ITTO CITES PHASE — II

Exploration of non-*Gonystylus bancanus* species in Sumatra, Bangka and Kalimantan.

TECHNICAL REPORT

Ministry of Environment and Forestry
Agency for Research, Development and Innovation
Center for Biotechnology and Tree Improvement Research and Development
in cooperation with
International Tropical Timber Organization
(ITTO) - CITES Phase II Project

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Technical Report

Exploration of non-*Gonystylus bancanus* species in Sumatra, Bangka and Kalimantan.

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A technical report for the Activity 3.1. Exploration and *ex situ* conservation of non-*Gonystylus bancanus* species in Sumatra and Kalimantan. Submitted to the International Tropical Timber Organization (ITTO)-CITES project phase-2

Executive Summary

Activity 3.1: Exploration of non-*Gonystylus bancanus* species in Sumatera, Bangka and Kalimantan

1. Activity context, Origin and problem to be addressed

Species of *Gonystylus* have been listed in Redlist of International Union for Conservation of Nature (IUCN), under criteria of vulnerable and extinction species and has been listed in Appendix II CITES. Natural habitat degradation due to various reasons causing the almost extinct of the species, added with the uncertainty of the planting program for the species. Of the 30 species found, nearly 12 species of *Gonystylus* were naturally found in Indonesian archipelagos, such as major island of Sumatera and Kalimantan. Moratorium policy has been declared by Minister of Forestry in 2001, and the harvest of the species was banned. Effort has been carried-out to ensure that the populations of the species and its habitats are sustainably managed and physically secured. However, the information on their current populations status remains limited.

2. Activity Objective

The main objective of the activity is to up-date the current status of *Gonystylus* species growing naturally in Indonesia, especially the previous species recorded in the herbarium specimen, specifically for non-*G. bancanus*. Exploration is aimed to update their population distributions, densities, natral generations, and conservation status including their potential uses. Findings is necessary to draw strategy and action plan in order to ensure the conservation and to safeguard their natural distributions.

3. The most critical differences between planned and realized activity implementation

Exploration activities were carried out based on the recorded information of herbarium specimen. By the field activities, the existence of the non-*G. bancanus* could be proved. Field activities have been carried-out several times to West Sumatera, Jambi, Bengkulu, South Sumatera, Central Bangka, West kalimantan and Central Kalimantan. Wildlings or genetic materials to be collected were mostly hard to find. Changing of the natural habitat into other uses mostly found such as to become coffe plantation, inhabitant, mining industry, palm oil plantation etc. Peatland fires added problems on the field activity progress and collection of

herbarium, leaves samples and wildlings or genetic materials. Forest/ peatland fire caused the delay of the field activities to South Sumatera and Kalimantan. By extending the activity until 31 March 2016 with no additional fundings, the problems have been solved.

4. The situation prevailing after activity completion, as compare to the pre-activity situation including the situation of the target beneficiaries, and indicate the post acticity sustainability.

Non-*G. bancanus* as well as other *Gonystylus* species is expected will be extinct if there is no replanting effort. By the exploration activities to Sumatera, Bangka and Kalimantan, It has been proved that several locations of the natural habitats have been disturbed and changed becoming other plantations or inhabitants. After activity completion, an *ex situ* conservation plot of non-*G. bancanus (G. velutinus)* in Sumberwringin, Bondowoso Regency was established resulted from the previous exploration to Taman Nasional Kerinci Seblat (Kerinci Seblat National Park) in Bengkulu. The plot would be benefit to researchers, educators as well as public as a show window on planting of non-*G.bancanus* (hilly ramin) in Java. Managing the plot will be the CFBTIR responsibility as the location is a research plot.

Other non-*G. bancanus* (*G. brunnescens*) has been collected from West Kalimantan as well to be planted in Sumberwringin, Bondowoso location. At the mean time, the rooted cuttings of the genetic materials have been growing in the greenhouse, under COFFCO plastic chambers.

5. The most relevant outcome of the analysis of the activity implementation

The most relevant outcome of the implementation of exploration activities to Sumatera, Bangka Island and Kalimantan were that the Officials of Forestry and other related Institutions should take actions in order to maintain the remaining populations and make effort to establish *in situ* and *ex situ* conservation of the species by collecting funds from either internal government or overseas. Policy should be declared to improve the inappropriate environment of the *Gonystylus* growing habitats.

6. The lessons learnt

Information on natural distributions of the non-*G.bancanus* species was mostly old. By visiting to the identified locations, information on the habitats, the species existance as well as the wildlings, saplings, poles distributions, abundance etc, and ecosystem balance could be updated. Depending on the available fund, more located to be explored seems to be better. The cooperative network is the best solution to

solve the problems on maintaining the remaining population of non-*G.bancanus* in the wild and develop an *in situ* and *ex situ* conservation plot for the species.

7. Recommendations

To ensure the existence of the species of non-*G. bancanus*, establishment of *in situ* and *ex situ* conservation should be promoted to safeguard the existence either in the wild or outside and to monitor the natural regeneration of the species. Research, monitoring is needed in order to evaluate the population dynamics and their regenerations potency.

PREFACE

Species of *Gonystylus* have been listed in Redlist of International Union for Conservation of Nature (IUCN), under the criteria for vulnerable and extinction species. Almost a half of the species are naturally growing in Indonesian archipelago, epsecially in the two major islands of Sumatra and Kalimantan. Habitat degradation and lost due to various reasons have eroded their genetic resources and even have devastated their population in nature. On the contrary, their conservation efforts remain insignificant. The information regarding their population, distribution and their regeneration potential is extremely limited. Their population and conservation status have not been comprehensively explored, making the policy intervention for their conservation effort have not been possible.

In order to prepare appropriate and effective strategy in enhancing their conservation objective, information on their current status on the existing and remnant population and associated habitats is essential need to be collected. This activity is intended to provide those information through the assessment from herbarium specimen and other records and field survey in selected locations. Their population distribution, conservation, density and regeneration potentials are also recorded in this activity. Results of this study, therefore is expected to be used especially *Gonystylus* conservation in Indonesia.

Director,

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NIP.

ACKNOWLEDGEMENT

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Authors

CONTENTS

I. INTRODUCTION

Background

Gonystylus spp. from family Thymelaeaceae consist of approximately 30 species, depending on their taxonomic interpretation. Based on the earlier records, nearly 12 species of *Gonystylus* naturally found in Indonenesian archipelagos, primarily in major islands of Sumatra and Kalimantan. In the previous records the species of *Gonystylu*s also found in Bangka island. It is also likely that *Gonystylus* also grow naturally in Celebes island and Papua New Guinea. Certain species of *Gonystylus* also naturally found in Peninsular Malaysia, Serawak and Sabah, the Phillippines, Singapore and Brunei Darussalam. Out of 10-12 species found naturally in Indonesia, only one species has been commercially harvested and traded, *Gonystylus bancanus*. This species grows natually in peat swamp forest of Sumatra and Kalimantan.

Most of species within this genus, including *G. bancanus*, have been classified as vulnerable in the IUCN's Red List of Threatened and Vulnerability criteria based on the observed, inferred of projected habitat loss. The severe habitat degradation of loss have been suspected as the major threat to these species (IUCN 2004 and IUCN 2008 as cited in Komar *et a*l 2010). The population of those species has also declined, at least in the last decades, not only due to the over exploitation but also due to other various disturbances, such as forest fire, conversion etc. In 2001, all *Gonystylus* species have also been listed in Appendix III of CITES and up-listed into Appendix II in 2004, effective in 2005. In the same year, the harvest of *Gonystylys* has been temporary banned, under Moratorium policy regulated under the Ministrer of Forestry Decree in 2001. No other restriction on the harvest and the use of those species other than CITES rules and logging moratorium. However, various efforts have been in place to ensure that the population and its associated habitats are sustainably managed and physically secured. However, the information on their current population status (distribution, regeneration and conservation) remains limited, making the effective intervention to conserve and to sustainably manage become ineffective.

Objective

The objective of this activity is intended to up-date the current status of *Gonystylus* species growing naturally in Indonesia, especially those previously recorded in the herbarium specimen, with specific to the non-*Gonystylus bancanus*. The exploration is aimed to update their population distribution, density, natural regeneration and conservation status including their potential uses, if any. Findings from this exploration is necessary to draw strategy and action plan in order to ensure the conservation and safeguard their natural distribution

II. METHODOLOGY

Prior to field survey, all possible data and informationn of *Gonystylus* species were collected. Data and information collection was carried out through literature search and analyses from the earlier record of herbarium specimens related to *Gonystylus*. Herbarium collection of the Forestry Research, Development and Innovation (FORDIA) in Gunung Batu Bogor was the primary source of information. The data from these herbarium specimens are mostly from their natural distribution at the time of herbarium collection of before 1980s (Triono *et al* 2009). We assumed the selected areas for specimen collection represent their natural distribution at the time of collection. Other available information was also searched and used. Additional and relatively rich information were cited from the previous literature search by Triono *et al* 2009) as "Literature review on *Gonystylus* spp. other than *Gonystylus bancanus* : Botany, Ecology and Potency". This literature search was also carried out under previous ITTO-CITES project " Exploratory assessment on non-*Gonystylus bancanus* species" as primary reference. As appear in Table 1 the species previously recorded in the herbarium speciemen will be further assessed under this study and field surveyed for selected location and areas (Figure 1).

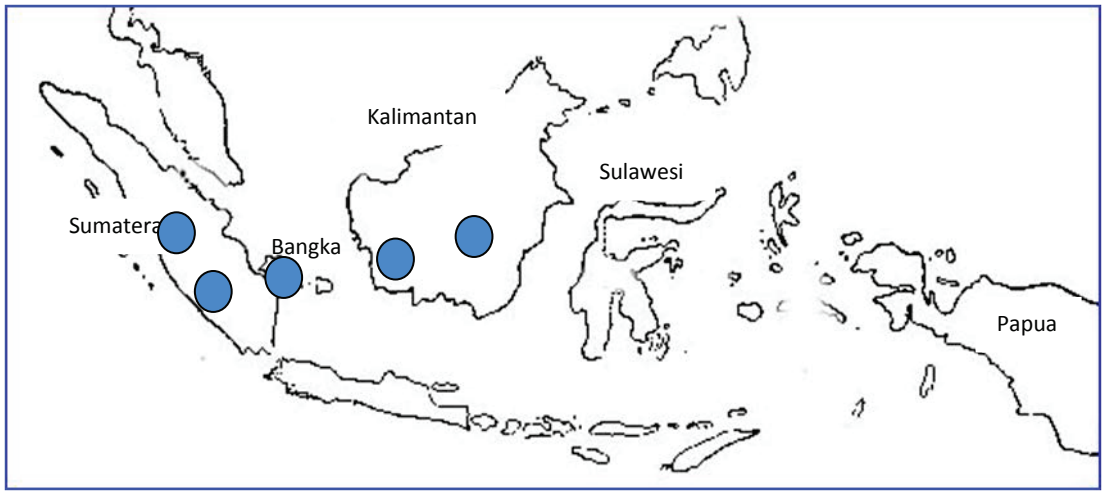

Figure 1. Exploration sites in Sumatra, Bangka and Kalimantan islands

Following the information collected, selection of field sites to be surveyed was made based on the probability of existence of the species in accordance with their current condition in their natural distribution, such as land status and security, disturbed and undisturbed areas and the relatively accessible sites to be visited.

The above information and their associated accessibility characteristics were used to choose sites in five provinces to be field visited. Those provinces are West Sumatra, Bengkulu, Bangka Belitung, West and Central Kalimantan (Figure 1). Specific sites to be field visited and surveyed were also selected in accordance with the existing guidance and information obtained from provincial level institutions, such as

provincial forest services, offices of natural parks, regional office of natural conservation and other local available sources. The field survey for all those locations was cariied out in May through November, 2015.

In the field, vegetation plots were established, after brief field and area orientation were made. Only certain sites with the presence of G*onystylus* species, the survey plots were made. In the plots, where *Gonystylus* species or their species looklike was found, vegetation were recorded in the plot size of 20x20 meter, 50 meter distance between plots. For seedlings, a plot of 1x1 meter was made within the main plot. Fresh herbarium specimens, especially *Gonystylus* species or its looklike based on the guidance for species idetification (Sidiayase *et al* 2010), were also collected and brought to botany lab for further species identification. Necessary environmental conditions, such as temperature, humidity, soil pH, slopes were also recorded.

There are some limitations in this survey, such as the area to be surveyed is vast and guidane for determining the specific area of distribution to be surveyed is limited, data deficiency for *Gonystylus* species and unavailable of skilled staff for species identification. Local cruisers or staffs were employed to do some field guidance to locate the possible species based on their local and traditional knowledge. The assessment of the most of the areas were also restricted by time limitation and accessibilities.

Table 1. Natural distribution of *Gonystylus* spp. in accorance with the existing herbarium specimens

No.	Species	Natural distribution
1.	*Gonystylus acuminatus* Airy Shaw	Malaya, Sumatra, Sarawak
2.	*Gonystylus affinis* Radlk.	Malaya, Sarawak, West Kalimantan
3.	*Gonystylus augescens Ridl.*	Sarawak, West Kalimantan
4.	*Gonystylus bancanus (Miq.) Kurz.*	Malaya, Sumatra, Bangka, Borneo
5.	*Gonystylus borneensis (Tiegh.) Gilg*	Sarawak, Sabah, Central Kalimantan
6.	*Gonystylus brunescens Airy Shaw*	Malaya, Sumatra (Riau), Brunei Darussalam, Sabah,West Kalimantan, East Kalimantan
7.	*Gonystylus confusus Airy Shaw*	Malaya, Sumatra (Aceh), West Kalimantan
8.	*Gonystylus consanguineus Airy Shaw*	Sarawak, Sabah, West Kalimantan,East Kalimantan
9.	*Gonystylus forbesii Gilg*	Sumatra (including Mentawai Islands), Sabah, South Kalimantan
10.	*Gonystylus glaucescens Airy Shaw*	East Kalimantan
11.	*Gonystylus keithii Airy Shaw*	Sarawak, Sabah, Kalimantan
12.	*Gonystylus maingayi Hook. F.*	Malaya, Sumatra, BruneiDarussalam, Sarawak, Sabah
13.	*Gonystylus micranthus Airy Shaw*	Sarawak, South Kalimantan
14.	*Gonystylus spectabilis Airy Shaw*	Sarawak, South Kalimantan
15.	*Gonystylus velutinus Airy Shaw*	Sumatra (including Bangka &Belitung), Borneo
16.	*Gonystylus xylocarpus Airy Shaw*	Sarawak, West Kalimantan

Source : Airy Shaw (1953,1972 & 1973), Sidiyasa (2005) as cited after Triono et al 2010.

III. RESULTS AND DISCUSSION

The overall results of the field survey of the current status of *Gonystylus* species in five provinces are presented in Table 2. As listed in the Table only three species of *Gonystylus* were found in the five provinces. *Gonystylus mainganyi* is found and still exist in West Sumatra and Bengkulu provinces with very limited number of trees. *Gonystylus velutinus* were found in Bengkulu and Bangka Belitung province with also very limited number of stems found. The last species is *G. brunescens* which is found in West and Central Kalimantan with also very limited number of mature trees. The number of individual trees (population size of each species) in each location varies in the survey plots. *Gonystylus mainganyi* and *G. brunesncens* are found in relatively wide areas of distribution compared to other species. In term of size, *G. maingayi* of West Sumatra and *G. brunescens* in Central Kalimantan are relatively larger in tree size which may reflect habitat conditions of the species.

Table 2. Summary of field survey results of Non-*Gonystylus bancanus* species in Sumatra, Bangka and Kalimantan

No.	Locations	Geo-posisition	Slope and soil	Environment	Spesies	No of trees/seedlings
1.	West Sumatra, Agam District, Tanjung Raya Sub district, Koto Malintang Village, around Danau Maninjau	00º 17´ 59.3´´ SL & 100º 07´ 39.6´´ EL; 580 m asl.	Slope: 85%, Soil: Alluvial	Temp: 22 – 31ºC Humidity: 95% Soil pH: 5.3 – 6.4 Top: hilly	*Gonystylus maingayi* **Hook.f.**	- Two trees found in two plots of 20x20 m, 60 cm in diameter, up to 25,6 m tall and 48 cm in diameter, 27,2 m tall. - 3 seedlings with average 1.3 m tall.
2.	Bengkulu, Rejang Lebong District, Padang Ulak Tanding Sub district, Kasie Kasubun Village, Bukit Pucung forest, Kerinci Seblat National Park	03º 22´ 17.03'' SL & 102º 41´ 52.6´´ EL;. 700 m asl.	Slope: 50 -70%; Soil: Red Yellow Podzolic, Alluvial	Temp: 24 - 29º C Humidity: 83% Soil pH:5.5 – 6.2 Top: hilly, wavy and stiff slope	*Gonystylus maingayi* **Hook.f.** (benban hitam) *Gonystylus velutinus* **Airy Shaw** (kayu minyak)	- Three stems in 2 plots of 20 x 20 m, 50 m distant between plot - *G. maingayi* diameter: 30 cm, tall: 23,5 m. - Two *G. velutinus* (kayu minyak), diameter: 26 cm and 49 cm, tall: 23 m and 25 m. - **Note:** *G velutinus* with diameter of 49 cm is fruiting and rich of seedlings 70-90 seedlings under the mother tree
3.	Bangka Belitung,Central Bangka, Sungai Selatan Subdistrict, Pasir Air forest	02° 26' - 02° 31' SL & 106° 04' - 106° 09' EL; 49 m asl.	Slope: 5-30%' Soil: Asosiasi Alluvial & Regusol	Temp: 28 0C Humidity: 73% Top: flat to wavy	*Gonystylus velutinus* **Airy Shaw** (kayu buluh)	- One mature tree, with diameter of 35 cm.
4.	West Kalimantan, Melawi District, Menukung	00º 35´ 52.6´´ SL & 112º 13´ 57.7´´ EL	Slope: 10% - 70%; Soil: Red	Temp: 25 - 31º C Humidity: 87% Soil pH: 5.9 –	*Gonystylus brunnescens* **Airy Shaw** (garu buaya)	- Three locations at kilometer (KM), 35, 54 and 84.

	Subdistrict, Belaban Ella Village	396 m asl.	Yellow Podzolic	6.2. Top: hilly, wavy to stiff		- **At KM 35** : 1 tree with 15.5 cm in diameter and 12 m in tall, two seedlings with 1.5 m and 3 m in tall. - **At KM 54 :** 3 seedlings with 2 cm in diameter, 4 m tall; 6 cm in diamter, 4.5 m tall; 2.7 cm in diameter and 2.7 m tall. - **KM 84**: 12 seedlings with ranges 0.4 to 9 m in tall, and 0.8 cm – 5 cm in diameter
5.	Central Kalimantan, Kotawaringin Timur District, Telaga Antang Sub district, : Tumbang Puan Village	01º 23´ 58.1´´ SL & 112º 27´ 05.1´´ EL 220 m asl.	Slope: 20% – 60%; Soil: Red Yellow Podzolic	Temp: 27 - 36º C Humidity: 85% Soil pH:5.3 – 6.1 Top: hilly, wavy to stiff	*Gonystylus brunnescens* **Airy Shaw** (ramin bukit)	- One mature tree and 2 seedlings in a plot of 20 x 20 m. - Old tree with 135 cm in diameter and 51.6 m tall. - Two seedlings are 120 cm and 145 cm in tall, respectively

The potential natural regeneration of those species surveyed is as follows. In general the potential regeneration is relatively small. Only *G. brunescens* which have relatively higher number of individuals and seedlings as appears in Table 2. Other species show small natural regeneration potentials indicated by the small number of seedlings in each location surveyed. Stand density, species composition, habitat and sites conditions may have influenced the overall natural regeneration of these species as also presented in Table 1.

Habitats and site condition at which those species were found as presented in Table 2. In general, those three species were found mostly in stiff slope and hilly areas with variability of soils. In the areas with less or no vegetation, it is unlikely a *Gonystylus* species was found. The number of stem of these species recorded in the plots is limited. The distribution and population density of these species may be formed through long ecological evolution or as response to habitat disturbance in those areas. This is in contrast to some species for which their potential regeneration is relatively high, except *G. brunescens*. In that table, there is also indication that habitats at which the species were assessed are relatively in good condition. As mentioned earlier, most habitats outside national parks are prone to various distubances, such as conversion of the habitat to other uses. In the case of *G. velutinus* in Bangka, the possible causes of decreasing number of population is the uses of the natural habitat for mining.

The growth of these species is also associated with other tree species, especially where the species found in good forest condition. Natural regeneration of these species found in the plots seems to be sufficient in number to maintain the sustainability or the existence of the species, unless severe habitat disturbance is taking places. Examples of these species are *G. velutinus* in Kerinci Seblat National

Park of Bengkulu and *G. brunnescens* in both West and Central Kalimantan. In this survey and assessment reports representative photographs of the results of field survey are attached in Appendix 1 to Appendix 4.

Figure 2a and b: Forest vegetation at KM 84 of PT. Sari Bumi Kusuma, concession area at West Kalimantan

IV. CONCLUSION

Most of *Gonystylus* species found in earlier records in the herbarium specimen still exist in the location surveyed with variability of population occurance and density in accordance with the habitat condition. Potential natural regeneration of each species also varies indicated by the number of seedlings found under the mother trees. However, due to various disturbances the number of mature trees may decrease as well to the seedlings survival. Information on population history is limited to infer whether the current population will reflect the population in the past. From the assessment results, it can also conclude that by keeping their remaining populations and habitats, these species may naturally regenerate and therefore the existence of these species may be relatively secure for future generation.

V. RECOMMENDATION

In order to ensure the conservation and the existence of *Gonystylus* species in the future, the establishment of *in-situ* and *ex-situ* conservation and at least maintaining good habitat conditions need to be carried out. These will also safeguard the existence and natural regeneration of these species. Regular monitoring is also needed to be conducted in order to see the population dynamics and their potential regeneration.

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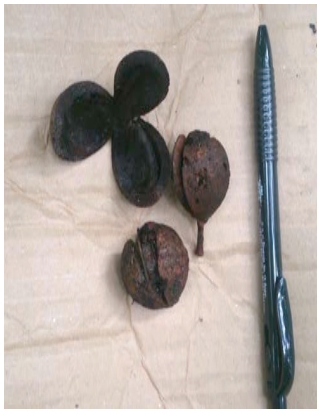
APPENDIXES

Appendix 1.

Gonystylus velutinus Airy Shaw **i**n Bukit Pucung Forest, Kerinci Seblat National Park, Rejang Lebong, Bengkulu.



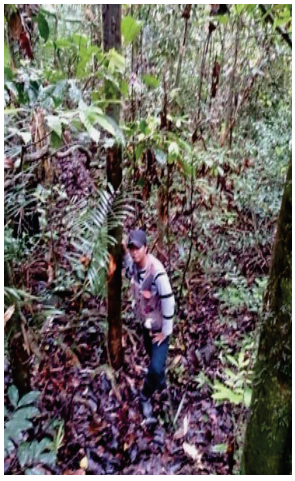

Appendix 2.

Gonystylus maingayi Hook.f. in Bukit Pucung Forest, Kerinci Seblat National Park, Rejang Lebong, Bengkulu.

Appendix 3.

Gonystylus brunnescens Airy Shaw in Belaban Ella Forest, Melawi, West Kalimantan

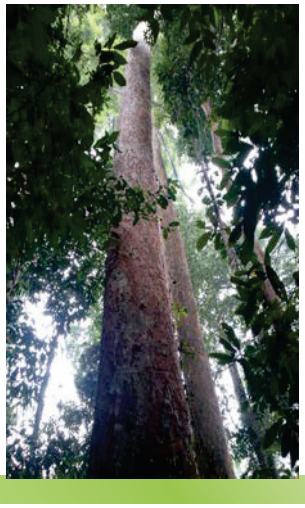
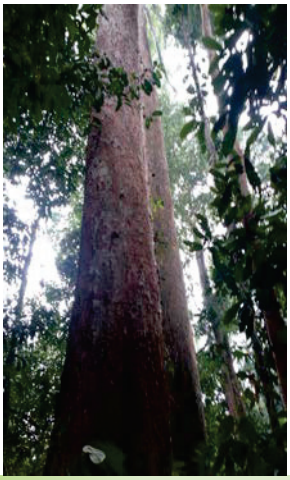





Appendix 4.

Gonystylus brunnescens Airy Shaw in Tumbang Puan Forest, Kotawaringin Timur, Central Kalimantan

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