RATTAN BIODIVERSITY AND CONSERVATION AREAS IN THE LAND OF PAPUA, INDONESIA

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The Land of Papua, Indonesia

CONTENT OF PRESENTATION

- Introduction
- Rattan Biodiversity in the Land of Papua
- Rattan Diversity on the Conservation Areas in the Land of Papua
- Factors Influence the Distribution of Rattan in the Land of Papua
- Conclusion

I. INTRODUCTION

A. Indonesia has famoused as the great rattan producer country in the world, which produces more than 80% of rattan material in the international market, since the year of 1980s.
B. The rattan industries in Indonesia have provided employment for millions of people, and have generated a large amount of foreign exchange for the country.
C. Naturaly, rattan has an important role in traditional life of villagers for many purposes, such as foods, building materials, weapons, to medicines.
D. Indonesia has 560 conservation areas, and also has around 314 species of rattan spreading across almost the entire islands, including the Land of Papua which is located on the island of New Guinea.

I. INTRODUCTION CONTINUED 1

E. The total area of the Island of New Guinea is 890,000 km². The area of the Indonesian part of Papua Island is 421,981 km² and the PNG share is 462,840 km²

F. Papua area is 31 million Ha & PB area is ± 11 million Ha.

G. The physiography of LP is very varied, ranging from lowland forest ecosystems on the mainland and small islands around it, coastal and swamp ecosystems, lowland dry land ecosystems, foothills and mountain slopes ecosystems, lower mountain ecosystems, upper mountain ecosystems, and alpine ecosystems at an altitude of almost 5000 m asl.

I. INTRODUCTION CONTINUED 2

H. Rattan in New Guinea: 2 Genera & c. 65 spp.

Genera *Ceratolobus*, *Daemonorops*, *Pogonotium* and *Retispatha* are placed in synonymy with Calamus (Baker, 2015)

Previously, there were three Genera, but currently only two Genera exist in Papua, *Calamus* and *Korthalsia*

K. How many rattan species are there in the LP?

L. How are they distributed in the LP?

II. RATTAN BIODIVERSITY IN THE LAND OF PAPUA

Rattan Diversity in New Guinea (Calamus = 63 spp., Korthalsia = 2 spp.)

No	Rattan Species	Year of Pub.	Dist.	Ø mm	Elevation M asl.
1	*Calamus altiscandens* Burret.	1939	PNG	L to 16	Lowland c. 100
2	*Calamus anomalus* Burret.	1935	PNG	?	1250 - 1830
3	*Calamus aruensis* Becc.	1886	Aru Isl., NG	L 6 - 30	Lowland to 1200, more frequent < 500
4	*Calamus badius* J.Dransf.&W.J.Baker	2014	P (Southern)	S 14 – 15	< 100
5	*Calamus baiyerensis* W.J. Baker & J. Dransf.	2017	PNG	S 15 - 18	1200
6	*Calamus bankae* W.J.Baker & J.Dransf.	2002	PNG	S c. 9	to 50 on limestone
7	*Calamus barbatus* Zipp. ex Blume	1830	NG	S 5 - 10	Lowland to 500 – 1000, more frequent in lowland
8	*Calamus barfodii* W.J.Baker & J.Dransf.	2014	PNG	S 5,5 - 10	50 - 460
9	*Calamus bulubabi* W.J.Baker & J.Dransf.	2014	PNG, P	S 9 - 14	< 300
10	*Calamus capillous* W.J. Baker & J.Dransf.	2017	PB	S 5 - 6	450
11	*Calamus cheirophyllus* J.Dransf. & W.J.Baker	2014	PNG	S < 6	1100 - 1400
12	*Calamus croftii* J.Dransf. & W.J.Baker	2014	PNG	S 6 - 8	< 150
13	*Calamus cuthbertsonii* Becc.	1888	PNG	S	2500
14	*Calamus dasyacanthus* W.J. Baker, Bayton, J. Dransf, & Maturb.	2003	P, PB	L 20 - 23	30 - 150
15	*Calamus depauperatus* Ridl.	1916	NG	S c. 2	>1000, Montane species
16	*Calamus distentus* Burret	1939	PNG	S 6 – 7	Lowland, c.100
17	*Calamus erythrocarpus* W.J. Baker & J. Dransf.	2017	PNG	S 9 - 13	460
18	*Calamus essigii* W.J. Baker	2002	PNG	Very S 2 – 2.5	671 - 719
19	*Calamus fertilis* Becc.	1908	NG	L 18 - 32	Lowland up to 450
20	Calamus gogolensis Becc. (1908)	1908	PNG	L 20 - 40	Lowland

II. RATTAN BIODIVERSITY IN THE LAND OF PAPUA

21	***Calamus heatubunii* W.J.Baker & J. Dransf.**	**2017**	**PB**	**S 7 - 11**	**45 - 180**
22	*Calamus heteracanthus* Zipp. ex Blume	1830	NG	S 10 - 15	Lowland to < 1000
23	*Calamus interruptus* Becc.	1886	PB	S 9 - 11	Lowland
24	*Calamus jacobsii* W.J. Baker & J. Dransf.	2017	PNG	L <18	500 - 600
25	*Calamus johnsii* W.J. Baker & J. Dransf.	2014	PNG	S 3,5 - 7	< 350
26	*Calamus katikii* W.J. Baker & J. Dransf.	2017	PNG	S 3	1800
27	*Calamus kebariensis* Maturb., J. Dransf. & W.J. Baker	2014	PB	S 1,5 – 3,5	1240 – 1500 Mt. Netoti
28	*Calamus klossii* Ridl.	1916	PNG, P	S ca. 10	762 - 2700
29	*Calamus komsaryi* (Maturb., J.Dransf. & Mogea) W.J.Baker	2015	PB	L 23 - 30	Lowland to Lower montane 600
30	*Calamus kostermansii* W.J. Baker & J. Dransf.	2017	PB & P	S 15 - 18	10
31	***Calamus lauterbachii* Becc.**	**1908**	**NG**	**S 10 - 12**	**Lowland to Lower Montane**
32	*Calamus longipinna* K. Schum. & Lauterb.	1900	PNG, Southern P	S	0 - 800
33	*Calamus lucysmithiae* W.J. Baker & J. Dransf.	2014	PNG	S 4 - 8	< 90
34	*Calamus macrochlamys* Becc.	1908	NG	S 8 - 15	10 -1200
35	*Calamus maturbongsii* W.J. Baker & J. Dransf.	2002	PB Sorong Regency	S 10 - 11	100 - 200
36	*Calamus moszkowskianus* Becc.	1913	PNG	S 1.5 - 3	c.1000, Montane species
37	*Calamus nanduensis* W.J. Baker & J. Dransf.	2014	PNG	L 9 - 20	1100 - 1200
38	*Calamus nannostachys* Burret	1931	SE NG	?	70 - 900
39	*Calamus nudus* W.J. Baker & S. Venter.	2019	P, PNG	S 7 - 9	Lowland
40	Calamus oresbius W.J. Baker & J. Dransf. (2014)	2014	PNG	S 3 - 8	700 - 2200

II. RATTAN BIODIVERSITY IN THE LAND OF PAPUA

41	***Calamus papuanus*** **Becc.**	**1886**	**PB, P**	**S 6 - 8**	**Lowland**
42	*Calamus papyraceus* W.J. Baker & J. Dransf.	2017	PNG	S 6 - 7	600 - 1000
43	*Calamus pholidostachys* J. Dransf. & .J. Baker	2003	PNG	S 9 - 15	Lower montane c.750
44	*Calamus pintaudii* W.J. Baker & J. Dransf.	2017	PNG	L 10 - 20	600 - 1400
45	*Calamus polycladus* Burret	1943	PNG	L 12	1500
46	*Calamus pseudozebrinus* Burret.	1935	PNG	S	
47	*Calamus reticulatus* Burret	1939	PNG	S	< 100, reophytic
48	*Calamus retroflexus* J. Dransf. & W.J. Baker	2014	P, PB	S 6 - 15	< 640
49	*Calamus sashae* J. Dransf.& W.J. Baker	2014	PB	L 15 - 19	< 400
50	*Calamus scabrispathus* Becc.	1923	PNG	?	Montane species
51	*Calamus schlecterianus* Becc.	1913	NG	S c.10	Lowland to 500
52	*Calamus serrulatus* Becc.	1886	PB	L 15 - 20	Lowland to Lower montane
53	*Calamus spanostachys* W.J. Baker & J. Dransf.	2014	P	S 2 - 3	700
54	*Calamus spiculiferus* J. Dransf. & W.J. Baker	2014	P, PNG	S 15	s.1300
55	*Calamus superciliatus* W.J. Baker & J. Dransf.	2017	PB	S 7 - 8	700 - 900

II. RATTAN BIODIVERSITY IN THE LAND OF PAPUA

56	**Calamus vestitus Becc.**	**1886**	**PB, P near boarder of PNG**	**S 5 - 13**	**Lowland**
57	*Calamus vitiensis* Warb. ex Becc.	1908	Fiji, NG	L 7 - 22	60 - 750
58	*Calamus wanggaii* W.J. Baker & J. Dransf.	2002	PB, P	S 7 - 9	Lowland
59	*Calamus warburgii* K. Schum.	1900	NG	L 30	Lowland to 780, more frequent in lowland
60	*Calamus womersleyi* J. Dransf. & W.J. Baker	2014	PNG	S < 6,5	1100 - 1500
61	*Calamus zebrinus* Becc.	1886	PB	S 8 - 18	Lowland to 450, more frequent in lowland
62	*Calamus zieckii* Fern.	2014	PB	S 10 - 15	Lowland
63	*Calamus zollingerii* Becc. Sbsp zollingeri	1908	PB, P	L 25 - 40	Lowland
64	*Korthalsia brassii* Burret.	1939	PNG, P	S	Lowland
65	*Korthalsia zippellii* Bl.	1843	NG	S 11 - 14	Lowland to Lower montane 1200, more frequent in Lowland

65 rattan species found in New Guinea, they are divided into two genera, *Calamus* 63 spp, and *Korthalsia* only two spp. (*K. zippelii* and *K. brassii*)

II. RATTAN BIODIVERSITY IN THE LAND OF PAPUA

	The Land of Papua	Papua New Guinea
Number of Rattan Species	38	46
Endemic Rattan	20	27
Shared Species	18	19

There are 38 (58.5%) species of rattans in the Land of Papua, with 18 (47.4%) species occuring on both side of the region (the Land of Papua & Papua New Guinea). That means 20 (52.6%) rattans species be endemic to the land of Papua Indonesia.

There are 46 (70.8%) species of rattan found in Papua New Guinea (PNG), with 19 (41.3%) species occurring on both sides of the area. This means that 27 (58.7%) rattan species are endemic to PNG.

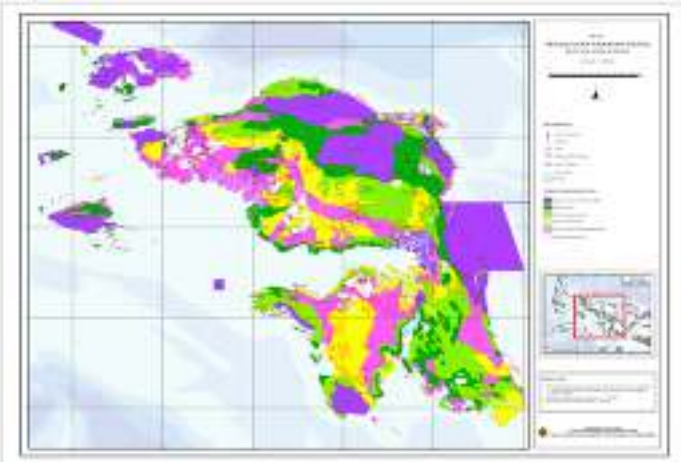
Nine species (13.8%) have cirrus on the tip of leaf, where as remain species with flagellum (85.2%).

III. RATTAN DIVERSITY AND CONSERVATION AREAS IN THE LAND OF PAPUA

Case study in Bird's Head Peninsula of the Land of Papua

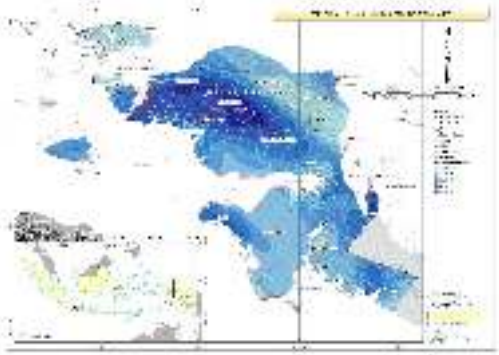
Methods

1. Preparing a checklist of rattan species presence in conservation areas and other forest status (in Excell file)
2. Preparing matrix Environmental variables on each sites (in Excell file)
3. Using Thematic Maps (Soil type, Geology, Rainfall, and Topography)
4. Running the Canoco application to analyze the relationship between the data above

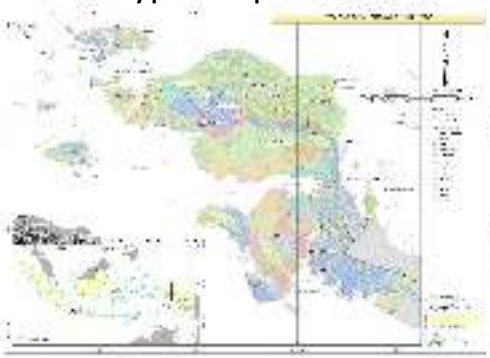


Thematic Maps to gain Data of Environment Variables

Rainfall Map

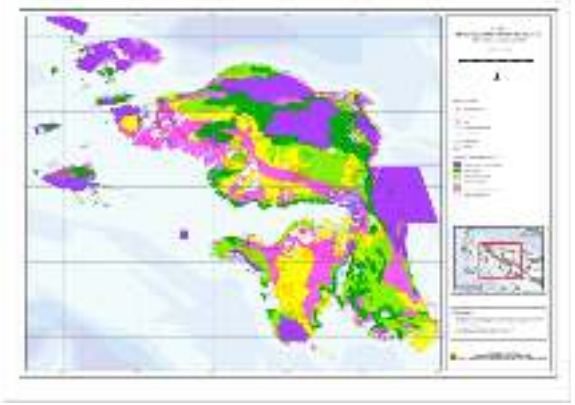


Soil type Map



Topography Map

Geology Map



Conservation Areas Map

III. RATTAN DIVERSITY AND CONSERVATION AREAS IN THE LAND OF PAPUA

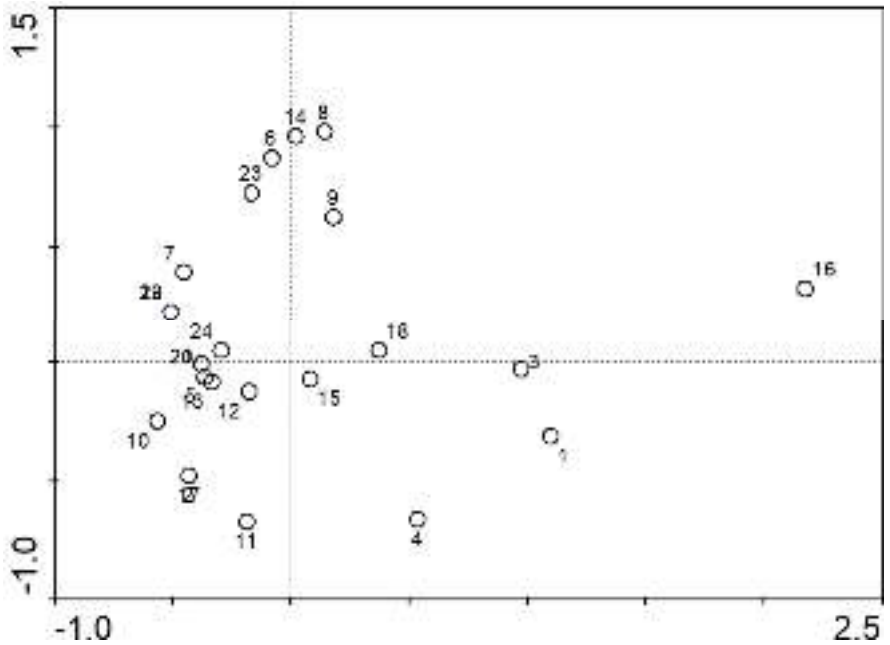
No	Initial Sites	∑ spp	No	Initial Sites	∑ spp
1	CAPA= CA. Peg. Arfak.	**10**	13	HLPUN= HL. Pantai Utara Nuni	**6**
2	HPTsWP= HP terbatas Warmare Prafi	**9**	14	HLTA= HL. Teluk Arguni	**4**
3	CAPTU= CA. Peg. Tamrauw Utara	**8**	15	HLA= HL. Ayamaru	**11**
4	CAPW= CA. Peg. Wondiboy	**5**	16	HLM= HL. Masikery	**3**
5	HPKW=HPK Wondiboy	**5**	17	HPKS= HPK. Sidey	**4**
6	CAWT= CA. Waigeo Timur	**5**	18	HPTsS= HP. Terbatas Saengga Babo	**5**
7	CASU= CA. Salawati Utara	**5**	19	HPTS= HP. Tetap Sebuni Manokwari	**7**
8	CABB= CA. Batanta Barat	**4**	20	HPdT= Hutan Pendidikan Tuwanwouwi	**6**
9	CAMS= CA. Misool Selatan	**6**	21	HPdU= Hutan Pendidikan UNIPA	**3**
10	TWAGM= TWA. Gunung Meja	**4**	22	APLS= APL. Sebuni Manokwari	**5**
11	TWAS= TWA. Sorong	**12**	23	APLK= APL. Kroy Kaimana	**4**
12	TWAK= TWA. Klamono	**11**	24	AKPS= Areal Konservasi Perkebunan Sawit	**12**

III. RATTAN DIVERSITY AND CONSERVATION AREAS IN THE LAND OF PAPUA

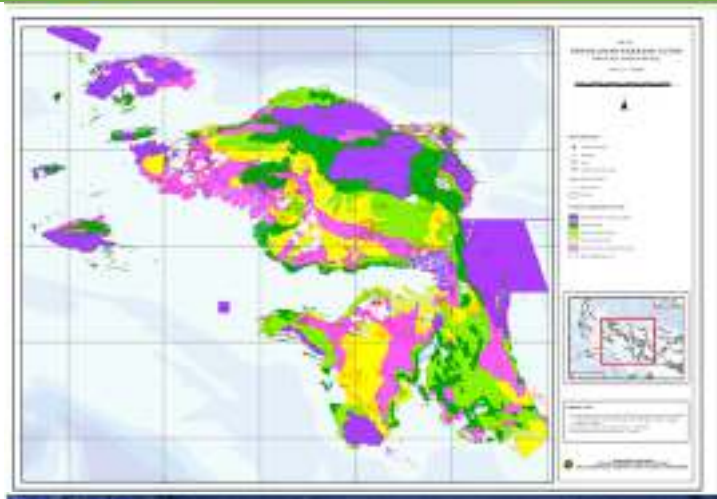
No	Variables	Description	Category
1	Geology	Neogene to quarternary sediment (24-12 million years)	1
		Paleogene to Mid Miocene arch type volcanic (6-12 million years)	2
		Papua Fold Belt (66-5 million years)	3
		Mesozoic to Quarternary sediment (240-1,7 million years)	4
		Mesozoic & Cenozoic Metamorphic Rocks (240-4 million years)	5
		Mesozoic to Middle Miocene Sediment (240-12 million years)	6
		Mesozoic to Quarternary Sediment + Mesozoic to Middle Miocene Sediment	7
		Paleozoic to Middle (435-12 million years) Miocene Sedimentary Limestone	8
		Paleozoic basement (435 million years)	9
2	Topography	0 – 500	1
	(Altitude m asl)	0 – 500 + 500 - 1000	2
		0 – 500 + 500 – 1000 + 1500 – 2000	3
		1000 – + 1500 – 2000 + 2000 – 2500 + 2500-3000	4
		0- 500 + 500 – 1000 + 1000 – 1500 + 1500 – 2000 + 2000 – 2500 + 2500 – 3000 m	5

No	Variables	Description	Category
3	Soil Types	Alluvium	1
		Podzolic Complex	2
		Podzolic Yellowish-Red	3
		Mediteranian	4
		Podzolic Yellowish-Red + Alluvium	5
		Podzolic Complex + Allvium + Rendzina	6
		Alluvium + Latosol	7
		Podzolic Brown + Podzolik Yellowish-Red	8
		Podzolik Complex + Podzolic Yellowish-Red + Alluvium + Rendzina	9
		Podzolic Grey-Brown + Podzolic Complex + Alluvium	10
		Podzolic Complex + Podzolic Yellowish-Red + Alluvium	11
4	Annual Rainfall	1250 – 1750	1
	(mm/yr)	1750 - 2250	2
		2250 – 2750	3
		2750 – 3500	4
		3500 – 4500	5
		4500 – 6500	6

III. RATTAN DIVERSITY AND CONSERVATION AREAS IN THE LAND OF PAPUA



Distribution of Plots (Sites) on Ordination Diagrams



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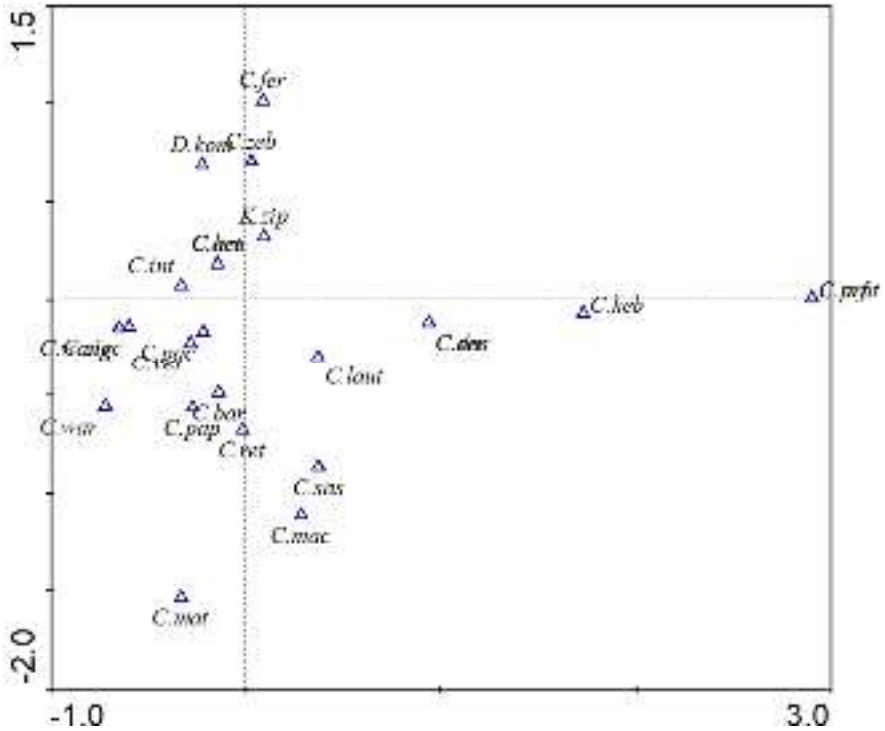
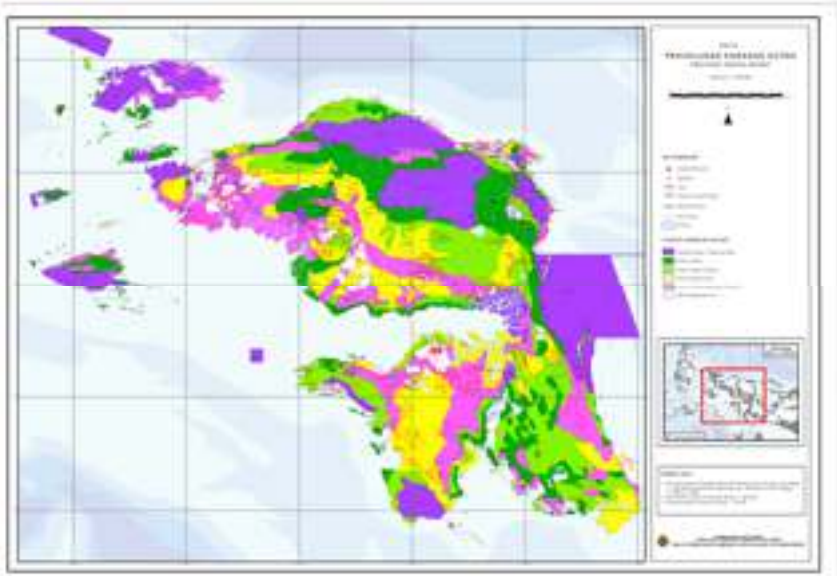
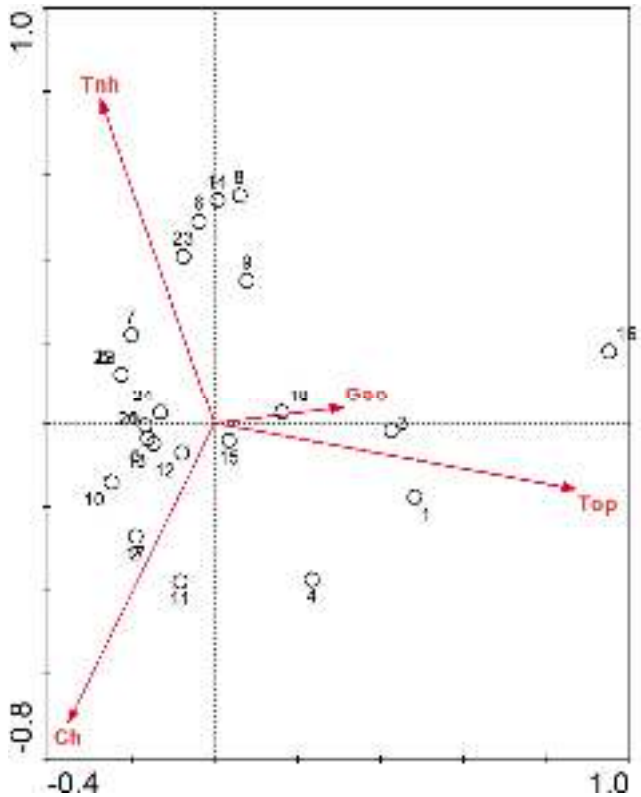


Distribution of Rattan Species on Ordination Diagrams

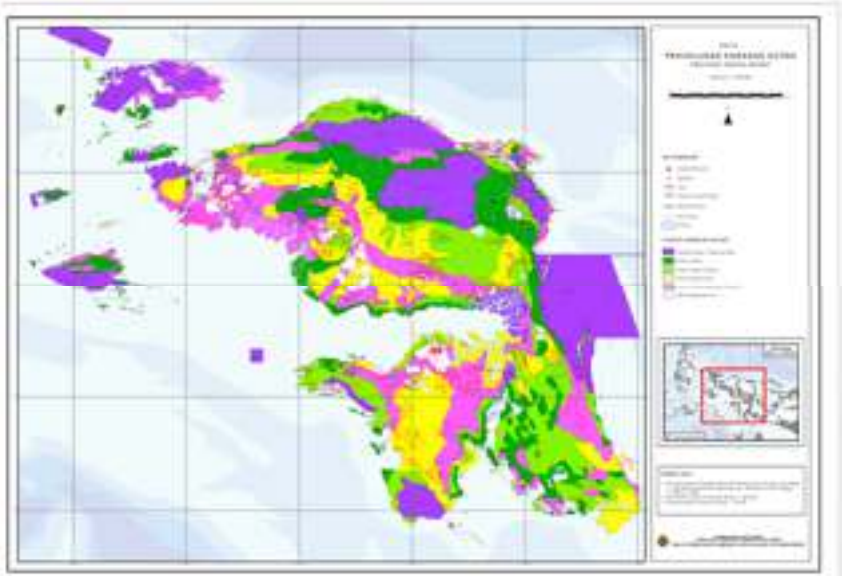


Map of Conservation Ares in Bird's Head Peninsula of Papua

III. RATTAN DIVERSITY AND CONSERVATION AREAS IN THE LAND OF PAPUA



Distribution of Sites x Environment Variables on Ordination Diagrams



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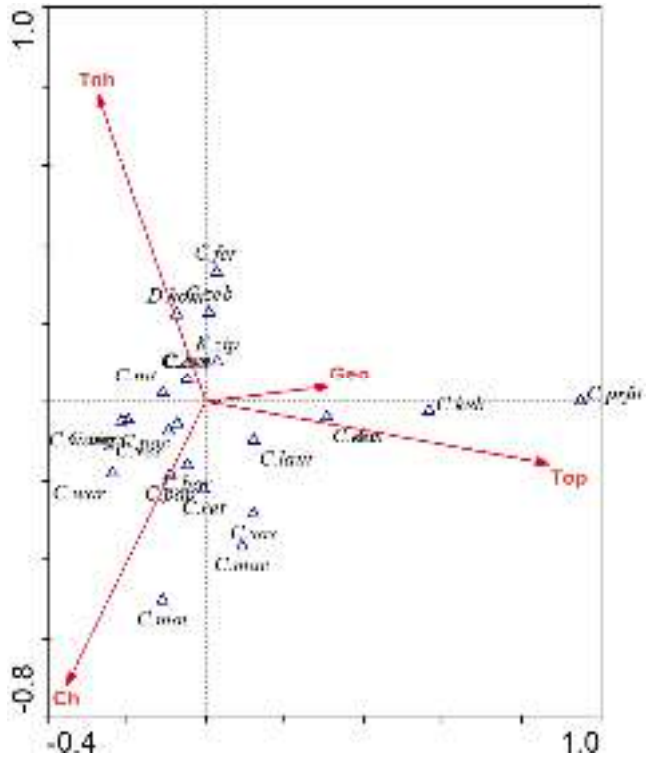
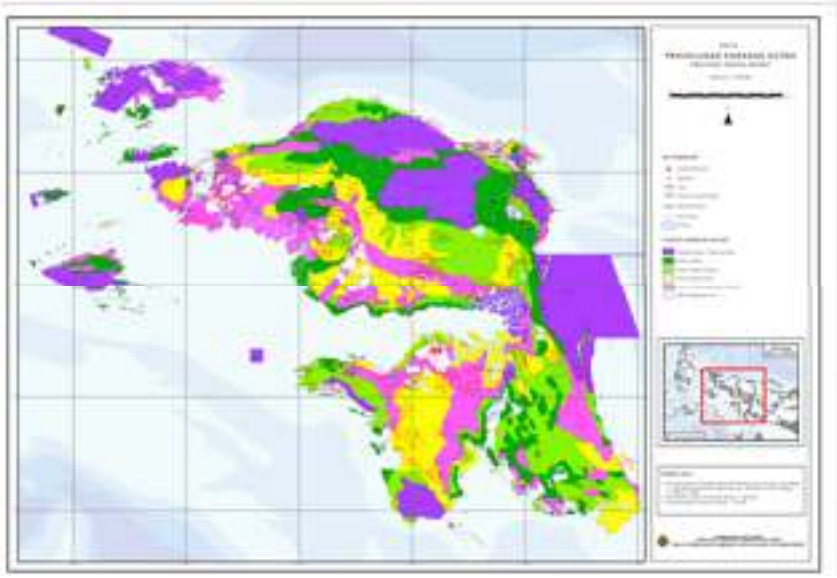


Distribution of Rattan Species x Environment Variables on Ordination Diagrams



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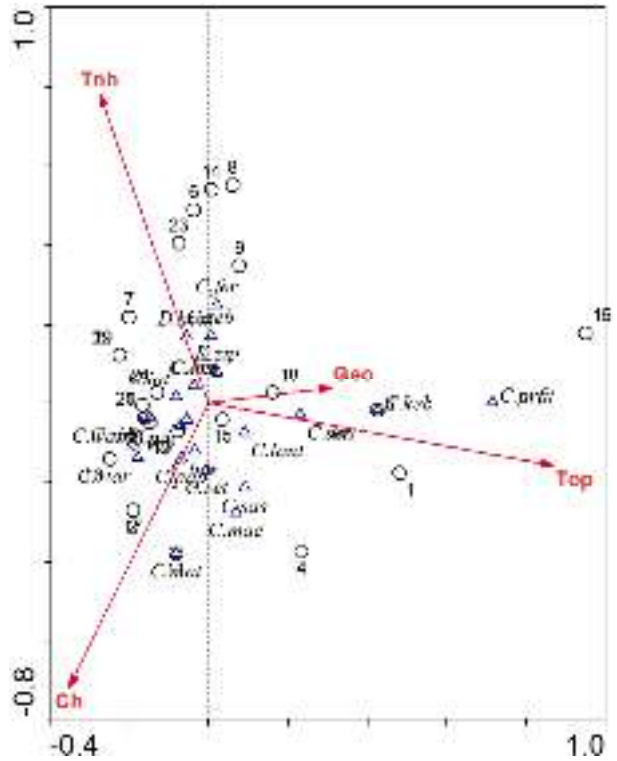
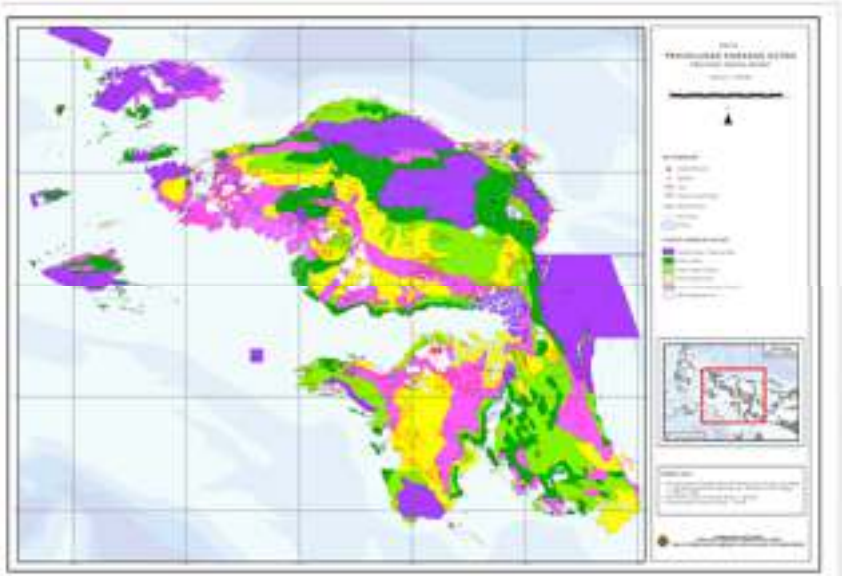


Distribution of Rattan Species, Sites & Environment Variables on Ordination Diagrams



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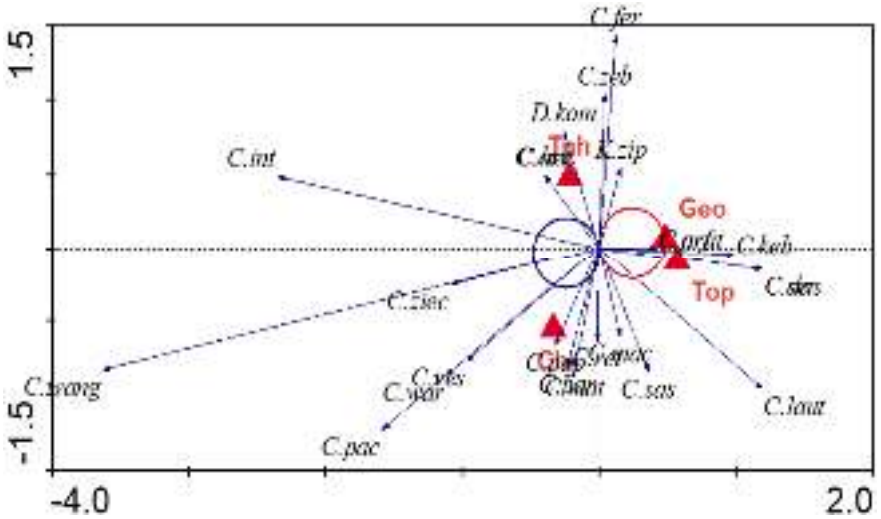
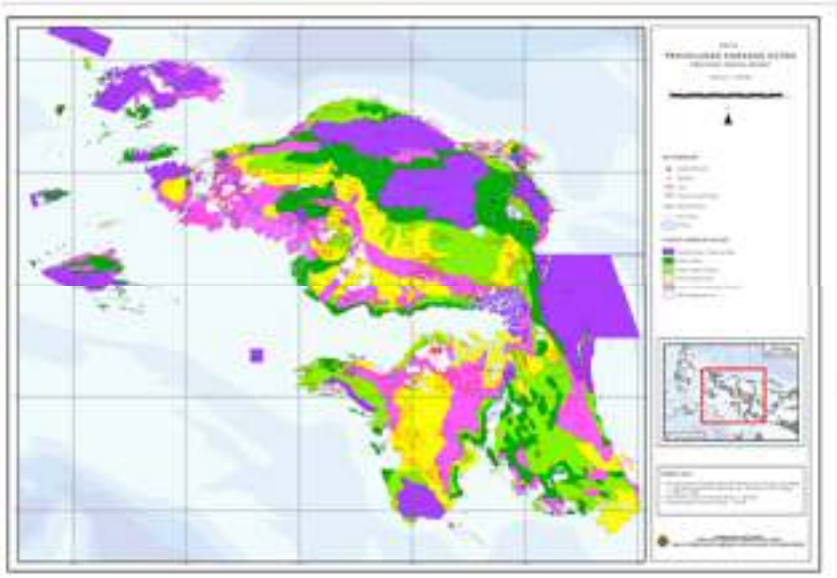


Biplot Diagram t-correlation Value Rattan Species x Environmental Variable of Geological Type



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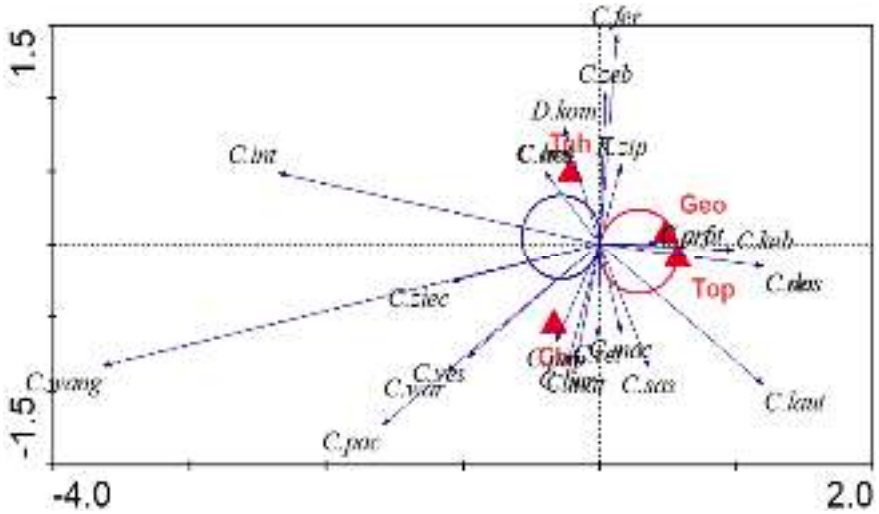
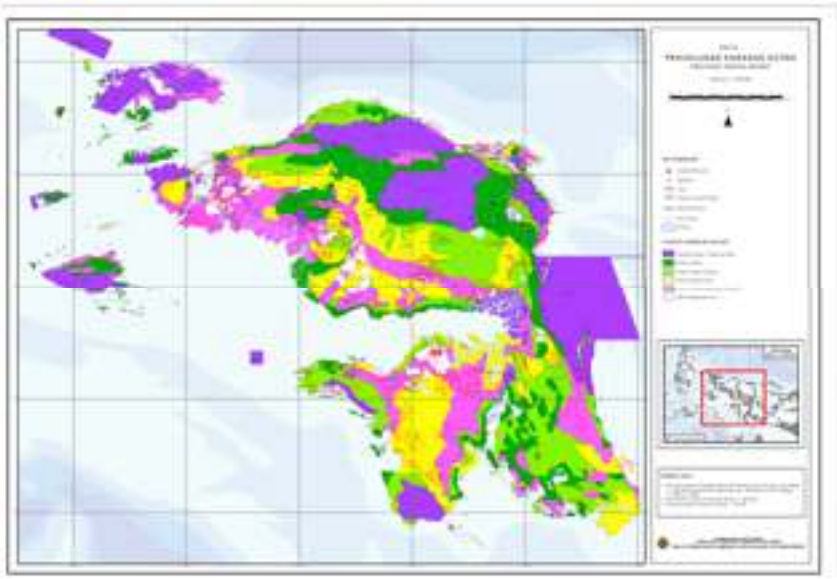


Biplot Diagram t-correlation Value Rattan Species x Environmental Variable of Topography



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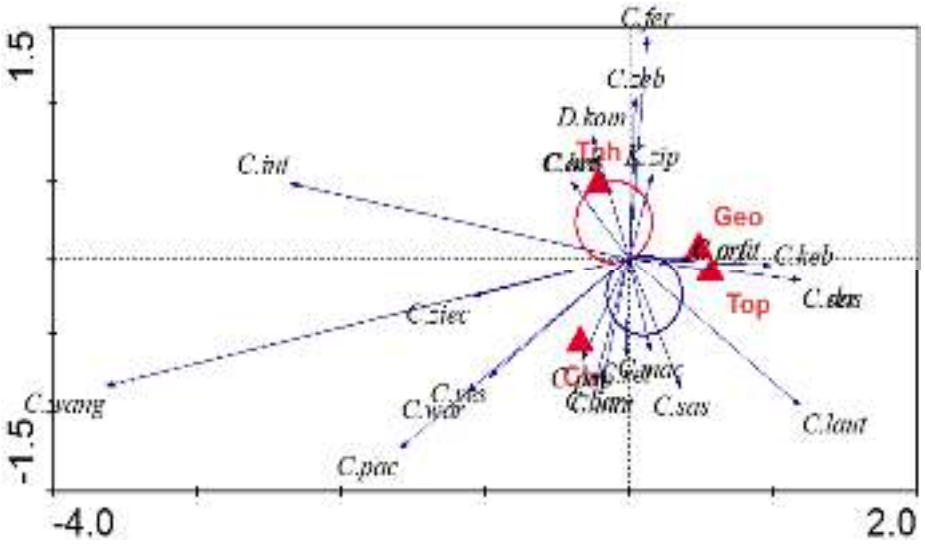
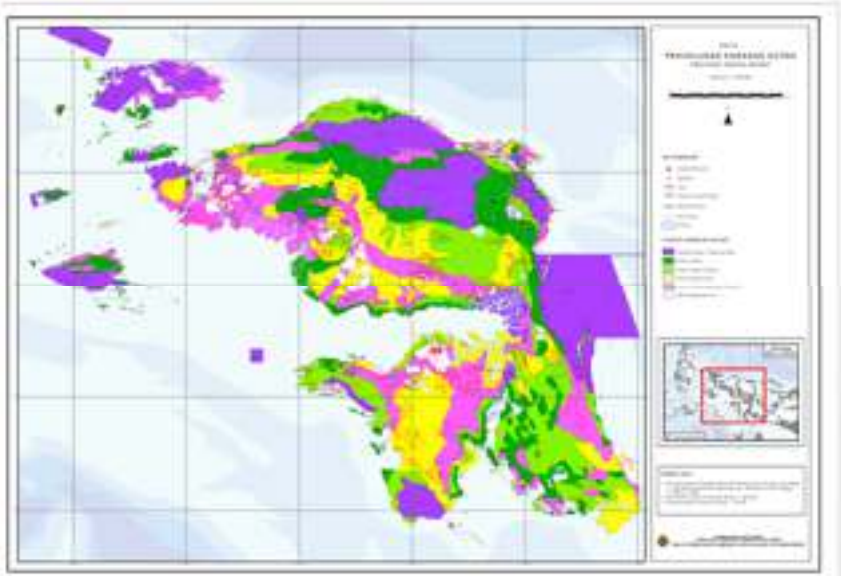


Biplot diagram Value of t-correlation Rattan Species x Environment Variables of Soil Type



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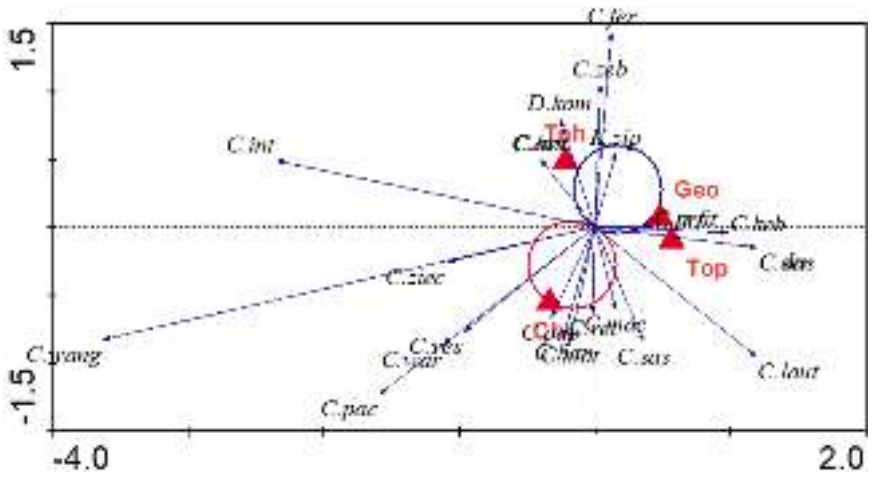
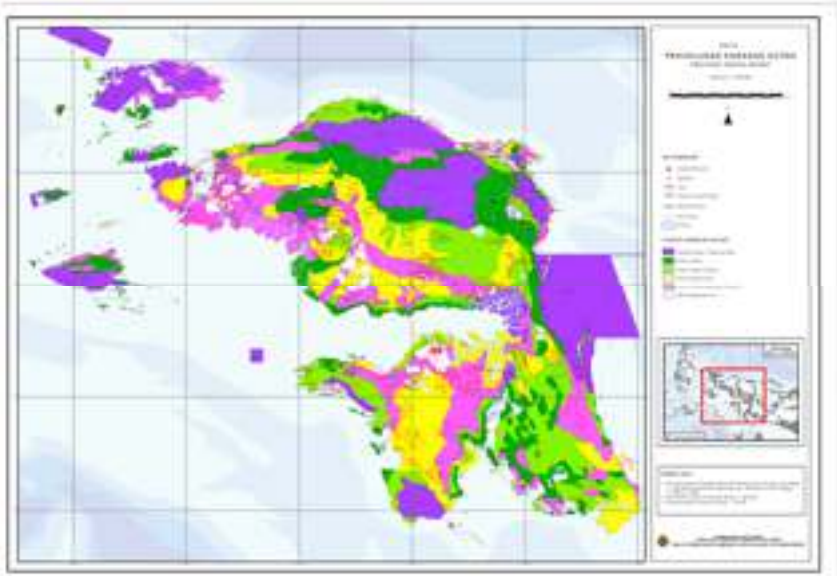


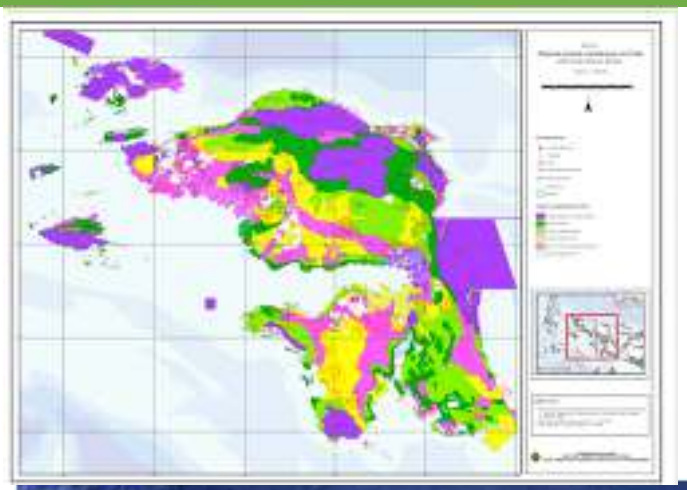
Biplot Diagram t-correlation Value of Rattan Species x Variable Annual Rainfall On Ordination Chart



Map of Conservation Ares in Bird's Head Peninsula of Papua

IV. CONCLUSION

1. There are 65 spp. of rattan occur in New Guinea, where as 38 (58.5%) species of rattans are found in the Land of Papua, with 18 (47.4%) species occuring on both side of the region (the Land of Papua & Papua New Guinea). That means 20 (52.6%) rattans species are endemic to the Land of Papua Indonesia.
2. The number of rattan species in the Land of Papua will increase along with the good progress of taxonomic research on rattan in Papua that has been carried out.
3. Conservation areas in the Land of Papua can protect most species of rattan, but there are some species of rattan that are only found outside conservation forest areas.
4. Rainfall, Soil type, Topography, and Geology are the factors that influence the distribution of rattan in the Land of Papua respectively.
5. The role of protected forest areas and essential ecosystem areas is very important to protect rattan species and other species that are still outside the conservation areas.



THANK YOU VERY MUCH