

BIODIVERSITY ASSESSMENT OF THE NWSSU-MATALUD FORESTED AREA

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ABSTRACT— A study conducted to verify the diversity and utilization status of NwSSU-Matalud forest using the five barangays along boundary lines as study sites, including selected respondents to determine its utilization status. Results indicated majority of respondents are in ages 50-61 years old, majority were male, married whose income was less than 3,000.00 pesos, High school level of education are obtained by most respondents and farming were their source of income. Premium trees species locally known as *Apanang*, *Bayog*, *Narra*, *Gisok*, *Lauan* and *Toog* are predominantly found, while, *G-melina* and Mahogany were the sufficient species in artificial forest area. Sufficient fruit trees found were Coconut, Caimito and Santol growing as plantation crops and along road networks of the school campus. Birds seen “frequently” to “always” in the area were the *tukmo*, *tatahilaw*, and *abucay*. Mammals observed were, wild pig, monkey and bats were present only “occasionally”. Reptiles like halo, ibid, turtles are the ones occasionally found in the forest. Land utilization of study area is classified into agricultural, forest and settlement areas. Timberland comprise the largest area with 898.5 hectares broken down to; ipil-ipil, mahogany and g-melina plantations. Natural and successional forest areas considered to be the water shed forest reserved of the NwSSU Matalud campus. Ipil-ipil plantation was threatened by the kaingineros due to high fertility status of the soil. The respondent’s issues and concerned with the forest areas are the incidental forest fire, expansion of kaingin area and timber poaching.

KEYWORDS: Biodiversity, assessment, utilization, species similarities, species diversity, species richness

1. INTRODUCTION

Forest as a whole is a wide tract of land predominantly occupied with trees and other woody vegetation and wild plants. It is also the ecological habitat of wildlife. Forest is among the priority ecosystem needing conservation. This is in recognition of its high species diversity, productivity and by being repository of tremendous ecological and economic wealth. In the Philippines, approximately 30 percent of the population, including some twelve to fifteen million indigenous peoples, depend on forests for their survival, and their cultures revolve around their interactions with their natural environment (DENR 2009). Samar, the third largest island in the Philippines archipelago, contains one of the country's largest unfragmented tracts of lowland rainforest. The island is of high significance for its global biodiversity, harboring within some 38 species of mammals (50% endemic), 215 species of birds (55% endemic), 51 species of reptiles (69% endemic), 26 species of amphibians (52% endemic) and over 1,000 species of plants (approximately 53% endemic). The forests of Samar, and the other ecosystems of the country, have been widely recognized for their biodiversity. For many years, however, civil unrest on the island hampered the conservation of this rich biodiversity, which faces threats from agricultural encroachment, and unsustainable logging, hunting, and harvesting of non-timber forest products. However, improvements in civil order in the 1990s provided an opportunity to address these threats by expanding and strengthening protected areas (PAs) on the island [10].

The NwSSU Main forest which is located in barangay Matalud, San Jorge, Samar is characterized by large, varied number of flora and fauna. It has been blessed with the rich forest resources which includes timber, wildlife, and botanical resources. Other forest wealth are caves and waterfalls that can be sources of income if converted into a tourist's spots. In fact, through the said forest area, it identified San Jorge, Samar as part of the Samar Island Natural Park (SINP) pursuant to Presidential Proclamation No. 442 (2003). With the current resource utilization patterns of nearby inhabitants, which might be responsible for the degradation of highly sensitive ecosystem in this landscape, the biodiversity is likely to be heavily affected. Moreover, the present administration of the university has encouraged San Jorge Campus official to propose a development program to maximize the existing idle area into an eco- tourism destination in the locality. Hence, this study was an initial attempt to determine the existing biodiversity, species composition and distribution, species similarities, species richness, and species diversity of the NwSSU Matalud Campus Water Shed Forest Reserve, Matalud, San Jorge, Samar.

2. METHODOLOGY

2.1 Description of the study area

The NwSSU-Matalud Forested area is located 12 kilometers from the municipal poblacion of San Jorge. It can be reached by a ride for six kilometers from San Jorge to Barangay Buenavista and another six kilometers by hiking towards barangay Matalud, San Jorge Samar. The former Agricultural School with its forested area consist of 996 hectares and at the boundaries of barangays Matalud on the west, Cagtotoog in the north, Libertad at east; Gayondato at east and Bay-ang at the north-east part. Previously, the area consists of 48% close canopy lowland and upland dipterocarp forest covers, 30% ipil-ipil plantation, 10% Mahogany and Gmelina plantation, 10% coconut plantation and almost 12% occupied by the school buildings, and various agricultural crop plantations.

2.2 Site Characterization

Sampling in the study area was done in five sites. The five Barangays mentioned was considered sampling sites of the study. Site 1 an area nearby barangay Matalud located in a heavily disturbed lower mountain forest dominated by agricultural cultivation particularly coconut and other fruits. Site 2 an area besides barangay Cagtotoog having disturbed lower mountain forest dominated by cultivated areas with patches of secondary forest and regeneration areas. Site 3 still located in somewhat higher mountain forest with patches of primary and secondary forests, reforestation and cultivation along barangay Libertad. Site 4 was located at barangay Gayondato with less disturbed upper mountain forest dominated by a mix of primary and secondary forest with patches of regeneration and active cultivation. And Site 5 was along barangay Bay-ang with less disturbed upper mountain forest with patches of primary and regenerated areas.

As to the population, Barangay Matalud consist of 723 people; Barangay Cagtoto-og comprise of 339 inhabitants; Barangay Libertad 195 people, Barangay Gayondato 312 people and Barangay Bay- ang have 169 people (LGU San Jorge, 2018).

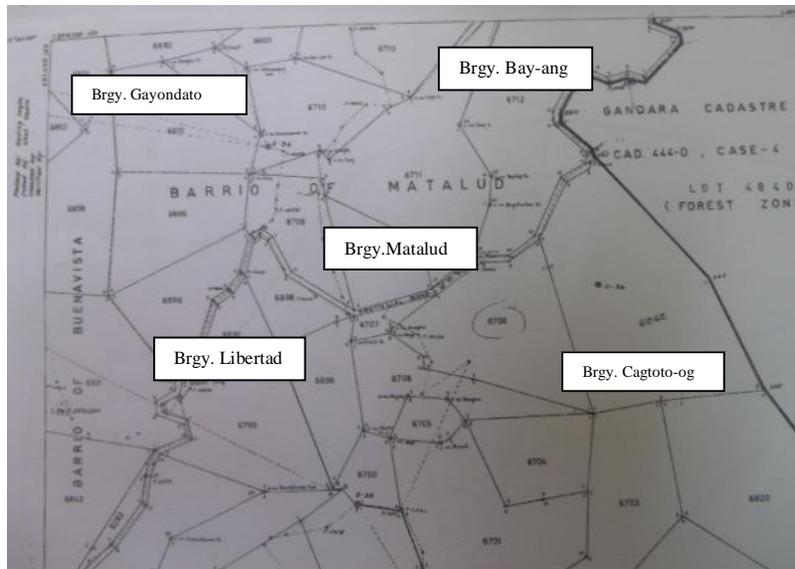


Fig. 1 Location map of the NwSSU-Matalud Forested Area

2.3 Biodiversity Survey

Composition and distribution of different organisms was assessed by the farmers using transect survey method based on [6]. Transect lines in each survey site was set and number of lines vary depending on the variability of the sites. Three to five farmers were assigned from each barangay site to observe and identify the flora and fauna seen in the area. Farmers visit in the site was made twice which were repeated during morning, noon, afternoon and until dusk. Only species of plants and animals known and encountered by farmers along the transect were recorded. Farmers identification of the organisms were in local or vernacular naming which were finally translated by the researchers into common and scientific names. In addition, the farmers are also provided with checklist of plants and animals in their local or vernacular names for them to refer and check the presence of the organisms. The species seen and identified, the following information's were noted; species name, number of organisms, and their distribution status whether they are sufficient, insufficient, rare and not found. Species considered "sufficient" when farmer is able see the two or more of the species at one visit or observation. "Insufficient" species are those seen ones during observation, "rare" for those seen only ones out of the two or three observation visits, and "not found" when the species was not encountered or seen in all of the observation visits made by the farmer.

2.4 Similarity Index

Sampling sites cover different habitat types, level of disturbances by others, and elevation gradients. In this, the Sorensen's Index of similarity [5] was used to compare species composition among sampling sites. Similarity values expressed in percentages was calculated using the equation below:

$$SI = \frac{2K}{A + B} \times 100$$

Where: K = number of species common to sites A and B

A = Number of species for site A

B = Number of species for site B

2.5 Species Richness

Species richness in every sampling sites was measured using 's Menhinick Richness Index [5]. Below is the

equation:

$$R = S/\sqrt{N}$$

Where: S = Total number of species per sampling site

N = Total number of individuals per sampling site

2.6 Species diversity

Diversity of species for each sampling site was computed using Shannon's Diversity Index [5] The equation will be:

$$H' = \sum (n1/n) \ln (n1/n)$$

Where: n1 = number of individuals per species

n = total number of individuals.

2.7 Other data considered

In addition to species determination by farmers on the forest reserve, information on land use system, forest resource utilization and conservation including issues and concerns are additional information to be taken cared. A questionnaire was the main instrument used in gathering information from the respondents. A secondary data through focus group discussion (FGD), records from the school being an agricultural high school then, LGU and DENR was also considered.

2.8 Sampling Procedure

A purposive sampling was adapted in this study, where the respondents of 3-5 were taken from each of the five identified barangays (Table 1). The chosen respondents are considered knowledgeable of the forest area and experienced farmers in their place.

Table 1. Farmer respondents and users of the forest resources in NwSSU-Matalud forest reserve.

Barangays	No. of farmer respondents
Matalud	5
Cagtotoog	4
Libertad	4
Gayondato	4
Bay-ang	3
TOTAL	20

3. RESULTS AND DISCUSSION

3.1 Species Composition

A total of 22 forest species, 16 bird species, five mammals and 5 reptiles were recorded in the five study sites based on barangay survey result (Table 2). The family of trees most represented are the Fabaceae and Dipterocarpaceae both had three species. The species belong to Fabaceae include ipil-ipil, narra and acacia, while the dipterocarps include the guisok, bangkal and lauan. Other families observed are the Arecaceae, Lecythidaceae, Verbenaceae, Euporbiaceae, Malvaceae, Araucariaceae, Gramineae, Meliaceae, and Mimosaceae. Of the forest species identified Dipterocarpaceae were most abundant but smaller sizes as compared to other species. Thus, these species are found to be the most utilized trees. The presence of varied family of trees justifies the ability of the forest to provide ecological balance with other organism with in the forest. For avian species, a total of 16 bird species recorded in NwSSU Matalud forest reserved which are endemic to all barangay study sites. Columbidae family found to be of three species which were the Green

Imperial Pigeon, Pink nicked green pigeon, Spotted dove. Mammal species found in specific sites were the bats, monkeys, rats, deer, wild pigs and tarsiers. While the reptiles include snakes, halo, ibid, turtles and tabili.

Table 2. List of flora and fauna taxa recorded in NwSSU-Matalud Forest reserve.

A. FOREST TREES			
Order	Family	Scientific Name	Common Name
Arecales	Arecaceae	Elaeis guineensis	Rattan
Ericales	Lecythidaceae	Petersianthus quadrialatus (Merr.)	Toog
Fabales	Fabaceae	Leucaena glauca L.	Ipil Ipil
		Pterocarpus indicus wild	Narra
		Samanea saman (jacq.) Merr.	Acacia
Lamiales	Verbenaceae	Gmelina arborea	Yemane
Securinega	Euphorbiaceae	Securinega flexuosa	Anislag
Malpighiales		Mallotus cumingii	Apanang
Malvales	Malvaceae	Pterospermum acerofolium	Bayog
Pinales	Araucariaceae	Dipterocarpaceae	Dayungon
Poales	Graminae	Bambuseae	Bamboo
Sietenia	Meliaceae	Swietenia macrophylla	Mahogany
Shorea	Dipterocarpaceae	Sorea guijo	Guisok
Nuclea		Rubiaceae	Bangkal
Malvales		Shorea contorta	Lauan
	Caesalpiniaceae		Tindalo/Barayong
Octomeles	Datisceae	Octomeles sumatrana	Binuang
Wallaceodendron	Mimosaceae	Wallacedendron celibicum koord.	Banuyo
Euonymus	Celastraceae	Euonymus benguetensis	Takbang
Syzygium	Myrtaceae	Syzygium albayense	Sambulawan
			Ferns
			Vines
B. BIRDS			
Order	Family	Scientific Name	Common Name
Accipitriformes	Accipitridae	Buteo jamaicensis	Hawk/Banog
Columbiformes	Columbidae	Ducula poliocephala	Green Imperial Pigeon
		Streptopelia chinensis	Spotted dove
		Treron vernans	Pink nicked green pigeon
Coraceformes	Alcedinidae	Halcyon smernensis	White throated kingfisher
	Bucerotidae	Anthracoceros marchei	Palawan hornbill
		Buceros hydrocorax	Rufous Hornbill
Cuculiformes	Cuculidae	Centropus viridis	Phil. Coucal
Galliformes	Phasianidae	Gallus gallus	Wild chicken
Passeriformes	Estrildidae	Lonchura Malacca	Chestnut mania
	Corvidae	Corvus macrorhyncos	Large bill crow
	Hirundinidae	Hirundo rustica	Barn Swallow
	Oriolidae	Oriolus chinensis	Black-naped oriol
Piciformes	Picidae	Dryocopus javanensis	White-bellied woodpecker
Psittaciformes	Psittacidae	Tanygnathus lucionensis	Blue naped
Stringiformes	Tytonidae	Bubo philippensis	Grass owl
C. MAMMALS			
Order	Family	Scientific Name	Common Name
Artiodactyla	Cervidae	Odocoileus virginianus	Deer
Artiodactyla	Suidae	Sus scrofa	Wild pig
Chiroptera	Phyllostomidae	Desmodus rotundus	Bats
Rodentia		Rattus, rattus	Rats
Primate	Ceboidae	Macaca fasciculariz	Monkey
Primate	Tarsiidae	Tarsius spectrum	Tarsier
D. REPTILES			
Order	Family	Scientific Name	Common Name
Squamata	Pythonidae	Python molurus	Snake
	Varanidae	Varanus salvator	Water monitor

	Iguanidae	Iguana iguana	Iguana (Ibid)
Testudines		Testidines	Turtle
			Gila monster (Tabili)

3.2 Species Distribution

The distribution of the biodiversity species in the five barangay sites is shown in Table 3. For forest trees site 3 (Brgy. Libertad) had 16 species of trees found, only one species higher than site 4 and 5 consisting of both 15 species of forest trees. Site 1 and 2 had 12 and 13 species respectively. Five species were found common in the five sites. Two species (Gmelina and Mahogany) were recorded in site 1 (Matalud site) only, this may be attributed to the reforestation project extended to barangay Matalud in the previous years. The rest of the species were observed either in 2, 3 or 4 sites. For avian species, a total of 22 species of birds were observed and distributed in the five study sites. Six species of birds were considered common to all sites for they were present during the observation period. Site 5 (Brgy. Bay-ang) had the highest bird species recorded numbering to 20 species. Site 4, 19 species, site 3, 15 species and sites 1 and 2 had 12 species of birds recorded. There were 6 mammals observed during the assessment by the respondent enumerators. These includes; bats deer, monkey, wild pigs and tarsiers. Bats and wild pigs were observed in all barangay sites. While rare number of tarsiers were found only in sites 1 and 4. For reptiles, only 5 species were observed, in which snake and gila monster or tabili were common to all sites. The five reptile species were commonly found in sites 3, 4, and 5.

Table 3. Distribution of flora and fauna species recorded in the five barangay sites in NwSSU Matalud Forest reserve.

Scientific Name	BARANGAY/SAMPLING SITES				
	1	2	3	4	5
A. Forest Trees					
1. <i>Pterocarpus indicus</i> (Narra)			x	x	x
2. <i>Petersianthus quadrialatus</i> (Toog)	x	x	x	x	x
3. <i>Gmelina arborea</i> (Yemane)	x				
4. <i>Swietenia macrophylla</i> (Mahogany)	x				
5. <i>Agathis philippinenses</i> (Almaciga)		x		x	x
6. <i>Shorea contorta</i> (Lauan)	x	x	x	x	x
7. <i>Securinega flexuosa</i> (Anislag)		x	x	x	x
8. <i>Azalia rhomboidea</i> (Barayong)			x	x	x
9. <i>Leucaena leucocephala</i> L. (Ipil ipil)	x	x	x		
10. <i>Pterospermum acerofolium</i> (Bayog)	x	x	x	x	x
11. <i>Octomeles sumatrana</i> (Bay-ang)					
12. <i>Wallacedendron celibicum</i> (Banuyo)		x	x	x	x
13. <i>Euonymus benguetensis</i> (Takuban)	x		x	x	x
14. <i>Mallotus cumingii</i> (Apanang)			x	x	x
15. <i>Sorea guijo</i> (Gisok)			x	x	x
16. <i>Nauclea orientales</i> (Bangkal)			x	x	
17. <i>Samanea saman</i> (Rain tree)		x	x		
18. <i>Syzygium albayense</i> (Sambulawan)	x	x			x
19. <i>Elaeis guineensis</i> (Rattan)	x	x	x		x
20. Ferns	x	x	x	x	x
21. <i>Bambuseae</i> (Bamboo)	x	x		x	
22. Balagon	x	x	x	x	x
Total number of species	12	13	16	15	15
B. Birds					
1. <i>Streptopelia chinensis</i> (Tukmo)	x	x	x		x
2. <i>Oriolus chinensis</i> (Tatahilaw)	x	x	x	x	x
3. <i>Tanygnathus lucionensis</i> (Pikoy)		x		x	x

4. <i>Buceros hydrocorax</i> (Kalaw)			x	x	x
5. <i>Anthraceros marchei</i> (Talusi)	x	x		x	x
6. <i>Buceros hydrocorax</i> (Hornbill)	x	x	x	x	x
7. <i>Bubo philippensis</i> (Owl)		x		x	x
8. (Abucay)	x		x	x	x
9. <i>Ducula poliocephala</i> (Balud)				x	x
10. <i>Halcyon smernensis</i> (Kingfisher)				x	x
11. <i>Corvus macrorhyncos</i> (Crow)	x		x	x	x
12. <i>Dryocopus javanensis</i> (Woodpecker)		x	x		x
13. <i>Buteo jamaicensis</i> (Hawk)	x		x	x	x
14. <i>Hirundo rustica</i> (Balinsasayaw)			x	x	x
15. <i>Gallus gallus</i> (Wild chicken)	x	x	x	x	x
16. <i>Treron vernans</i> (Manatad)	x	x	x	x	x
17. (Iling)	x		x	x	x
18. (Sikop)		x	x	x	
19. (Pago)	x	x	x	x	x
20. <i>Lonchura Malacca</i> (Maya)	x	x	x	x	x
21. <i>Centropus viridis</i> (Saguksok)	x	x	x	x	x
22. (Melopiko)				x	x
Total number of species	12	12	15	19	20
C. Mammals					
1. <i>Desmodus rotundus</i> (Bats)	x	x	x	x	x
2. <i>Odocoileus virginianus</i> (Deer)		x			x
3. <i>Rattus rattus</i> (Rats)	x	x	x	x	x
4. <i>Sus scrofa</i> (Wild pig)	x	x	x	x	x
5. <i>Macaca fascicularis</i> (Monkey)				x	x
6. <i>Tarsius spectrum</i> (Tarsier)	x			x	
Total number of species	3	3	2	4	4
D. Reptiles					
1. Snake	x	x	x	x	x
2. Halo		x	x	x	x
3. Ibid		x	x	x	x
4. Turtle	x		x	x	x
5. Tabili	x	x	x	x	x
Total number of species	3	4	5	5	5

3.3 Species Similarity

The similarity indices of the different species in the 5 sites are shown in Table 4. For forest species, site 4 and 5 had the highest index of similarity (86.67%). Site 3 and 5 ranked second with 83.87%, third was observed in site 3 and 4 (77.42%). And the lowest percentage index of similarity was observed between site 1 and 3 (57.14%). In terms of bird's species similarity, site 4 and 5 got the highest index of similarity (87.18%), followed by site 1 and 3 (81.48%), the third was site 3 and 5 with 80.0% index of similarity. The lowest was observed between site 2 and 4 (64.52%). A closer similarity index for the mammal species between sites 1 and 4 as well as site 2 and 5 with 85% respectively. Second similar indices were also shown between sites 1,2 and 3 at 80.0%. the 3rd ranked was the site 4 and 5 having 75% similarity index. While the lowest was obtained between site 1 and 5; site 2 and 4 with 57.14% similarity.

For reptiles, 100% similarity were obtained from sites 3 and 4; 3 and 5 as well as sites 4 and 5. Sites 2 and 3,4, and 5 got 88.89% similarity index. The lowest was site 1 and 2 which was only 57.14%. The higher similarities between and among sites may be attribute generally to habitat heterogeneity and habitat types. Species similarity was commonly observed to sites 4 and 5 (Brgy. Gayondato and Bay-ang) for forest, birds and reptiles' organisms. This can be associated to the fact that these sites are distantly located from the urban population, hence, disturbances of these habitat and moving organisms are limited. Dense under growth of secondary forest and regenerated areas supports high diversity and similarity of birds, mammals and reptiles' organisms in sites 4 and 5.

Table 4. Flora and fauna similarity indices of the study sites in NwSSU matalud forested area.

SPECIES	STUDY SITE	SIMILARITY INDEX (%)				
		1	2	3	4	5
Forest trees	1		9	8	8	8
	2	72.00		10	9	10
	3	57.14	68.97		12	13
	4	59.26	64.29	77.42		13
	5	59.26	71.43	83.87	86.67	
Birds	1		8	11	11	12
	2	66.67		9	10	11
	3	81.48	66.67		13	14
	4	70.97	64.52	76.47		17
	5	75.00	68.75	80.00	87.18	
Mammals	1		2	2	3	2
	2	66.67		2	2	3
	3	80.00	80.00		2	2
	4	85.71	57.14	66.67		3
	5	57.14	85.71	66.67	75.00	
Reptiles	1		2	3	3	3
	2	57.14		4	4	4
	3	75.00	88.89		5	5
	4	75.00	88.89	100		5
	5	75.00	88.89	100	100	

3.4 Species Richness and Diversity

As shown in Table 5 and Fig. 1, site 3 had the highest species richness of 1.55 with 159 individuals belonging to 16 species of forest trees. Site 1 had the lowest species richness of 1.03 for the forest trees with 203 individuals belonging to 12 species; Sites 5 and 2 considered the highest (1.53) and lowest (1.13) species richness in terms of bird's species respectively. For mammals, site 4 obtained a higher species richness of 0.62 and the lowest was the site 3 with only 0.32 mammal species richness. And in reptiles, site 3 got the highest species richness (1.34) while site 1 had the lowest with only 0.87 species richness. Still on Table 5 and Fig. 2, site 4 had the highest species diversity for forest trees of 2.73 and the lowest species diversity was observed in site 2 (2.14). Sites 4 and 2 considered the highest (2.88) and lowest (2.35) species diversity for birds' species respectively. For mammals, site 4 and 5 obtained a higher species diversity of 0.55 and the lowest was the site 3 with only 0.25 species diversity. And in reptiles, site 5 got the highest species diversity (1.39) while site 1 had the lowest with only 0.27 species diversity.

Table 5. Species richness and diversity of the five sites in NwSSU Matalud forested areas.

Species	Study site	Total number of species	Total number of individuals	Species richness (Mean)	Species Diversity (Mean)
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	1	12	203	1.03	2.14
	2	13	116	1.43	2.45

Forest trees	3	16	159	1.55	2.64
	4	15	201	1.48	2.73
	5	15	196	1.43	2.63
Birds	1	12	37	1.15	2.44
	2	12	31	1.13	2.35
	3	15	44	1.34	2.58
	4	19	56	1.52	2.88
	5	20	54	1.53	2.79
Mammals	1	3	22	0.57	0.37
	2	3	34	0.53	0.27
	3	2	30	0.32	0.25
	4	4	35	0.62	0.55
	5	4	29	0.58	0.55
Reptiles	1	3	8	0.87	0.27
	2	4	8	0.97	0.97
	3	5	10	1.34	1.01
	4	5	7	1.09	1.04
	5	5	9	1.18	1.39

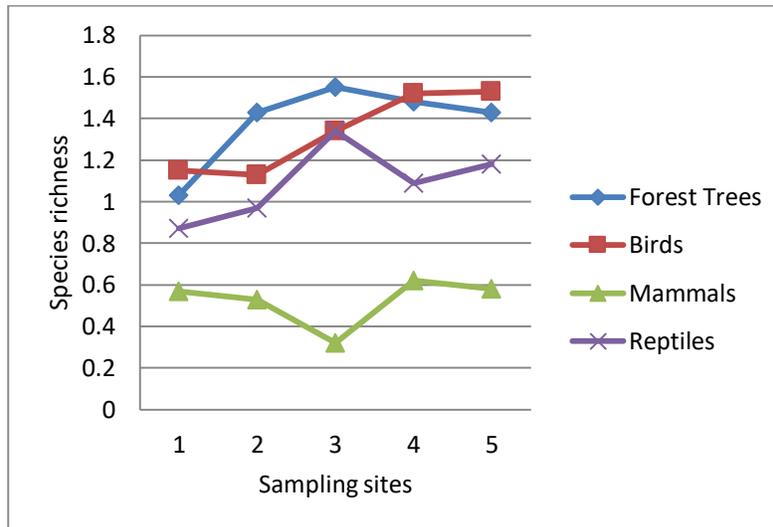


Fig. 2. Species richness of forest trees, birds, mammals and reptiles in NwSSU-Matalud Forest Area

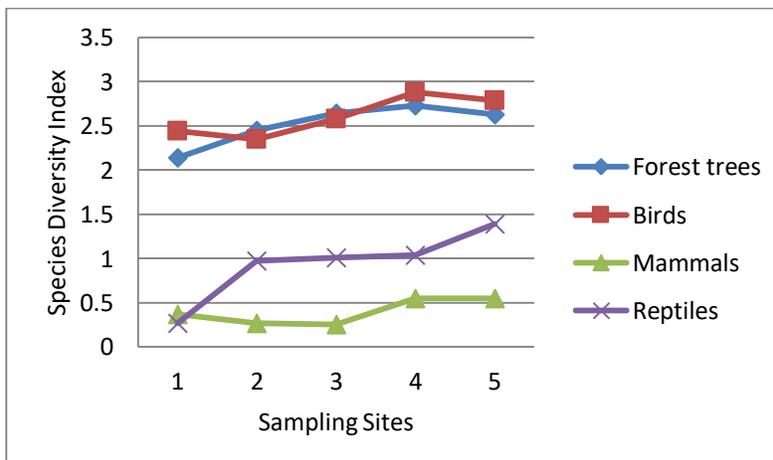


Fig. 3. Species diversity of forest trees, birds, mammals and reptiles in NwSSU-Matalud Forest Area

3.5 Conservation status of the forest resources as perceived by the respondents

The data on conservation status of the forest resources was based from respondent's observation as a result of their encounters in each sampling sites. As shown in Table 6, only seven forest species (Lauan, Anislag, Bayog, Apanang, Rattan, Ferns and Balagon) were found to be sufficient in all sites. However, there were forest species that were still sufficient in one, two or three sites. Others are insufficient to rarely found in certain sites, while Mahogany was the only tree species not found in sites 3, 4, and 5. And site 5 is the only one that do not have even a single Gmelina tree. For birds, 6 species were commonly found and considered sufficient in all sites. These were the Tatahilaw, hawk, Manatad, Pago, Maya and Sagoksok. Insufficiency and rareness of different birds were also observed among different barangay sites. Bats and rats are the mammals still sufficient and found in all study sites. Wild pig was insufficient to rare in all of the sites, this means that wild pig still existing but of limited number already. For reptiles, snake and tabili were still observed and considered sufficient in all sites. However, ibid was sufficiently found except in site 1 by which the species did not appear and encountered by the farmer enumerators.

Table 6. Status of flora and fauna species recorded in the five barangay sites in NwSSU-Matalud Forest reserve.

Scientific Name	BARANGAY/SAMPLING SITES				
	1	2	3	4	5
A. Forest Trees					
1. <i>Pterocarpus indicus</i> (Narra)	R	R	IS	IS	IS
2. <i>Petersianthus quadrialatus</i> (Toog)	IS	IS	IS	IS	IS
3. <i>Gmelina arborea</i> (Yemane)	S	IS	R	R	NF
4. <i>Swietenia macrophylla</i> (Mahogany)	S	R	NF	NF	NF
5. <i>Agathis philippinenses</i> (Almaciga)	R	IS	R	R	IS
6. <i>Shorea contorta</i> (Lauan)	S	S	S	S	S
7. <i>Securinega flexuosa</i> (Anislag)	S	S	S	S	S
8. <i>Afzelia rhomboidea</i> (Barayong)	R	R	IS	IS	IS
9. <i>Leucaena leucocephala</i> L.(Ipil ipil)	S	S	S	IS	IS
10. <i>Pterospermum acerofolium</i> (Bayog)	S	S	S	S	S
11. <i>Octomeles sumatrana</i> (Bay-ang)	R	R	R	R	R
12. <i>Wallacedendron celibicum</i> (Banuyo)	IS	R	S	IS	S
13. <i>Euonymus benguetensis</i> (Takuban)	S	R	S	S	S
14. <i>Mallotus cumingii</i> (Apanang)	S	S	S	S	S
15. <i>Shorea guijo</i> (Gisok)	IS	IS	IS	R	IS
16. <i>Nauclea orientales</i> (Bangkal)	R	R	IS	IS	R
17. <i>Samanea saman</i> (Rain tree)	R	R	IS	IS	R
18. <i>Syzygium albayense</i> (Sambulawan)	IS	IS	R	R	IS
19. Rattan	S	S	S	S	S
20. Ferns	S	S	S	S	S
21. Bamboo	S	S	IS	S	IS
22. Balagon	S	S	S	S	S
Total number of species					
B. Birds					
23. Tukmo	S	S	IS	R	IS
24. Tatahilaw	S	S	S	S	S
25. Pikoy	R	IS	R	IS	S
26. Kalaw	R	R	IS	IS	IS
27. Talusi	IS	IS	R	IS	IS
28. Hornbill	S	IS	IS	S	S
29. Owl	R	IS	R	IS	IS

30. Abucay	IS	R	IS	IS	IS
31. Balud	R	R	R	IS	IS
32. Kingfisher	R	R	R	IS	IS
33. Crow	IS	R	IS	IS	S
34. Woodpecker	R	IS	IS	R	R
35. Hawk	S	S	S	S	S
36. Balinsasayaw	IS	R	IS	S	S
37. Wild chicken	IS	IS	IS	S	S
38. Manatad	S	S	S	S	S
39. Iling	IS	R	IS	IS	IS
40. Sikop	R	IS	IS	IS	R
41. Pago	S	S	S	S	S
42. Maya	S	S	S	S	S
43. Saguksok	S	S	S	S	S
44. Melopiko	R	R	R	IS	IS
Total number of species					
C. Mammals					
7. Bats	S	S	S	S	S
8. Deer	R	IS	NF	R	NF
9. Wild pig	IS	IS	R	IS	IS
10. Monkey	NF	NF	R	R	R
11. Tarsier	R	NF	NF	R	R
Total number of species	3	3	2	4	4
D. Reptiles					
6. Snake	S	S	S	S	S
7. Halo	NF	R	IS	IS	IS
8. Ibid	NF	S	S	S	S
9. Turtle	IS	NF	IS	R	IS
10. Tabili	S	S	S	S	S
Total number of species	3	4	5	5	5

Legend:

S= Sufficient IS=Insufficient R= Rare NF=Not Found

3.6 Land use system

Table 7 shows the land use system of the NwSSU-Matalud Campus forested area, Matalud, San Jorge Samar during the previous and present time. Previous records indicated that the original school site comprised of 966.5 hectares total land area in Matalud campus, 898.5 hectares or 93 percent of the total land area was under the category of forest or timberland covered within the scope of the five barangays included in this study. This was divided into tree plantation areas that composed of Ipil-ipil (350 ha.) from the BLISS and SRP- SCUNAS projects under the supervision of the then SNAS and SSCAF, one hundred (100 ha.) hectares planted to Mahogany and Gmelina by the Hillside Farmers Association, in coordination with the DENR, and the large tract of forested area consisting of natural and succession forest measuring about 448.5 hectares of forest/timberland. The natural forest is composed of small trees that are left after timber poaching. The successional forest is composed of pioneer trees that regenerate after series of burning and abandoned kaingin. The fifty-three (53) hectares or 5.5 percent of the area was under the category of agricultural land. This was planted to various annual crops like rice, corn, root crops, vegetables about 23 hectares. About thirty (30)

hectares are planted to coconut with little portion of coffee plantations.

And the last category consisting of fifteen (15) hectares was utilized as settlement area. This was the area originally occupied for school buildings as agricultural school then, and cottages for personnel and students. The present status of the NwSSU-Matalud land resources has drastically changed more utilization of the area into agricultural activities by the surrounding inhabitants. The agricultural cash crop production area and coconut plantation due to increase of rice, vegetables, root crop production and self-initiated planting of coconut by different families in the area. Ipil-ipil plantation has already been disturbed, most of them are regenerated plants after being slashed and burned for planting rice and corn and later on planted to vegetables and root crops. Area planted to Gmelina and Mahogany remain the same, however, random cutting of bigger trees at very minimal percentage was observed. While natural and succession forest was getting reduced due to illegal logging (timber poaching), slash and burn or kaingin system of farming.

Table 7. The land use system of the NwSSU- Matalud forest area.

Land use	Previous Area (ha.)	Present Approx. area (ha.)
1. Agricultural area	53	70-100
a. lowland rice/veg. corn, root crops	23	> 40
b. coconut plantation	30	> 50
2. Forest/timberland	898.5	
a. tree plantation		
a.1. ipil-ipil	350	< 200
a.2. mahogany and gmelina	100	100
b. natural and succession forest	448.5	< 400
3. Settlement	15	

3.7 Forest Resources Utilization and Conservation

There are a number of factors that have contributed to deforestation in the Philippines, including illegal logging, fuel wood and timber poaching, agricultural expansion, strip-mining, migration and plantation development (DENRFMB and CoDe REDD-plus Philippines 2010). The most serious threat to forest ecosystems has been logging (both legal and illegal) (DENR 2009). Illegal logging operations have continued because of poor law enforcement and the growing demand for timber and wood products. The Matalud forested area were exposed to some utilization measures. Previous illegal logging, kaingin system of farming made tremendous effect of the area. Forest plantation of ipil-ipil was also threatened for eradication due to kaingin system since the area was utilized to planting agricultural crops. These ipil-ipil plantation were within the areas of barangay Matalud, Cagtoto-og and Libertad. Conversion of ipil-ipil plantation into farming area was very attractive to the nearby inhabitants because of the soil fertility coming from the biomass accumulated by the leguminous ipil-ipil trees. The trees were cut and gathered as firewood. However, the mahogany and gmelina plantation were still in place and growing well in the plantation area except for very few illegally cut down trees, this viable plantation was planted within the vicinity of barangay Matalud and Cagtoto-og. A plan of selling the timber by selective logging process was already conceptualized, however, negotiations as to the marketing of trees has been stopped when transition of the school as a university came into.

3.8 Other Resources Found

The Matalud forest reserve is also endowed with other stable and viable natural resources such as caves and water fall best fitted for ecotourism. More than 5 caves and 3 water falls can be found within the forested areas of the 5 barangays included in this study. However, these ecotourism sites are not so much recognized due to absence of infrastructures such as road networks, distance and peace and order condition.

3.9 Issues and Concerned Forest Resources

The respondent's issues and concerned on the forest resources was the incidental forest fire from the kaingin especially during summer, expansion of kaingin area and timber poaching. Expansion of kaingin was associated with the increase of population. When there is an increase of population, there also a need to expand their farm in order to satisfy their needs for food and income. During off season months, people may find alternative way to obtain income to support their family, especially during the time that their crops are not yet ready for harvest. This may result on illegal logging, making them into lumber and sold to people who need materials for house construction.

4. CONCLUSION

Based on the findings of the study, biodiversity status in NwSSU-Matalud forested area either wild animals, timber and forest resources are still obviously available. However, habitat alteration brought about by conversion of forest into agricultural practices due to slash and burn cultivation and other related activities on the forest reserve are of great threat to birds and other wild life. Since the miniature of the forest was changed, the flora and fauna identified are becoming insufficient or in nearly threatened category, thus, requires conservation policies. Infrastructure and ecotourism development and in-depth ecological studies must be carried out so that any conservation measures be effectively implemented.

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