very steep slopes with Karst Mountain characteristics. The trees are located from 198 to 1,219 meters above sea level. The majority of the almaciga trees were also found in the west and southwest aspects. The stands are located in areas having acidic to very acidic soil, with high organic content. The study sites are considered low in phosphorus, however, high in potassium. The average diameter of the tree observed is 73.9 centimeters and are large trees, having an average height of 51.08 meters. In terms of live crown ratio, the average for all sites is 55.641 % which indicates that most of the trees are vigorous. The associated species are malabayabas (Tristaniopsis decorticata), bolong-eta (Diospyros philosanthera), Tanguile (Shorea polysperma), white lauan (Shorea contorta), panglomboein (Syzygium simile) and bitanghol-sibat (Callophyllum soulatri). Natural regenerations were inadequate and the presence of dead trees is notable. Carbon stock ranges from 279, 611.1 kg/ ha to 411,982.7 kg/ha with an average of 363,993.50 kg/ha. The estimated resin yield is 2500 kg/ year. For the development of propagation protocol, the middle portion with 15 ml/l concentration performed better in terms of shoot length, root length, and number of roots. For the socioeconomic profile and knowledge, attitudes and practices studies, the respondents know the existence of the Almaciga tree in the locality and acknowledged that the tree is important to the community and to the environment as well. Consequently, most of them also recognized that the conservation and protection of the tree is very important. The majority had no experience in propagating, planting, and tapping Almaciga, however, most of them agreed that proper propagation, plantation establishment, and resin tapping of Almaciga is necessary. For their preferred skills training and livelihood preferences, resin processing (product development from raw Manila copal) topped over the other, followed by resin tapping.

Keywords: Agathis philippinensis, ecological characterization, carbon sequestration, propagation protocol, knowledge, attitudes and practices.

INTRODUCTION

Almaciga (*Agathis philippinensis* Warb.) is an indigenous Philippine softwood species in the Araucariaceae family. Its height reaches 60-65 m, and its diameter at breast height can reach up to 300 cm. It thrives in mountainous forests throughout the Philippines particularly in the provinces of Cagayan, Rizal, Isabela, Benguet, Abra, Zambales, Nueva Ecija, Bataan, Quezon, Polilio, Aurora, Mindoro, Camarines, Albay, Sorsogon, Calayaan Island, Sibuyan, Negros,

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Samar, Palawan, Misamis, Davao, and Zamboanga (ERDB-DENR, 2013). *A. philippinensis* has green, leathery leaves that are opposite, broad, shaped like an oval (or sometimes with a narrower portion from middle to tip) that develop up to seven centimeters (7cm) long and two centimeters (2cm) wide. It produces cones that measure up to five cm (5cm) long for male cones, which are usually cylindrical; while up to eight centimeters (8 cm long) for female cones, commonly resembling the shape of a globe but not having the perfect shape of a sphere or ball. Its bark is gray and smooth and oozes white liquid material called "resin" whenever cut. This resin is what makes A. *philippinensis* highly valued in the world. *A. philippinensis* resin, commercially known as "Manila Copal," is considered the country's most important chemical non-timber forest product (NTFP). Manila copal comes as ground or fossil resin or as surface or tapped resin. Fossil resin is the amber-colored exudation from the roots, which is obtained by digging into the ground where the plant once grew, whereas surface resin is extracted by tapping living *A. philippinensis* trees. The resin is mainly used as a component of varnishes (Frezza *et al.,* 2020).

In addition, resins, in general, are used in torches, embalming chemicals, waterproofing and caulking ships, incense, paints, and medicines; a major portion of the resins are also used as food additives, paint, lacquer, paper, cosmetics, food, pharmaceutical, and chemical industries (Sharma *et al.,* 2018). In southern Palawan, the resin of *A. philippinensis* is also used as an adhesive for making native baskets.

The cutting of *A. philippinensis* trees was banned in 1987 thru Department Administrative Order Number 74 s. 1987 to protect the source of livelihood of the resin tappers in the Philippines.

Apayao province, dubbed the "Last Ecological Frontier in the North," with a vast tract of forestland that is classified as a closed forest with 110,356 hectares and open forests with 146,808 hectares (PSA, 2020) that has *A. philippinensis* stands. While at present, resin tapping is not undertaken in the locality, some of the locals are gathering resin from trees naturally exudes from it. Ensuring its perpetuation, advocacy, and protection must be in place.

To improve the knowledge and eventual acquisition of maximum potential benefits from conserving *A. philippinensis* and likewise promote sustainable forest/ landscape management and development, which will contribute to alleviating poverty among locals; hence the study on the ecological characterization, productivity potentials in terms of carbon stock and resin yield, development of its propagation protocols and the existing knowledge, attitudes, and practices of nearby communities must be conducted, hence this dissertation.

METHODS

This study was designed to inventory and characterized the ecological habitat of Almaciga (*Agathis philippinensis* Warb.*)*, compute carbon sequestered and determined production potentials in terms of resin (Manila copal), developed nursery macro propagation protocols in the province of Apayao, and determined the knowledge, attitudes, and practices by the locals towards the utilization and conservation.

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Distribution of Almaciga Trees in the Study Sites

The specific locations of *A. philppinensis* trees in Apayao province were taken using Global Positioning System (GPS). Points of known boundary landmarks were taken. The data were processed using GIS software to produce the locations in which Almaciga trees grow.

Ecological Characterization

a. Topography/ slope. The topography study sites were observed and described. For slope, it was categorized as 0-3% – Level to nearly level; 3%-8% – Gently sloping to undulating; 8%-18% – Undulating to rolling; 18%-30% Rolling to moderately steep; 30%- 50% – Steep; Over 50% – Very steep.

b. Elevation. The term elevation is mainly used when referring to points on the earth's surface with reference to the mean sea level. Elevation was observed using the Global Positioning System machine/ receiver.

c. Aspect. Aspect indicates the directions the physical slopes face. For this study, aspects were observed and described as follows: Northeast (22.5° to 67.5°), East (67.5° to 112.5°), Southeast (112.5° to 157.5°), South (157.5° to 202.5°), Southwest (202.5° to 247.5°), West (247.5° to 292.5°). Northwest (292.5° to 337.5°), North (337.5° to 360°), Flat (00)

d. Soil Chemical Properties

   Soil samples were taken from the randomly selected plots in each study site. The soil samples were air-dried and brought to the Regional Soils Laboratory of the Department of Agriculture Regional Office Number 2 for the analysis of pH, organic matter (Nitrogen), phosphorus, and potassium.

e. Dendrometric profile and diversity

   A total of 18 (20m x 20m) purposive sampling plots were laid out in the study sites. A 100 % sampling intensity and assessment of trees were done in all plots. Six 20m x 20 meters' plot was laid out in each study site. In the 20 x 20-meter plots, all trees naturally growing inside with a diameter at breast height (dbh) ≥ 10 cm were identified and counted. All tree species dbh (diameter at breast height) and total height were taken and recorded. GPS reading and elevation were recorded for each plot. Live crown ratio was also determined.

The importance value of the species in a community can be expressed in terms of density, dominance, and frequency. The importance value can be expressed as the sum of the relative density, relative dominance, and relative frequency of the species in the stands. The importance value of trees IV (%), of each species in all sites/ stratum, was computed using the following formula by Mueller-Dombois and Ellenberg in vegetation analysis. The Shannon-Weiner Diversity Index formula was used for diversity index computation.

Carbon Stock and Resin Yield Estimation

a. Carbon Stock Assessment

A total of 18 (20m x 20m) purposive sampling plots were laid out in the study sites with six

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plots at each study site. Due to practical concerns, destructive sampling is not recommended for large trees. Instead, the biomass was estimated through the use of allometric equations typically relating tree diameter to biomass. The biomass value was then used to calculate the carbon in trees. All trees with a circumference or diameter at breast height at 1.3 meters (dbh) > 5cm that fall within the plot were measured using diameter tape and tape measure. Species names were recorded. Tree biomass was calculated using the allometric equation from Brown (1997). Banaticla et al (2007) developed a generic power fit biomass regression equation using existing data from studies involving destructive sampling for biomass determination of trees conducted in several localities in the Philippines. Brown and Banaticla equations were used as high and low estimates for the tree biomass in this study. A default value of 45% was used to determine the carbon stored in tree biomass, which is the average carbon content of wood samples collected from secondary forests from several locations in the Philippines (Lasco & Pulhin 2000). Banaticla and Brown's estimates were compared using a t-test.

b. Estimation of Almaciga Resin (Manila copal)

Estimation of the productivity of the Almaciga trees or stands was calculated using existing studies in order to minimize disturbance to the trees and or stands. According to Ella (2018), productive almaciga tree can produce 15–20 kg of resin annually and resin yield increases as almaciga trees mature in the absence of resin yield studies, the productivity curve of almaciga resin was assumed to follow the sigmoidal curve model where the volume of resin yield will reach its peak and be constant throughout the productive life span of almaciga tree.

Development of propagation protocol for Almaciga

Experimental Design

A two-factor Completely Randomized Design was used in this study with three replications to determine the nursery propagation protocols for raising Almaciga seedlings. The treatments were as follows: Factor A – stem cutting section: A1 – apical section; A2 – middle section; A3 – basal section; and Factor B – concentration of commercial rooting hormone (Alpha Naphthalene Acetic Acid): B1 – 0 ml· L^{-1} (Distilled water only); B2- 15 ml· L^{-1}, B3- 30 ml· L^{-1}.

The parameters that were gathered are percent survival, shoot length, root length, and number of roots. The collection of data was done 120 days after planting the stem cuttings. A total of twenty-seven (27) treatment combinations were used in this study.

Socioeconomic profiling cum knowledge, attitudes, and practices studies

To recognize and understand the existing knowledge, attitudes, and practices of the locals towards utilizing and conserving almaciga, a survey was conducted. Purposive sampling was employed in this study. Slovin's formula was used in computing the required sample population size for the study.

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RESULTS AND DISCUSSION

Distribution of Almaciga Trees in the Study Sites

Study site 1 falls within the jurisdiction of Cagandungan, Luna, Apayao. It is situated near the Marag River and is part of Mount Kapurawan. The study site spans an estimated area of 30 hectares. Figure 1 visually represents the tree location within the study site.

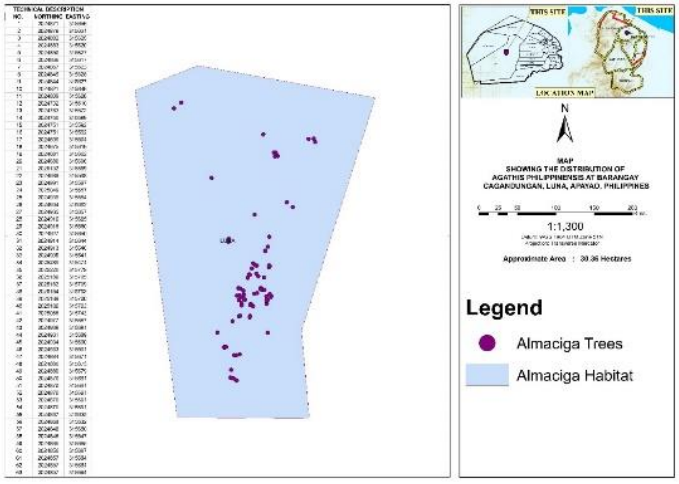

Figure 1: Study Site Number 1 (Cagandungan, Luna, Apayao

Study site 2 is located in Barangay Parina, Calanasan. It forms part of Mount Catalauan and covers approximately 46 hectares. Figure 2 displays the specific tree locations within the study sites.

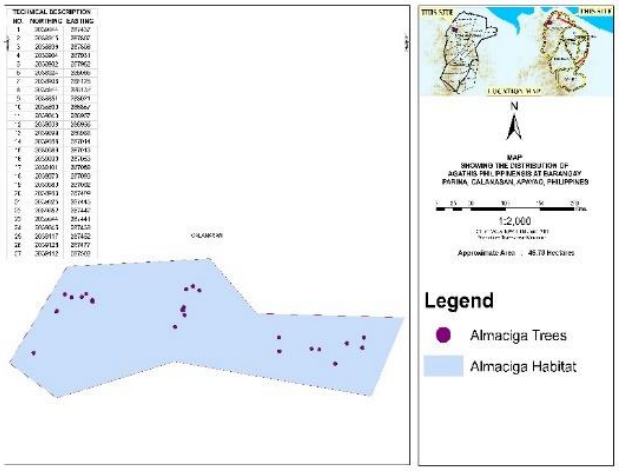

Figure 2: Study Site Number 2 (Parina, Calanasan, Apayao)

Study site 3 is situated within the jurisdiction of Barangay Ninoy Aquino, Calanasan. This site is located on the ridges of Mount Lipsuk and encompasses an area of approximately 54 hectares. Figure 3 showcases the exact locations of the trees within the study area.

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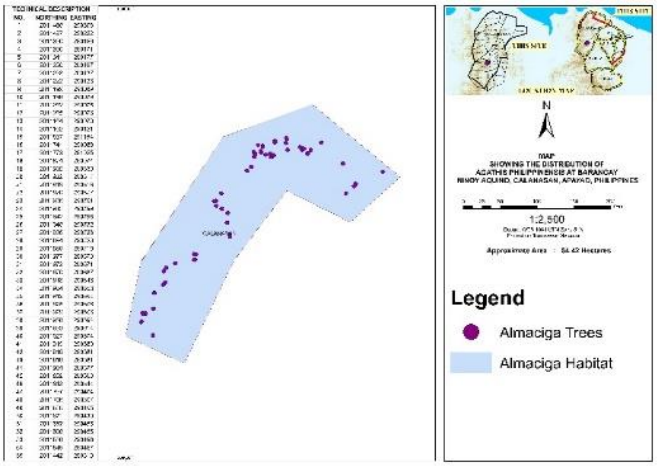

Figure 3: Study Site Number 3 (Ninoy Aquino, Calanasan, Apayao)

Ecological Habitat Characterization of A. philippinensis in Apayao Province

The occurrence of the Almaciga tree in Apayao province was established in this study. Almaciga stands are found on moderately sloping to very steep slopes with *Karst* Mountain characteristics. The trees are from 198 to 1,219 meters above sea level and at the west and southwest aspects.

The stands are located in areas with high organic content with acidic to very acidic soil. The study sites are considered low in phosphorus, however, high in potassium.

Table 1: Soil Chemical Properties of the Different Study Sites.

Soil Chemical Properties	Study Sites					
	Study y Site 1 Depth1	Study Site 1 Depth2	Study Site 2 Depth1	Study Site 2 Depth2	Study Site 3 Depth1	Study Site 3 Depth 2
Soil pH value	6.32	6.53	5.02	5.20	5.06	5.05
Organic Matter, %	8.48	4.87	2.27	.62	2.61	2.44
Phosphorus (ppm)	3.45	2.33	3.80	4.76	1.67	.24
Potassium (ppm)	76.20	67.20	46.10	23.00	113.40	108.40

Average diameter of the tree observed is 73.9 centimeters, with corresponding average height of 51.08 meters. In terms of the live crown ratio, the average for all sites is 55.64 %. The associated species are malabayabas (*Tristaniopsis decorticata*), bolong-eta (*Diospyros philosanthera*), Tanguile (*Shorea polysperma*), white lauan (Shorea *contorta*), panglomboein (*Syzygium simile*) and bitanghol-sibat (*Callophyllum soulatri*). The study areas have a tree diversity index ranging from H' 2.311 to H' 3.44. Natural regenerations were inadequate, and the presence of dead trees is notable.

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Table 2: Dendrometric Profile

STUDY SITE	NUMBER OF TREES	Average Diameter (cm.)	Average Height (m.)	Average Live Crown Ratio (%)
Site 1	63	64.73	47.17	54.050
Site 2	29	76.23	44.2	60.330
Site 3	55	80.74	53.87	52.543
Total	**147**	**73.9**	**51.08**	**55.641**

In the geophysical and dendrometric characteristics, diameter is positively related to elevation, negatively associated with slope r = -0.182, and has no relationship to aspect. Height is negatively related to slope but has no relationship with elevation and aspect. Live crown ratio, elevation, slope, and aspect are not significantly related.

Productivity of Almaciga in terms of carbon stock and resin yield of the stand

Carbon stock ranges from 279.611 tons/ha to 411.983 tons/ha, with an average of 363.994 tons/ha. Comparison between Brown and Banaticla formula in the carbon density estimate, the result showed that for Banaticla is 489.08Mg/ha while for Brown (2007), the carbon density per hectare is 1205.8Mg/ha an increase of 246.54 percent. The estimated resin is 2500 kg/ year.

Table 2: Computed Carbon Stock from the Different Study Sites.

Study Sites	*Brown*		*Banaticla*		*Average*
	Biomass (t/ has.)	C Density (t/ has.)	Biomass (t/ has.)	C Density (t/ has.)	
Site 1	671.02	301.95	285.84	128.63	279.61
Site 2	1005.13	452.31	412.94	185.82	411.98
Site 3	1003.37	451.51	388.06	174.62	400.38
Site 1	671.02	301.95	285.84	128.63	279.61

Table 3. Resin Yield Estimates.

Study Sites	Diameter Classes				Number of trees	Multiplier	Estimated Resin (Kg.)
	40-60	61-114	115-190	191-Up			
Site 1	**18**	**31**	**2**		**51**	**20**	**1,020**
Site 2	**6**	**8**	**8**	**1**	**23**	**20**	**460**
Site 3	**10**	**31**	**9**		**50**	**20**	**1,000**
All Study Sites	**34**	**70**	**19**	**1**	**124**	**20**	**20**
Total							**2,500.00**

Development of propagation protocol for Almaciga

For the development of economic and practical production of quality planting stocks of almaciga, the result showed that the middle section cuttings gave the highest percentage survival, longest shoots, longest roots, and the greatest number of roots. While the acetic acid concentration of 15ml acetic acid mixed with 1 liter of water produces the highest percent survival, longest shoots, longest roots, and the greatest number of roots. On the treatment combination, middle section cuttings treated with 15ml acetic acid mixed with 1 liter of water produce the highest percentage survival, longest shoots, longest roots, and most roots.

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Table 4: Percent Survival

Treatment	Acetic Acid Concentration			Average Percent Survival
Section	**0 ml/l**	**15 ml/l**	**30 ml/ l**	
Apical	63.88	66.66	69.44	66.66
Middle	72.22	**75.00**	63.88	71.29
Basal	58.88	58.33	55.55	57.59
Average % Survival	64.99	66.66	63.88	

Table 5: Average shoot length of Almaciga as affected by acetic acid concentration, section of cuttings, and the combination of acetic concentration and section of cuttings (mm)

Treatment	Acetic Acid Concentration			Average Section
Section	**0 ml/ l**	**15 ml/l**	**30 ml/l**	
Apical	28.00b	31.50b	27.50b	29.00b
Middle	28.30b	45.20a	33.20b	35.57a
Basal	29.40b	35.60ab	31.60b	32.20ab
Average Acetic Acid	28.57b	37.43a	30.77b	**32.26**

Table 6: Average root length of Almaciga as affected by acetic levels, section of cuttings and the combination of acetic levels and section of cuttings (mm)

Treatment	Acetic Acid Concentration			Average Section
Section	**0 ml/ l**	**15 ml/l**	**30 ml/l**	
Apical	29.50	39.60	30.50	33.20b
Middle	31.30	**48.00**	37.40	38.90a
Basal	33.50	38.50	35.10	35.70b
Average Acetic Acid	31.43b	42.03a	34.33b	**35.93**

Table 7: Average number of roots of Almaciga as affected by acetic levels, the section of cuttings, and the combination of acetic levels and section of cuttings (mm).

Treatment	Acetic Acid Concentration			Average Section
Section	**0 ml/ l**	**15 ml/l**	**30 ml/l**	
Apical	5	6	6	6a
Middle	4	6	5	5ab
Basal	4	4	4	4b
Average Acetic Acid	5	5	5	5

Socioeconomic profiling cum knowledge, attitudes, and practices studies

For the knowledge, attitudes and practices studies, there were 111 respondents from the different study sites. The majority are male and married. Most of them are Isnegs. Almost half of the respondents have a 5-8 household size, closely followed by a 1-4 household size.

Most respondents know the existence of the Almaciga tree in the locality and acknowledged that the tree is important to the community and the environment. Consequently, most of them also recognized that the conservation and protection of the tree is very important.

Most needed to gain experience in propagating, planting, and tapping Almaciga. However, most agreed that proper propagation, plantation establishment, and resin tapping of Almaciga

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are necessary. Nevertheless, most respondents are willing to be trained in the appropriate propagation, plantation establishment, and resin tapping of Almaciga. Most respondents had never experienced processing raw resin into industrial products like paints, varnish, and other related products and are willing to undertake the same training and seminars and be part of tree planting and caring activities for the Almaciga plantation in the locality.

On the relationship of the socioeconomic profile of the respondents and their knowledge, attitudes, and practices. Age showed a positive relationship with the knowledge of Almaciga trees in the locality with the older respondents, who are more knowledgeable about the presence of Almaciga. However, negative relationships were found in experience in propagating, planting, and resin tapping of Almaciga, meaning younger respondents are more involved in these activities. Almaciga trees are important in the community or the environment, depicting that the younger the respondents, the higher the value of Almaciga. No relationship on the remaining knowledge, attitudes, and practice in relation to age were found. In terms of sex, the respondents positively related to their experience in propagating, planting, and resin tapping of Almaciga, and knowledge of the existence of Almaciga trees, which shows that the female respondents are more knowledgeable about the presence of Almaciga. No relationship between the remaining knowledge, attitudes, and practice in relation to sex was found.

Table 20: Relationship between socioeconomic characteristics and knowledge, attitudes, and practices.

PARTICULARS	Age	Sex	Civil Status	Ethnic Group	Educ. Attain.
Knowledge of the existence of Almaciga trees in the locality.	0.335***	0.316***	0.029	-0.007	0.257**
Almaciga trees are important in the community or the environment.	-0.275**	0.316*	0.019	-0.072	0.238*
Almaciga trees must be conserved.	-0.039	0.144	0.014	-0.05	0.094
Reporting to proper authorities of illegal cutting and gathering of forest products, including Almaciga tree and resin, is necessary.	-0.172	0.082	0.02	-0.072	0.211*
Experience in propagating, planting, and resin tapping of Almaciga.	-0.339***	0.324***	0.104	-0.224*	0.223*
Proper propagation, plantation establishment, and resin tapping of Almaciga are necessary.	-0.056	-0.051	-0.091	0.105	0.107
Willing to be trained in the proper propagation, plantation establishment, and resin tapping of Almaciga.	-0.095	0.098	-0.029	-0.031	0.041
Experience processing raw resin into industrial products like paints, varnish, and other related products.	-0.07	0.087	-0.019	0.071	0.036
Willing to be trained in adequately processing raw resin into industrial products like paint, varnish, and other related products.	-0.022	0.017	0.137	-0.03	0.081
Willing to be part of tree planting and caring activities for the Almaciga plantation in the locality.	NAN	NaN	NaN	NaN	NaN

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On the relationship between the civil status of the respondents and the knowledge, attitude, and practices, no relationship was recorded. On the relationship between the educational attainment of the respondents and the knowledge, attitude, and practices, positive relationship with the knowledge in the existence of Almaciga trees, Almaciga trees are important in the community or in the environment, reporting to proper authorities of illegal cutting and gathering of forest products including Almaciga tree and resin is necessary and experience in propagating, planting and resin tapping of Almaciga. The result suggests that the higher the respondents' educational attainment, the higher their knowledge of the existence of Almaciga, value its presence, and are more experienced in propagating, planting, and resin tapping. It also suggests that the higher educational attainment of the respondents has more courage to report illegal logging activities. All the other knowledge, attitude, and practices concerning educational attainment recorded no relationship. The protection, promotion, and maintenance of cultural identity is embedded in both local and provincial government programs and also recognized by national line agencies. For their preferred skills training and livelihood preferences, resin processing (product development from raw Manila copal) topped over the others, followed by resin tapping.

CONCLUSION AND FUTURE WORKS

Almaciga stands are found on moderately sloping to very steep slopes with *Karst* Mountain characteristics. The trees are from 198 to 1,219 meters above sea level and at the west and southwest aspects. The stands are located in areas with high organic content with acidic to very acidic soil. The study sites are considered low in phosphorus, however, high in potassium.

The associated species are malabayabas (*Tristaniopsis decorticata*), bolong-eta (*Diospyros philosanthera*), Tanguile (*Shorea polysperma*), white lauan (Shorea *contorta*), panglomboein (*Syzygium simile*) and bitanghol-sibat (*Callophyllum soulatri*). In the geophysical and dendrometric characteristics, diameter is positively related to elevation, negatively associated with slope r = -0.182, and has no relationship to aspect. Height is negatively related to slope but has no relationship with elevation and aspect. Live crown ratio, elevation, slope, and aspect are not significantly related. Carbon stock ranges from 279.611 tons/ha to 411.983 tons/ha and the estimated resin is 2500 kg/ year.

On the propagation protocol development, middle section cuttings treated with 15ml acetic acid mixed with 1 liter of water produce the highest percentage survival, longest shoots, longest roots, and most roots. For the knowledge, attitudes and practices studies, there were 111 respondents from the different study sites. The majority are male and married. Most of them are Isnegs. Most respondents know the existence of the Almaciga tree in the locality and acknowledged that the tree is important to the community and the environment. Consequently, most of them also recognized that the conservation and protection of the tree is very important. Most needed to gain experience in propagating, planting, and tapping Almaciga. However, most agreed that proper propagation, plantation establishment, and resin tapping of Almaciga are necessary. Nevertheless, most respondents are willing to be trained in the appropriate propagation, plantation establishment, and resin tapping of Almaciga. Most respondents had

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never experienced processing raw resin into industrial products like paints, varnish, and other related products and are willing to undertake the same training and seminars and be part of tree planting and caring activities for the Almaciga plantation in the locality.

The inventory and mapping of Almaciga trees or stands must be continued. Mapping of potentially suitable plantation sites within the province must be undertaken to expand areas of production and conservation. Using the middle portion cuttings treated with 15ml mixed with 1-liter water as concentration can be used in the nursery for seedlings production. The development, reproduction, and eventual giving of IEC materials for Almaciga for further protection and conservation is likewise forwarded. Additional skills training and livelihood opportunities for the communities near the study sites. Studies on the correlation among some chemical and thermal properties of Almaciga (*Agathis philippinensis* Warb.) resins from the different locations in Apayao is likewise a good venture in the future to assess the quality of the resin produced from these sites. Likewise, studies on influencing factors affecting resin quality would be a good undertaking.

Ethical Considerations

In the conduct of the study specially in propagation protocols development and in the knowledge, attitudes and practices studies, request letters and approval of the Local Government Units was secured first before the conduct of the study. The author explains the study to the respondents and let them agree with the interview through signing the discussed Interview Consent Forms before them.

I hereby declare that I comply with the Research Ethics Guidelines and that I have not engaged in any misconduct related to research activities, including forgery, alteration, and plagiarism. If it is determined that I have not followed the rules of research ethics, I will not appeal to any sanctions imposed on me. I pledge that I am responsible for this statement.

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