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Vegetation profile around the hornbill nest tree (*Bucerotidae*) at Way Rilau Research Station, Forest Management Unit (FMU) Batutegi

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ABSTRACT
Hornbills are birds capable of flying over long distances, ranging approximately from 39 to 55 km. However, habitat loss caused by widespread forest encroachment poses a serious threat to their survival. Modeling to visualize the canopy structure of potential trees can help visualize the stand profile at the Way Rilau Research Station. The aim is to analyze the characteristics of potential hornbill nests in habitats identified as suitable for these birds. The research was conducted from December 2024 to January 2025 at the Way Rilau Research Station (SRWR), FMU Batutegi, Tanggamus Regency. Data collection uses vegetation analysis, including observations, to identify trees within a 20 m x 20 m plot. The data is analyzed using the Spatially Explicit Individual-based Forest Simulator (SExI-FS) software to model and project canopy profiles digitally and analyze dominance across all plots using the Important Value Index (IVI). The vegetation analysis identified 14 families and 24 tree species, including potential nesting trees such as Kepak, Lengsar, Pasang Merah, and Sempur. The highest Importance Value Index in this analysis was Quercus sundaicus (40.96%), followed by *Dipterocarpus korthalsii* (32.74%) and *Corypha utan* (25.03%). These results were projected as a stand profile using SExI-FS software to visualize the conditions around potential nest trees and the criteria. Based on these projections, the potential nest trees have larger crowns than the surrounding supporting trees.
Keyword: Canopy Structure, Hornbill Nests, FMU Batutegi, SExI-FS, Vegetation Analysis

1. Introduction

The hornbill, also known as the enggang, is a fruit-eating bird whose presence plays a crucial role in forest regeneration. This bird can widely disperse seeds through the fruits it eats, which become droppings and then spread widely throughout its range. The hornbill's home range is extensive, spanning approximately 39-55 km [1]. In Asia, hornbills are distributed across fragmented rainforests and adjacent modified agroforestry plantations [2]. There are 32 recorded hornbill species in Asia, with Indonesia accounting for almost half, comprising 13 species spread throughout tropical rainforests [3]. The International Union protects birds that are nearly endangered due to various threats for Conservation of Nature (IUCN), the Conservation on International Trade in Endangered Species of Wild Fauna and Flora (CITES) are classified as Appendix II, and in Indonesia are protected under Law No. 32 of 2024, a revision of Law No. 5 of 1990 concerning KSDAHE and Regulation of the Minister of Environment and Forestry P.160/MENLHK/SETJEN/KUM.1/12/2018 concerning Protected Species of Animals and Plants.

Threats to hornbills include deforestation and habitat changes driven by rampant human encroachment on land and poaching. According to [3], in their research in Way Canguk TNBBS, they found that hornbill presence is influenced by both habitat conditions and human factors, such as hunting for their beaks as decorations or home ornaments. Furthermore, the threat of trade that occurs in hornbills (Bucerotidae) is also a problem for the sustainability of hornbills in nature [4]. According to [5], logging activities on large trees and fruit trees, such as ficus, which hornbills need, can result in reduced habitat for hornbills. It is known that large trees and fruit trees are essential for hornbills. Uncontrolled land use can be the most significant factor in making hornbill populations vulnerable. Land cover changes are often caused by humans, who affect nature for their own needs rather than being influenced by factors such as climate, soil, and topography [6]. Spatial planning using SExI-FS software facilitates visualization of stand profiles and simulations of productivity management and annual tree growth. According to [7], individual-based natural forest simulations are important because canopy gaps caused by tree mortality help maintain species diversity and productivity.

The Way Rilau Research Station is located in the Batutegi Forest Management Unit (FMU) Core Block, Tanggamus Regency, Lampung Province. This location is still identified as an area with criteria for hornbill activity. This is due to the area's diverse potential for food trees and its hilly tropical rainforest. The relationship between trees and birds plays a crucial role in providing food sources and breeding grounds [8], especially for hornbills. Therefore, the increase and presence of birds in this location is significantly driven by the diversity of tree species and the provision of varied habitats and food sources to support their survival [9,10]. In addition, due to limited research, especially at the Way Rilau Research Station, this study was conducted to analyze the nesting potential characteristics in habitats identified as potential nesting sites for hornbills.

2. Method

2.1. Area Study

This research was conducted in December 2024 – January 2025. The research site was the Way Rilau Research Station, within the Batutegi Forest Management Unit, Tanggamus Regency, Lampung Province. Way Rilau Research Station (SRWR) is a location where hornbill activity is still identified. This is because the location still has natural tree diversity and meets the hornbill nesting criteria. This location offers a diverse range of fruit feed and nest trees, including those needed by hornbills, such as large-diameter hollow trees. Additionally, small fruits, such as those of the ficus tree, are factors that attract hornbills to the Way Rilau Research Station (SRWR) for activities and foraging. Based on the results of observations, geographically the research location is at the coordinates Potential Nest 1 104°45'38.63"E, 5°10'47.03"S; Potential Nest 2 104°45'29.33"E, 5°10'33.56"S; Potential Nest 3 104°45'31.63"E, 5°10'36.04"S; and Potential Nest 4 104°45'24.74"E, 5°10'52.44"S (Figure 1).

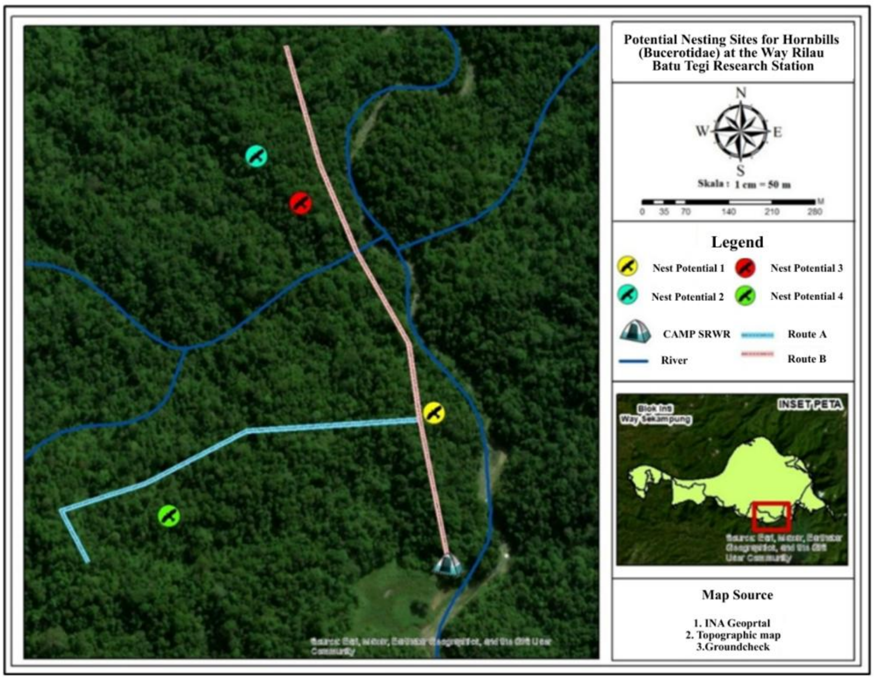


Figure 1. Map of potential nest locations at the Way Rilau Research Station (SRWR) [11].

2.2. Data Collection

Data collection was conducted using observation and plotting methods. The observation method involved identifying potential nesting sites based on observations and related information, which ultimately led to the conclusion that trees with the potential to become hornbill nests were present. The plotting method was used to collect data on tree phases that support hornbill nesting, breeding, and foraging. The plot measured 20 m × 20 m and was rectangular, as shown in Figure 2.

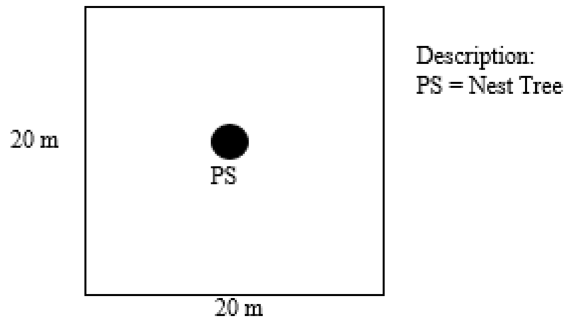


Figure 2. Illustration of a 20m x 20m plot.

The plot accounts for potential nesting tree populations and field conditions, and the data include diameter at breast height (dbh), total height, and nest height. The following formula is used to measure dbh:

$$D = K/\pi \tag{1}$$

Description: D = Diameter; K = Circumference; π = 3.14

2.3. Data Analysis

The tree-visualization data analysis will be performed using the Spatially Explicit Individual-based Forest Simulator (SExI-Fs) software version 2.1.0. The data collected in Microsoft Excel is converted into a text document, which is then imported into the software and formatted according to the plot presented, specifically a 20m x 20m grid. After that, the data is entered and visualized in 3D, with the same color representing the same parts of the tree, and the entire tree is displayed on the right. The data required for analysis using this software include tree species, total tree height, diameter at breast height (DBH), Branch Free Height (BFH), cr curve, cr depth, and cr radius, as well as the following crown formula.

$$\text{Cr. curve} = \text{Tree height} - \text{BFH} \tag{2}$$

$$\text{Cr. depth} = \text{Tree height} - \text{Widest tree canopy} \tag{3}$$

The Cr radius is a combination of each crown, divided into four, with the furthest crown, as simulated in Figure 3 below.

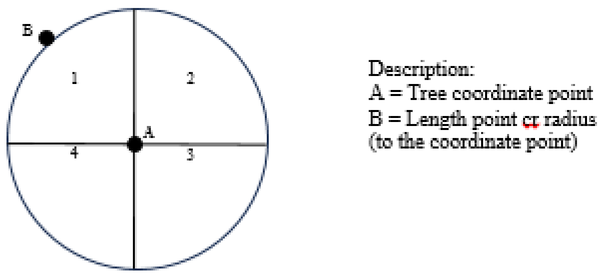


Figure 3. Sketch of Cr radius.

According to [12], the SExI-FS software can visualize environmental conditions, such as tree potential data, to view canopy stand profiles. ICRAF has developed this software as a growth simulation model. Then, to find dominance in all plots, the Important Value Index (IVI) is used, which can be calculated using the formula:

$$\text{IVI} = \text{RD} + \text{DR} + \text{FR} \tag{4}$$

The formula above shows where Relative Density (RD), Relative Dominance (DR), and Relative Frequency (RF) are each calculated using the following formula:

$$Species\ density = \frac{Number\ of\ individuals\ of\ a\ species}{Area\ of\ the\ total\ sample\ units} \times 100 \tag{5}$$

$$RD = \frac{Density\ of\ a\ type}{Density\ of\ all\ types} \times 100 \tag{6}$$

$$Frekuensi\ type = \frac{Number\ of\ plots\ where\ a\ species\ was\ found}{Sum\ of\ all\ plots} \times 100 \tag{7}$$

$$FR = \frac{Frequency\ of\ a\ type}{Frequency\ of\ all\ types} \times 100 \tag{8}$$

$$Dominance\ of\ type = \frac{The\ basic\ area\ of\ a\ type}{Total\ area\ of\ sample\ units} \times 100 \tag{9}$$

$$DR = \frac{Dominance\ of\ a\ species}{Dominance\ of\ all\ types} \times 100 \tag{10}$$

3. Results and Discussion

3.1. Variety of Tree Species

Based on the results of vegetation analysis on potential nest trees at the Way Rilau Research Station, there are four potential nest trees for hornbills and 20 types of supporting trees around the nest trees belonging to 14 identified families. These families include Arecaceae, Asteraceae, Dilleniaceae, Dipterocarpaceae, Euphorbiaceae, Fagaceae, Lamiaceae, Lauraceae, Lecythidaceae, Malvaceae, Meliaceae, Myrtaceae, Phylantaceae, and Sapindaceae. Trees from these various families generally serve a role for hornbills, such as providing foraging and perching sites. In addition, information regarding food trees at the Way Rilau Research Station (SRWR) states that the most likely food trees preferred by hornbills are Gebang, Durian alas, Kecapi, Kokosan Monyet, Langsat lutung, Kepak, Kisireum, Kanyere badak, Buni utan, Lengsar, and Laban, which are included in the fleshy and juicy fruit. Additionally, one of the trees has a natural hole that serves as a potential nesting site for hornbills. To view the individuals of each tree type, the information is presented in Tables 1, 2, 3, and 4.4. Conclusion. It is the last section in the AIM (RAD) C model. It summarizes the research findings and discussion.

Table 1. Plant Types in potential nest plot 1

Family	Local Name	Scientific Name	Total
Arecaceae	Gebang	*Corypha utan*	4
Myrtaceae	Kepak	*Syzygium polycephalum*	1
Malvaceae	Bengang	*Neesia altissima*	3
Lamiaceae	Laban	*Vitex pinnata*	2
Euphorbiaceae	Kareumbi	*Homalanthus populifolius*	1
Asteraceae	Africa	*Vernonia amygdalina*	1
Dipterocarpaceae	Pasang abu	*Dipterocarpus korthalsii*	2
Meliaceae	Kecapi	*Sandoricum koetjape*	1
	Total		16

Table 2. Plant types in potential nest plot 2

Family	Local Name	Scientific Name	Total
Dipterocarpaceae	Pasang Abu	*Dipterocarpus korthalsii*	1
	Pasang	*Dipterocarpus blumei*	1
	Meranti	*Dipterocarpus sp.*	1
Euphorbiaceae	Kareumbi	*Homalanthus populifolius*	2
Fagaceae	Pasang Merah	*Quercus sundaicus*	1
Malvaceae	Semangkok	*Scaphium macropodum*	1
Phyllanthaceae	Buni Utan	*Antidesma sp.*	1
	Kanyere Badak	*Bridelia glauca*	1

Sapindaceae	Lengsar	*Pometia pinnata*	1
	Total		10

Table 3. Plant types in potential nest plot 3

Family	Local Name	Scientific Name	Total
Arecaceae	Gebang	*Corypha utan*	2
Dipterocarpaceae	Pasang Abu	*Dipterocarpus korthalsii*	1
Fagaceae	Pasang merah	*Quercus sundaicus*	2
	Pasang putih	*Lithocarpus indicus*	2
Lauraceae	Huru batu	*Litsea glutinosa*	1
Myrtaceae	Kisireum	*Syzygium polyanthum*	1
	Total		9

Table 4. Plant types in potential nest plot 4

Family	Local Name	Scientific Name	Total
Dipterocarpaceae	Pasang Abu	*Dipterocarpus korthalsii*	1
	Meranti braga	*Shorea sp.*	1
Dilleniaceae	Simpur	*Dillenia excelsa*	1
Malvaceae	Durian alas	*Durio sp.*	1
Meliaceae	Kecapi	*Sandoricum koetjape*	1
	Langsat lutung	*Aglaia lawii*	1
	Total		7

The plant types in the table are the results of observations on the tree phase in a 20m x 20m plot that has been determined as a potential plot for nest trees and supporting trees. The results show that around the nest, there are differences in tree diversity where path B has three plots, namely plot 1, plot 2, and plot 3, which can be seen (Table 1, Table 2, Table 3). The diversity of tree phases is significantly greater than in path A, specifically in Plot 4 (Table 4). This is evident from the land cover and the observed tree diversity during data collection along the two paths. Path B still dominates diversity in the tree phase, along with the potential for nest trees in very dense land cover conditions. In contrast, Path A still exhibits considerable tree diversity in the seedling, sapling, and pole phases. However, both paths have abundant fruit tree diversity.

In the plots and vegetation around the potential nesting tree locations, most of the trees are fruit-bearing trees needed by hornbills as a food source, as stated by [3], that hornbills at the Way Canguk Research Station of Bukit Barisan Selatan National Park have several families that are the same in the type of fruit feed at the Way Rilau Research Station, including the Aracaceae, Euphorbiaceae, Lauraceae, Malvaceae, and Meliaceae families. In addition, the Dipterocarpaceae family is also part of the hornbill food trees. Therefore, hornbills still make their presence known around the location to search for food. As stated [13], hornbills are fruit-eating animals (Frugivores), so fruit-bearing trees are essential for their needs. The fruits eaten by hornbills are usually small, such as those of the ficus tree. These trees are characteristic of hornbills, distinguished by their large diameters and towering heights. This is because hornbills are animals that avoid predators on the ground. The results of the tree data show the dominance levels in all plots: red tide (40.96%), gray tide (32.74%), and gebang (25.03%) (Table 5).

Table 5. Importance value index (IVI)

No	Local Name	Scientific Name	RD	FR	DF	IVI
1	Afrika	*Vernonia amygdalina*	2.38	3.23	0.80	6.40
2	Bengang	*Neesia altissima*	7.14	3.23	4.51	14.88
3	Buni utan	*Antidesma sp.*	2.38	3.23	0.75	6.36
4	Durian alas	*Durio sp. (kemungkinan)*	2.38	3.23	0.00	5.61
5	Gebang	*Corypha utan*	14.29	6.45	4.30	25.03
6	Huru batu	*Litsea glutinosa*	2.38	3.23	0.60	6.20
7	Kanyere badak	*Bridelia glauca*	2.38	3.23	0.58	6.19
8	Kareumbi	*Homalanthus populifolius*	7.14	6.45	1.10	14.69
9	Kecapi	*Sandoricum koetjape*	4.76	6.45	4.79	16.00
10	Kepak	*Syzygium polycephalum*	2.38	3.23	15.04	20.65
11	Kisireum	*Syzygium polyanthum*	2.38	3.23	0.80	6.40

No	Local Name	Scientific Name	RD	FR	DF	IVI
12	Kokosan monyet	*Dysoxylum caulostachyum*	2.38	3.23	0.91	6.51
13	Laban	*Vitex pinnata*	4.76	3.23	3.42	11.41
14	Langsat lutung	*Aglaia lawii*	2.38	3.23	0.69	6.30
15	Lengsar	*Pometia pinnata*	2.38	3.23	5.95	11.55
16	Meranti	*Dipterocarpus sp.*	2.38	3.23	4.19	9.79
17	Meranti braga	*Dipterocarpus sp. (kemungkinan)*	2.38	3.23	0.77	6.38
18	Pasang	*Dipterocarpus blumei*	2.38	3.23	1.62	7.23
19	Pasang abu	*Dipterocarpus korthalsii*	11.90	12.90	7.94	32.74
20	Pasang merah	*Quercus sundaicus*	7.14	6.45	27.36	40.96
21	Pasang putih	*Lithocarpus indicus*	4.76	3.23	2.16	10.15
22	Putat sungai	*Barringtonia racemosa*	2.38	3.23	1.84	7.45
23	Semangkok	*Scaphium macropodum*	2.38	3.23	0.84	6.45
24	Sempur	*Dillenia excelsa*	2.38	3.23	9.06	14.67
		Total	100.00	100.00	100	300.00

3.2. Spatially Explicit Individual-based Forest Simulator

Crown profile structure is a method for visualizing the shape of a habitat or location for animals, including hornbills. This individual-based simulator is designed to explore forest vegetation and project stand profiles and can demonstrate changes driven by various factors, such as climate. Furthermore, this simulator is used to observe tree growth [14,15]. Furthermore, the software used to visualize stand profiles in potential nesting trees is shown in the following figure.

3.3. Potential nest 1: Kepak (Syzygium polycephalum)

Based on the research results, the kepak tree was identified as a potential nest tree at an altitude of 361 meters above sea level, with a slope of -27 degrees. In Figure 3, the kepak tree is marked with code 2, which has a wide crown sketch. Kepak has a natural tree hole at an altitude of 9.4 m with a total height of 24.2 m and a DBH of 103.8. Then, to see the tree type from the code in Figure 4, which aims to facilitate tree identification, refer to Table 6 below.

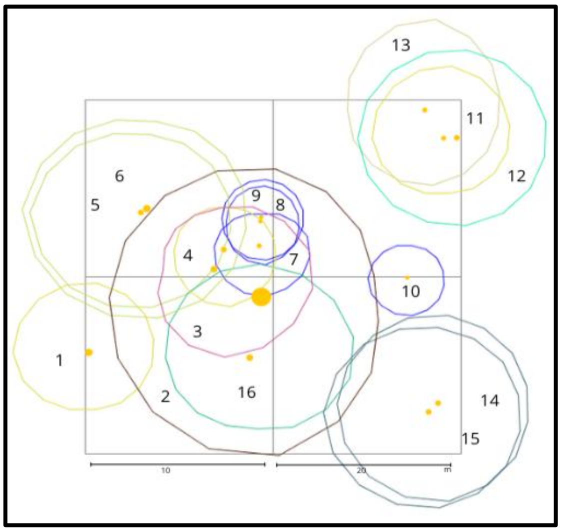


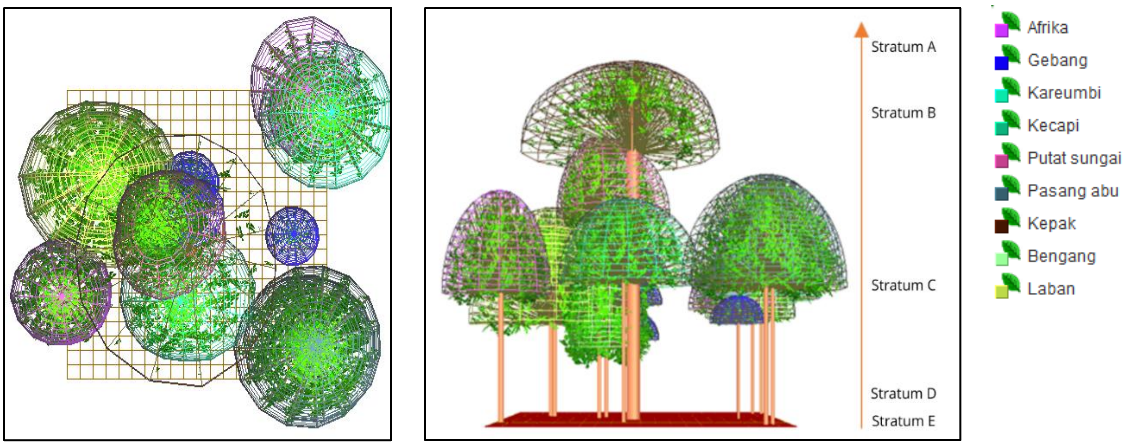
Figure 4. Sketch of stand profile (potential 1).

Table 6. Tree code and tree type 1

Tree Code	Local Name	Scientific Name
1.	Bengang	*Neesia altissima*
2.	Kepak	*Syzygium polycephalum*
3.	Putat sungai	*Barringtonia racemosa*
4.	Bengang	*Neesia altissima*
5.	Laban	*Vitex pinnata*

6.	Laban	*Vitex pinnata*
7.	Gebang	*Corypha utan*
8.	Gebang	*Corypha utan*
9.	Gebang	*Corypha utan*
10.	Gebang	*Corypha utan*
11.	Bengang	*Neesia altissima*
12.	Kareumbi	*Homalanthus populifolius*
13.	Afrika	*Vernonia amygdalina*
14.	Pasang abu	*Dipterocarpus korthalsii*
15.	Pasang abu	*Dipterocarpus korthalsii*
16.	Kecapi	*Sandoricum koetjape*

Kepak (*Syzygium polycephalum*), commonly called gowok, is a plant that has a tall and large tree size, has oval-shaped leaves, and has clustered fruit, and can be found in areas with an altitude of 200-1,800 meters above sea level [16]. Besides being known as gowok, this plant is also called kupa/ruruhi and belongs to the Myrtaceae family, a member of the guava group. This plant is a natural biological resource often found growing wild in forests and has numerous benefits [17]. This plant, which exhibits incredible diversity in Southeast Asia, is also found in tropical and subtropical regions, such as Indonesia, Malaysia, and East India [18].



A : Top view B : Front view

Figure 5. 3D stand profile of trees at the research location (potential 1).

3.4. Potential nest 2: Lengsar (Pometia pinnata)

Based on research results from the Way Rilau Research Station (SRWR), Lengsar is located at an altitude of 365 meters above sea level, with a slope of -25 degrees. The tree leaves were in a fall period, which caused the canopy in Figure 6, code 5, to have only half its normal size. In addition, Lengsar has a total height of 25.8 m with a diameter at breast height (Dbh) of 65.5 cm. Field conditions indicate that Lengsar has a natural hole at a height of 9 m, which can be used as a breeding or perching place for hornbills. The types of trees in the potential Lengsar nest plot are listed in Table 7.

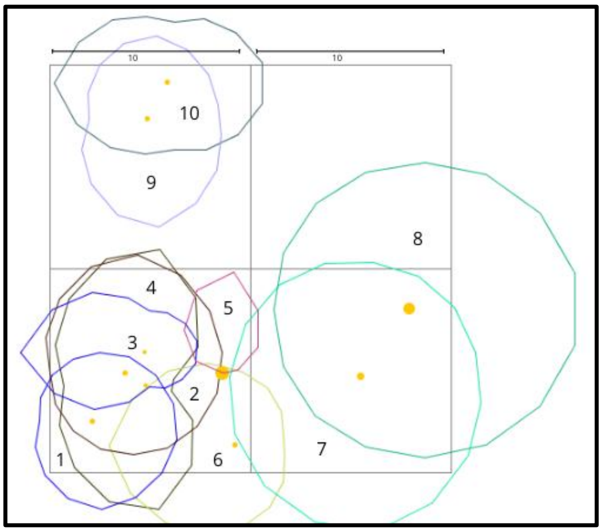
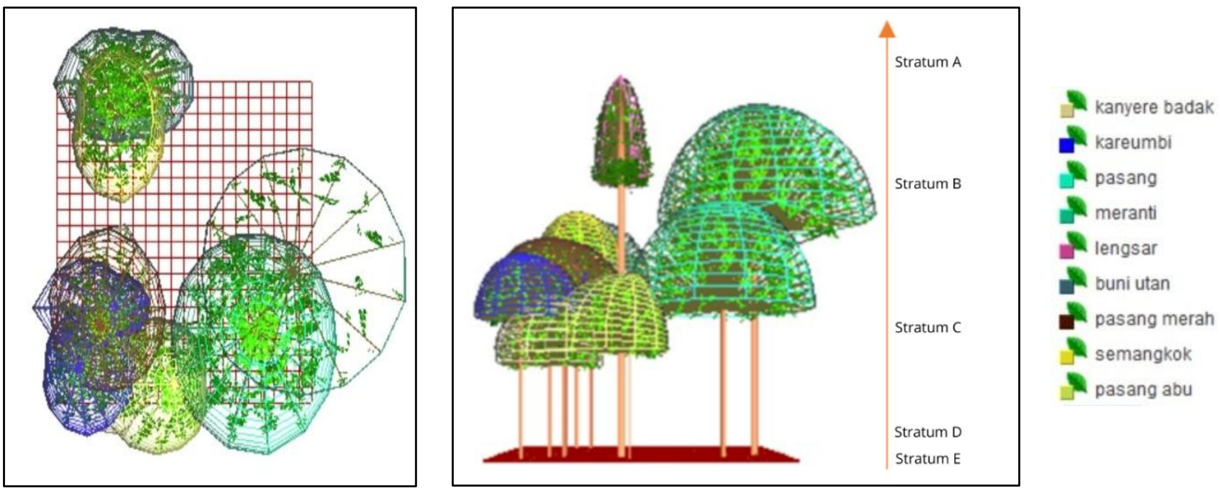


Figure 6. Sketch of the standing profile (potential 2).

Table 7. Identification of tree types in potential Sarang Lengsar plots

Tree Code	Local Name	Scientific Name
1.	Kareumbi	*Homalanthus populifolius*
2.	Pasang Merah	*Quercus sundaicus*
3.	Kareumbi	*Homalanthus populifolius*
4.	Kanyere Badak	*Bridelia glauca*
5.	Lengsar	*Pometia pinnata*
6.	Pasang Abu	*Dipterocarpus korthalsii*
7.	Pasang	*Dipterocarpus blumei*
8.	Meranti	*Dipterocarpus sp.*
9.	Semangkok	*Scaphium macropodum*
10.	Buni Utan	*Antidesma sp.*

Lengsar (*Pometia pinnata*), commonly called matoa, is a plant from the Sapindaceae family, which includes a species of fruit tree. This plant originates from Papua and is believed to have health benefits. This plant, endemic to Southeast Asia, is found throughout Indonesia [19]. Therefore, this plant is identified as a nest tree along with a supporting tree when hornbills do not forage far from their nest location. Lengsar or matoa has benefits in various parts, including leaves, seeds, fruit skin, and bark (although it cannot be consumed directly) [20]. Therefore, matoa is defined as a tree rich in benefits, and [21] states that hornbills eat fruits from several trees rich in protein, such as forest nutmeg, lipids, and walnuts.



A : Top view B : Front view

Figure 7. 3D stand profile of trees at the research location (potential 2).

3.5. Potential nest 3: Pasang Merah (Quercus sundaicus)

Pasang merah (*Quercus sundaicus*) is a tree species identified as a potential nesting tree; in Figure 8, the red pair is marked with code 2. This sign facilitates the identification and visualization of the sketch of the stand profile by type, as shown in Table 8.

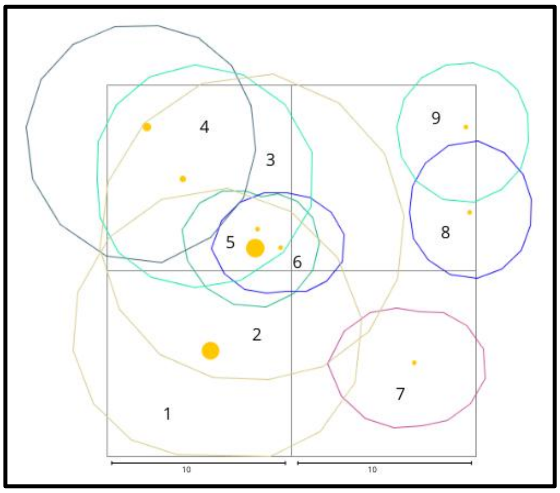
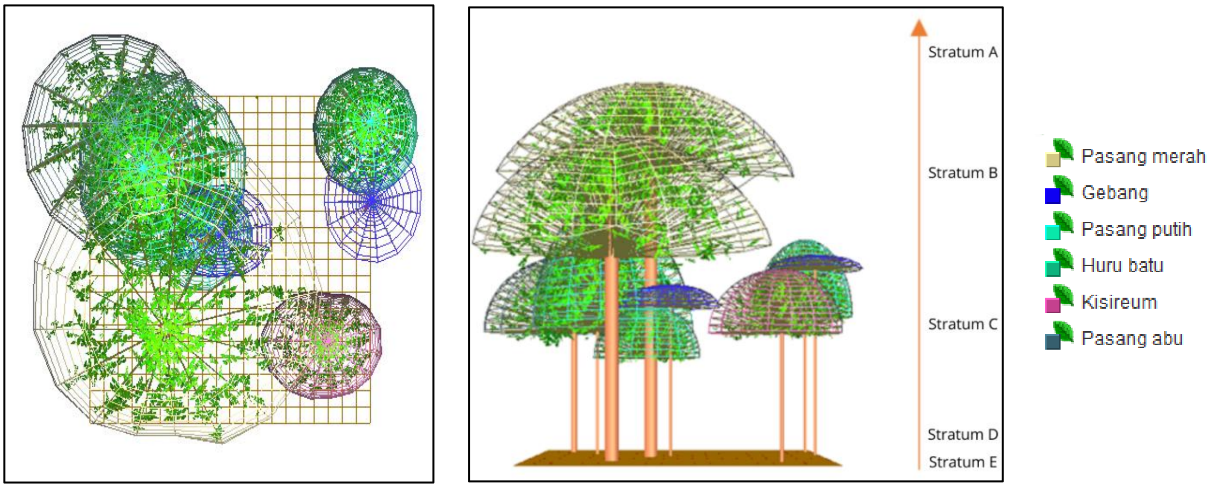


Figure 8. Sketch of the standing profile (potential 3).

Table 8. Identification of tree types in potential Sarang Lengsar plots

Tree Code	Local Name	Scientific Name
1.	Pasang Merah	*Quercus sundaicus*
2.	Pasang Merah	*Quercus sundaicus*
3.	Pasang Putih	*Lithocarpus indicus*
4.	Pasang Abu	*Dipterocarpus korthalsii*
5.	Huru Batu	*Litsea glutinosa*
6.	Gebang	*Corypha utan*
7.	Kisireum	*Syzygium polyanthum*
8.	Gebang	*Corypha utan*
9.	Pasang Putih	*Lithocarpus indicus*

Based on research at the Way Rilau Research Station (SRWR), red tides were found at an altitude of 386 meters above sea level with a slope of -43 degrees. The results also showed that the red tide has a total height of 25.7 m, a diameter of 100 cm, and a nest hole height of 12 m. What makes red tides a potential target, besides their height, is the presence of natural holes in the trees, which can serve as nesting sites for hornbills.



A : Top view B : Front view

Figure 9. 3D stand profile of trees at the research location (potential 3).

3.6. Potential nest 4: Sempur (Dillenia excelsa)

In the sketch in Figure 10, the potential for the sarang sempur tree is marked with code 5, which has a broad crown. Based on research, sempur was found at an altitude of 386 meters above sea level and a slope of -10 degrees. Furthermore, to view the tree species in the potential Sarang Lengsar plot, refer to Table 9 below.

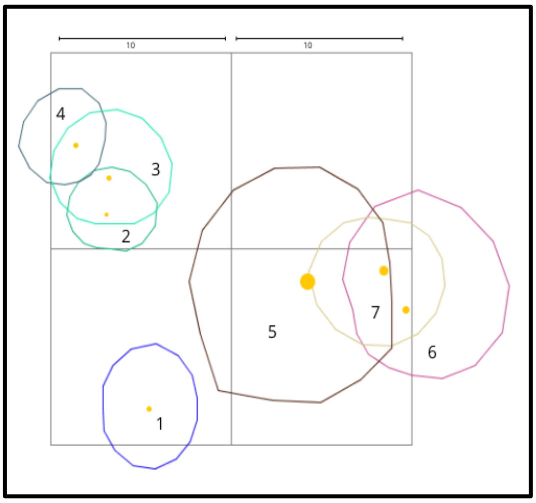
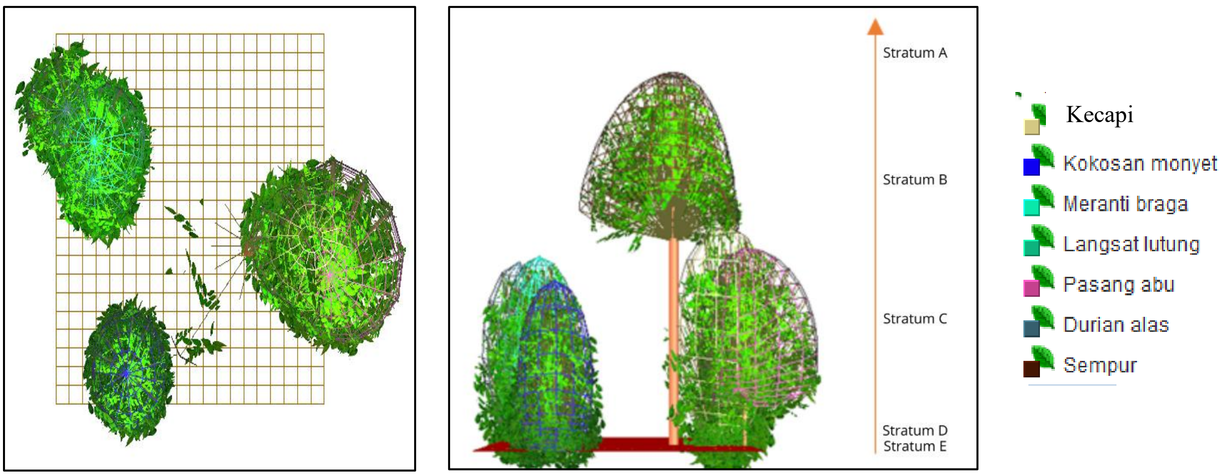


Figure 10. Sketch of the standing profile (potential 4).

Table 9. Identification of tree types in potential Sarang Lengsar plots

Tree Code	Local Name	Scientific Name
1.	Kokosan monyet	*Dysoxylum caulostachyum*
2.	Langsat lutung	*Aglaia lawii*
3.	Meranti braga	*Shorea sp*
4.	Durian alas	*Durio sp.*
5.	Sempur	*Dillenia excelsa*
6.	Pasang abu	*Dipterocarpus korthalsii*
7.	Kecapi	*Sandoricum koetjape*

Sempur (*Dillenia excelsa*) is a plant belonging to the Dilleniaceae family, characterized by dense leaves and a broad canopy. It is widely found in Indonesia, including Java, Kalimantan, and Sumatra [22]. In addition, this family is recorded as having as many as sixty genera with the broadest distribution area [23]. The study's results also showed a total height of the potential nest to be 29 m, with a diameter of 80.5 cm. Natural holes between the tree trunks make the trees potential nesting sites for hornbills. The total height of the nest from the ground is approximately 10.4 m, which can serve as a criterion for hornbill nests to avoid predators during nesting.



A : Top view B : Front view

Figure 11. 3D stand profile of trees at the research location (potential 4).

A stand profile, which provides a three-dimensional view of the horizontal and vertical tree structures, can help analyze stand structures for desired shapes, as shown in the image above, which clearly demonstrates the shape based on previously obtained data. The tree species in the plot are generally the food trees that hornbills require. These results indicate that the study area exhibits diverse stand structures with diverse characteristics across various canopy strata. Nest trees tend to be taller and larger, making them ideal for wildlife, particularly hornbills, which require large spaces and heights for breeding and protection from predators [24].

Furthermore, the presence of large trees with substantial trunk diameters and expansive canopies also indicates that the area is protected and pristine, thereby providing the availability of trees and the characteristics required by hornbills. Holes in the tree trunks are also a key factor in determining nesting potential. According to [25], in their research, hornbills tend to choose nesting sites in living trees with holes. From the results of their research, they identified four potential nests, including those of Madhuca, Canarium, Terminalia, and Heritiera. Meanwhile, in this study, four potential species were identified at the Way Rilau Research Station (SRWR), including Syzygium, Pommetia, Quercus, and Dillenia. In addition, research by [26] and [27] in Asia identified four potential species, including Dipterocarpus, Eugenia, Tetrameles, and Nephelium. The analysis also shows that the number of available tree species can influence hornbill nesting-site preferences, and the presence of these species indicates that the forest at the research location still has the potential to serve as a suitable habitat for hornbills.

4. Conclusion

Tree diversity, including potential and supporting trees for hornbills, was identified based on vegetation analysis. There are 24 species from 14 families, including Araceae, Asteraceae, Dilleniaceae, Dipterocarpaceae, Euphorbiaceae, Fagaceae, Lamiaceae, Lauraceae, Lecythidaceae, Malvaceae, Meliaceae, Myrtaceae, Phyllanthaceae, and Sapindaceae. Based on the results of the Importance Value Index (IVI), the dominant species of the entire plot are the red tide species (40.96%), the ash tide (32.74%), and the gebang (25.03%). Of the 24 tree species identified, 4 are potential nest trees: kepak, lengsar, red tide, and sempur. This was identified based on visible criteria, where parts of the tree have natural holes that are potentially suitable for hornbills to nest. Additionally, the visualization results obtained using SExI-FS Software indicate that nest trees predominate in terms of tree height and canopy area. Conditions that support hornbills around nest trees, such as food trees, are also critical because they enable hornbills to obtain food without having to fly away from the nest location, making this habitat more optimal for their survival.

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