PRELIMINARY CHECKLIST ON TREE FLORA IN COMMUNITY USE ZONE (CUZ), AT ULU SENAGANG, KENINGAU, SABAH

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Abstract

Community Use Zone (CUZ) is one of the tangible designated concepts that Sabah Parks successfully realised to promote the proactive engagement of local communities in preserving the ecology and ecosystem balances in the parks while striving to sustain their livelihoods. Hence, documentation on the floristic vegetation, particularly the tree flora in Ulu Senagang, is crucial for monitoring CUZ implementation in the Park's region. A field survey was undertaken at Ulu Senagang, Keningau, Sabah to document the tree species composition in the study areas. Temporary plots measuring 10 m x 10 m were randomly established in primary forest, secondary forest, and riparian vegetation. The inventory plots are dominated by the tree species from Dipterocarpaceae, Sterculiaceae, and Moraceae families. A survey has recorded two species of Dipterocarpaceae and one species of Tetramelaceae in the International Union for Conservation of Nature (IUCN) Red List Threatened Species. *Shorea parvifolia* classified as a Vulnerable (VU) while *Parashorea malaanonan* as a Critically Endangered (CR) species. *Octomeles sumatrana* of Tetramelaceae listed as the Least Concern (LC) species. With the preliminary findings reported herein, it is plausible justification for the researchers to do a comprehensive study on the tree flora in Ulu Senagang to assess how well flora diversity in Ulu Senagang can blend and adapt amicably to the CUZ approach.

Keyword: Community Use Zone, tree flora, Ulu Senagang, Sabah Parks, Crocker Range Park

Introduction

Ulu Senagang is located inside the Crocker Range Park (CRP) (5°21'46"N, 116°1'43" E), where the Park has been practicing a unique conservation mechanism since the 2000s, known as Community Use Zone (CUZ). CUZ is derived from the concept of Satoyama, a Japanese term that applied to the environment where people have co-existed with nature over time. CUZ implementation allows traditional human activities under a co-management system by the Sabah Park Authority and the local community in Ulu Senagang (Mojiol et al., 2016). Mojiol et al. (2016) implied that CUZ is a zoning tool of community use areas accepted as the most reasonable short-term strategy to address land use management issues inside the CRP biosphere reserve. The zone balances the existing local communities' necessities and conservation, thus promoting participation and collaboration with park management. Intriguingly, traditional cultivation areas were also under the Zoning Plan. It is compelling to discern local communities in Ulu Senagang to harmonize with the biodiversity inside the

CRP area and how they strive to conserve the forest without infringing on it to sustain their livelihood. The National Commission recognized the CUZ concept on Human Rights of Malaysia, the Government of Sabah, stakeholders, and communities as a good and innovative approach.

On a different note, Lee (2001) identified many plant species, including trees in Sabah, as rare and endangered. Furthermore, the species list is expected to become longer as flora research intensifies. Therefore, it is indispensable to record as much of the plant taxa as possible before they become extinct and subjects to anthropogenic activities, particularly involving Sabah Park areas. Sabah Park areas were predominantly known for being occupied by local communities, and it is essential to monitor their access to the forest, to avoid forest encroachment and degradation. The last few years have witnessed considerable growth in Sabah Park's initiative to enhance forest-related community tourism options to support forest management. Subsequently, Sabah Park has introduced CUZ as a new approach in forest governance, equivalent to community forestry projects by integrating local communities living in the vicinity of the park area to safeguard the natural resources in the forest. Two CUZs in CRP, namely Ulu Papar CUZ established in 2012, and Ulu Senagang and Mongool Baru in 2013, respectively. Previously, Sabah Park also came up with several initiatives, including Indigenous Community Conservation Areas (ICCA). As addressed in Sabah Parks Strategic Planning 2020-2025, the concept of CUZ is aimed to be rigorously expanded and make it a world model for a practical protected area management approach.

The implementation of co-management, CUZ, is similar to the Sabah EU-REDD+ Kinabalu Crocker Eco-Linc concept, empowering the local community through forest management. Studies by Voo et al. (2016) have led to a more profound understanding of the implementation of CUZ would improve the area of forest cover and helps to increase the species diversity. Hence, the main aim of this study is to produce a checklist of tree flora in Ulu Senagang, Keningau, as baseline information on trees in the area. The results from the survey are reported herein.

Materials and Methods

Study Area

A field survey was carried out in Ulu Senagang, Keningau, situated at N 5º 21' 2", E 116º 1' 41" (**Figure 1**). The sampling site is adjacent to Tenom and Keningau districts' boundaries and separated by the Mosolog River. The different sampling sites consist of primary forest, secondary forest, and riparian vegetation, representing the current forest habitat state in Ulu Senagang (**Table 1**).

Table 1 Coordinates of the field inventory locations

Sampling Site	Coordinates
Primary forest	5º 21' 56" N 116º 1' 32" E
Secondary forest	5º 20' 36" N 116º 1' 55" E
Riparian vegetation	5º 21' 2" N 116º 1' 41" E

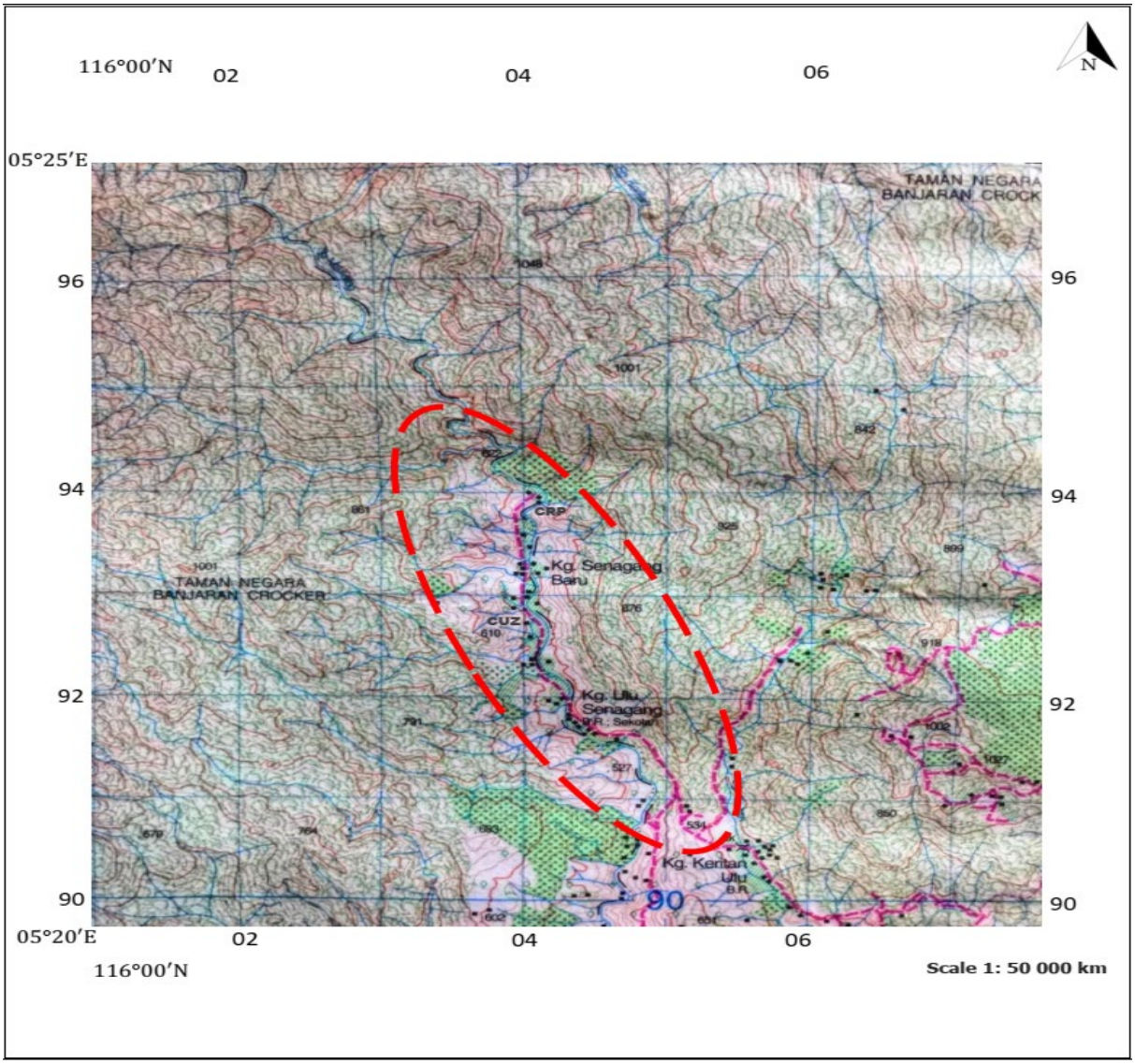

Figure 1 Map of the study area at Crocker Range Substation Ulu Senagang, Keningau

Sampling Design and Tree Identification

Field survey was conducted between 19-21 February 2019 in three days, where first day and subsequent days were allocated for the primary forest, secondary forest and riparian vegetation, respectively. Three plots were randomly established for each vegetation area. Each plot measured 10 m x 10 m and was divided into four subplots measuring 5 m x 5 m. All individual tree species (≥ 10 cm diameter at breast height) were identified and recorded in the field in each plot. The diameter of the trees was measured at breast height by a diameter tape. Meanwhile, the tree species were identified directly to species level in the field using their distinctive field characteristics with the help of a field guide from the Institute of Tropical Biology & Conservation, Universiti Malaysia Sabah. Identification of trees was based on the Tree Flora of Sabah and Sarawak Volume 1–7 (Soepadmo & Wong, 1995; Soepadmo et al., 1996; Soepadmo & Saw, 2000; Soepadmo et al., 2002; Soepadmo et al., 2004; Soepadmo et al., 2007, and Soepadmo et al., 2011), Preferred Check-List Sabah Trees Third Edition (Lee, 2003) and Pocket Check List of Timber Trees Fourth Edition (Kochummen, 1995).

Results and Discussion

Thirty individuals representing 25 species and 16 families were recorded in the Ulu Senagang, Keningau (**Table 2**). The largest tree recorded is *Bischofia javanica* (Tungou/Tuai), with 83.39 cm DBH. The tallest tree is *Octomeles sumatrana* (Binuang), with a height of 30 m, and both are found in riparian vegetation. Interestingly, riparian species are water-loving species as they serve as a natural buffer along the landscape toward waterways. However, only a small fraction of the riparian tree community are damp or water-loving species of Ulu Senagang, Keningau. Furthermore, only one species of true-riparian, *Pometia pinnata,* from Family Sapindaceae is recorded in riparian vegetation. These findings coincide with Azliza et al. (2012), who documented that they discovered only small numbers of true riparian species in the lowland forest.

The uncovering of numerous tree species that remain undisturbed along the riparian vegetation (**Table 2**) has shown that the communities in Ulu Senagang provide strong support towards implementing CUZ. The present study corroborates with the findings from Voo et al. (2016) that the local community of Ulu Senagang has exhibited a 100% understanding of conservation practices and demonstrated their support towards conservation activity in the forest.

The scarcity of timber trees in secondary vegetation is due to the cultivation of Non-Timber Forest Products (NTFPs), including *Hevea brasiliensis*, cocoa, fruit trees such as tarap (*Artocarpus elasticus*), durian, langsat, and rambutan (**Table 3**). According to Mojiol et al. (2016), the rubber trees and cocoa have contributed to the primary cash income for subsistence for the local communities in Ulu Senagang. Secondary forests in Ulu Senagang have grown considerably concerning their potential for wood production, environmental functions, and support for the livelihood of local people.

In this study, one tree species is listed as Vulnerable (VU), namely *Shorea laevis*; one Critically Endangered (CR), namely *Parashorea malaanonan,* and one species Least Concern (LC), *Octomeles sumatrana.* Nevertheless, it is noteworthy that the first dominant family in the primary forest is Dipterocarpaceae with 5 species (31%) (**Table 2**). In terms of number of trees, Moraceae family has more than others family tree (**Figure 2**). The local community should consider their existence in the CUZ area forest for conservation monitoring purposes. Despite *Octomeles sumatrana* being valued as not being a focus of species conservation and may potentially be subject to human threats, further studies regarding this species should be considered, as local communities' livelihood dependency on protected areas remains controversial. Some tree species such as *Dipterocarpus conformis, Shorea parvifolia, Artocarpus odoratissimus, Alstonia angustiloba* were listed as Not Evaluated (NE) due to insufficient information on its risk of extinction in regards to their conservation status. Therefore, a comprehensive study should be instigated on these particular tree species. Meanwhile, tree species such as *Gluta* sp. are categorized as Data Deficient (DD). Unfortunately, trees with unknown species names such as *Lithocarpus* sp., *Aglaia* sp., *Diospyros* sp., *Shorea* sp., and *Microcos* sp., unable to be identified for their IUCN status.

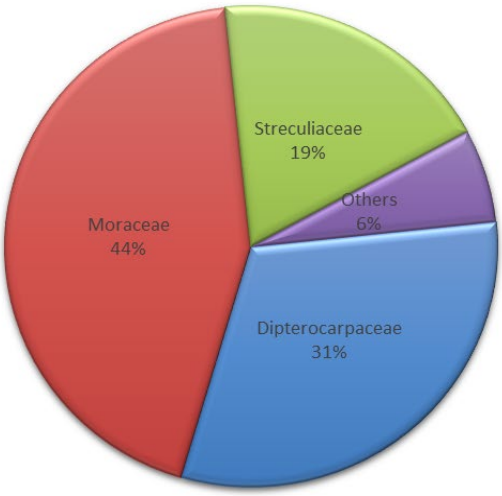

Figure 2 Tree families recorded in Ulu Senagang, Keningau

Table 2 List of trees existing at the respective sites

Family	Species	IUCN Red List 2021
Primary Forest		
Anacardiaceae	*Gluta* sp.	DD
Dipterocarpaceae	*Shorea* sp.	-
	Shorea parvifolia	NE
	Shorea laevis	VU
	Dipterocarpus conformis	NE
	Parashorea malaanonan	CR
Fagaceae	*Lithocarpus* sp.	-
Meliaceae	*Aglaia* sp.	-
Moraceae	*Artocarpus odoratissimus*	NE
Apocynaceae	*Alstonia angustiloba*	NE
Ebenaceae	*Diospyros* sp.	-
Secondary forest		
Moraceae	*Artocarpus elasticus*	NE
Oleaceae	*Chionanthus pluriflorus*	NE
Tiliaceae	*Microcos* sp.	-
Riparian vegetation		
Tetramelaceae	*Octomeles sumatrana*	LC
Euphorbiaceae	*Bridelia penangiana*	NE
Lauraceae	*Litsea* sp.	-
Moracaeae	*Ficus* sp.	NE
Moracaeae	*Artocarpus odoratissimus*	NE
Sapindaceae	*Pometia pinnata*	NE
Sonneratiaceae	*Duabanga moluccana*	NE
Streculiaceae	*Sterculia* sp.	-
Streculiaceae	*Pterocymbium javanicum*	DD
Tiliaceae	*Microcos* sp.	DD

CR – Critically Endangered, VU – Vulnerable, LC – Least Concern, DD – Data Deficient, NE – Not Evaluated

Table 3 List of trees in Ulu Senagang, Keningau

Family	Species	No. of Individuals
Moraceae	*Artocarpus odoratissimus*	2
	Artocarpus elasticus	3
	Ficus sp.	1
	Ficus septica	1
Dipterocarpaceae	*Shorea* sp.	1
	Shorea parvifolia	1
	Shorea laevis	1
	Dipterocarpus conformis	1
	Parashorea malaanonan	1
Streculiaceae	*Pterocymbium javanicum*	2
	Sterculia sp.	1
Euphorbiaceae	*Bridelia penangiana*	1
Bischofiaceae	*Bischofia javanica*	2
Tilicaceae	*Microcos* sp.	1
	Microcos sp. 1	1
Tetramelaceae	*Octomeles sumatrana*	1
Sapindaceae	*Pometia pinnata*	1
Sonneraticeae	*Duabanga moluccana*	1
Lauraceae	*Litsea* sp.	1
Anacardiaceae	*Gluta* sp.	1
Fagaceae	*Lithocarpus* sp.	1
Oleaceae	*Chionanthus pluriflorus*	1
Meliaceae	*Agalia* sp.	1
Apocynaceae	*Alstonia angustiloba*	1
Ebenaceae	*Diospyros* sp.	1
Total = 16 Families	**Total = 25 Species**	**Total = 30 Individuals**

Conclusion

The preliminary checklist of tree flora during the present study can be used as a reference and guideline for future research in the CUZ, Ulu Senagang, Keningau. To know the exact tree floristic vegetation, expansion of plot size and increasing the number of plots is deemed necessary. CRP is an enormous protected area, and large parts of this park have not been surveyed during the present study. Hence, additional explorations in less accessible areas will increase the number of tree species in this park and provide a better understanding of the distribution of species within the park. The large area of lowland forests in CRP is an asset to this protected area as it harbors important species of trees and other plants.

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Conflict of interests

Author declares no conflict of interest.

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