



Faculty of Resource Science and Technology

**Forest Stand Characteristics and Their Correlation with Carbon
Stock in Sarawak Forests**

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**Doctor of Philosophy
2024**

Forest Stand Characteristics and Their Correlation with Carbon Stock in Sarawak Forests

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A thesis submitted

In fulfillment of the requirements for the degree of Doctor of

Philosophy (Ecology)

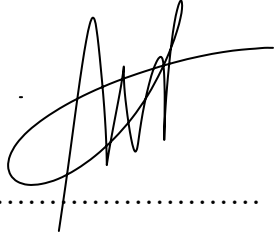
Faculty of Resource Science and Technology

UNIVERSITI MALAYSIA SARAWAK

2024

DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Malaysia Sarawak. Except where due acknowledgements have been made, the work is that of the author alone. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.



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Date : 18/09/2024

ACKNOWLEDGEMENT

Bismillahirrahmanirrahim. Alhamdulillah and my most gratefulness to the All Mighty Allah S.W.T for giving me the strength, physically and mentally, to complete this project. First and foremost, I would like to express my gratitude to my supervisor, Prof. Dr. Ismail Jusoh and my co-supervisor Dr. Mohamad Hasnul Bolhassan, for their constant guidance and supervision, attention and moral support and for always lending me their precious time for some discussions throughout the days this project was conducted. Thank you for being so encouraging. I also would like to thank Dr Jonas Stenbæk from the Danish Technological Institute, Denmark, for being so encouraging and responsible for my funding throughout my study. Without all their help, I may be unable to finish this project on time. I will not forget my supportive fellow friends for their wonderful friendship, assistance through thick and thin, and never-ending guidance. Special thanks to the Danish Technological Institute, Denmark, for providing the funding under the research grant GL/F07/DTI/2019 to carry out this research. Last but not least, I would like to express my sincere gratitude to my beloved (forever) mother, Allahyarhamah Ropidah Shaari (1955-2015), my father, Mr. Nazeri Nesa, and my stepmother Mdm. Shuhaida Mustapa, my siblings, and all my friends for their support, devotion and encouragement. Thank you for everything. I sincerely thank the Centre for Graduate Studies for the advice and support I received at Universiti Malaysia Sarawak. Finally, I would like to thank the Faculty of Resource Science and Technology, Universiti Malaysia Sarawak for making it possible for me to complete my studies here in Sarawak. Thank you all.

ABSTRACT

Borneo's primary rainforest is one of the world's oldest and most extensive forests. Heterogeneity in the environment and biogeography made these forests rich in tree species composition and diversity. It has been recognized that forests have proven to be a significant contributor to recovering the excessive carbon in the atmosphere into ecosystem pools. Forest carbon stock is directly linked to forest biomass. Factors that increase tree biomass such as tree diameter, basal area, wood density, and species composition will subsequently increase carbon storage. This study examined the influence of forest stand structure attributes and species composition on forest carbon stock. Two logged-over forests, namely Bukit Durang and Saremas 1 Div 5 and two primary forests, Lambir Hills National Park and Kubah National Park, were selected for this study. Vegetation analysis and the line transect sampling method were carried out in all study areas. Twenty-five 20 m x 20 m quadrates were established in each study area. All trees above DBH of 10 cm and above were enumerated. Forest stand structures and vegetation indices were determined. Aboveground biomass (AGB) of all enumerated trees was calculated using a non-destructive method and converted to carbon stock. The Pearson correlation analysis was performed to determine the correlation between carbon stock forest stand attributes and species composition. The forest structure among the study areas has no variation regarding tree density, number of families and number of genera. However, they differ in terms of basal area and number of species. The highest basal area was recorded in Lambir Hills National Park, while Saremas 1 Div 5 and Kubah National Park exhibited the greatest number of species. The study areas are dominated by the family Dipterocarpaceae, followed by Euphorbiaceae. Other families that are commonly found in the study areas include Burseraceae, Anacardiaceae, Lauraceae and

Moraceae. The only dominant genus is *Shorea*, and other genera vary between the study areas. The dominant species varies among the study areas. Higher species diversity indices were computed for Bukit Durang and Saremas 1 Div 5. The logged-over forests were found to have a high number of fast-growing species compared to the primary forests. Tree diameter distributions revealed the reverse J-pattern indicative of all the forest areas studied in a state of equilibrium that can regenerate naturally. Dipterocarpaceae and the genus *Shorea* recorded the highest carbon stock among all the families and genera. Pearson correlation analyses revealed positive correlations between carbon stock and tree diameter, suggesting that large trees store large amounts of carbon. A weak correlation was also observed between carbon stock and species composition. However, other factors influencing the forest carbon stock are likely possible. Thus, further studies are recommended to include more variables.

Keywords: Logged-over forests, primary forests, forest structure attributes, species composition, species diversity, carbon stock

Ciri-ciri Dirian Hutan dan Korelasinya dengan Stok Karbon dalam Hutan Sarawak

ABSTRAK

Hutan pamah primer Borneo merupakan salah satu hutan tertua dan terluas di dunia. Heterogeniti dalam persekitaran dan biogeografi menjadikan hutan-hutan ini kaya dengan komposisi dan kepelbagaian spesies pokok. Telah diakui bahawa hutan telah terbukti sebagai penyumbang penting dalam pemulihan lebihan karbon di dalam atmosfera ke takungan ekosistem. Stok karbon hutan berkait secara langsung dengan biojisim hutan. Faktor-faktor yang meningkatkan biojisim pokok seperti diameter pokok, luas pangkal, ketumpatan kayu, dan komposisi spesies akan mengakibatkan peningkatan penyimpanan karbon. Kajian ini mengkaji kesan-kesan atribut struktur dirian hutan dan komposisi spesies terhadap stok karbon hutan. Dua hutan yang telah dibalak, iaitu Bukit Durang dan Saremas 1 Div 5, dan dua hutan primer, Taman Negara Bukit Lambir dan Taman Negara Kubah, dipilih untuk kajian ini. Analisis vegetasi dan kaedah jalur transek garis telah dilaksanakan di semua kawasan kajian. Dua puluh lima kuadrat berukuran 20 m x 20 m didirikan di setiap kawasan kajian. Semua pokok berdiameter 10 cm pada ketinggian dada (DBH) dan ke atas disenarai dan diukur. Struktur dirian hutan dan indeks vegetasi ditentukan. Biojisim atas tanah semua pokok yang diukur dianggarkan menggunakan kaedah tanpa musnah dan ditukarkan kepada stok karbon. Analisis korelasi Pearson dilakukan untuk menentukan korelasi antara stok karbon, atribut struktur dirian hutan dan komposisi spesies. Struktur hutan di antara kawasan kajian tidak menunjukkan variasi dari segi kepadatan pokok, bilangan famili, dan bilangan genus. Walaubagaimanapun, terdapat perbezaan dari segi luas pangkal dan bilangan spesies. Taman Negara Bukit Lambir mencatatkan luas pangkal tertinggi,

sementara Saremas 1 Div 5 dan Taman Negara Kubah menunjukkan bilangan spesies tertinggi. Kawasan kajian didominasi oleh famili Dipterocarpaceae, diikuti oleh Euphorbiaceae. Famili-famili lain yang kerap ditemui di kawasan-kawasan kajian termasuk Burseraceae, Anacardiaceae, Lauraceae, dan Moraceae. Genus yang dominan hanyalah Shorea, dan genus-genus lain berbeza di antara kawasan kajian. Spesies yang dominan berbeza-beza di antara kawasan kajian. Indeks kepelbagaian spesies yang lebih tinggi direkodkan untuk Bukit Durang dan Saremas 1 Div 5. Hutan telah dibalak didapati mempunyai bilangan spesies pokok cepat tumbuh lebih tinggi berbanding dengan hutan primer. Taburan diameter pokok menunjukkan corak J terbalik yang menunjukkan semua kawasan hutan yang dikaji dalam keadaan keseimbangan di mana regenerasi pokok-pokok adalah secara semula jadi. Dipterocarpaceae dan genus Shorea mencatatkan stok karbon tertinggi di antara semua famili dan genus. Analisis korelasi Pearson menunjukkan korelasi positif antara stok karbon dan diameter pokok, menunjukkan bahawa pokok besar menyimpan jumlah karbon yang besar. Korelasi lemah juga diperhatikan antara stok karbon dan komposisi spesies. Walau bagaimanapun, faktor-faktor lain yang mempengaruhi stok karbon hutan mungkin juga wujud. Oleh itu, kajian lanjut adalah disyorkan dengan mengambil kira lebih banyak pembolehubah.

Kata kunci: Hutan yang dibalak, hutan primer, atribut struktur hutan, komposisi spesies, kepelbagaian spesies, stok karbon

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LIST OF ABBREVIATIONS

a.s.l	above sea level
AGB	Aboveground Biomass
ANOVA	Analysis of Variance
CPO	Crude Palm Oil
DBH	Diameter Breast Height
FAO	Food Agriculture Organization
FDS	Forest Department of Sarawak
FIV	Family Importance Value
HCV	High Conservation Value
ICRAF	Council for Research in Agroforestry
IPCC	Intergovernmental Panel on Climate Change
MWC	Matang Wildlife Centre
MDF	Mixed Dipterocarp Forest
MPOB	Malaysian Palm Oil Board
PC	Principal Component
PCC	Pearson Coefficient Correlation
PFE	Permanent Forest Estate
PFZ	Planted Forest Zone
PROSEA	Plant Resources of Southeast Asia
REDD	The Reducing Emissions from Deforestation and Forest Degradation
SFC	Sarawak Forestry Corporation
SIV	Species Importance Value

SPSS	Statistical Software for Social Science
TPA	Totally Protected Area
UNIMAS	Universiti Malaysia Sarawak

CHAPTER 1

INTRODUCTION

1.1 Study Background

Carbon stock is vital in the global carbon cycle and significantly impacts climate change. Carbon stock regulates the earth's climate by removing carbon dioxide from the atmosphere. Photosynthesis sequesters the atmospheric carbon and stores it in natural reservoirs such as forests, oceans and soil. These reservoirs kept the carbon stock for long periods, preventing it from contributing to global warming. Terrestrial forests are a significant factor in recovering the excessive CO₂ in the atmosphere into ecosystem pools (Jeyanny et al., 2014). The entire CO₂ content in the atmosphere passes through the terrestrial vegetation every seven years (Waring & Schlesinger, 1985). During the period, it was recorded that a total of 70% of CO₂ was exchanged through the forest ecosystem.

The sequestered carbon content is deposited in numerous components of the forest, such as litter, aboveground biomass (AGB) and soil (Jeyanny et al., 2014). According to Lal (2018), organic carbon within 1 m of soil globally accumulates around 80% of the earth's terrestrial carbon. This occurrence is rigorously dependent on the stability of ecosystem components to have a balanced integration. Mainly, soil received a large amount of carbon content via plants, demonstrating forest vegetation's vital role in the global carbon cycle. The living tree biomass is responsible for the active carbon sinking long until it is deceased (Waring & Schlesinger, 1985; Nave et al., 2019). Different forest study areas attribute to different carbon stock rates depending on the sequestration rate.

Every study area is unique in terms of geographical and regional area; hence, precipitation, solar radiation, temperature and soil properties vary. The forest structure, tree structure attributes (height, basal area and wood density), plant diversity and tree AGB are the major elements determining the capacity of carbon content to be stored within the living trees (Clark & Clark, 1996; Dossa et al., 2013; Jeyanny et al., 2014). The distribution of carbon stocks varies across different regions of the world, with some regions having higher levels of carbon storage while others have much lower levels. Factors affecting the distribution of carbon stocks include vegetation type, climate and land-use history. Tropical rainforests cover 30% of the Earth's tree-filled areas, covering approximately 45% of the total global forest area, which amounts to 1.827 billion hectares out of the 4.06 billion hectares (FAO, 2001; Abbas et al., 2020). They hold 50% of the global carbon in trees (Global Resource Institute, 2023).

These tropical forests significantly absorb atmospheric CO₂, accounting for 56% of the terrestrial absorption, which amounts to 1.4 billion metric tons of CO₂ annually, equivalent to 1.3 petagrams of carbon (PgC) (Stephens et al., 2007; Lewis et al., 2009; Abbas et al., 2020). Most of the carbon in tropical forests is stored within their vegetation, known as biomass. On the other hand, other types of forests, such as boreal forests, are renowned for harbouring substantial carbon reserves within their soils (Hayes et al., 2022). Intact forests typically contain more significant amounts of carbon stock as the forest possesses massive old trees (Ngo et al., 2013). These intact forests also usually have more diverse plant species. The diversity of tree species composition in natural forests contributes to higher rates of carbon sequestration and stocks stored in tree biomass (Vallet & Perot, 2011; Poorter et al., 2015).

The decline in tree diversity of forests may reduce their sink potential (Watanabe & Ortega, 2011). According to Yeboah et al. (2014), wood density varies among species and thus exhibits various carbon stocks. This indicates that tree species and study area variation are unique to carbon storage potentials. Carbon stocks in tropical forests were affected mainly by the activity of deforestation, as forest degradation and fragmentation led to its decline. The degradation of tropical forests is responsible for significant carbon losses. Specifically, it accounts for 69% of carbon losses in the present period and 27% in the past. The exploitation and disruption of forests often lead to the depletion of significant tree species with high carbon content levels. Removing high stored-carbon trees results in changes to biogenic aerosols, which can further exacerbate the severe consequences of climate change (Spracklen et al., 2008; Petäjä et al., 2021). Among the emissions from forest degradation, approximately half, or 50%, can be attributed to selective logging activities occurring in tropical forests worldwide (Ellis et al., 2019). The activity of selective logging in tropical and subtropical natural forests results in an emission of approximately 0.85 Gt CO₂ (Gt = Gigatonnes) per year. This emission level is equivalent to one-fourth of the average annual CO₂ emissions from the loss of tropical forests since 2001 (Sasaki, 2021).

The decline of tree species with larger range diameter sizes will also increase the risk of catastrophic or range-wide losses to the biodiversity in the forest (Lindenmayer et al., 2012). Forest rehabilitation and conservation efforts may regain the forest's capability to protect the trees and store the carbon content. The Reducing Emissions from Deforestation and Forest Degradation (REDD+) program aims to reduce greenhouse gas emissions from deforestation and forest degradation in developing countries. The high conservation value (HCV) concept is one of the crucial components

of this program. Robust legal and policy frameworks and financial incentives enable successful cooperation in implementing this project. Set-aside logged-over forests with HCV are progressively discovered and established.

The emergence of new standards, such as the HCV program for forest sustainability, has caught the attention of many forest estate consumers. This effort is to protect the respective forest area from any anthropogenic disturbances. The potential status of the logged-over forest after some periods in terms of carbon storage and forest structure in some local regions remains vague, especially the one encircled by an oil palm plantation. Thus, understanding this historically degraded forest is essential for forest management to help recover the carbon content and rebalance the atmospheric CO₂ concentration.

1.2 Problem Statement

Logging has been identified as a significant driver of biodiversity loss and carbon emissions, particularly in tropical forests. Despite recognizing their ecological importance, logged-over forests remain understudied compared to primary forests. The variation in forest tree structure attributes, species importance, composition, and carbon storage between these forest types are poorly understood. Recent studies have suggested differences in community composition and forest structure between unlogged and naturally regenerating logged forests across all tree size classes. Although richness, diversity and biomass may recover to pre-logging levels within 35 years post-logging, community composition remains distinct from nearby unlogged forests (Hayward et al., 2021). This highlights the importance of exploring the association between the tree characteristics, species composition and forest carbon stock.

Previous studies have been carried out on the intercorrelation of tree stand attributions, species importance and carbon storage in disturbed (secondary and logged-overforests) and primary forests (Yeboah et al., 2011; Jeyanny et al., 2014; Wassihun et al., 2019; Van Do et al., 2020; Ma et al., 2023). However, less attention is being given to which tree stand attributions and which group of tree species significantly influence carbon storage. Thus, the relative effects of wood density, basal area and diameter on specific tree species relative to carbon stock are not apparent. This study was conducted to determine the relationship between forest stand structure and tree species composition on carbon stock in some forest areas of Sarawak. Any forest attributes that increase tree biomass will consequently increase tree carbon stock. The information from this study can be valuable as an indicator of the health status and regeneration of disturbed and primary forests.

Hence, this study attempts to answer questions such as which group of tree species affects the amount of carbon stock in two types of forests, namely logged-over and primary forests. Does species with high wood density and tree diameter result in higher carbon stock? Is there a variation of carbon stock with regard to tree species diversity? Is there a correlation between carbon stock and stand attributes and species diversity? The study can provide baseline data and information that can be used to assist forest managers in the decision-making process to achieve best management forest practices.

1.3 Objectives

This study investigated how forest stand structure and tree species composition affect carbon stock in selected forests in Sarawak. The specific objectives are to;

- i. determine the variation of aboveground biomass (AGB) and carbon stock in selected logged-over and primary forests in relation to tree diameter and species composition.
- ii. study the correlation between carbon stock, stand structure attributes and species composition in selected logged-over and primary forests.

1.4 Chapter Summary

This chapter has provided a general introduction to this research on carbon stock, species composition, diversity and importance in logged-over and tropical primary forests. This study focuses on understanding the ecological dynamics of both logged-over and primary forests. Specifically, it aims to determine how carbon stocks vary in relation to stand structure attributes and species composition within these forest types. Additionally, the study seeks to explore the correlations among carbon stocks, stand structure and species composition to provide comprehensive insights into forest ecosystems. The research intends to contribute valuable knowledge towards forest management and conservation strategies by examining these variables.

This study faces several limitations. Focusing on specific locations within Sarawak provides detailed insights into these areas, although it does not encompass the diversity of forest types in Borneo. Concentrating on AGB allows for a thorough understanding of this component, even though it does not include belowground carbon

stock or other ecosystem elements that contribute to overall carbon storage. The use of non-destructive methods for biomass estimation is a positive approach to conservation, even if it may introduce minor inaccuracies compared to direct measurement techniques.

CHAPTER 2

LITERATURE REVIEW

2.1 Forest in Borneo

The tropical forests of Borneo island are of substantial interest these days because the island is one of the world's mega-diversity hotspots (Butler, 2020). Heterogeneity in the environment and biogeography made Bornean forests rich in tree species composition and diversity (Whitmore, 1998; Kueh et al., 2017). This island is home to thousands of plants, including 15,000 different flowering plants and more than 3,000 species of trees. From that, 267 species of trees are dipterocarps and 155 of those are endemic to Borneo (Hardiono & Alfred, 2005). The diverse animal species coexist in the rainforest, with more than 1400 discovered species of amphibians, birds, fish, mammals, reptiles and unknown insects (Butler, 2020).

The terrestrial land area of Borneo is made up of 74.3 million ha (Butler, 2020), comprising four regions that are politically divided into three different countries: Malaysia (Sabah and Sarawak), Brunei and Indonesia (Kalimantan). Kalimantan, Indonesia, covers most of the island with approximately 53.94 million ha. Sarawak has about 12.4 million ha and Sabah is made up of an area of approximately 7.37 million ha. Brunei is the smallest area on the island, with 0.58 million ha of land (Butler, 2020). The rainforest has a complex mix of tree age and species and a broad spectrum of physical and biological characteristics. It possessed the highest biodiversity in the world's terrestrial forest ecosystems in terms of floral richness (Suzuki, 1999).

The island is moist and tropical, with temperatures between 23°C and 32°C (Malaysian Meteorological Department, 2019). This island has two monsoons, which are dry (May to October) and wet monsoons (November to April) in a year. However, it is always described as an ever-wet zone with an average heavy rainfall of more than 60 mm monthly (Hardiono & Alfred, 2005; Malaysian Meteorological Department, 2019). Sarawak recorded a total rainfall between 3200 mm and 4600 mm per year (Malaysian Meteorological Department, 2019). Borneo's natural terrestrial areas are mainly comprised of mangrove, freshwater and peat swamps, lowland and hill dipterocarp and ironwood forests. The lowland dipterocarp forest is the most extensive on the island. The forest possessed diverse plant communities and most of the upper-canopy trees are comprised of dipterocarp trees, with more than two-thirds (Hardiono & Alfred, 2005).

2.2 Forest in Sarawak

Sarawak is covered with 7.72 million ha of forest area, equivalent to 62% of the state's total landmass, consisting of hill mixed dipterocarp forest (7.35 million ha), peat swamp forest (0.33 million ha) and mangrove forest (0.07 million ha) (FDS, 2022). Other significant forest types, such as heath, montane and limestone, coexisted in the region. Most of the forest areas are organized under the Permanent Forest Estate (PFE), namely protected forest, forest reserve and communal forest. The forests are then classified into three categories: permanent forest estate, state land forest and totally protected areas (TPA). The TPA comprises National Parks, Wildlife Sanctuaries and Nature Reserves (FDS, 2022).

At present, Sarawak has gazetted a total of almost 1 million ha of its terrestrial land as a totally protected area, which consists of 46 national parks (0.64 million ha), 15

nature reserves (0.03 million ha) and five wildlife sanctuaries (0.23 million ha) (FDS, 2021). The Sarawak National Parks Programme was established under the jurisdiction of the Federal Department of Wildlife and National Parks of Malaysia and is now entirely governed by the Sarawak Forestry Corporation (SFC) (FDS, 2021). The establishment of forest national parks is important to protect and conserve native flora and fauna as well as to ensure that undisturbed forests remain intact. This is by limiting human settlement and exploitation activities for natural resources.

2.3 Dipterocarp forests

The dipterocarp trees dominate the forest emergent of Malaysia with up to 85% of the forest areas and commonly grow within 1000 meters above sea level (a.s.l) (MacKinnon et al., 1997). The lowland dipterocarp forest is named after the tree family Dipterocarpaceae, which dominates the forest's large group. Tropical rainforests are also rich with diverse tree species, which can be up to 240 different plant species within one ha (MacKinnon et al., 1997). The emergent trees often exceed 45 meters in height and reach up to 60 meters, making this tree family the most valuable timber in Borneo (Hardiono & Alfred, 2005).

In recent years, over 350 Dipterocarp species in the Borneo tropical rainforest have been identified as threatened with extinction (Global Trees Campaign, 2022). Most of them are dipterocarps that are native to Borneo island. The tree species are classified as threatened due to the conservation status and endemism that demand conservation action. Some of the most endangered species recorded include *Dipterocarpus validus*, *Parashorea malaanonan*, *Shorea andulensis*, *S. argentifolia*, *S. balangeran*, *S. polyandra*, *S. richetia*, *S. superba*, *S. symingtonii*, *Vatica cauliflora*, *V. chartacea*, *V.*

globosa, *V. maritima* and *V. pentandra* (Global Trees Campaign, 2022).

In Sarawak, the endangered tree species consist of high-yield timbers and primarily contribute significantly to forest ecosystem function and carbon storage. *Dipterocarpus oblongifolius*, in the family of Dipterocarpaceae, is recorded to be the most endangered tree species in the state and is categorized as a totally protected plant (Sarawak Wildlife Protection Ordinance, 1998; FDS, 2022). Many *Shorea* trees are listed under protected plants in Sarawak, such as *S. macrophylla*, *S. splendida*, *S. hemsleyana*, *S. seminis*, *S. palembanica*, *S. stenoptera*, *S. pinanga* and *S. ochracea*.

The slow-grower non-dipterocarp tree species are also significant to the rainforest tree population. The non-dipterocarp tree species within the Malaysian tropical rainforests, particularly Sarawak, also risk extinction. These tree species receive the same threats as dipterocarp trees in the timber industry. Some of the endangered non-dipterocarp trees species in Sarawak include *Eusideroxylon zwageri*, *Ficus* spp., *Sonneratia* spp., *Avicennia* spp., *Lumnizera littorea*, *Koompassia malaccensis*, *K. excelsa*, *Aquilaria* spp. and *Casuarina equisetifolia* (Sarawak Wildlife Protection Ordinance, 1998; FDS, 2022).

2.4 Forest disturbance

Over the years, human forest exploitation has caused the forest to be fragmented. The tremendous forest destruction is primarily driven by deforestation activities for settlement, timber production and plantation. A high correlation exists between the human population and the loss of forest regions (Pahari & Murai, 1999). The increased accumulation of people in a particular area requires the authorities to transform some forest areas into human settlements. Thus, it caused land transformation activities within

the forest area, including forestry, agriculture, infrastructure and urbanization (Forman, 1995; Abdullah, 2016).

The forest establishment had impacted the area causing the breakage of a continuous natural land cover or habitat into patches (Fahrig, 2003). The patchiness of the fragmented forest typically affects the ecosystem structure and function in tropical forests, causing habitat isolation, loss of biodiversity and decreasing soil fertility (Wade et al., 2003; Abdullah, 2016). Forest fragmentation provides better accessibility, enhancing the potential of forest exploitations, therefore inducing anthropogenic disturbances. The tree populations within the edge of the fragmented forest are also more susceptible to natural disturbances. The edge areas are prone to unfavourable environments such as temperature, humidity, wind and light intensity. The disruption of tree habitats within fragmented forests is significant to the threats to global biological diversity (Mullu et al., 2016; Jana & Jusoh, 2021).

2.5 Forest set-aside in oil palm plantation

The notable increase in Malaysia's oil palm production and the transformation of forests into oil palm plantations is noteworthy. Malaysian palm oil production increased from 13.98 million tonnes of oil production recorded in 2004 to 17.56 million tonnes in 2009, expanding to 11.8% of the annual total global oil production (Abdullah & Wahid, 2010). Currently, the Malaysian Palm Oil Board (MPOB) foresaw crude palm oil (CPO) production to expand by 4.9% to 19 million tonnes in 2022 from 18.12 million tonnes in 2021 (Jaafar, 2022). This anticipation inevitably expands the total oil palm planted area in the nation's terrestrial forests.

The establishment of oil palm plantations in Malaysian Borneo has caused significant forest destruction, accounting for 9% of the average annual expansion rate of oil palm areas (Jaafar et al., 2020). In December 2021, it was recorded that Malaysia's current total oil palm planted area had increased to over 5.7 million ha, with 28% covering the Sarawak land area, equivalent to more than 3.1 million ha (Jaafar, 2022). The enormous development of oil palm plantation areas has directly transformed the geographical landscape of tropical forests in Sarawak since 2006 (McCarthy & Cramb, 2009). These activities impacted the forest area, causing numerous breakages of continuous natural land cover or habitat into patches (Fahrig, 2003).

Forest sustainability standards have emerged and caught the attention of multinational retailers, consumer goods companies, manufacturers and palm oil producers. They had vowed to implement a sustainable forest program, beginning with zero-deforestation and deforestation-free within their plantation management (Jopke & Schoneveld, 2018). Butler (2015) stated that more than 96% of internationally traded palm oil is controlled by companies with an obligation for zero deforestation in their oil palm plantation planning. Therefore, many highly set-aside forests gazetted as high conservation value (HCV) were discovered and established.

2.6 Logging activities in Sarawak forests

Intensive logging in Sarawak started in the early 1970s, resulting in many primary forests and the gazetted national park forests with logging history, with plantations surrounding some of them and some being bound with timber concessions (Gaveau et al., 2014). The historical involvement of large amounts of heavy equipment during past logging activities led to soil compaction and reduced seedling recruitment

and growth within parts of the forest areas (Whitman et al., 1997). Throughout the uncontrolled logging technique, forest areas were often clear-cut regardless of the size and species of the trees, inevitably causing significant destruction of biodiversity comprising animals and plant taxa. This will create harmful damage to the response of species' progressive replacement sequences. The succession genetic sustainability of forest plant species is critical to sustaining forest biomass, species diversity and homeostasis (Brokaw & Busing, 2000; Wiafe, 2014).

The selective logging practices in natural forests are established as an alternative land use strategy that shifted from the clear-cutting practices, preventing over-exploitation of woods for timber sustainability in the forest. Selective timber extraction prevails in tropical forests, meaning that only a few stems (typically 4–10) are cut off from each hectare, giving a diverse residues forest still standing (Putz et al., 2012; Clark et al., 2009; Edward & Laurance, 2013). These modified habitats retain appreciable biodiversity, serving as an effective buffer for forest regeneration (Berry et al., 2010; Putz et al., 2012).

Forests that practice the selected logging regime can sustain similar densities of species as sufficient as unlogged forests in some periods depending on the local area's climatic, geographical and ecological conditions. Slik et al. (2002) stated that some Bornean logged forests are able to regenerate to be as similar as unlogged forests within 5-15 years, Hector et al. (2011) stated 22 years, while Brodie et al. (2015) stated that at least more than 10 years were needed. The results were varied, attributed to different intensities or remnant forest structures between studies (Hayward et al., 2021).

Many studies have suggested that selective logging has less and not directly impacted a forest ecosystem than traditional logging in terms of overall species richness and diversity (Whitman et al., 1997; Kerfahi et al., 2014). The harvesting cycle for commercial trees is every 25-30 years, securing sufficient regeneration for the collective trees in the forest (Bryan et al., 2010). In 2015, the Second Resource Planning and Environment Minister of Sarawak, Datuk Amar Awang Tengah Ali Hassan, stated that all licensed timber harvesters in the state are required to comply with the annual limit production quota as only 7-9 trees per ha are allowed to be felled (Borneo Post Online, 2016). This controlled logging approach aims to achieve a balance between biodiversity conservation and timber production by limiting the number of trees removed. By capping the number of trees harvested, the regulation helps preserve the forest's ecological integrity, ensuring that sufficient trees and habitats support diverse species. Simultaneously, it allows for sustainable timber yield, ensuring that timber resources are available without depleting the forest. Thus, through strict adherence to these quotas, both conservation and production objectives can be achieved, maintaining ecological balance while supporting economic activities. Hence, the effort to balance biodiversity conservation and adequate timber yield collection can be accomplished.

However, this regime might still provide sufficient disturbances for forest regeneration, affecting the forest ecosystem either mildly or severely, depending on the intensity of logging practices (Burivalova et al., 2014). Additionally, improper logging practices (let alone without involvement of illegal logging activity) can cause soil damage, waterways and forest alterations and residual trees (Bryan et al., 2013). It could alter the structure and species composition of the forest by declining the forest-interior specialist and edge tolerance (Hamer et al., 2003; Cleary et al., 2007; Kerfahi et al.,

2014). It could also cause the key species to shift, leading to notable biodiversity reduction, forest community structure and physical structure alteration (Foody & Culter, 2003; Putz et al., 2012). This eventually would adversely impact the tree regeneration process across the logged and haul trail areas.

A study was carried out to determine the effects of selective logging on tree species diversity, stand structure and physical environment in the tropical hill dipterocarp forest of Peninsular Malaysia, similar to the one done by Saiful and Latiff (2014). They compared the before and 6-12 months after the logging activity within the exact location in Kedah, Malaysia. They recorded that selective logging affected all tree diameter class habitat types, causing a reduction in the number of species and diversity. The recovery rate of affected original species due to the damaged logged area was not regained fully or tremendously delayed, contributing to the extinction of rare species.

2.7 Stand structure of logged-over fragmented, logged-over, secondary forests and primary forests in Malaysia

Previous studies on tree composition and diversity of several types of logged-over, secondary and undisturbed dipterocarp forests in Sarawak and Peninsular Malaysia are summarised in Table 2.1. Most Malaysian lowland dipterocarp forests are exceptionally rich in plants and trees. They have a primary abundance of trees in the family of Dipterocarpaceae regardless of any degree of disturbances that happened to the study areas (undisturbed, logged-over or secondary forest). Nevertheless, several forest study areas were recorded to be co-dominated with non-dipterocarps. Lambir Hills National Park in Sarawak and Kuala Keniam, Pahang National Park in Pahang, were

reported to be dominated by Euphorbiaceae trees (Lee et al., 2002; Suratman, 2012). Like in Payeh Maga, Lawas, Sarawak, the Fagaceae family dominated the montane forest, which is typically abundant in high-altitude forest areas (Kueh et al., 2017).

The undisturbed mixed-dipterocarp forests are commonly dominated by slow-growing tree species, such as in Lambir Hills National Park with *Dryobalanops aromatica* and *Dipterocarpus globosus*, Semenggoh Arboretum, Sarawak with *Pouteria malaccensis* and Kuala Keniam, Pahang National Park with *Elateriospermum tapos* (Lee et al., 2002; Ling & Julia, 2012; Suratman, 2012). The disturbed mixed-dipterocarp forests, consisting of some logged-over and secondary forest study areas, were reported to have a high abundance of pioneer tree species, mainly *Macaranga* spp. (Takeshige et al., 2023).

Table 2.1: Tree species composition and diversity in the tropical rainforests of Malaysia

Location	Forest types	Study plot area	Tree composition (Number of tree)	Dominant family	Dominant genus	Dominant species	Species diversity index	Citations
Lambir Hills National Park, Miri, Sarawak	Mixed dipterocarp	52 ha (≥ 1 cm DBH)	Family: 81 Genera: 286 Species: 1173	Euphorbiaceae	<i>Shorea</i>	<i>Dryobalanops aromatica</i> , <i>Dipterocarpus globolus</i>	Fisher's α : 151.0	Lee et al. (2002)
Bintulu, Sarawak	Logged-over mixed dipterocarp	7.67 ha (≥ 10 cm DBH)	Family: 66 Genera: 208 Species: 827	Dipterocarpaceae	<i>Shorea</i>	<i>Macaranga hosei</i> , <i>Shorea collaris</i>	Shannon Weiner (H'): 3.44	Demies et al. (2019)
Payeh Maga, Lawas, Sarawak	Montane forest	1 ha (≥ 10 cm DBH)	Family: 40 Genera: 68 Species: 151	Fagaceae	Castanopsis, Lithocarpus, Quercus	<i>Lithocarpus urceolaris</i>	Shannon Weiner (H'): 1.05 – 3.08	Kueh et al. (2017)
Suai, Sarawak	logged over mixed dipterocarp fragmented forest	1 ha (≥ 5 cm DBH)	Family: 59 Genera: 137 Species: 274	Dipterocarpaceae	*	<i>Elateriospermum tapos</i>	Shannon Weiner (H'): 2.25	Jana & Jusoh (2021)
Mina Wildlife Corridor, Bintulu	Planted forest zone (PFZ)	0.25 ha (≥ 10 cm DBH)	Family: 58 Genera: 171 Species: 618	Dipterocarpaceae	*	<i>Macaranga hypoleuca</i>	*	Vilma et al. (2010)
Semenggoh Arboretum, Sarawak	Lowland mixed-dipterocarp	4 ha (≥ 10 cm DBH)	Family: 60 Genera: 160 Species: 541	Dipterocarpaceae	*	<i>Pouteria malaccensis</i>	*	Ling & Julia (2012)
Kuala Keniam, Pahang National Park, Pahang	Lowland mixed-dipterocarp forest	1 ha (≥ 10 cm DBH)	Family: 44 Genera: 116 Species: 198	Euphorbiaceae	*	<i>Elateriospermum tapos</i>	Shannon Weiner (H'): 3.42 – 3.97	Suratman (2012)
Universiti Teknologi Malaysia Recreational Forest, Skudai, Johor	Secondary forest (Pioneer species)	0.5 ha (≥ 5 cm DBH)	Pioneer species: 256	Euphorbiaceae	*	<i>Macaranga gigantea</i>	*	Isa et al. (2015)

Abbreviation. DBH: diameter at breast height, ha: hectare, *: Not available

The logged-over mixed dipterocarp forests in Bintulu, Sarawak, were reportedly dominated by *Macaranga hosei* (Demies et al., 2019). The planted forest zone in Mina Wildlife Corridor, Bintulu, was dominated by *Macaranga hypoleuca* and the secondary forest of Universiti Teknologi Malaysia Recreational Forest, Skudai, was dominated by *Macaranga gigantea* (Vilma et al., 2010; Isa et al., 2015). There is an exceptional case in certain forest study areas, such as in the logged-over mixed dipterocarp forest of Suai, Sarawak, recorded to be dominated mainly by slow-grower tree species (*Elateriospermum tapos*) (Jana & Jusoh, 2021).

The mixed dipterocarp forest in Lambir Hills National Park, Miri, is widely known for possessing the highest diversity of trees compared to the other rainforests on earth, which recorded to reach up to 151.0 of Fisher's species diversity index (Lee et al., 2002). Recently, Takeuchi et al. (2017) recorded that the rainforest area's Shannon-Weiner (H') values were between the range of 4.1-4.3 within 4 and 8 ha of the study areas. The H' values in primary rainforests typically range from 1.5 to 3.5 but rarely reach 4.5 (Magurran, 2021). The recorded diversity index (H') in the undisturbed dipterocarp forest in Kuala Keniam, Pahang National Park, was within the range of 3.42 to 3.97 (Suratman, 2012).

Likewise, Zani et al. (2013) recorded the high diversity in riparian and lowland dipterocarp forests in Pahang National Park with H' values of 3.38 and 4.84, respectively. The logged-over mixed dipterocarp fragmented forest in Suai, Sarawak, was recorded to have a lower value of H' with 2.25, indicating the study area has a lesser diversity than the typical undisturbed forests (Jana & Jusoh, 2021). In comparison, the log-over forest in Anap Muput, Bintulu, had H' of 3.44 (Demeis et al., 2019). The diversity of (H') of the montane forest was typically in a wide range, as Kueh et al. (2017) stated in their study

in Payeh Maga within the range of 1.050– 3.08.

2.8 Carbon stock

The rainforest has been proven to be a significant contributor to recovering the excessive CO₂ in the atmosphere into ecosystem pools. A large amount of atmospheric CO₂ is sequestered into forest vegetation via photosynthesis. The carbon content is deposited in numerous components of forest, such as in litter, aboveground biomass and soil (Jeyanny et al., 2014). Forest products such as woody biomass mitigate atmospheric CO₂ by sequestering carbon and storing it for a long timescale (Nave et al., 2019). Trees serve as vital agents in capturing and sequestering carbon from the atmosphere. Their perennial nature enables them to act as long-term active carbon sinks until their eventual decease (Waring & Salesinger, 1985).

The carbon content in tropical forests is stored verily within the aboveground (AGB) and belowground biomass, depending on the study area of the sites. AGB constitutes the largest portion of carbon storage in forest ecosystems. Consequently, AGB significantly contributes to the carbon pool of tropical forests (Ngo et al., 2013). Forest carbon stocks are closely tied to forest biomass. The carbon content is undoubtedly linked to the value of AGB in the forest as it is relatively 50% of the AGB in the trees (Brown, 1997; Mattsson et al., 2015). A conversion factor of 0.5 is used to convert biomass (dry weight) to carbon equivalents (C)(ton) (Petersson et al., 2012).

2.9 Aboveground biomass (AGB) and carbon stock estimation in tropical forests

The estimation of forest AGB is crucial in assessing changes in the carbon cycle and climate change and it requires accurate estimation of AGB (Brown & Lugo, 1982; Ketterings et al., 2001; Chave et al., 2005; Yeboah et al., 2014; Li et al., 2020). Several methods have been developed to estimate forest AGB and carbon stock, including field measurements, allometric equations, biomass expansion factors (BEFs), remote sensing and light detection and ranging (LiDAR). Field measurements are one of the most common and accurate methods for determining forest AGB and carbon stock (Attarchi & Gloaguen, 2014). This method involves measuring trees' diameter, height and wood density in a forest. These measurements are used to calculate the biomass and carbon stock of the forest. Usually, this method is used along with allometric equations or biomass expansion factors to estimate their biomass and carbon content. However, this method is time-consuming and labour -intensive, but it provides accurate and reliable data (Attarchi & Gloaguen, 2014).

Allometric equations are mathematical models that relate tree dimensions, such as diameter and height, to biomass and carbon stock (Chave et al., 2014). These equations can be used to estimate the forest AGB and carbon stock based on the size and density of the trees in a forest. Allometric equations are an efficient way to estimate the forest AGB and carbon stock and are cost-effective (Kumar & Sharma, 2015). However, the accuracy of this method depends on the quality of the data used to develop the equations (Daba & Soromessa, 2019). The equations consider different parameters such as tree diameter (D), tree height (H), wood density (ρ) and AGB. The AGB allometric equations developed for tropical forests in several regions with different forest types are listed in Table 2.2.

Table 2.2: List of allometric equations developed for different tropical forest types

Forest types	Region	Expression	References
Primary forest	Kalimantan Indonesia	$\ln(\text{AGB}) = 2.62 \times \ln(\text{D}) - 2.30$	Yamakura et al. (1986)
Primary forest	Kalimantan, Indonesia	$\text{Exp}((2.196 \times \ln(\text{DBH})) - 1.201)$	Basuki et al. (2009)
Mix primary and secondary forests	Pantropical	$\ln(\text{AGB}) = a + b \times \ln(\text{D}) + c \times (\ln(\text{D}))^3 + e \times \ln(\rho)$	Chave et al. (2005)
Secondary forests	Pantropical	$0.0559 \times (\text{wood density} \times \text{DBH}^2 \times \text{Height})$	Chave et al. (2014)
Secondary forest	Sumatra, Indonesia	$\text{Exp}((2.59 \times \ln(\text{DBH})) - 2.75)$	Ketterings et al. (2001)
Logged-over forest	Sarawak, Malaysia	$0.0829 \text{ DBH}^{2.43}$	Kenzo et al. (2010)

The predicted biomass is the tree AGB (kg), D is DBH (cm), H is tree height (m) and WD is stem wood density (g/cm^3), ρ is wood density (g/cm^3).

These equations provide valuable tools for estimating AGB in different types of forests. It is important to note that these equations may have limitations and uncertainties, and their accuracy may vary depending on the local conditions and the data quality used for parameter estimation. Therefore, it is important to use caution when applying these equations and to verify their validity through field measurements and validation studies. The structure of biomass models varies among functional groups as they employ different ecological strategies. The local calibration and validation of allometric equations are important to ensure the accurate estimation of AGB in other forest types and regions. Allometric equations for different ecological groups rely on distinct predictors crucial for accurate prediction.

In Malaysia, the Chave et al. (2005) equation is primarily used because it incorporates the region's forest data (Pasoh, Malaysia, Sumatra and Kalimantan, Indonesia) and provides a relatively simple and accurate way to estimate AGB. Chave et al. (2005) proposed a pantropical allometric equation that estimates the AGB of trees using only tree diameter as a predictor variable. The equation is accurate in a wide range

of forest types and regions and is widely used by researchers and practitioners working in tropical forests. The models were tested in different environments, including secondary and old-growth forests, dry, moist and wet forests, as well as lowland, montane and mangrove forests. The study identified the most important predictors of a tree's AGB in the following order of decreasing significance, including stem diameter, wood specific gravity, total height and forest type (dry, moist, or wet). Their results show overestimates with 0.5-6.5% when errors are averaged across all stands (Chave et al., 2005).

2.10 Carbon stocks in tropical forests

The typical amount of total carbon stocks in tropical forests is within the range of 4 to 384 Mg C ha⁻¹ (Kho & Jepsen, 2015) and contains 40% of global terrestrial carbon (Beer et al., 2010; Pan et al., 2011). The carbon stock in tropical forests varies depending on the ecological condition and elevation of the local areas (Busch & Engelmann, 2015). Depending on the sequestration rate, different study areas attribute to a different carbon stock rate. Every study area is unique in terms of geographical and regional area, precipitation, solar radiation, temperature, and soil properties. The key elements of tropical forest biodiversity pattern include productivity, climatic variation, and edaphic and biotic factors (Dossa et al., 2013).

The forest AGB value is highly associated with the climatic gradient as the AGB is positively correlated to the precipitation rate of the study areas (Becknell et al., 2012; Slik et al., 2013; Sullivan et al., 2020; Rozendaal et al., 2022). For example, In Malaysia, there were notable biomass declines in the Pasoh Forest Reserve and Lambir Hills National Parks due to the strong El Niño and regional droughts (Chave et al.,

2008). The recruitment and emergence of tree species depends on forest succession, which influences the total AGB value in the study area.

Forests with high populations of fast-growing tree species, such as those in most tropical disturbed forests, have higher carbon sequestration rates than those primarily dominated by slow-grower tree species. This is due to the forests having much nitrogen accumulation after forest disturbances (Kenzo et al., 2010) and the domination of pioneer species containing higher photosynthesis pigments (Silvestrini et al., 2007). Nevertheless, the fast-growing tree species typically carry lower wood density (Debell et al., 1994; Tonouéwa et al., 2022) and higher mortality rates (Hietz et al., 2013), which consequently possess low AGB values. The accumulation of wood density is higher within the wetter forest zone (Yeboah et al., 2014).

The trees in mixed dipterocarp forests on red-yellow podzolic soils typically have a taller and greater AGB than in heath forests on white-sand podzol soils (Ashton & Hall, 1992). Proctor et al. (1983) recorded that the mixed dipterocarp forest in Gunung Mulu, Sarawak, on sandstone-derived soil has greater AGB than the limestone forest and the heath forests on acidic podzols soils have the lowest AGB within the locality. Regarding elevation variation, Dossa et al. (2013) recorded in their study in the volcanic tropical forest showed no significant AGB pattern. The AGB and carbon stocks in different types of forests and localities are shown in Table 2.3.

Table 2.3: Variation of AGB and carbon stocks in different types of forest and locality

Forest Locality	Forest type	AGB (Mg ha ⁻¹)	Carbon Stocks (C Mg ha ⁻¹)	References
Pahang National Park	Lowland dipterocarp primary forest	354.58	177.29	Zani et al. (2018)
Pahang National Park	Hill dipterocarp primary forest	493.76	246.88	Zani et al. (2018)
Tangkalup Forest Reserve, Sabah	Primary forest	270.3	135.15	Seo et al. (2014)
Sebulu, East Kalimantan, Indonesia	Primary forest	508.7	254.35	Yamakura et al. (1986)
Lambir Hills National Park, Miri Sarawak	Primary forest	497.2	248.6	Chave et al. (2008)
Pasoh Forest Reserve, Negeri Sembilan	Primary forest	393.8	196.9	Chave et al. (2008)
Lambir National Park, Miri Sarawak	Primary forest	272.4	136.2	Katayama et al. (2016)
Malaysian Borneo	Selectively logged forests	60.0-140.0	30-70	Asner et al. (2018); Ordway & Asner (2020)
Singapore	60-year secondary forest	274.0	137.0	Ngo et al. (2013)
Seramas, Suai, Sarawak	Oil palm plantation fragmented forest	249.0	124.5	Jana & Jusoh (2021)
Sabal, Sarawak	Post 20 years logged-over tropical rainforest	205.0	102.5	Kenzo et al. (2015)
Balai Ringin, Sarawak	Post 20 years logged-over tropical rainforest	242.0	121.0	Kenzo et al. (2015)

The AGB and carbon stock of the lowland dipterocarp forest in Pahang National Park were 354.58 Mg ha⁻¹ and 177.29 C Mg ha⁻¹, while the hill dipterocarp recorded had 493.76 Mg ha⁻¹ and 246.88 C Mg ha⁻¹, respectively (Zani et al., 2018). While in Pasoh Forest Reserve recorded to have 393.8 Mg ha⁻¹ and 196.9 C Mg ha⁻¹ of AGB and carbon content, respectively. The Borneo rainforests are recognised for their higher AGB and carbon stock (Katayama et al., 2016). The AGB and carbon stock study in Tangkalup Forest Reserve in Sabah, Malaysia, estimated to have 270.3 AGB Mg ha⁻¹ and 135. 15 C Mg ha⁻¹ within the forest area (Seo et al., 2014).

In Bornean primary forests, the AGB of forest areas in Sebulu, East Kalimantan, Indonesia, reached up to 508.7 Mg ha⁻¹ with a carbon stock value of 254.35 C Mg ha⁻¹ (Yamakura et al., 1986). The AGB and carbon stock in Lambir Hill National Parks, Miri, recorded to have 497.2 Mg ha⁻¹ and 248.6 C Mg ha⁻¹, respectively (Chave et al., 2008). The subsequent finding in Lambir National Park recorded 272.4 Mg ha⁻¹ and 136.2 C Mg ha⁻¹ of AGB and carbon content, respectively (Katayama et al., 2016).

According to Asner et al. (2018) and Ordway and Asner (2020), LiDAR surveys of aboveground carbon (AGC) in Malaysian Borneo documented that the selectively logged forests contain 60-140 C Mg ha⁻¹. The recruitment and growth rates of trees in logged-over forests are generally higher than in primary stands (Kuusipalo et al., 1996; Nakagawa et al., 2013; Yamada et al., 2013) set off the forest area to possess a relatively larger rate of carbon intake (Ziegler et al., 2012). Approximately 47–97% of the aboveground live carbon is retained by logged-over forests (Putz et al., 2012).

A 60-year secondary forest in the tropical forest of Singapore recorded 274 Mg ha⁻¹ and 137 C Mg ha⁻¹ of AGB and carbon stock, respectively (Ngo et al., 2013). The forest fringe of an oil palm plantation fragmented forest in Suai, Sarawak, was recorded to have 260 Mg ha⁻¹ and 130 C Mg ha⁻¹ of AGB and carbon stock (Jana & Jusoh, 2021). The study of set-aside forests in certified sustainable oil palm plantations by Fleiss et al. (2020) discovered that the carbon stock values on some of their plot studies were similar to those intypical primary forests. Due to selective logging activities, the AGB in degraded forests is typically lower than in old-growth forests (Berenguer et al., 2014; Rutishauser et al., 2015; Longo et al., 2016). The undisturbed primary forest tends to contain larger amounts of AGB since the forest localities possess larger trees with greater diameters (Ngo et al., 2013).

The old-growth forest generally has more AGB than in > 20 years old secondary logged forests (Rozendaal et al., 2022). Some localities require longer to retain the AGB in the logged-over forest, which is correlated to the site conditions. For example, in post-20 years logged-over tropical rainforests in Sabal and Balai Ringin, Sarawak, the AGB was observed to have less than half the value recorded in undisturbed forests in Borneo. Specifically, AGB levels were 205 Mg ha⁻¹ and 102.5 C Mg ha⁻¹ in Sabal rainforest and 242 Mg ha⁻¹ and 121 C Mg ha⁻¹ in Balai Ringin rainforest, respectively (Kenzo et al., 2015).

The diversity of forest attributes across different locations impacts the multitude of characteristics of a forest by shaping its structure, composition and ecological functions (Poorter et al., 2021). These attributes include factors such as the age distribution of trees, tree structure and characteristics, tree species diversity, soil characteristics, topography, climate and disturbances. Diverse tree attributes exert varying effects on trees' carbon sequestration and storage capabilities (Aponte et al., 2022). Understanding how forest characteristics affect AGB can provide insights into the functioning and resilience of ecosystems and inform management strategies for the sustainable use of forest resources.

2.11 Forest age and carbon

Forest stand age is one of the most critical factors influencing carbon stock, as older forests tend to have higher biomass than younger ones. Older trees have larger trunks and more extensive root systems, contributing to higher biomass accumulation over time (Köhl et al., 2017). The age of the stand significantly influences the storage of various carbon pools in forest ecosystems, likely because stand age can promote greater

biomass and productivity by increasing both tree size and size variation (Zhu et al., 2017; Barry et al., 2019; Zhang & Chen, 2015; Wang et al., 2020). The disturbance of the mature forests can significantly impact AGB in forests. The areas with high disturbance intensity typically had lower AGB (Temesgen et al., 2015; Wulder et al., 2020).

The forests are commonly disrupted by events like logging, wildfires or other disturbances and there is a loss of mature trees and vegetation, which can reduce the overall biomass in the affected areas. When disturbed forests are left to recover independently, new generations of trees start rapidly regrowing (Matějka, 2015). These regrowth forests are crucial in replenishing the lost biomass over time. Numerous regrowth forests within rainforest areas create variations in carbon stock distribution across different niche areas. As these forests mature, they gradually accumulate carbon through photosynthesis, contributing to the carbon sequestration capacity of the rainforest ecosystem. The growth of new trees in the forests helps offset the carbon loss caused by the initial disturbance, aiding in the recovery and resilience of the rainforest (Cole et al., 2014).

Nevertheless, the carbon stock in disturbed forests is reported to be lower than in old-growth intact forests. Nascimento and Laurance (2004) stated that fragmented forests had lower AGB than intact forests and suggested that this was due to increased disturbance and reduced habitat quality. The carbon stock in a degraded peat swamp forest in Sarawak, Malaysia, was recorded to be positively correlated with tree age, but the relationship was nonlinear and varied among species (Kiat et al., 2020). The study suggested that the pattern was influenced by similar variations of tree ages with consistent tree size and wood density variation.

2.12 Forest stand density and carbon stock

Forest stand density significantly affects AGB in Malaysian tropical rainforests (Wassihun et al., 2019). Stand density refers to the number of trees per unit area within a forest stand. It is a measure of how closely trees are spaced in a particular area and is commonly expressed as the number of trees per hectare or per acre. Becker et al. (1999); Lee et al. (2002) reported that the forest with an evenly structured canopy with high emergent and a density of big tree-size classes typically has high carbon stock.

The high stand density can improve the total carbon stock if it leads to more trees per unit area (Castro-Izaguirre et al., 2016). The relationship between stand density and carbon stock is complex and can vary depending on forest type and management practices. The high stand density can sometimes lead to increased competition among trees for resources such as sunlight, water and nutrients. This competition may reduce species diversity as certain tree species may outcompete others. This leads to a more homogenous forest composition.

Several studies have reported variations in the relationship between stand density and carbon stock across different localities and types of forests. Wirabuana et al. (2021) stated that the relationship between stand density, species diversity, timber production and carbon stock can vary across different types of forests, including community forests. The study in Indian tropical deciduous forests recorded a strong positive correlation of AGB with stand density (Behera et al., 2017). The study in the Korean pine forest (*Pinus koraiensis*) in China revealed a direct relationship between higher stand density and increased timber production and carbon stock (Cai et al., 2016). Conversely, Wirabuana et al. (2021) recorded a study in a tropical forest of West Java

found that stand density had no significant correlation with carbon stock. This indicates that the greater stand density does not certainly result in enhanced carbon stock. This implies that a high stand density in some forests does not necessarily indicate high carbon stock.

2.13 Tree diameter and carbon stock

Tree diameter at breast height (DBH) vary significantly among species (Paoli et al., 2008; King, 1996; Feldpausch et al., 2011). Forests with many large-diameter trees have more capability to sustain, function and maintain the carbon stock within the localities compared to smaller trees (Clark & Clark, 1996). The correlation between carbon stock (in the form of AGB) and DBH in tropical forests varies depending on the forest type (Zapfack et al., 2020). Intact primary forests typically correlate more strongly with carbon stock and DBH than secondary forests, likely due to differences in forest structure and composition (Miyamoto et al., 2018). The intact primary forest tends to have more large trees, which always dominate the forest's carbon storage. This trend is common across almost all types of forests, regardless of their niches or locations (Slik et al., 2013; Mildrexler et al., 2020; Johnston et al., 2021; Bordin et al., 2021).

The large trees dominate carbon storage in forests east of the Cascade Crest in the United States Pacific Northwest (Mildrexler et al., 2020; Johnston et al., 2021). On average, the AGB on South America's subtropical forests is 246 Mg ha⁻¹. The positive effect of large-sized trees indicates that mature forests play a key role in the long-term persistence of carbon storage, as these large trees account for 64% of the total biomass stored in these forests (Bordin et al., 2021). Slik et al. (2013) determined the importance of large trees for tropical forest biomass storage. They recorded that the large trees with

DBHs of more than 70 cm store large amounts of biomass and may also be vulnerable to changing climates.

The relationship between carbon stock and DBH is weaker in forests that have undergone selective logging than in unharvested forests, potentially because the unharvested forests have higher tree species diversity and more intricate forest structure (Pearson et al., 2014). Logged forests typically experience a significant loss of their large tree population, primarily because these trees hold high value in the timber industry. The considerable loss of large tree populations following logging activities is a widely observed trend in various types of forests.

The large trees play an important role in carbon storage and dynamics after selective logging in the Eastern Amazon (Sist et al., 2014). They recorded that the forest had 187 trees per hectare before logging with an AGB of 377.6 Mg ha⁻¹ for trees with DBH of more than 20 cm. While 9.3% of the total tree density consists of large trees with DBH of more than 60 cm gathered nearly half of the AGB. After logging, the mortality of large trees had a significant impact, resulting in annual AGB losses of up to 40% in the first years after logging.

The adverse impact on forest biomass from this activity also consistently occurred in African tropical forests (Cazzolla Gatti et al., 2014), the lowland rainforest of West Kalimantan, Indonesia (Cannon et al., 1994) and in almost all the designated logging concessions in tropical forests (Martin et al., 2015). The impact of selective logging activities also exhibits a similar trend across various Malaysian forests. This observation underscores the necessity for a comprehensive understanding of the relationship between DBH and AGB to accurately estimate carbon stock in the country.

Such knowledge is crucial for effective forest management, conservation strategies and informed decision-making regarding carbon sequestration and climate change mitigation efforts.

2.14 Tree basal area and carbon stock

The basal area measures the cross-sectional area of trees at breast height and is strongly correlated with carbon stock (Paquette & Messier, 2011). This direct relationship between basal area and AGB underscores the significance of basal area measurements in carbon content assessment. A higher basal area implies a larger trunk diameter, which indicates greater biomass accumulation (Power et al., 2019). As trees grow and increase in basal area, they accumulate more carbon through photosynthesis, effectively acting as carbon sinks. The basal area also provides a means to estimate the overall tree density within a forest stand. In a given area, a higher basal area suggests a denser population of trees, leading to more efficient carbon sequestration. Dense forests with substantial basal area values can store significant amounts of carbon (Osuri et al., 2020), making them invaluable contributors to carbon offset strategies.

Studies have shown that the relationship between carbon stock and basal area can vary among different forest types and regions. Forest age, forest structure and species composition can affect the amount of biomass and basal area in a forest. Van Do et al. (2020) stated the basal area and AGB are positively correlated with trees of more than 30 DBH in old-growth forests of Vietnam. Paquette and Messier (2011) discovered a positive association between stand basal area and AGB in both temperate and boreal forests. A study in Borneo's tropical forest also recorded a strong relationship between AGB and the basal area, further emphasizing the significance of the basal area as a

significant contributor to carbon stock in forests (Slik et al., 2010). Joshi et al. (2021) recorded a strong positive correlation between carbon stock and basal area in the forest that is dominated by *Shorea robusta* tree species in Dhangadhi, Nepal.

The relationship between carbon stock and the basal area can also vary depending on forest type and management practices (Dignac et al., 2017). For example, in managed forests where trees are thinned or harvested, the relationship between carbon stock and basal area may be weaker due to changes in forest structure. In unmanaged logged forests, the relationship between carbon stock and the basal area may be stronger, as the trees tend to grow more densely and have higher biomass per unit area.

2.15 Wood density and carbon stock

Wood density is an important tree trait strongly correlated with carbon stock in forests. According to Mcleod et al. (2011) and Jones et al. (2020), wood density is important in estimating carbon stock. The mean wood density of most tree species in Southeast Asia was estimated at 0.574 g cm^{-3} . These tree species typically exhibited a range measurement from 0.080 to 1.095 g cm^{-3} of wood density (Chave et al., 2009), as the dipterocarp trees had an average wood density of 0.451 (Rosaizan & Gang, 2013).

The relationship between carbon stock and wood density varies depending on forest type and tree species. The value of the wood density of trees at a specific locality can be influenced by geographical area and species-specific factors (Henry et al., 2010). Within tropical forests, most trees typically exhibit an abundance of slow-grower tree species with high wood density. Yeboah et al. (2014) stated that the slow-growing trees that survive under the taller tree canopies in tropical forests possess higher wood

density. The richness of these tree species leads to a stronger correlation between carbon stock and wood density (Phillips et al., 2019).

Tree species with low wood density exhibit a higher mortality rate and tend to perish at an early age, typically within 10 to 20 years. In contrast, species with high wood density could live longer, extending their lifespan for hundreds of years (Hamdan, 2021). Consequently, this intercorrelation of wood density, tree survivorship and mortality ultimately affects cumulative AGB within forests. For example, the relationship between carbon stock and wood density may be weaker in temperate forests, as there is a wide range of variation in wood density among species (Chave et al., 2003).

Research conducted in South America, encompassing countries like Costa Rica, Panama, Puerto Rico and Ecuador, unveiled a lack of an association between forest biomass and wood density (Stegen et al., 2009). The findings indicated that certain forests exhibited substantial carbon stocks despite having abundant tree species with low wood density. Due to global change, they also suggest that declining wood density will result in decreased or increased stored carbon in forests with high or low mean wood density, respectively. Furthermore, the research indicated that alterations in wood density resulting from global influences may result in diminished or augmented carbon storage within forests.

Tropical primary forests generally have higher carbon stock and wood density compared to logged-over and secondary forests. Rozendaal et al. (2022) reported in their meta-analysis study that the AGB values of old-growth forests are significantly higher than those of logged forests. This is attributed to the fact that old-growth forests

have had more time to accumulate carbon stocks by retaining large trees, leading to greater AGB values. Similarly, Slik et al. (2013) found that large trees significantly impact carbon stock variation in lowland forests across the tropics and that logging can disproportionately affect large trees and reduce carbon stock.

2.16 Species composition and carbon stock

Forests with high diversity and species richness typically have high carbon stock (Tilman, 2001; Van Con et al., 2013). Species diversity contributes to high rates of carbon sequestration and stocks stored in tree biomass (Vallet & Perot, 2016), as wood density varies among species. The importance of different types of trees to carbon stock varies depending on the forest type. Tropical forests tend to have more diverse tree populations, which store more carbon (Poorter et al., 2015). The level of biodiversity within forest ecosystems is also a key factor influencing the contribution of individual tree species to carbon stock. Forests with high levels of biodiversity have greater importance of individual tree species to carbon stock, whereas forests with lower biodiversity levels have comparatively lower species importance (Poorter et al., 2015).

From previous studies, most tropical regions recorded that diversity positively correlates with AGB (Vallet & Pérot, 2011; Van Con et al., 2013; Poorter et al., 2015; Fliess et al., 2020). According to Deere et al. (2018), Strassburg et al. (2010) and Sullivan et al. (2017), the correlation between biodiversity in tropical forests and AGB is almost constantly positive, nonetheless, it is still variable and scale-dependent. It is also important to note that the relationship between carbon stock and species diversity is complex and can be influenced by other factors, such as environmental conditions, disturbance regimes and tree size distribution. Fleiss et al. (2020) stated that the tree

diversity in a set-aside forest of oil palm plantations in Eastern Sabah positively influences carbon stock. The carbon stock measures in the tropical forests of Vietnam recorded that they have a positive relationship with species richness (Van Con et al., 2013). On the other hand, the study recorded in the Central Europe natural forest found a negative correlation between carbon stock and tree species diversity (Szwagrzyk & Gazda, 2007; Van Con et al., 2013) and similar findings recorded in *Quercus* communities in China (An-ning et al., 2008; Van Con et al., 2013). The study in the tropical volcano forest of Mount Rinjani, Lombok, Indonesia, recorded no correlation between carbon stock and diversity detected within the locality (Dossa et al., 2013).

In Malaysian dipterocarp forests, it has been identified that both dipterocarp and certain non-dipterocarp tree species play a role in storing carbon. It is important to note that the contribution of different tree species to carbon stock can vary depending on the forest types with dipterocarp forests having a significant role in carbon sequestration (Omar et al., 2015; Raihan et al., 2021). For example, *Shorea*, belonging to the Dipterocarpaceae family known for their large trees with high biomass, which contribute significantly to the carbon storage in the forest (Kaushal & Baisya, 2021). The presence of certain non-dipterocarp tree species can also enhance the carbon sequestration capacity of the forest, as they can grow alongside dipterocarp species and contribute to the overall carbon storage (Zani et al., 2018). According to Slik et al. (2013), dipterocarp tree species accounted for 77% of the total AGB in lowland dipterocarp forests in Sarawak, Malaysia.

The susceptibility of forests to disturbance is another factor shaping the importance of individual tree species to carbon stock. Forests prone to disturbances experience significant alterations in their tree species composition. Consequently, less

tolerant tree species are lost, allowing more tolerant tree species to dominate the forest. This dominance of more tolerant species subsequently results in their greater importance in contributing to carbon stock (Wang et al., 2020). Hence, having information about the species-specific composition, including density, height, diameter and carbon content, is vital for determining the carbon stored in the forests. This information also plays a key role in conservation efforts and aids in accurately planning reforestation and commercial forest plantation activities.

2.17 Chapter summary

This chapter covers various aspects of tropical forests in Borneo, with a specific focus on Sarawak. It discusses Dipterocarp forests, forest disturbances due to oil palm plantations, logging activities and the differences between logged-over, secondary and primary forests in Malaysia. The chapter also explores carbon stock estimation methods, the influence of forest age, stand density, tree diameter, basal area, wood density and species composition on carbon stock.

CHAPTER 3

MATERIALS AND METHODS

3.1 Study area

Field samplings were carried out in two logged-over forests and two primary forests. The locations of selected study areas of both types of forests are illustrated in Figures 3.1 and 3.2. The logged-over primary forests in this study have been set aside as high conservation value (HCV) forests. Both logged-over forests were located within an oil palm plantation in Suai, Miri, owned by Saremas Sdn Bhd, a subsidiary of PPB Oil Palms Berhad (PPB Oil Palms). The study areas are Bukit Durang and Saremas 1 Div 5. The forests have been selectively logged and conversion to oil palm plantations, resulting in a mix of old-growth and fast-growing trees. The two types of forest environments represent disturbed and pristine forest landscapes, whereas the forests in oil palm plantations and national parks represent disturbed and undisturbed areas, respectively.

The primary forests in this study were in two National Parks located in the northern and southern parts of Sarawak. The study area's north is in Lambir Hills National Park, Miri, and the southern part is Kubah National Park, Kuching. These study areas possess high ecological and conservation significance, with contrasting land use histories and management practices. These study areas serve as a reference for exploring natural carbon stock variation among forest types and assessing links with stand characteristic attributes and species diversity.

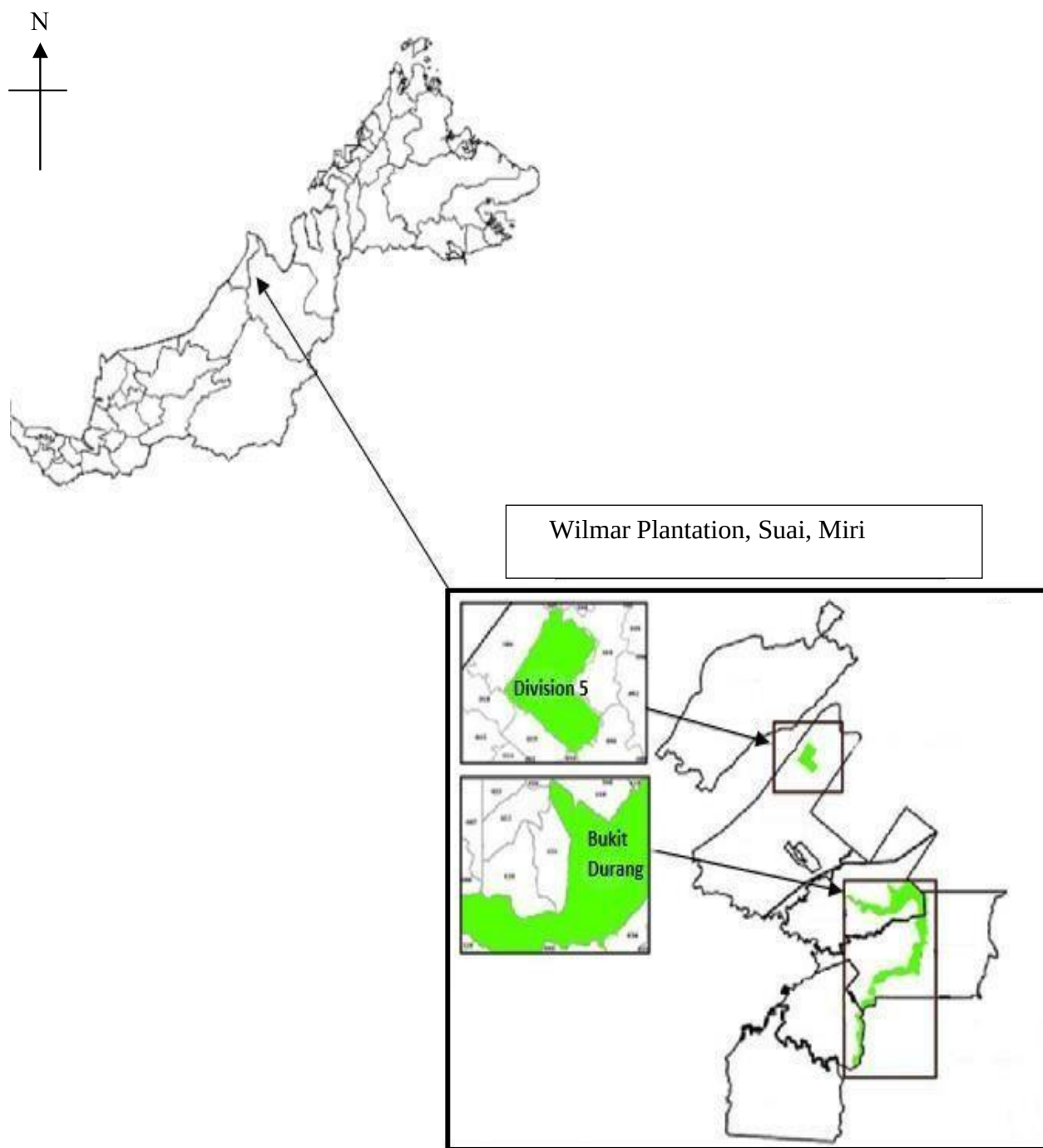


Figure 3.1: Location of sampling sites in Saremas 1 oil palm estate

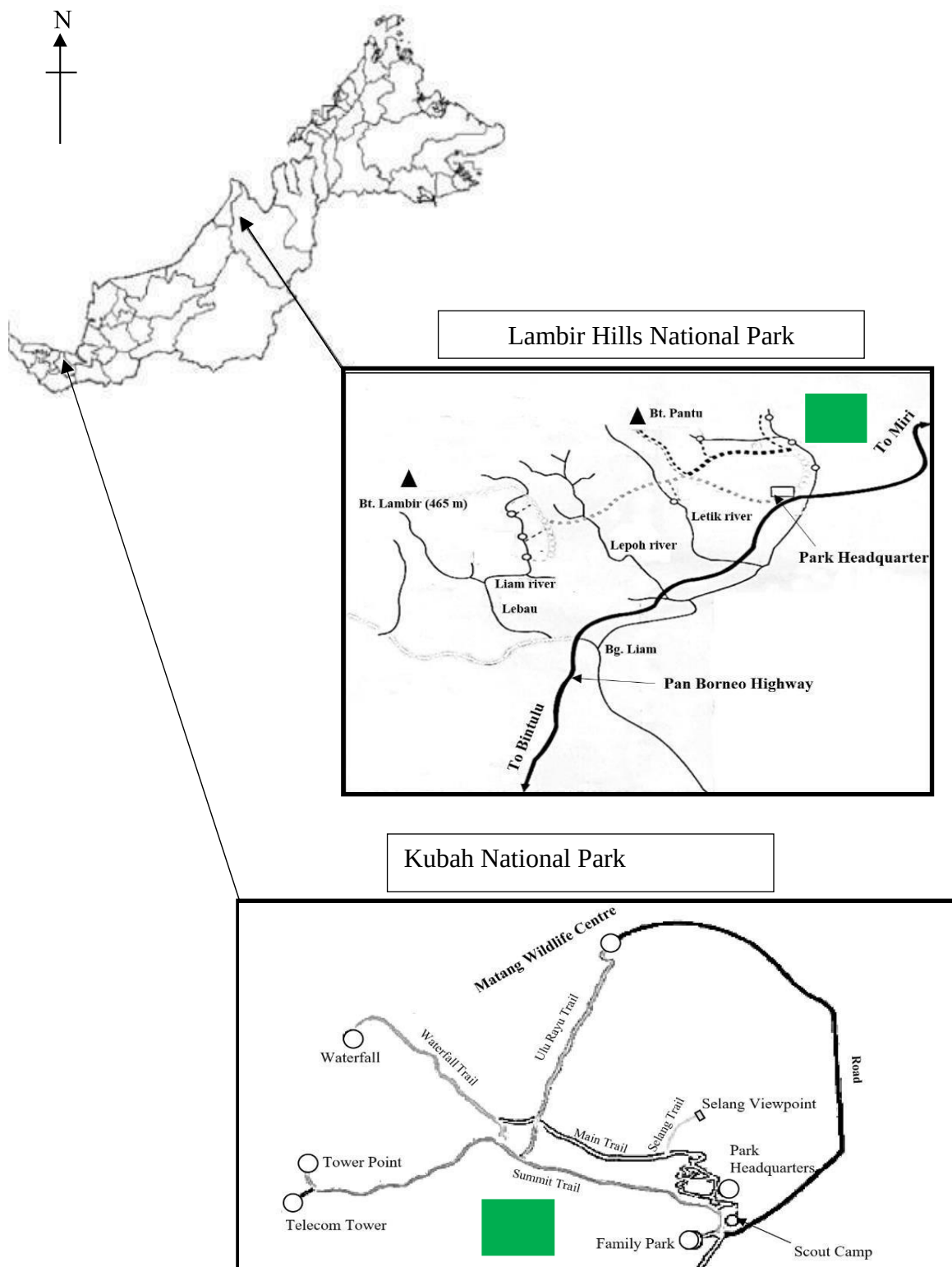


Figure 3.2: Locations of sampling sites in Lambir Hill National Park and Kubah National Park (green zones indicate the plotting areas).

3.2 Logged-over forests Wilmar PPB Oil Palms Berhad

The selected logged-over forests in this study are located at Bukit Durang (3°34'1.52" N 113°46'4.26" E) and Saremas 1 Division 5 (Div 5) (3°29'35.10" N 113°49'15.60" E). Both areas have been set aside as high conservation value (HCV) forests within Saremas 1 Estate plantations. The average terrain of the forests is within 45 to 75 m a.s.l and receives 1,700–5,800 mm of rainfall throughout the year (Malaysian Meteorological Department, 2020).

The forest areas are located approximately 60 km from Miri. Bukit Durang forest, the largest HCV area with 989.9 ha is linear-shaped within the estate, and Saremas 1 Div 5 forest consists of approximately 604 ha and is almost heart-shaped. Both forests are the logged-over mixed dipterocarp forest (MDF) with the historically selectively logged that ended in 1996. The forests are now gazetted as HCV 4 areas by the plantation company. The HCV 4 areas are designated to provide basic ecosystem services in critical situations, including protection of water catchments and control of erosion (HCV Malaysia Toolkit, 2018). It also aims to protect and retain flora and fauna within the plantation. Bukit Durang and Saremas 1 Div 5 forest areas are approximately 10.06 km apart. The study areas can be accessed by oil palm estate road (Figures 3.3 and 3.4).



Figure 3.3: Entrance route to Bukit Durang study area



Figure 3.4: Entrance route to the Saremas 1 Div 5 study area

3.3 Primary forests

3.3.1 Lambir Hills National Park

Lambir Hills National Park is located 32 km south of Miri, Sarawak. The park has been gazetted for research, education, amenity, and as a reservoir of resources and biodiversity since 1957. This national park comprises approximately 7000 ha of tropical primary dipterocarp forest with altitudes ranging from 20 to 470 m. The forest consists of mixed dipterocarp forest and tropical heath forest. The lower terrestrial area of the park is mainly covered with dipterocarp trees, which dominate 85% of the area.

The average annual rainfall in the forest area is about 1,700–5,800 with ever-wet but monsoonal climatic conditions (Malaysian Meteorological Department, 2020). Typically, the wet season occurs from November to February, while the dry season occurs from April to September throughout the year (Chai et al., 1995). The typical annual rainfall for the area was about 3,300 mm (Sa’adi et al., 2017). The soil is red-yellow podsols, covering most of the park area, and is further divided into three soil families: Bekenu, Nyalau, and Merit (Chai et al., 1995).

3.3.2 Kubah National Park

Kubah National Park lies on Matang Ridge, located 20 km from the city centre of Kuching, Sarawak, providing the scenic backdrop to the state capital. The park comprises patches of Kerangas, scrub and ridge-top forests, mainly encompassing mixed dipterocarp forests. In contrast, lower montane forests can be observed above 700 m a.s.l. (Das et al., 2007; Dow, 2013). The park is covered with 2230 ha, mainly mixed dipterocarps forest area and Kerangas (Bornean heath forest) with three sandstone mountains known as Gunung Serapi, Gunung Selang and Gunung Sendok

(FDS, 2021). The soil status within the area consists of soft podzolic soils of different colours (i.e., red-yellow and grey-white), lowland podzols on soft old alluvium, soft upland podzols and concentrated alluvial soils (Pearce, 1994). The study area receives between 2,000 and 3,000 mm (Khan et al., 2017).

Kubah National Park had a historical selective logging activity decades ago and stopped in the 1960's when the forest area was left to regrow (Abang Bohari, 2015). This study was conducted in Matang Wildlife Centre (MWC), located at the western corner of the Kubah National Park and was established in 1998. The forest condition of the study area is shown in Figure 3.5.



Figure 3.5: Forest condition of Kubah National Park study area

3.4 Field sampling

Vegetation analysis in all study areas was carried out to understand the forest stand characteristics, tree species diversity and species distribution. The line transect sampling method was employed. This method provides a convenient method of enumerating the tree population as more ground can be covered in with modest resources (Buckland et al., 2007). Twenty-five (25) 20 m x 20 m plots were established within each site (Figure 3.6 and Figure 3.7). The plots were established at 100 m intervals along five parallel 1000 m transect lines to cover the maximum area. The tree population with DBH of ≥ 10 cm was then assessed within the plot.

The plot area was marked using GPS (Figure 3.8). Trees with DBH ≥ 10 cm were identified and enumerated. Enumerated trees were preliminarily identified in the field based on the bark, slash and leaf characteristics. Unidentified tree species were named up to the genus level. Detailed species identification was further carried out in the UNIMAS herbarium and Forest Department Sarawak herbarium.

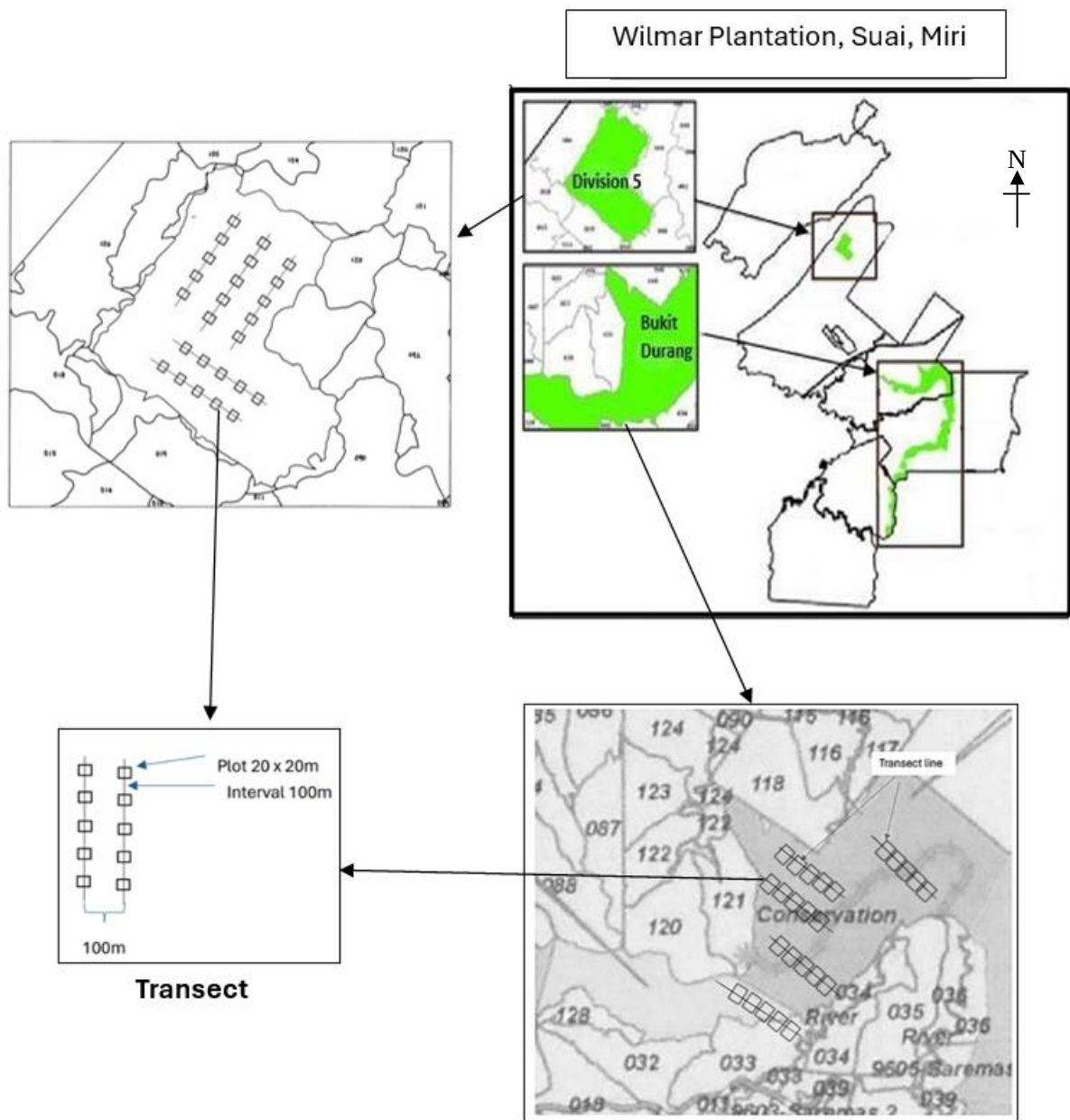


Figure 3.6: Sampling layouts in Bukit Durang and Saremas 1 Division 5

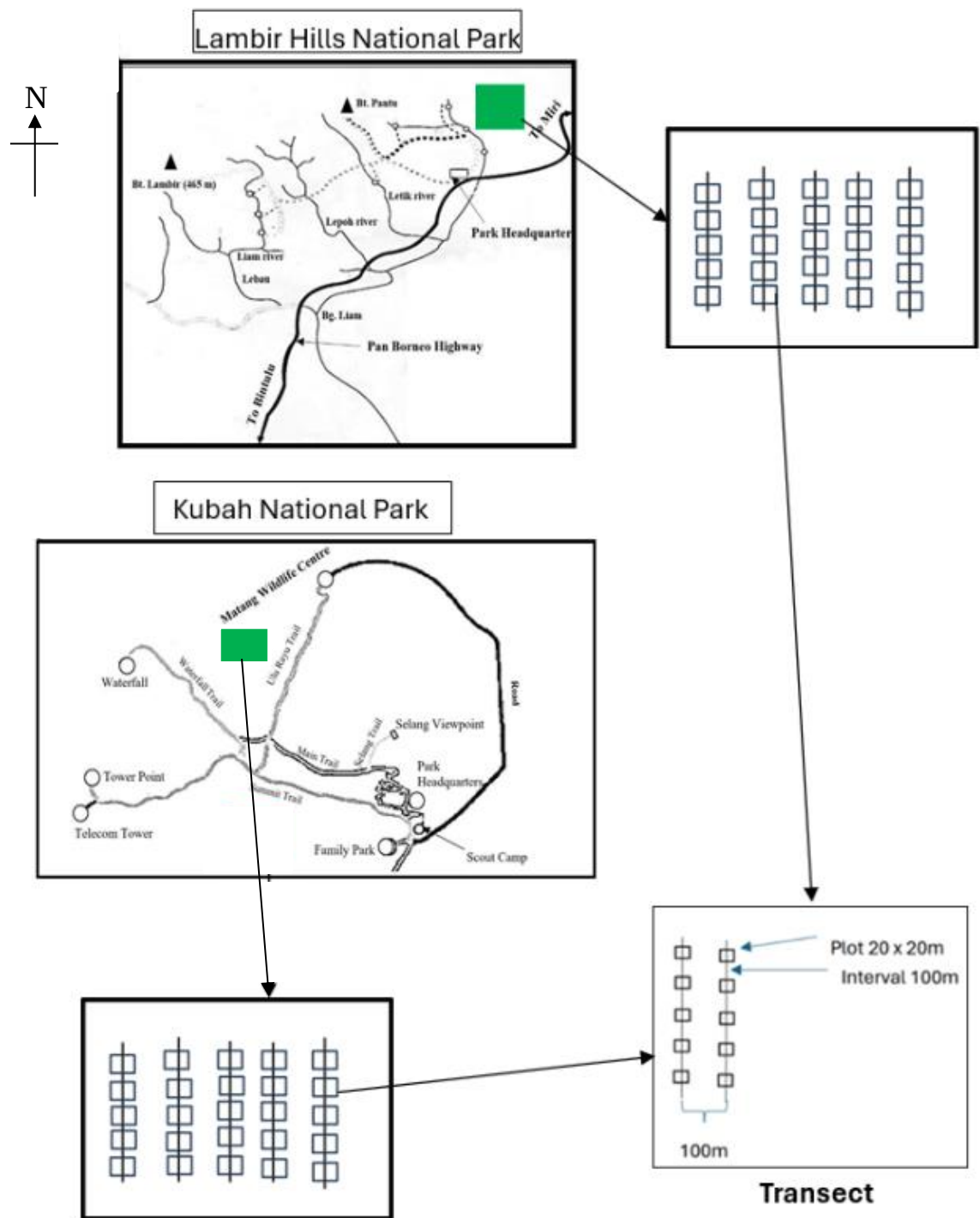


Figure 3.7: Sampling layout in Lambir Hills National Park and Kubah National Park
(green zones indicate the plotting areas)

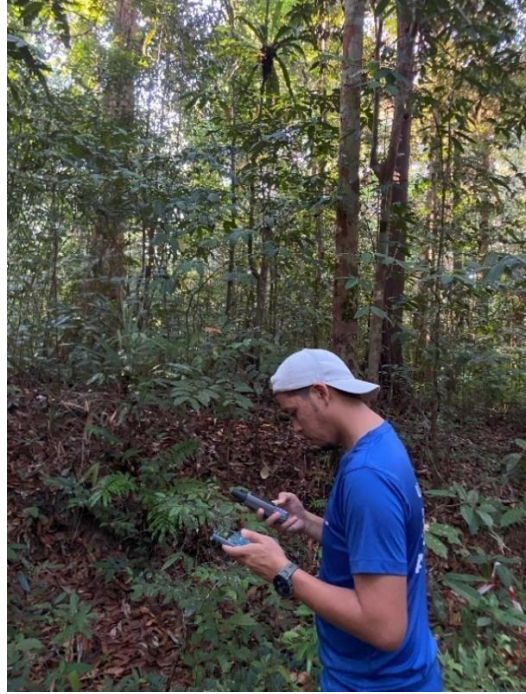


Figure 3.8: The location of the study area was tracked and marked using GPS receiver

3.5 Determination of stand structure attributes

The stand structure attributes refer to tree diameter at breast height (DBH), basal area, tree density, number of families and genera and wood density. Measurement of tree diameter over bark at breast height (i.e., 1.30 m above ground level) was done to the nearest cm using a diameter tape (Figure 3.9). Wood densities of tree species were obtained from the wood density database at the International Council for Research in Agroforestry (ICRAF) websites and Plant Resources of Southeast Asia (PROSEA).



Figure 3.9: Tree DBH was measured using DBH tape

The basal area is the tree stems occupying an average area, which defines the area of a portion of land occupied by tree's cross-section. The basal area for each tree was calculated by multiplying the squared diameter of the tree by the mathematical constant pi (π) and dividing by 4. The calculation is as follows:

$$\text{Basal area (BA)} = \frac{\pi D^2}{4} \quad \text{Equation 3.1}$$

Where, π = Constant pi (approximately 3.14), D = Diameter of the tree measured at breast height (DBH).

The tree density (d) was calculated by dividing the total number of trees (n) by the area of study site (m^2);

$$d = \frac{\text{total number of trees (n)}}{\text{the area of study site (m}^2\text{)}} \quad \text{Equation 3.2}$$

Tree frequency (f) was determined by dividing the number of subplots the species present by the total number of subplots and multiple with 100;

$$f = \frac{\text{Number of subplot the species present}}{\text{total number of subplot}} \times 100 \quad \text{Equation 3.3}$$

3.6 Determination of important value index (IVI)

3.6.1 Species important value (SIV) index

The importance value (SIV) index was used to describe and compare the species dominance within each study area. It was calculated by summation of the total relative density (Rd), relative frequency (Rf) and relative coverage (RDo). The value of SIV ranges from 0 to 300. It is to determine the dominance of each species as well as their abundance. The larger the importance value, the more dominant a species is.

$$\text{Relative density (Rd)} = \frac{\text{Number of individuals of species}}{\text{Total number of individuals}} \times 100 \quad \text{Equation 3.4}$$

$$\text{Relative frequency (Rf)} = \frac{\text{frequency of a species}}{\text{Sum of frequency of all species}} \times 100 \quad \text{Equation 3.5}$$

$$\text{Relative coverage (RDo)} = \frac{\text{Total basal area of a species}}{\text{Total basal area of all species}} \times 100 \quad \text{Equation 3.6}$$

3.6.2 Genus Important Value (GIV) Index

The genus important value index (GIV) index was used to describe and compare the genera dominance within each study area. It was determined by summing the percentages of relative density (Rde), relative dominance (Rbdo) and relative density (Rdi). The value of GIV ranges from 0 to 300. It is to determine the dominance of each

family as well as their abundance. The larger the importance value, the more dominant a genus is.

$$\text{Relative density (Rde)} = \frac{\text{Number of individuals in a genera}}{\text{Total number of individuals}} \times 100 \quad \text{Equation 3.7}$$

$$\text{Relative dominance (Rbdo)} = \frac{\text{Total basal area of genera}}{\text{Total basal area of all genera}} \times 100 \quad \text{Equation 3.8}$$

$$\text{Relative diversity (Rdi)} = \frac{\text{Number of species of genera}}{\text{Total Number of species of genera}} \times 100 \quad \text{Equation 3.9}$$

3.6.3 Family Important Value (FIV) Index

The family important value index (FIV) index was used to describe and compare the family dominance within each study area. It was determined by summing the percentages of relative density (Rde), relative dominance (Rbdo) and relative density (Rdi). It analyses each family's contribution and indicates a particular family's dominance in a forest community (Kacholi, 2014). The value of FIV ranges from 0 to 300. It is to determine the dominance of each family as well as their abundance. The larger the importance value, the more dominant a family is.

$$\text{Relative density (Rde)} = \frac{\text{Number of individuals in a family}}{\text{Total number of individuals}} \times 100 \quad \text{Equation 3.10}$$

$$\text{Relative dominance (Rbdo)} = \frac{\text{Total basal area of family}}{\text{Total basal area of all families}} \times 100 \quad \text{Equation 3.11}$$

$$\text{Relative diversity (Rdi)} = \frac{\text{Number of species of family}}{\text{Total Number of species of families}} \times 100 \quad \text{Equation 3.12}$$

3.7 Determination of tree distribution by diameter class

The tree distribution by diameter class was determined by identifying the representative trees with recorded DBH measurements in each locality. These measurements are then grouped into interval 4.9 cm width ranges of diameter classes. They consist of 10 – 14.9 cm, 15 – 19.9 cm, 20 – 24.9 cm, 25 – 29.9 cm, 30 – 34.9 cm, 35 – 39.9 cm, 40 – 44.9 cm, 45 – 49.9 cm, 50 – 54.9 cm, 55 – 59.9 cm and > 60 cm. The number of trees falling within each diameter class was tallied, creating a frequency distribution. This distribution provides valuable insights into the forest's structure and growth patterns.

3.8 Estimation of carbon stock

3.8.1 Estimation of aboveground biomass (AGB)

Biomass and carbon stock of tree species were evaluated using non-destructive methods. The AGB of all enumerated trees with a DBH of 10 cm and greater was estimated using an allometric equation provided by Chave et al. (2005). The equation for the estimation of AGB is as follows:

$$AGB = p \times \exp (-1.499 + 2.148 \ln(D) + 0.207 (\ln(D))^2 - 0.0281 (\ln(D))^3) \quad \text{Equation 3.10}$$

Where AGB is the dry weight of AGB (kg tree⁻¹), DBH is the diameter at breast height in centimetres (cm) and p is the basic density of the tree (g cm⁻³). Wood densities of all species were taken from the wood density database on the International Council for Research in Agroforestry (ICRAF) website and the Sarawak Timber Species (2018). All air-dry wood density (10–18% moisture content) was converted to basic wood density by multiplying wood densities by a value of 0.861 (Vieilledent et al., 2018).

3.8.2 Estimation of carbon stock

The carbon stock of all enumerated trees was estimated. A conversion factor of 0.5 is used to convert biomass (dry weight) to carbon equivalents (C) (ton) (Petersson et al., 2012). The AGB values were converted to carbon stock using the equation below.

$$\text{Total Carbon Stock (Mg C ha}^{-1}\text{)} = \text{Total AGB} \times 0.50 \quad \text{Equation 3.13}$$

3.9 Determination of species diversity, evenness and dispersion index

Tree species diversity indices, the Shannon–Wiener index of species heterogeneity (H'), Simpson diversity index (D), Pielou's evenness (E'). The evenness index (E') value is equal to 1 when the species distribution is perfectly evenly distributed and 0 when the variation is maximum.

Tree species diversity was calculated following the Shannon-Wiener diversity index (Shannon & Weiner, 1963).

$$H' = -\sum p_i \ln(p_i) \quad \text{Equation 3.13}$$

where H' is the Shannon-Wiener diversity index, p_i is the proportion of individuals belonging to the species, and $\ln$ is the natural logarithm.

The evenness index (E') value equals 1 when the species distribution is perfectly evenly distributed and 0 when the variation is maximum.

$$\text{Evenness (e)} = H' / \log S \quad \text{Equation 3.14}$$

where, H' = Shannon-Wiener diversity index, S = No. of tree species

Tree species richness was also calculated as follows (Menhinick, 1964):

$$d = \frac{S}{\sqrt{N}} \quad \text{Equation 3.15}$$

where d = tree species richness; S = Total number of tree species in a forest stands; N = Total number of individuals of all the species in the forest stands.

3.10 Data analysis

3.10.1 Variation of tree structure attributes and species importance

Analysis of variance (ANOVA) was used to determine the differences in tree structure attribute parameters (DBH, basal area, wood density) and species importance (SIV) index in different tree species for each study area. ANOVA was also used to examine differences in AGB and carbon stocks among the study areas. Tukey's HSD tests were used to test contrasts among means of the study areas. The statistical analysis was conducted using IBM Statistical Software for Social Science (SPSS) 2.0 for Windows Version 9.1. The significant level used was 0.05.

3.10.2 Pearson Correlation Analysis

Pearson correlation coefficient (PCC) was used to measure the strength of the association among parameters in the study areas. These parameters included tree structure (DBH, basal area and wood density), SIV and carbon stock across the combined datasets of overall study areas. Components exhibiting significant correlations at the 0.01 level were considered significant in the analysis. The statistical analysis was conducted using IBM Statistical Software for Social Science (SPSS) 2.0 for Windows Version 9.1.

3.11 Chapter summary

This chapter describes the study areas, including logged-over forests in Suai, Miri, and primary forests in Lambir Hills National Park and Kubah National Park. It details the field sampling methods, determination of stand structure attributes, species importance indices, tree distribution by diameter class, AGB and carbon stock estimation, species diversity indices and data analysis techniques.

CHAPTER 4

RESULTS

4.1 Stand structure

The stand structure and composition with DBH ≥ 10 of Bukit Durang, Saremas 1 Div5, Lambir Hills National Park and Kubah National Park are presented in Table 4.1. Bukit Durang and Saremas 1 Div 5 represent logged-over forests in an oil palm plantation, and Lambir Hills National Park and Kubah National Park represent primary forests.

Table 4.1: Stand structural characteristics of Bukit Durang, Saremas Div 5, Lambir Hills National Park and Kubah National Park with DBH ≥ 10

Variable	Study areas			
	Bukit Durang	Saremas 1 Div 5	Lambir Hills National Park	Kubah National Park
Number of trees (DBH ≥ 10 cm)	723 ^a	785 ^a	747 ^a	684 ^a
Basal area (m ² /ha)	28.73 ^a	29.90 ^a	42.54 ^b	29.13 ^a
Number of species	161 ^b	218 ^c	131 ^a	213 ^c
Number of genera	93 ^a	106 ^a	85 ^a	104 ^a
Number of families	47 ^a	52 ^a	37 ^a	45 ^a

*Mean values in the row followed by different letters (a, b and c) indicate significant differences at $P < 0.05$ using Tukey's test.

4.1.1 Stand structure of logged-over and primary forests

The number of trees with DBH ≥ 10 cm in 25 plots of 20 x 20 m of all study areas were comparable. Saremas 1 Div 5 recorded a higher total number of trees with 785, followed by Bukit Durang with 723, Lambir Hills National Park with 747 and Kubah National Park with 684 trees per hectare, but this difference is not statistically significant. In terms of basal area, Lambir Hills National Park recorded the highest ($p \leq 0.05$) compared to the other study areas, with 42.54 m²/ha. The logged-over forests

(Bukit Durang and Saremas 1 Div 5) and Kubah National Park basal areas were statistically insignificant.

The number of species recorded in the studied areas varied. Saremas 1 Div 5 (218) and Kubah National Park (213) were significantly higher ($p \leq 0.05$) number of species than Bukit Durang (161) and Lambir Hills National Park (131). Lambir National Park recorded the lowest ($p \leq 0.05$) number of species compared to the other study areas in the study. The number of genera and families was comparable in all study areas. In Bukit Durang, 93 genera and 40 families were recorded, while Saremas 2 Div 5 comprises 106 genera and 52 families. Lambir Hills National Park comprises 85 genera and 37 families and Kubah National Park has 104 genera and 45 families.

4.2 Floristic family composition

4.2.1 Floristic family composition of logged-over forests

The list of the top ten floristic family compositions of logged-over is presented in Table 4.2. Overall, both logged-over forests in the study have common families, such as Dipterocarpaceae and Euphorbiaceae, but have some differences in family and genus composition. The most abundant family in Bukit Durang was Dipterocarpaceae, with 41 (16.5%) species and 235 (29.8%) individuals. The other top families in terms of abundance were Euphorbiaceae with 148 (18.7%) individuals, Myristicaceae with 57 (7.2%) individuals, Anacardiaceae with 27 (3.4%) individuals and Moraceae with 24 (3.0%) individuals.

In Saremas 1 Div 5, the most abundant family was also Dipterocarpaceae, with 38 species and 216 individuals, representing 17.2% and 27.1% of the total species and

stems recorded, respectively. The other top families in terms of abundance were Euphorbiaceae, with 64 (8.0%) trees, 52 (6.5%) and Sapotaceae 51 (6.4%). Bukit Durang has a higher number of families and genera than Saremas 1 Div 5.

Table 4.2: Top 10 dominant families in Bukit Durang and Saremas 1 Div 5
logged-overforests (Appendix 5 and Appendix 6)

Bukit Durang							
No.	Family	Genus		No. of species		No. of individual	
		No.	%	No.	%	No.	%
1	Dipterocarpaceae	7	6.2	41	16.5	235	29.8
2	Euphorbiaceae	11	9.7	22	8.9	148	18.7
3	Myristicaceae	4	3.5	17	6.9	57	7.2
4	Anacardiaceae	8	7.1	11	4.4	27	3.4
5	Moraceae	2	1.8	10	4.0	24	3.0
6	Annonaceae	6	5.3	11	4.4	23	2.9
7	Myrtaceae	2	1.8	14	5.7	23	2.9
8	Polygalaceae	1	0.9	5	2.0	22	2.8
9	Rubiaceae	8	7.1	8	3.2	22	2.8
10	Phyllanthaceae	4	3.5	10	4.0	21	2.7
Saremas 1 Div 5							
No.	Family	Genus		No. of species		No. of individuals	
		No.	%	No.	%	No.	%
1	Dipterocarpaceae	7	6.6	38	17.2	216	27.1
2	Euphorbiaceae	9	8.5	12	5.4	64	8.0
3	Lauraceae	5	4.7	15	6.8	52	6.5
4	Sapotaceae	3	2.8	10	4.5	51	6.4
5	Anacardiaceae	5	4.7	8	3.6	41	5.1
6	Myrtaceae	2	1.9	15	6.8	40	5.0
7	Moraceae	3	2.8	12	5.4	33	4.1
8	Myristicaceae	4	3.8	12	5.4	28	3.5
9	Burseraceae	3	2.8	6	2.7	23	2.9
10	Annonaceae	4	3.8	9	4.1	22	2.8
11	Polygalaceae	1	0.9	6	2.7	22	2.8

4.2.2 Floristic family composition of primary forests

The list of the top ten floristic family compositions of primary forests is presented in Table 4.3. Overall, the number of species and individuals of each family in primary forests was comparable to the logged-over forests of this study. The tree population in Kubah National Park was more diverse than that of Lambir Hills National Park. While Dipterocarpaceae remains the most dominant family in both parks, its percentage was much higher in Lambir Hills National Park.

The highest number of families in Lambir Hills National Park was Dipterocarpaceae, with 248 (33.2%) of the total tree individuals, 29 (22.1%) species and 9 (10.6%) genera. Polygalaceae and Anacardiaceae came in second and third place with 65 (8.7%) individuals and 5.1 (6.8%) individuals, respectively. The other remarkable families found in Lambir Hills National Park are Euphorbiaceae with 57 (5%) individuals, Moraceae with 37 (5%) individuals and Lauraceae with 35 (4.7%) individuals.

In Kubah National Park, the highest number of families was also Dipterocarpaceae, with 165 (24.2%) individuals, 33 (15.6%) species and 6 (5.7%) genera. Myrtaceae and Burseraceae came in second and third place with 91 (13.3%) and 39 (5.7%) individuals, respectively. The other remarkable families found in the study area include Lauraceae, with 31 (4.6%) individuals, Sapotaceae with 28 (4.1%) individuals and Myristicaceae, 27 (4.0%) individuals.

Table 4.3: Top 10 dominant families in Lambir Hills National Park and Kubah National Park primary forests (Appendix 7 and Appendix 8)

Lambir Hills National							
No.	Family	Genus		Species		Individuals	
		No.	%	No.	%	No.	%
1	Dipterocarpaceae	9	10.6	29	22.1	248	33.2
2	Polygalaceae	1	1.2	2	1.5	65	8.7
3	Anacardiaceae	6	7.1	8	6.1	51	6.8
4	Euphorbiaceae	8	9.4	9	6.9	37	5.0
5	Moraceae	2	2.4	7	5.3	37	5.0
6	Lauraceae	5	5.9	8	6.1	35	4.7
7	Myristicaceae	4	4.7	7	5.3	34	4.6
8	Myrtaceae	2	2.4	5	3.8	33	4.4
9	Sapotaceae	2	2.4	3	2.3	29	3.9
10	Buseraceae	3	3.5	9	6.9	28	3.7
Kubah National Park							
No.	Family	Genus		Species		Individuals	
		No.	%	No.	%	No.	%
1	Dipterocarpaceae	6	5.7	33	15.6	165	24.2
2	Myrtaceae	1	0.9	14	6.6	91	13.3
3	Burseraceae	3	2.8	6	2.8	39	5.7
4	Lauraceae	6	5.7	13	6.2	31	4.6
5	Sapotaceae	3	2.8	8	3.8	28	4.1
6	Myristicaceae	4	3.8	8	3.8	27	4.0
7	Annonaceae	5	4.7	12	5.7	26	3.8
8	Fabaceae	8	7.6	9	4.3	25	3.7
9	Polygalaceae	1	0.9	8	3.8	20	2.9
10	Phyllanthaceae	2	2.0	4	2.0	19	2.6

4.3 Family, genera and species dominance

4.3.1 Family, genera and species dominance in logged-over forests

The top ten families, genera and species important value indexes of logged-over forests are presented in Tables 4.4, 4.5 and 4.6, respectively. The family important value index (FIV) and genus important value index (GIV) show the Relative Density (Rde), Relative Dominance (RDi) and Relative Basal Area (Rbdo). The species important value (SIV) index shows relative density (Rd), relative frequency (Rf) and relative

coverage (Rba).

The family importance value (FIV) index reflects the dominant families. The top ten families with the highest FIV in Bukit Durang show that the Dipterocarpaceae family had the highest FIV of 28.5, followed by Euphorbiaceae with an FIV of 16.1. Myristicaceae and Burseraceae families had FIVs of 7.1 and 4.3, respectively and were ranked third and fourth. Anacardiaceae, Phyllanthaceae, Moraceae, Myrtaceae, Annonaceae and Fagaceae families had FIVs ranging from 2.9 to 3.5 and were ranked fifth to tenth, respectively.

In Saremas 1 Div 5, the Dipterocarpaceae family had the highest FIV of 25.3, followed by Euphorbiaceae, with an FIV of 9.4. Sapotaceae, Myrtaceae, Moraceae, Lauraceae, Anacardiaceae, Myristicaceae, Burseraceae and Polygalaceae families had FIVs ranging from 2.9 to 5.5 and were ranked third to tenth, respectively. The Dipterocarpaceae family dominates both study areas, followed by Euphorbiaceae, Myristicaceae and Burseraceae.

Table 4.4: Top ten most dominant families in terms of Relative density (Rde), Relative dominance (RDi), Relative basal area (Rbdo) and Family Importance Value (FIV) at Bukit Durang and Saremas 1 Div 5 with DBH $\geq$ 10 cm

Bukit Durang					
No.	Family	Rde (%)	RDi (%)	Rbdo (%)	FIV
1	Dipterocarpaceae	29.9	21.6	34.0	28.5
2	Euphorbiaceae	18.8	11.9	17.7	16.1
3	Myristicaceae	7.2	9.4	4.7	7.1
4	Burseraceae	3.1	4.5	5.2	4.3
5	Anacardiaceae	3.3	4.0	3.2	3.5
6	Phyllanthaceae	2.8	2.9	4.6	3.4
7	Moraceae	2.4	3.2	3.6	3.1
8	Myrtaceae	2.9	3.8	2.2	3.0
9	Annonaceae	2.9	4.0	1.9	3.0
10	Fagaceae	1.8	2.5	4.5	2.9
Saremas 1 Div 5					
No.	Family	Rde (%)	RDi (%)	Rbdo (%)	FIV
1	Dipterocarpaceae	27.7	21.0	27.3	25.3
2	Euphorbiaceae	6.8	8.0	6.7	9.4
3	Sapotaceae	6.2	6.2	4.0	5.5
4	Myrtaceae	4.8	5.7	4.8	5.1
5	Moraceae	3.9	4.7	6.4	5.0
6	Lauraceae	4.4	4.2	5.2	4.6
7	Anacardiaceae	5	4.2	3.9	4.4
8	Myristicaceae	3.4	4.2	2.8	3.5
9	Burseraceae	2.8	3.5	3.2	3.2
10	Polygalaceae	2.6	3.0	3.1	2.9

Table 4.5 shows the study's relative abundance of different plant genera in logged-over forests in terms of Genera Importance Value (GIV). In Bukit Durang, the top 10 genera are *Shorea*, *Macaranga*, *Elateriospermum*, *Santiria*, *Xanthophyllum*, *Lithocarpus*, *Myristica*, *Diospyros*, *Syzygium* and *Knema*, with *Shorea* having the highest GIV of 24.2. This indicates that *Shorea* is the most ecologically significant genus in Bukit Durang. In Saremas 1 Div 5, the top 10 genera based on their GIV are *Shorea*, *Syzygium*, *Palaquium*, *Artocarpus*, *Litsea*, *Xanthophyllum*, *Semecarpus*,

Lithocarpus, *Vatica* and *Diospyros*, with *Shorea* also having the highest GIV of 18.69.

This indicates that *Shorea* is also the most ecologically significant genus in Saremas 1

Div 5.

Table 4.5: Top ten most dominant genera in terms of Relative density (Rde),

Relative dominance (RDi), Relative basal area (Rbdo) and Genus Importance

Value (GIV) at Saremas 1 Div 5 and Bukit Durang with DBH $\geq$ 10 cm

Bukit Durang					
No.	Genus	Rde (%)	RDi (%)	Rbdo (%)	GIV
1	<i>Shorea</i>	24.2	24.2	24.1	24.2
2	<i>Macaranga</i>	9.6	9.6	9.6	9.6
3	<i>Elateriospermum</i>	4.6	4.6	4.6	4.6
4	<i>Santiria</i>	3.1	3.1	3.1	3.1
5	<i>Xanthophyllum</i>	2.6	2.6	2.6	2.6
6	<i>Lithocarpus</i>	2.5	2.5	2.5	2.5
7	<i>Myristica</i>	2.2	2.2	2.2	2.2
8	<i>Diospyros</i>	2.1	2.1	2.1	2.1
9	<i>Syzygium</i>	2.1	2.1	2.1	2.1
10	<i>Knema</i>	2.0	2.0	2.0	2.0
Saremas 1 Div 5					
No.	Genus	Rde (%)	RDi (%)	Rbdo (%)	GIV
1	<i>Shorea</i>	20.6	14.1	21.3	18.7
2	<i>Syzygium</i>	4.8	5.7	4.8	5.1
3	<i>Palaquium</i>	5.6	5.3	3.4	4.8
4	<i>Artocarpus</i>	3.5	4.2	5.5	4.4
5	<i>Litsea</i>	3.7	3.2	3.5	3.4
6	<i>Xanthophyllum</i>	2.6	3.0	3.1	2.9
7	<i>Semecarpus</i>	2.9	1.8	2.0	2.2
8	<i>Lithocarpus</i>	1.6	1.5	3.2	2.1
9	<i>Vatica</i>	2.2	2.5	1.6	2.1
10	<i>Diospyros</i>	2.1	2.3	1.7	2.0

Table 4.6 shows the Species Importance Value (SIV), which presents the relative abundance of different plant species in logged-over. The SIV contribution for Bukit Durang was 27.6, Saremas 1 Div 5 with 17.9, Lambir Hills National Park with 41.3% and Kubah National Park with 25.9. In Bukit Durang, *Macaranga triloba* had the highest SIV (5.6), followed by *Elateriospermum tapos* (4.5) and *Shorea parvifolia* (3.4). In Saremas1 Div 5, *S. macroptera* had the highest SIV (4.5), followed by *E. tapos* (1.7) and *S. beccariana* (1.56). The abundance of fast-growing tree species was observed within both logged-over forests of the study areas. The high SIV values of fast-growing pioneer tree species of *M. triloba* in Bukit Durang at 5.6 and Saremas 1 Div 5 at 1.4 were observed. The other fast-grower tree species, such as *S. parvifolia* (Figure 4.1), were also observed to be significant in Saremas 1 Div 5.

Table 4.6: Top ten most dominant species in terms of Relative density (Rd), Relative frequency (Rf), Relative coverage (Rba) and Species Importance Value (SIV) at Bukit Durang and Saremas 1 Div 5 with DBH $\geq$ 10 cm

Bukit Durang					
No.	Species	Rd (%)	Rf (%)	Rba (%)	SIV
1	<i>Macaranga triloba</i>	7.1	3.6	6.1	5.6
2	<i>Elateriospermum tapos</i>	4.8	3.2	5.5	4.5
3	<i>Shorea parvifolia</i>	3.9	1.8	4.5	3.4
4	<i>Shorea pubistyla</i>	3.2	2.0	4.9	3.4
5	<i>Shorea subcylindrical</i>	4.2	2.0	2.6	2.9
6	<i>Gironniera nervosa</i>	2.0	2.3	0.6	1.6
7	<i>Shorea leprosula</i>	1.3	0.9	2.6	1.6
8	<i>Shorea beccariana</i>	1.0	0.2	3.4	1.5
9	<i>Shorea ovata</i>	1.8	1.1	1.6	1.5
10	<i>Xanthophyllum amoenum</i>	1.4	1.4	1.7	1.5
Saremas 1 Div 5					
No.	Species	Rd (%)	Rf (%)	Rba (%)	SIV
1	<i>Shorea macroptera</i>	5.6	2.7	5.4	4.5
2	<i>Elateriospermum tapos</i>	1.5	1.7	1.8	1.7
3	<i>Shorea beccariana</i>	1.7	1.7	1.8	1.6
4	<i>Shorea amplexicaulis</i>	1.7	0.8	2.0	1.5
5	<i>Palaquium pseudorostratum</i>	1.6	1.8	1.0	1.5
6	<i>Semecarpus heterophylla</i>	1.8	1.3	1.2	1.4
7	<i>Litsea accedens</i>	1.6	1.2	1.5	1.4
8	<i>Macaranga triloba</i>	1.3	1.5	1.4	1.4
9	<i>Shorea parvifolia</i>	1.2	0.8	2.2	1.4
10	<i>Shorea multiflora</i>	2.2	0.7	1.3	1.4



Figure 4.1: *Shorea parvifolia* trees grow close to each other in Saremas 1 Div 5

4.3.2 Family, genera and species dominance in primary forests

The top ten families, genera and species important value index (IVI) of primary forests are presented in Tables 4.7, 4.8 and 4.9, respectively. The family important value index (FIV) and genus important value index (GIV) show the Relative Density (Rde), Relative Dominance (RDi) and Relative Basal Area (Rbdo). The species important value (SIV) index shows relative frequency (Rf), relative density (Rd) and relative coverage (Rba).

Both study areas were observed to be highly dominated by Dipterocarpaceae. Lambir Hills National Park had an extremely high FIV with 91.0, while Kubah National Park had 24.6. Lambir Hills National Park showed that Anacardiaceae, Polygalaceae, Lauraceae, Myristicaceae and Moraceae families had FIVs ranging from 15 to 19 and were ranked sixth to second, respectively.

In Kubah National Park, Myrtaceae, Burseraceae, Lauraceae, Sapotaceae and Fabaceae families had FIVs ranging from 4.12% to 10.79% and were ranked sixth to second, respectively. Despite being highly dominated within the other study areas, there was notably exceptional Euphorbiaceae trees lacking in Kubah National Park. Myrtaceae was found to be the second most dominant family in Kubah National Park.

Table 4.7: Top ten most dominant families in terms of Relative density (Rde), Relative dominance (RDi), Relative basal area (Rbdo) and Family Importance Value (FIV) at Lambir Hills National Park and Kubah National Park with DBH $\geq$ 10 cm

Lambir Hills National Park					
No.	Family	Rde (%)	RDi (%)	Rbdo (%)	FIV
1	Dipterocarpaceae	33.16	22.14	35.70	90.99
2	Anacardiaceae	6.82	6.11	6.07	18.99
3	Polygalaceae	8.69	1.53	7.89	18.11
4	Lauraceae	4.68	6.11	6.46	17.25
5	Myristicaceae	4.55	5.34	5.27	15.15
6	Moraceae	4.95	5.34	4.76	15.05
7	Euphorbiaceae	4.95	6.87	3.08	14.90
8	Myrtaceae	4.41	3.82	6.34	14.57
9	Buseraceae	3.74	6.87	2.87	13.48
10	Annonaceae	3.07	4.58	5.15	12.81
Kubah National Park					
No.	Family	Rde (%)	RDi (%)	Rbdo (%)	FIV
1	Dipterocarpaceae	23.8	19.4	30.5	24.6
2	Myrtaceae	12.4	8.2	11.8	10.8
3	Burseraceae	5.7	5.3	8.1	6.4
4	Lauraceae	4.5	5.3	3.9	4.6
5	Sapotaceae	4.1	4.6	4.7	4.5
6	Fabaceae	3.7	4.2	4.5	4.1
7	Annonaceae	3.8	4.6	2.6	3.7
8	Myristicaceae	4.1	4.8	2.1	3.6
9	Polygalaceae	2.9	3.6	1.8	2.8
10	Fagaceae	2.8	2.7	2.4	2.6

Table 4.8 shows the Relative Density (Rde), Relative Dominance (RDi), Relative Basal Area (Rbdo) and Genera Importance Value (GIV). Results show that *Shorea* is the most dominant genus in both national parks. In Lambir Hills National Park, the most ecologically important genus was *Shorea*, with a GIV of 27.87, followed by *Dryobalanops*, with a GIV of 13.47. Other genera have lesser GIV values, indicating they are less dominant in this ecosystem, such as *Xanthophyllum*, *Vatica*, *Dipterocarpus* and *Artocarpus*, with GIVs ranging from 3 to 6. In Kubah National Park, *Shorea* is also the most dominant genus, but with a slightly lower GIV value of 16.6. *Syzygium* is the second most dominant genus, with a GIV of 12.5. The other genera with lower GIV values, including *Santiria*, *Palaquium*, *Dipterocarpus* and *Litsea*, had GIVs ranging

from 3 to 5.

Table 4.8: Top ten most dominant genera in terms of Relative density (Rde), Relative dominance (RDi), Relative basal area (Rbdo) and Genus Importance Value (GIV) at Lambir Hills and Kubah National Parks with DBH $\geq$ 10 cm

Lambir Hills National Park					
No.	Genus	Rde (%)	RDi (%)	Rbdo (%)	GIV
1	<i>Shorea</i>	14.17	14.17	3.04	27.87
2	<i>Dryobalanops</i>	5.75	5.75	3.04	13.47
3	<i>Xanthophyllum</i>	8.42	8.69	3.68	5.26
4	<i>Vatica</i>	8.69	8.42	2.88	4.36
5	<i>Dipterocarpus</i>	3.74	3.74	2.88	4.49
6	<i>Artocarpus</i>	4.68	4.68	2.88	3.41
7	<i>Palaquium</i>	3.61	3.61	2.24	2.86
8	<i>Syzygium</i>	2.54	4.14	2.24	2.60
9	<i>Litsea</i>	3.74	3.74	2.24	2.25
10	<i>Santiria</i>	4.14	2.54	1.76	1.90
Kubah National Park					
No.	Genus	Rde (%)	RDi (%)	Rbdo (%)	GIV
1	<i>Shorea</i>	15.5	12.9	21.4	16.6
2	<i>Syzygium</i>	12.8	10.5	14.3	12.5
3	<i>Santiria</i>	4.0	3.6	6.9	4.8
4	<i>Palaquium</i>	3.1	4.0	4.1	3.7
5	<i>Dipterocarpus</i>	3.8	2.5	4.2	3.5
6	<i>Litsea</i>	3.4	3.8	2.8	3.3
7	<i>Xanthophyllum</i>	2.9	3.6	1.8	2.8
8	<i>Baccaurea</i>	2.1	2.5	2.0	2.2
9	<i>Vatica</i>	2.2	1.5	2.6	2.1
10	<i>Castanopsis</i>	2.0	1.7	2.0	1.9

The dominance of different tree species in primary forests of both National Parks in terms of their Relative Density (Rde), Relative Dominance (RDi), Relative Basal Area (Rbdo) and Species Importance Value (SIV) is shown in Table 4.9. Lambir Hills National Park had high SIV values of *Dryobalanops aromatica*, with 21.4. The other species, such as *Xanthophyllum velutinum*, *Vatica nitens*, *Shorea falcifera*, *D. globosus* and *S. parvifolia*, have SIV ranging from 11 to 19. Kubah National Park was observed to have a high value of SIV of *Syzygium havilandii* at 6.9. Other species' SIVs

represented by *Santiria tomentosa*, *Santiria rubiginosa* and *Shorea macroptera* ranged from 2.1 to 2.9.

Table 4.9: Top ten most dominant species in terms of Relative density (Rd), Relative frequency (Rf), Relative coverage (Rba) and Species Importance Value (SIV) at Lambir Hills and Kubah National Parks with DBH $\geq$ 10 cm

Lambir Hills National Park					
No.	Species	Rd (%)	Rf (%)	Rba (%)	SIV
1	<i>Dryobalanops aromatica</i>	5.4	3.5	12.6	21.4
2	<i>Xanthophyllum velutinum</i>	8.6	4.7	5.3	18.6
3	<i>Vatica nitens</i>	8.2	4.5	4.3	17.0
4	<i>Shorea falcifera</i>	3.6	3.1	4.8	11.5
5	<i>Dipterocarpus globosus</i>	3.6	3.5	4.0	11.1
6	<i>Shorea parvifolia</i>	2.1	2.2	6.1	10.5
7	<i>Palaquium leiocarpum</i>	3.5	2.9	2.9	9.2
8	<i>Shorea pinanga</i>	1.7	1.4	5.3	8.5
9	<i>Elateriospermum tapos</i>	2.0	2.2	2.9	7.1
10	<i>Parishia insignis</i>	2.7	2.2	2.0	6.9
Kubah National Park					
No.	Species	Rd (%)	Rf (%)	Rba (%)	SIV
1	<i>Syzygium havilandii</i>	8.0	3.6	8.9	6.9
2	<i>Santiria tomentosa</i>	2.5	2.1	3.5	2.7
3	<i>Santiria rubiginosa</i>	1.5	1.5	3.4	2.1
4	<i>Shorea macroptera</i>	2.9	1.7	1.8	2.1
5	<i>Castanopsis evansii</i>	2.1	1.7	2.0	1.9
6	<i>Shorea parvifolia</i>	1.6	1.7	2.0	1.8
7	<i>Syzygium subrufa</i>	1.9	2.3	1.0	1.7
8	<i>Shorea quadrinervis</i>	1.5	1.0	2.4	1.6
9	<i>Koompassia malaccensis</i>	1.2	1.1	2.2	1.5
10	<i>Vatica nitens</i>	1.5	0.8	2.2	1.5

4.4 Genus and species diversity indices

4.4.1 Genus and species diversity index of logged-over and primary forests

Genera and species diversity indices in logged-over and primary forests in this study showed variations, as shown in Table 4.10. At the genus level, the Shannon-Weiner Diversity Index (H') of Saremas 1 Div 5 (5.42) and Lambir National Park (5.41) were significantly higher ($p \leq 0.05$) compared to Bukit Durang (4.70) and Kubah National Park (4.62). There is no significant difference between Saremas 1 Div 5 and Lambir Hills National Park, as well as between Bukit Durang and Kubah National Park. For Simpson's Diversity Index (D), the genera of all study areas showed no significant differences among each other. Bukit Durang recorded a value of 0.93, Saremas 1 Div 5 was 0.94, Lambir Hills National Park was 0.95 and Kubah National Park was 0.95.

Pielou's evenness (E') measures the relative abundance of different species in an area. The E' values of both primary forests of Lambir Hills (0.21) and Kubah National Park (0.21) were recorded to have significantly higher ($p \leq 0.05$) than both logged-over forests (0.17 for Bukit Durang and 0.17 for Saremas 1 Div 5). There is no significant difference between Lambir Hills and Kubah National Parks, as well as between Bukit Durang and Saremas 1 Div 5.

At the species level, the Shannon-Weiner Diversity Index (H') values recorded in both logged-over forests (5.05 for Bukit Durang and 5.07 for Saremas 1 Div 5) and Kubah National Park (4.85) were comparable among each other. On the contrary, Lambir Hills National Park was shown to be significantly lower ($p \leq 0.05$) than the other study areas. The Simpson's Diversity Index (D) was similar among each study area, with

the D values ranging from 0.97 to 0.99. The Pielou's evenness (E') values for species level in all study areas were not significantly different among each study area, with the values ranging from 0.18 to 0.19.

Table 4.10: Genus and species diversity indices

Indices	Bukit Durang	Saremas 1 Div 5	Lambir Hills National Park	Kubah National Park
Genera				
Shannon-Weiner Diversity Index (H')	4.70 ^a	5.42 ^b	5.41 ^b	4.62 ^a
Simpson's Diversity Index (D)	0.93 ^a	0.94 ^a	0.95 ^a	0.95 ^a
Pielou's evenness (E')	0.17 ^a	0.17 ^a	0.21 ^b	0.21 ^b
Species				
Shannon-Weiner Diversity Index (H')	5.05 ^b	5.07 ^b	4.09 ^a	4.85 ^b
Simpson's Diversity Index (D)	0.99 ^a	0.99 ^a	0.97 ^a	0.97 ^a
Pielou's evenness (E')	0.18 ^a	0.18 ^a	0.20 ^a	0.18 ^a

*Mean values in the row followed by different letters indicate significant differences at $P < 0.05$ using Tukey's test.

4.5 Tree size distribution by diameter class

4.5.1 Tree size distribution by diameter class of logged-over forests

Figures 4.2 and 4.3 represent the number of enumerated tree stems in logged-over forests categorized into different diameter classes. The number of individual stems decreased with the increasing diameter of trees. This pattern of distribution of logged-over forests is referred to as the reverse J-curve.

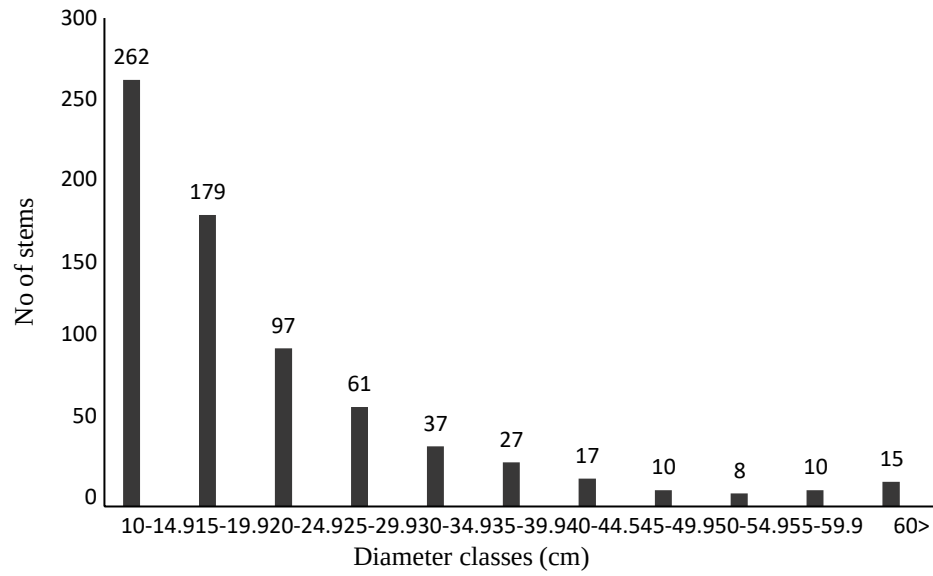


Figure 4.2: Stand distribution of by diameter classes in Bukit Durang

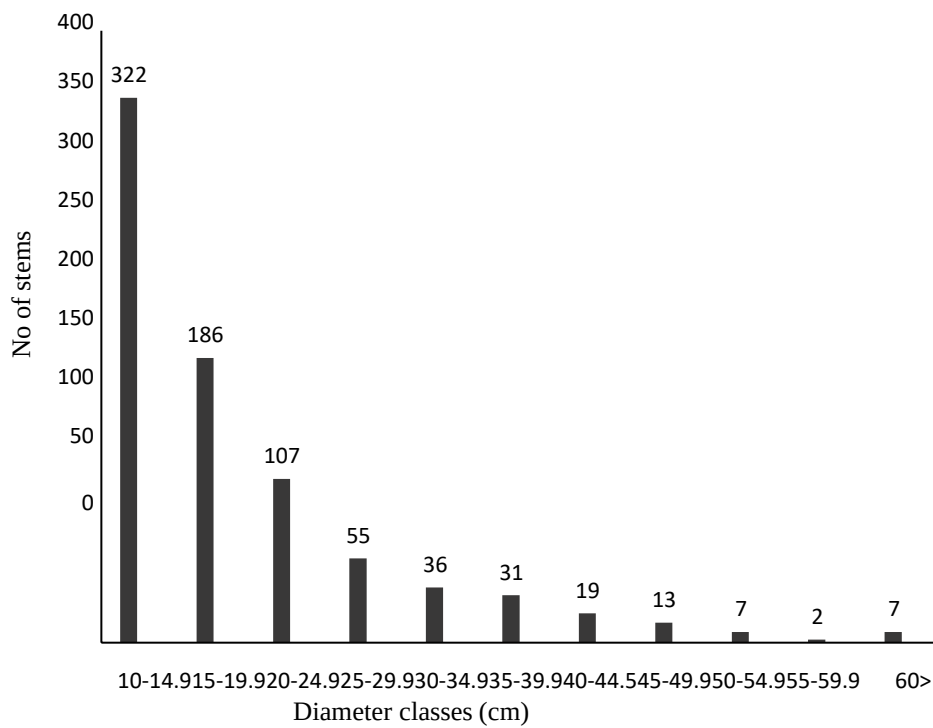


Figure 4.3: Stand distribution of by diameter classes in Saremas 1 Div 5

In Bukit Durang, trees with DBH of 10–14.9 cm classes contain the highest number of individual trees with 262 stems (Figure 4.2). The lowest number of trees was 50–54.9 cm diameter class, with eight number stems. There were 15 stems of seven families in diameter classes 60 cm and higher. The tree with the largest diameter recorded in the study area is *Glochidion obscurum* (a fast-growing tree species) in the family of Phyllantaceae, with a diameter of 104 cm (Appendix 1).

In Saremas 1 Div 5, the trees with DBH 10–14.9 cm class contain the highest number of individual trees with 356 stems (Figure 4.3). It was recorded that the lowest number of individual trees was within 55–59.9 cm diameter classes with two number stems. Only seven living trees with a stand diameter of more than 60 cm were found in the study area. The families with large trees in the study area include Dipterocarpaceae and Pentaphylacaceae. *Shorea macroptera* in the family of Dipterocarpaceae recorded the largest diameter of 85.9 cm (Appendix 1).

4.5.2 Tree distribution by diameter class of primary forests

Figures 4.4 and 4.5 represent the number of enumerated trees according to different diameter classes in primary forests. As observed in logged-over forests, the tree distribution shows the reverse-J pattern. Lambir Hills National Park study area recorded a high number of trees in the DBH of 10–14.9 cm class with 265 stems (Figure 4.4). The lowest number of individual trees was within the 55–59.9 cm diameter class with eight stems. A remarkably high number of trees with diameters of 60 cm and above were observed and recorded, which consist of 20 stems.

In Lambir Hills National Park, the *Shorea uliginosa* tree from the family of Dipterocarpaceae was recorded to have the largest stem diameter of 105.2 cm in

diameter (Appendix 3). Kubah National Park recorded a high abundance of 10–14.9 cm DBH class with 263 stems (Figure 4.5). It was recorded that this study area’s large tree population (DBH $\geq$ 60 cm) had the lowest number of stems. *Shorea collaris* and *S. havilandii* recorded the largest diameter within the Kubah National Park study area, with 63.1 and 69.2 cm, respectively (Appendix 4).

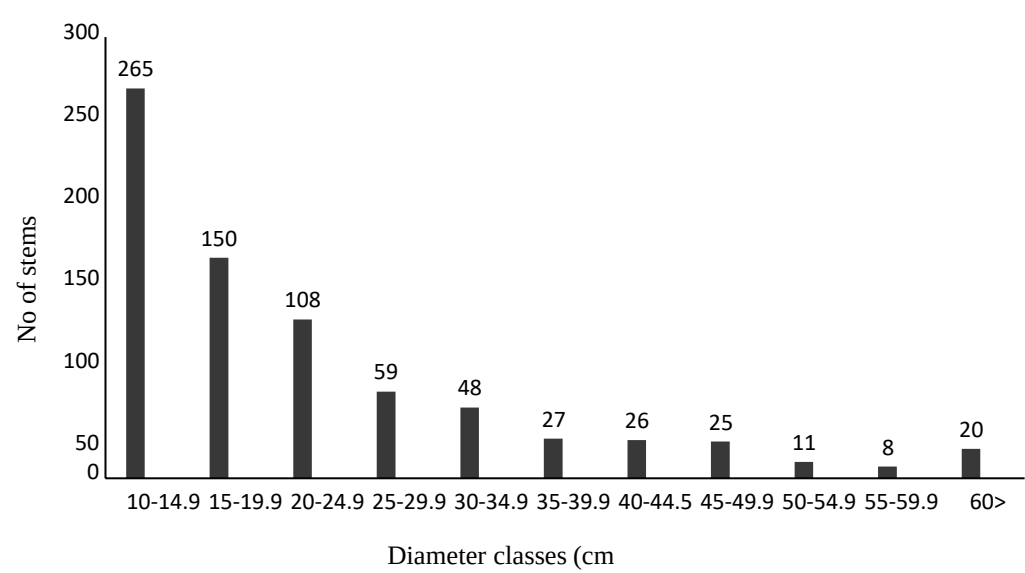


Figure 4.4: Stand distribution by diameter classes in Lambir Hills National Park

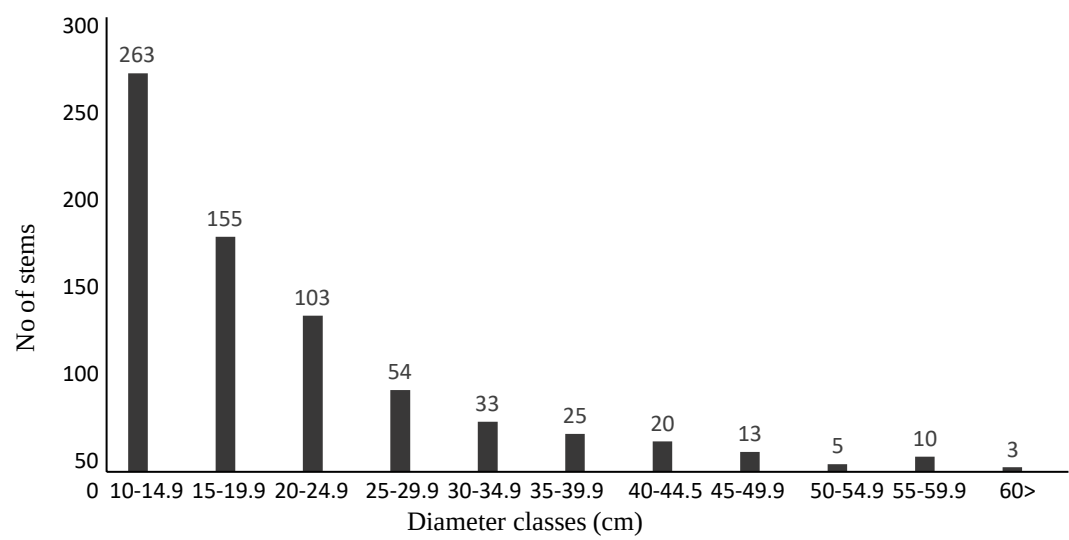


Figure 4.5: Stand distribution by diameter classes in Kubah National Park

4.6 Aboveground biomass (AGB) and carbon stocks

The results of the estimated total AGB and carbon stocks of trees of all of the logged-over and primary forests in this study are shown in Figure 4.6.

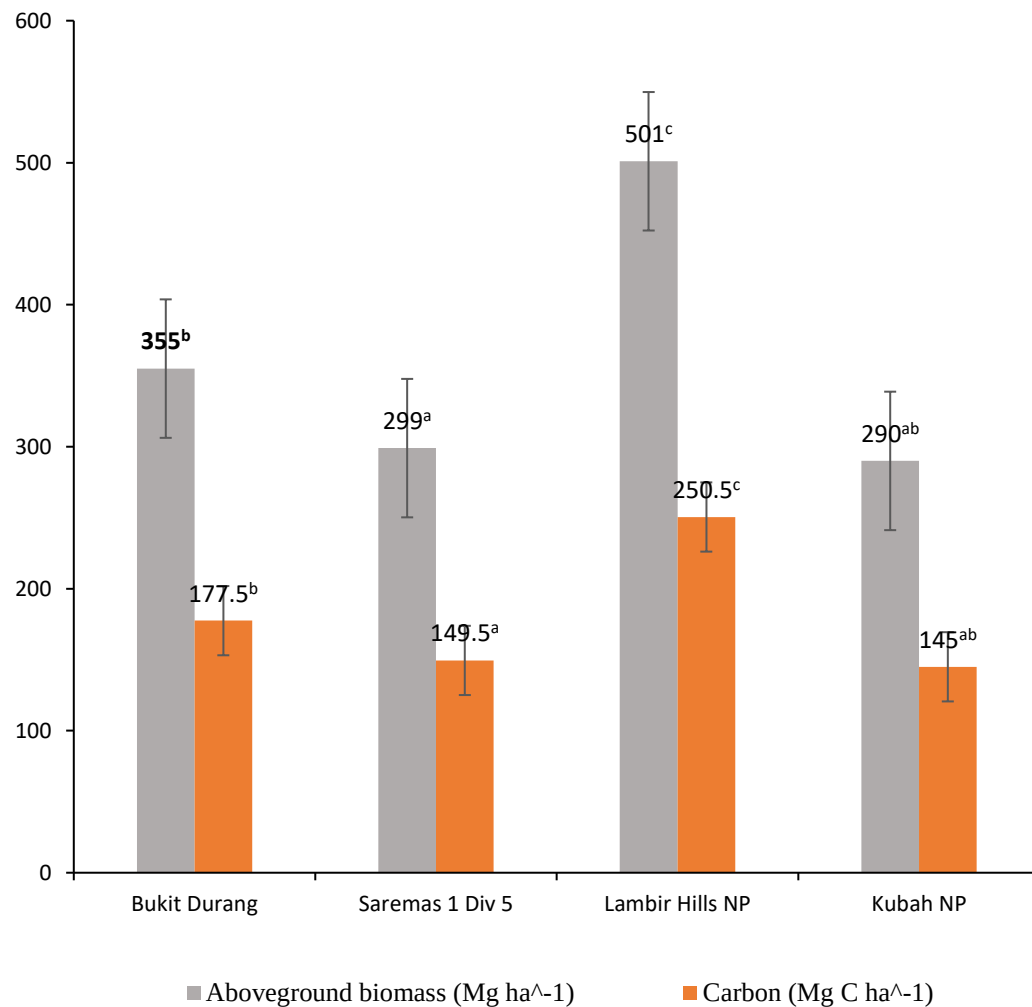


Figure 4.6: The AGB and carbon stock in logged-over and primary forests. Mean values in the bar followed by different letters indicate significant differences at $P < 0.05$ using Tukey's test

The result shows AGB and carbon stock in Bukit Durang are significantly higher ($p \leq 0.05$) than in Saremas 1 Div 5. The AGB and carbon stock values recorded for both Bukit Durang were 355 Mg ha⁻¹ and 177.5 Mg C ha⁻¹ and for Saremas 1 Div 5, they were 299 Mg ha⁻¹ and 149 Mg C ha⁻¹, respectively. The AGB in Lambir Hills National Park is 501 Mg ha⁻¹ and Kubah National Park is 290 Mg ha⁻¹. The AGB values are equivalent to 250.5 Mg C ha⁻¹ and 145 Mg C ha⁻¹ of carbon stock in Lambir Hills National Park and Kubah National Park, respectively. The AGB and carbon stock of the Lambir Hills National Park study area were recorded to be significantly higher ($p \leq 0.05$) than the other study areas in this study. The AGB and carbon stock of trees in Kubah National Park were slightly lower than that in both logged-over forests in this study (Bukit Durang and Saremas 1 Div 5), with no significant difference recorded.

4.7 Variation of carbon stock

4.7.1 Carbon stock distribution among diameter classes

4.7.1.1 Carbon stock distribution among diameter classes of logged-over forests

The results of the estimation of carbon stock distribution in different diameter tree size classes of both logged-over forests are shown in Figure 4.7. The carbon accumulation trend varies with respect to diameter classes. The result revealed that the carbon stock was high in the diameter class 60 cm and above. The lowest carbon stock was in the 10–14.9 cm diameter class. The carbon stocks distribution trend among diameter classes of stands in Saremas 1 Div 5 is similar to Bukit Durang. Carbon stock was highest in the diameter class of 60 cm and above with 19 Mg C ha⁻¹.

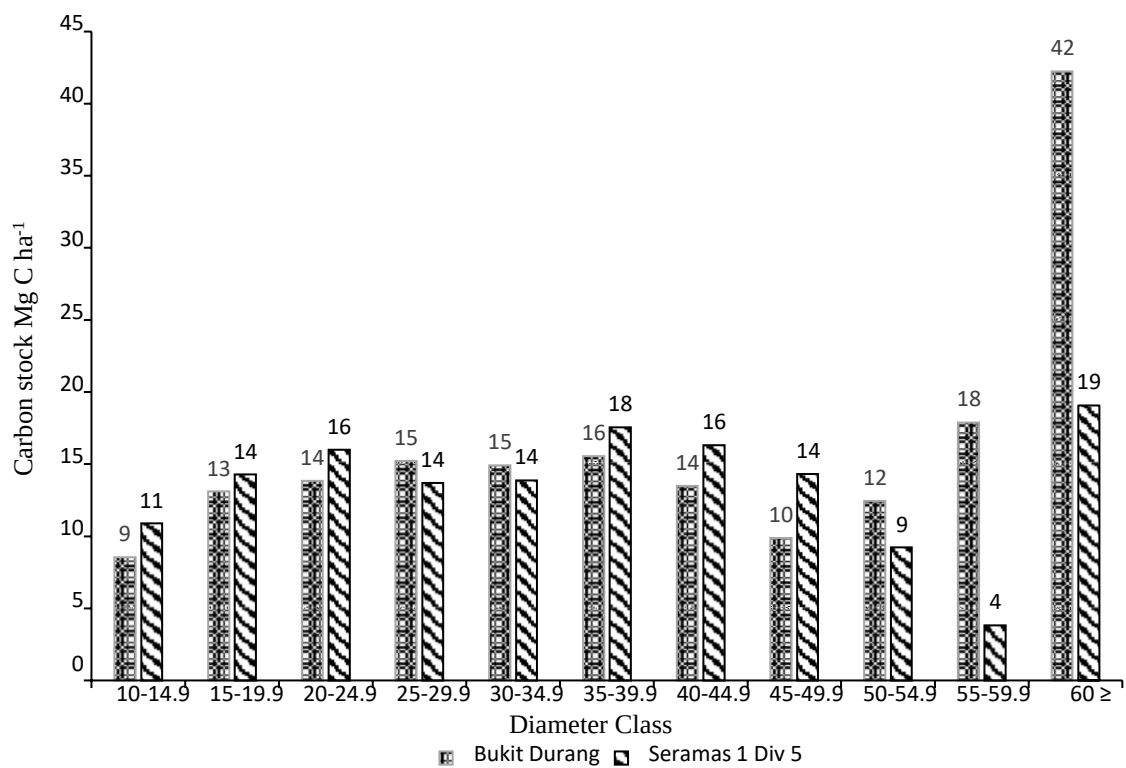


Figure 4.7: Carbon stock distribution among diameter classes (cm) inBukit Durang and Saremas 1 Div 5

4.7.1.2 Carbon stock distribution among diameter classes of primary forests

The distribution of carbon stocks in different diameter tree size classes of primary forests is shown in Figure 4.8. The carbon accumulation trend varies among the diameter classes. In Lambir Hills National Park, an exceptionally high carbon stock was observed in the class with a more than 60 cm diameter and 76 Mg C ha⁻¹. The carbon stock value equals 30% of the total carbon stock within the study area. The least carbon stock was 10 Mg C ha⁻¹ in the 10–14.9 cm diameter class. The carbon stock in Kubah National Park distribution also varies among diameter classes. However, carbon stock in the 60 cm and above diameter class is comparatively low. High carbon stocks were observed in 40–44.9 cm and 55–59.9 cm diameter classes.

Generally, smaller trees in the 10–29.9 cm diameter range in all study areas were observed to have a small contribution to the carbon stock in the forests despite having the highest number of trees except for Kubah National Park. The bulk of carbon stock distribution in both logged-over forests (Bukit Durang and Saremas 1 Div 5) study areas and Lambir Hills National Park seemed to be in the ≥ 60 cm diameter class.

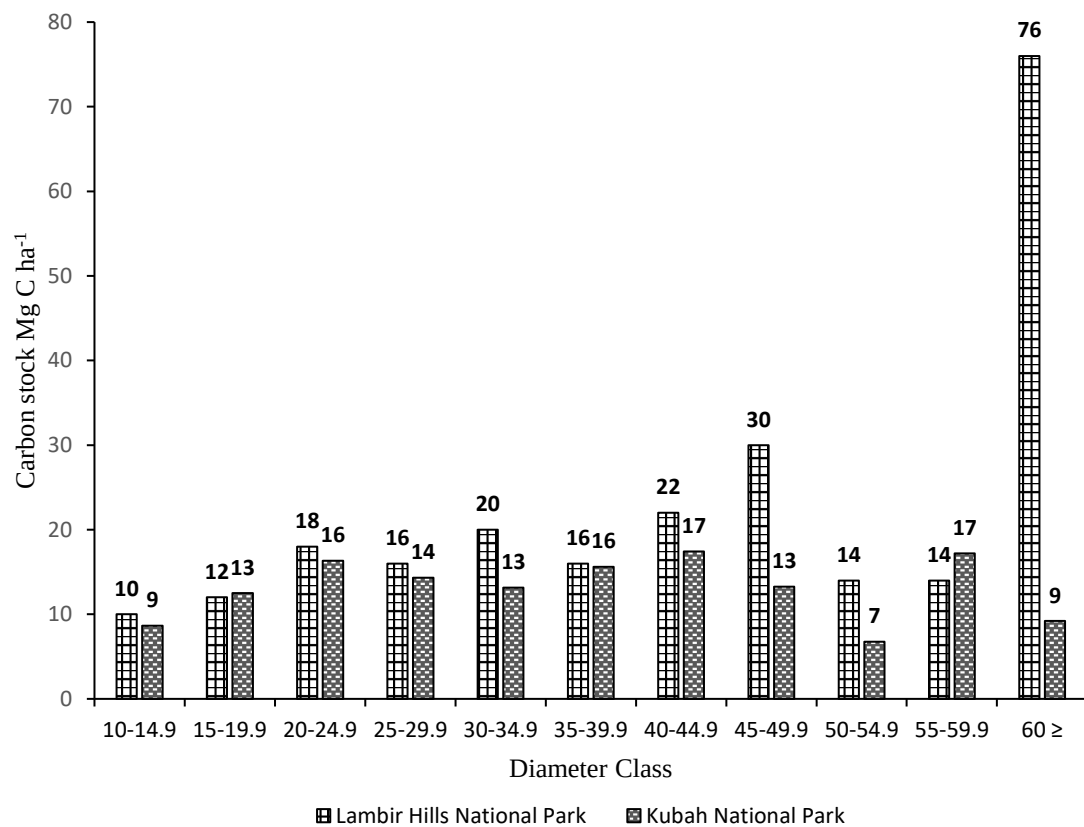


Figure 4.8: Carbon stocks distribution among diameter classes (cm) in Lambir Hills National Park and Kubah National Park

4.7.2 Carbon stock distribution in family, genera and species

4.7.2.1 Carbon stock distribution in family, genera and species of logged-over forests

The distribution of the top ten carbon stocks in family, genera and species levels for logged-over is presented in Table 4.11. In the Bukit Durang study area, the top ten families of tree populations contributed up to 80.2% of the total carbon storage. At the genus level, the top ten genera population accounts for 61.9% and at the species level, the top ten species contribute 34.5% of the overall carbon stock. In Saremas 1 Div 5, the top ten tree populations within the study area contributed up to 69.5% of the total carbon storage. At the genus level, the top ten genera population accounts for 53.2%, at the species level, the top ten species contribute 26.2% of total carbon stocks.

Dipterocarpaceae was recorded as the major contributor to the total carbon stocks of both logged-over forests in this study. Dipterocarpaceae contributed 25 Mg C ha⁻¹ or 14% of the total carbon stock in Bukit Durang. The notable high contribution of carbon stock by Euphorbiaceae, Phyllanthaceae and Burseraceae in Bukit Durang was 10 Mg C ha⁻¹ and 9 Mg C ha⁻¹, respectively. Meanwhile, the other top ten families contribute to AGB in the 4–8 Mg C ha⁻¹ range. In Saremas 1 Div 5, the list of top ten families also showed that the Dipterocarpaceae trees recorded 37 Mg C ha⁻¹ (25%) of carbon stock, while the other families in the top ten ranged between 5 Mg C ha⁻¹ to 10 Mg C ha⁻¹.

The generic level, *Shorea*, considerably contributed to carbon stock in the study areas. In Bukit Durang, *Elasteriospermum*, *Macaranga* and *Syzygium* were the other notable genera carbon stock contributors to the forest areas, with 13 Mg C ha⁻¹, 9 Mg C

ha⁻¹ and 7 Mg C ha⁻¹, respectively. In Saremas 1 Div 5, *Artocarpus*, *Syzygium* and *Lithocarpus* were the other major contributors to carbon stocks within the study area, with 9 Mg C ha⁻¹, 8 Mg C ha⁻¹ and 6 Mg C ha⁻¹. The notable carbon stock contributor was *Macaranga* (pioneer species trees) within the study area of Bukit Durang, with 9 Mg C ha⁻¹.

Fast-growing species like *Macaranga triloba*, *Glochidion obscurum* and *Shorea parvifolia* were observed to be among the important contributors to carbon storage within the Bukit Durang study area. In the Saremas 1 Div 5 study area, *S. macroptera* was the major contributor to carbon storage within the study areas with 8 Mg C ha⁻¹. The other notable species contributing the carbon include *Ternstroemia citrina*, *Elateriospermum tapos*, *Lithocarpus bennettii* and *Dipterocarpus sublamellatus* with 5 Mg C ha⁻¹, 4 Mg C ha⁻¹, 4 Mg C ha⁻¹ and 4 Mg C ha⁻¹, respectively.

Table 4.11: Top ten cumulative carbon stocks for tree families, genera and species in logged-over forests

Locations				
Bukit Durang			Saremas 1 Div 5	
No	Family	Carbon (Mg C ha ⁻¹)	Family	Carbon (Mg C ha ⁻¹)
1	Dipterocarpaceae	25	Dipterocarpaceae	37
2	Euphorbiaceae	10	Moraceae	10
3	Phyllanthaceae	9	Euphorbiaceae	9
4	Burseraceae	9	Myrtaceae	9
5	Myrtaceae	9	Lauraceae	9
6	Fagaceae	6	Fagaceae	7
7	Anacardiaceae	6	Fabaceae	6
8	Moraceae	6	Sapotaceae	6
9	Sapindaceae	5	Burseraceae	6
10	Myristicaceae	5	Pentaphylacaceae	5
No	Genera	Carbon (Mg C ha ⁻¹)	Genera	Carbon (Mg C ha ⁻¹)
1	<i>Shorea</i>	45	<i>Shorea</i>	29
2	<i>Elateriospermum</i>	13	<i>Artocapus</i>	9
3	<i>Macaranga</i>	9	<i>Syzygium</i>	8
4	<i>Syzygium</i>	8	<i>Lithocarpus</i>	6
5	<i>Lithocarpus</i>	7	<i>Ternstroemia</i>	5
6	<i>Glochidion</i>	7	<i>Xanthophyllum</i>	5
7	<i>Santiria</i>	7	<i>Dipterocarpus</i>	5
8	<i>Dipterocarpus</i>	5	<i>Dacryodes</i>	4
9	<i>Xerospermum</i>	5	<i>Elateriospermum</i>	4
10	<i>Xanthophyllum</i>	4	<i>Palaquium</i>	4
No.	Species	Carbon (Mg C ha ⁻¹)	Species	Carbon (Mg C ha ⁻¹)
1	<i>Elateriospermum tapos</i>	13	<i>Shorea macroptera</i>	8
2	<i>Shorea pubistyla</i>	8	<i>Ternstroemia citrina</i>	5
3	<i>Glochidion obscurum</i>	7	<i>Elateriospermum tapos</i>	4
4	<i>Shorea parvifolia</i>	7	<i>Lithocarpus bennettii</i>	4
5	<i>Macaranga triloba</i>	6	<i>Dipterocarpus sublamellatus</i>	4
6	<i>Shorea beccariana</i>	6	<i>Shorea parvifolia</i>	3
7	<i>Xerospermum noronhianum</i>	5	<i>Sindora beccariana</i>	3
8	<i>Shorea macrophylla</i>	4	<i>Syzygium subcrenatum</i>	3
9	<i>Shorea leprosula</i>	4	<i>Shorea pinanga</i>	3
10	<i>Shorea mecistopteryx</i>	3	<i>Xanthophyllum affine</i>	3

4.7.2.2 Carbon stock distribution in families, genera and species of primary forests

The top ten carbon stock distributions in family, genera and species levels for primary forests are presented in Table 4.12. Lambir Hills National Park was recorded to have exceptionally high carbon stock contributions from the top ten families, genera and species compared to the other study areas, with 88.6%, 75.5% and 55.0%, respectively. Meanwhile, Kubah National Park has 77.3%, 63.6% and 37.3% of the contribution of carbon stocks from the top ten families, genera and species within the study area, respectively.

Dipterocarp trees in Lambir Hills National Park have a considerably high contribution of carbon stock within the study area, with 147 Mg C ha^{-1} or about 59% of the total carbon stock. The notable high contribution of carbon stocks for Euphorbiaceae and Polygalaceae in Lambir Hills National Park was also observed with 14 Mg C ha^{-1} and 12 MgC ha^{-1} , respectively. Other top ten families contributions ranged between 5 Mg C ha^{-1} to 12 Mg C ha^{-1} . Family Dipterocarpaceae in Kubah National Park also recorded substantial carbon stock with 48 Mg C ha^{-1} . The other remarkable carbon stock values in the study area were contributed by Myrtaceae and Burseraceae with 18 Mg C ha^{-1} and 13 Mg C ha^{-1} , respectively. The other top ten families ranged from 3 Mg C ha^{-1} to 8 Mg C ha^{-1} .

In the genus level, Lambir Hills National Park recorded the contribution of carbon stocks were dominated by *Shorea*, *Dipterocarpus*, *Xanthophyllum* and *Elateriospermum* with 75 Mg C ha^{-1} , 44 Mg C ha^{-1} , 13 Mg ha^{-1} , 12 Mg C ha^{-1} and 12 Mg C ha^{-1} , respectively. In Kubah National Park, *Shorea*, *Syzygium*, *Santiria* and *Palaquium* were recorded as the main contributors of carbon stocks in the study area,

with 33 Mg C ha⁻¹, 16 Mg C ha⁻¹, 11 Mg C ha⁻¹ and 8 Mg C ha⁻¹, respectively.

At the species level, Lambir Hills National Park recorded *Dryobalanops aromatica* as the main contributor to the carbon stock within the study area with 41 Mg C ha⁻¹. *Shorea falcifera* and *S. parvifolia* notably contributed a remarkable amount of carbon stocks within the study area, with 17 Mg C ha⁻¹ and 16 Mg C ha⁻¹ of carbon stocks, respectively. The other species with abundant carbon stocks within the study area were *Xanthophyllum velutimum* and *Elateriospermum tapos*, which were recorded to have 12 Mg C ha⁻¹. In Kubah National Park, *Syzygium havilandii* was the main contributor to carbon stocks at the species level within the study area, with 13 Mg C ha⁻¹. The other notable species contributing to the carbon stocks within the study area included *Santiria rubiginosa*, *S. tomentosa*, *Dipterocarpus* spp. *S. havilandii* and *Kompassia malaccensis* with 6 Mg C ha⁻¹, 5. Mg C ha⁻¹, 5 Mg C ha⁻¹, 5 MgC ha⁻¹ and 5 Mg C ha⁻¹, respectively.

Table 4.12: Top ten cumulative carbon stocks for tree families, genera and species in primary forests

Locations				
Lambir Hills National Park			Kubah National Park	
No	Family	Carbon (Mg C ha ⁻¹)	Family	Carbon (Mg C ha ⁻¹)
1	Dipterocarpaceae	147	Dipterocarpaceae	48
2	Euphorbiaceae	14	Myrtaceae	18
3	Polygalaceae	12	Burseraceae	13
4	Anacardiaceae	10	Sapotaceae	8
5	Fabaceae	8	Fabaceae	8
6	Sapotaceae	7	Anacardiaceae	5
7	Buseraceae	7	Lauraceae	4
8	Moraceae	7	Fagaceae	3
9	Myrtaceae	5	Phyllanthaceae	3
10	Loganiaceae	5	Annonaceae	3
No	Genera	Carbon (Mg C ha ⁻¹)	Genera	Carbon (Mg C ha ⁻¹)
1	<i>Shorea</i>	75	<i>Shorea</i>	33
2	<i>Dryobalanops</i>	44	<i>Syzygium</i>	16
3	<i>Dipterocarpus</i>	13	<i>Santiria</i>	11
4	<i>Xanthophyllum</i>	12	<i>Palaquium</i>	8
5	<i>Elateriospermum</i>	12	<i>Dipterocarpus</i>	7
6	<i>Vatica</i>	9	<i>Koompassia</i>	5
7	<i>Palaquium</i>	8	<i>Vatica</i>	4
8	<i>Artocarpus</i>	6	<i>Baccaurea</i>	3
9	<i>Syzygium</i>	5	<i>Castanopsis</i>	3
10	<i>Koompassia</i>	5	<i>Melanorrhoea</i>	3
No	Species	Carbon (Mg C ha ⁻¹)	Species	Carbon (Mg C ha ⁻¹)
1	<i>Dryobalanops aromatica</i>	41	<i>Syzygium havilandii</i>	13
2	<i>Shorea falcifera</i>	17	<i>Santiria rubiginosa</i>	6
3	<i>Shorea parvifolia</i>	16	<i>Santiria tomentosa</i>	5
4	<i>Xanthophyllum velutinum</i>	12	<i>Dipterocarpus</i> spp.	5
5	<i>Elateriospermum tapos</i>	12	<i>Shorea havilandii</i>	5
6	<i>Dipterocarpus globosus</i>	11	<i>Koompassia malaccensis</i>	5
7	<i>Vatica nitens</i> King	9	<i>Shorea</i> spp.	4
8	<i>Shorea macroptera</i>	8	<i>Shorea glaucescens</i>	4
9	<i>Palaquium leiocarpum</i> .	8	<i>Vatica nitens</i>	4
10	<i>Koompassia malaccensis</i>	5	<i>Shorea quadrinervis</i>	3

4.8 Relationship of stand structure attributes, SIV and carbon stock of logged-over and primary forests

4.8.1 Pearson correlation coefficient (PCC) analysis for combined data of stand structure attributions, SIV and carbon stock

The Pearson correlation coefficient (PCC) was used to measure the strength of the association among the tree attributions and carbon stock for overall data in all study areas, as shown in Table 4.13. Tree attributions considered were DBH, wood density and species important value (SIV) index. Results show that basal area and DBH are significantly ($P < 0.01$) correlated to carbon stock. The result showed a remarkable correlation of the stand growth parameters with carbon stock. SIV ($r = 0.137$), basal area ($r = 0.442$) and DBH ($r = 0.361$).

Table 4.13: Pearson correlation coefficient for combined data of stand structure attributes, SIV and carbon stock

Parameters	Carbon stock (Mg C ha ⁻¹)
Carbon stock (Mg C ha ⁻¹)	1
SIV (%)	0.137**
Basal area (m ² /ha)	0.442**
DBH (cm)	0.361**
Wood density	0.024

** . Correlation is significant at the 0.01 level (2-tailed).

4.9 Chapter summary

This chapter presents comprehensive findings on various aspects of the studied forests. It covers the stand structure and floristic family composition, including family, genera and species dominance. Additionally, it provides insights into genus and species diversity indices and the distribution of tree sizes by diameter class. The chapter also examines AGB and carbon stocks and the relationships between stand structure attributes, species importance and carbon stock in both logged-over and primary forests.

CHAPTER 5

DISCUSSION

5.1 Stand structure characteristics

5.1.1 Tree density and species composition in logged-over forests and primary forests

Generally, the trend of tree density with $\text{DBH} \geq 10$ cm recorded in logged-over forest areas is comparable to the primary forests in this study. The overall results in this study concurred with previous studies, which stated that the lowland tropical rainforest bears a remarkably high density of trees (Chai et al., 1995; LaFrankie et al., 2006). The statistical analysis shows the number of trees in each study area is comparable. Nevertheless, Saremas 1 Div 5 ($798 \text{ trees ha}^{-1}$) and Bukit Durang ($760 \text{ trees ha}^{-1}$) showed a relatively higher tree density (despite experiencing more recent disturbance) than Lambir Hills ($747 \text{ trees ha}^{-1}$) and Kubah National Park ($720 \text{ trees ha}^{-1}$). The past recorded data reported that the number of trees per ha in other tropical primary forests found in southern regions of Sarawak was relatively comparable, such as in Semenggoh Nature Reserve ($710 \text{ trees ha}^{-1}$) (Diway et al., 2009), Bako National Park ($792 \text{ trees ha}^{-1}$) and Batang Ai National Park ($813 \text{ trees ha}^{-1}$) (Ling & Julia, 2012). The tree density in other disturbed forests was reported to be comparable, as in the fragmented forest of Mina Wildlife Corridor, Bintulu ($712 \text{ trees ha}^{-1}$) (Vilma et al., 2012) and Bukit Jugam, Bintulu logged-over forest ($728 \text{ trees ha}^{-1}$) (Demies et al., 2019).

This depicts the variation of forest recovery and composition in response to different levels of disturbance and ecological conditions. The higher tree density in logged-over forests also suggests that the study areas might be experiencing favourable conditions for regrowth or could have a different composition of tree species that are more resilient to the disturbance factors present. This is crucial for understanding the potential for forest recovery in disturbed areas and can inform strategies for promoting regrowth and restoration in degraded forests (Mills et al., 2023; Nunes et al., 2021).

The comparatively reduced species and family diversity in Lambir Hills National Park could be attributed to the forest's basal area. The basal area of Lambir Hills National Park was recorded to be significantly higher than other study areas. This implies that the forest is in an advanced stage of maturity with larger, older trees, promoting increased competition for resources among tree species. In closed-canopy forests like mature tropical ones, competition among trees usually reduces individual tree growth and mortality, primarily due to the limited light levels beneath the canopy (Uriarte et al., 2004; Lasky et al., 2015; Rozendaal et al., 2020). The intense tree competition also diminishes tree species' adaptive capability, consequently elevating forest ecosystems' susceptibility to environmental stress (Linares et al., 2010; Magalhães et al., 2021).

This intense competition might constrain the establishment and survival of certain species, ultimately leading to a decreased species count in the Lambir Hills National Park study area. The increased competition for resources among tree species in such mature forests can have implications for species survival and forest resilience. Understanding these dynamics is essential for developing effective conservation strategies that promote biodiversity and ecosystem health in mature forests.

5.1.2 Stand DBH in logged-over forests and primary forests

Tree DBH varies significantly among species (Paoli et al., 2008; King, 1996; Feldpausch et al., 2011). The DBH variation of stems in dipterocarp forests can vary depending on the specific species composition, age of the forest and degree of disturbances. Genetic variations within forest species are diverse, leading to distinct traits in different tree species that contribute to varying sizes and structures (Potter & Riitters, 2021). Hence, certain species exhibit rapid growth, while others follow a slower growth pattern. Disturbances like storms, fires and pest outbreaks can also affect tree growth. Some species might be more resilient to certain disturbances and can maintain or recover their DBH more effectively. A combination of biological, ecological and environmental factors also influences the growth and development of trees. Tree species that possess greater adaptability to varying soil conditions and light availability may lead to a larger DBH. The weather conditions can also influence tree growth, with both tree size and species contributing to this effect and these factors may interact with each other (Nabeshima et al., 2010). Pumijumnong et al. (2023) stated that temperature and rainfall are essential drivers of tree growth in tropical regions. The forest's environmental conditions shape the growth patterns of trees, resulting in tree diameter variations.

In Bukit Durang, the DBH class of 10–14.9 cm exhibited the highest number of individual trees, indicating a relatively dense population of smaller trees within the study area (Figure 4.1). The lowest number of individual trees was recorded in the higher diameter class (50–54.9 cm), with only eight stems suggesting a decrease in tree density as the diameter increases. In the Saremas 1 Div 5 study area, the stands with a DBH of 10–14.9 cm also exhibited the highest number of individual trees (Figure 4.2),

with 356 stems showing a similar pattern to Bukit Durang, with a dense population of smaller trees. The pattern of stem diameter variations within both logged-over forests result from the historical logging activities that created gaps in the canopy of the forest areas. These gaps allow more sunlight to reach the forest floor, promoting the growth of small, fast-growing trees (Numata et al., 2006). As a result, these forests often have a high density of small trees and a low density of large trees.

The study recorded 15 trees from seven families with a stem diameter exceeding 60 cm in Bukit Durang. These larger trees belong to various families, indicating diverse species composition and the presence of notable individuals. A fast-growing tree species, *Glochidion obscurum* recorded as the largest diameter within the forest area, highlighting the occurrence of exceptional tree growth by the pioneer tree species. Within Saremas 1 Div 5, only seven trees with a stand diameter greater than 60 cm. The dominant families among these larger trees were Dipterocarpaceae and Pentaphylacaceae. *Shorea macroptera*, a tree species belonging to the Dipterocarpaceae family, recorded the largest stem diameter within the study area, highlighting the significance of these families in terms of large tree representation in the study area.

The primary forests in the study showed the tree distribution on diameter classes in Lambir Hills and Kubah National Parks, which exhibited unique patterns. In both Lambir Hills (Figure 4.3) and Kubah National Park (Figure 4.4), the abundance of trees within the 10–14.9 cm DBH class is particularly ecologically important. It reveals a significant presence of younger trees in this size range, indicating successful regeneration and recruitment processes within the park forests. The remarkably high number of large trees, more than 60 cm DBH class, suggests the presence of mature and potentially old-growth trees in the Lambir Hills study area. According to Sahoo et al.

(2009), the undisturbed forest stands generally showed higher tree density in each DBH class, particularly the intermediate diameter class.

Kubah National Park forest was found to have the lowest number of stem individuals in the larger diameter classes ($\text{DBH} \geq 60$ cm), indicating a variation in forest dynamics or a different stage of forest development compared to the other study areas. The historical selective logging activity might contribute to the lack of large trees in the Kubah National Park forest area, although the activity ceased approximately 60 years (Abang Bohari, 2015). According to McDowell et al. (2020), alterations in environmental factors, land utilization patterns and disturbance routines are making forests transition into younger and shorter tree heights.

These changes reflect the impact of shifting ecological conditions and human activities on forest composition and structure within some parts of the forest area. The lasting effects of the logging activity in the forest can be attributed to a species shift toward dominance in the forest gap, which has influenced species turnover within the area (Numata et al., 2006). The smaller, more shade-tolerant tree species may have a competitive advantage in gap environments. They can establish themselves more quickly and effectively, preventing the regeneration of larger tree species (Hossain & Olson, 2023). Consequently, this may explain the lack of large trees in the Kubah National Park study area.

The tropical dipterocarp forests are known for their large and tall trees, with some species reaching impressive sizes. Forests with many large-diameter trees have more capability to sustain, function and maintain the carbon stock within the study areas (Clark & Clark, 1996). These large trees will likely play a crucial role in providing

habitat, structural complexity and other ecosystem functions. The reverse J-curve distribution of diameter classes observed in both logged-over and primary forests depicts a higher abundance of smaller tree stems and a gradual decrease in individuals as the diameter classes increase. This suggests that the carbon stock might be scarce across the study areas due to the limited number of larger trees. However, the presence of diverse tree species across different diameter classes suggests the potential for carbon stock within both the logged-over and primary forests. According to Gonçalves et al. (2017), a good regenerating tree species in undisturbed forests usually exhibit an inverse J-shaped curve. Thus, this shows a common trend which is also observed in other forest ecosystems, indicating a natural progression of tree growth and development (Westphal et al., 2006).

5.1.3 Basal area in logged-over forests and primary forests

The determination of basal area is important for forest management, and it is part of stand structure and ecological measurement highly associated with standing volume and tree succession (Rozendall et al., 2020). It is a key measurement along with wood density in determining the standing biomass, carbon storage and productivity. This clear correlation between basal area and AGB highlights the importance of measuring basal area when assessing carbon content. An increased basal area indicates a wider trunk diameter, which signifies a higher biomass accumulation (Power et al., 2019).

Lambir Hills National Park has a significantly higher basal area than the other study areas. This might be due to the fact that the forest area is intact without major disturbances as compared to other study areas. However, the number of species and

families observed within the study area was relatively low (compared to the other study areas), with a recorded count of only 131 species and 37 families. Lee et al. (2002) recorded that the number of species and families in their study in 52 ha (≥ 1 cm DBH) of Lambir Hills National Park was 1173 and 81, respectively. The intact tropical rainforest is typically rich in tree species diversity, which can be up to 240 different plant species within one ha (MacKinnon et al., 1997). Lambir Hills National Park species attribution was relatively lower than Malaysia's other recorded undisturbed forests.

The study in lowland mixed dipterocarp forests in Semenggoh Arboretum, Sarawak (Ling & Julia, 2012) and Kuala Keniam, Pahang National Park, Pahang (Suratman, 2012) were recorded to have about 135 and 198 species within one ha study plot, respectively. The results imply that Lambir Hills National Park might have a more established and mature ecosystem than the other three study areas. The undisturbed forest maintains its ecological balance remains intact, as human intervention is minimal (Shumba et al., 2020). This environment permits natural processes like tree growth, competition and self-thinning to continue without disruption, leading to larger tree diameters.

According to Mori and Takeda (2004), the variability in spatial and temporal disturbances in historically disturbed forests significantly impacts the regeneration, dominance and long-term survival of woody species within a forest ecosystem. The primary cause for the reduction in basal area, affecting tree growth and establishment, could be attributed to past anthropogenic disturbances that took place in both the logged-over forests and Kubah National Park. Whitman et al. (1997) stated that the forest areas that had undergone logging activities in the past that typically involved

significant use of heavy equipment have resulted in soil compaction and hindered the recruitment and growth of seedlings in certain forest areas.

The tree species composition also has a remarkable influence on the basal area in the forest study areas of this study. A forest dominated by a high density of wooded tree species usually will possess a greater mass of big trees and have a greater basal area (Baker et al., 2009; Malhi et al., 2006). All study areas showed a prominent presence of tree species belonging to the Dipterocarpaceae family. This family also had the highest basal area contribution in the tropical forest (Gobilik, 2008). Some of the trees in this family grow large and tall and often reach emergent or upper canopy heights. Their ability to attain substantial sizes over long periods contribute to their higher representation in the basal area of the forest area.

Lambir Hills National Park has a significantly higher basal area reflected in the greater domination of Dipterocarp trees within the forest study area. Dipterocarpaceae constitute 33.2% of the total individuals in the park, whereas this family percentage is comparatively lower in Bukit Durang, Saremas 1 Div 5 and Kubah National Park, accounting for 29.9%, 27.1% and 22.9%, respectively. The study by Gobilik (2008) in a virgin jungle reserve of Sabah reported that the contribution of the basal area from Dipterocarpaceae is 55.4% per ha, which is significantly higher compared to Euphorbiaceae with 3% per ha. The result also showed that abundant tree communities within the Lambir Hills National Park have large diameters ($DBH \geq 60$ cm), resulting in a higher basal area. This can be observed as Lambir Hills National Park was recorded to have a higher number of large trees (20). In contrast, Bukit Durang, Saremas 1 Div 5 and Kubah National Park recorded a comparatively lower number of large trees, with 15, 7 and 3, respectively.

The abundance of fast-growing pioneer tree species in both logged-over forests also might contribute to the small value of the basal area in the study areas. Fast-growing tree species typically have low-density wood and are more susceptible to mortality (Hietz et al., 2013; Tonouéwa et al., 2022). The relatively lower basal area in Bukit Durang compared to the other study areas might be due to the abundance of pioneer species, such as *Macaranga triloba* and *Glochidion obscurum*. The total basal area of Kubah National Park was significantly lower than in Lambir Hills National Park, implying that the basal area of the study area is highly dependent on ecological factors, as stated by Huston and Wolverton(2009) and Mazón et al. (2020). The comparable values of the Kubah National Park basal area and Saremas 1 Div 5 depicted that the tree population in these forest areas might have been disturbed and regenerated with young and small trees.

5.2 Floristic composition

5.2.1 Tree composition in logged-over and primary forests

The high domination of Dipterocarpaceae within all four study sites agrees with other studies reported by Lee et al. (2002) in Lambir and Ganivet et al. (2020) in Mina Wildlife Corridor and Semenggoh Arboretum. Based on the works of literature, the relative contribution of dipterocarp trees is generally within the range of 8-18% of stem number (Proctor et al., 1983; Kochummen et al., 1990; Newbery et al., 1992; Davies & Becker, 1996; Lee et al., 2002; Ganivet et al., 2020). According to MacKinnon et al. (1997), dipterocarp trees may dominate the forests of Malaysia, accounting for up to 85% of the forest areas. Most of the Malaysian lowland dipterocarp forests show an abundance of trees in the family of Dipterocarpaceae regardless of any degree of

disturbances that happened to many types of study areas (undisturbed, logged-over or secondary forest) (Matius et al., 2000; Sakai et al., 2022).

Each study area is recorded to have a common top ten of other tree families such as Euphorbiaceae, Anacardiaceae, Myrtaceae and Burseraceae. A study in Semenggoh Nature Reserve recorded that the typical families dominating the terrestrial tropical mixed dipterocarp forests are Dipterocarpaceae, followed by Euphorbiaceae, Anacardiaceae, Myrtaceae and Myristicaceae (Ling & Julia, 2012). Vilma et al. (2012) stated that Euphorbiaceae, Myrtaceae, Myristicaceae, Burseraceae and Clusiaceae were the most abundant families in the Mina Wildlife Corridor, Bintulu forest area. A study in Sungai Udang Forest Reserve, Malacca, Peninsular Malaysia, recorded that Euphorbiaceae is the most abundant family, followed by Myrtaceae and Anacardiaceae (Razak et al., 2015).

At the genus level, all dipterocarp trees in all logged-over and primary forests of this study are dominated by *Shorea*, which comprises more than half of the population of the dipterocarp stands. This finding parallels a study stating that *Shorea* is highly distributed in Bornean dipterocarp forests (Indrioko & Wicaksono, 2021). *Shorea* is one of the genera within Dipterocarpaceae with the most species. Bornean dipterocarp forests are the highest habitat for *Shorea* tree distribution, comprising 102 species. The *Shorea* trees exhibit their highest distribution at 0-500 m and 500-1000 m altitude in the Dipterocarps forest (Kintamani, 2018).

The dominance of *Shorea* may also suggest a high degree of adaptation to the local environmental conditions in the study areas. This adaptation could include tolerance to specific soil types, climatic factors, or disturbance regimes that favour

Shorea over other dipterocarp genera. Each study area was recorded to have a common top ten of other genera such as *Syzygium*, *Xanthophyllum*, *Palaquium*, *Santiria*, *Vatica* and *Litsea*. It is also a unique observation that some genera, such as *Diospyrus* and *Lithocarpus*, are remarkably abundant in logged-over forests. *Dipterocarpus* is found to be relatively predominant in primary forests than logged-over forests.

At the species level, both logged-over forests (Bukit Durang and Saremas 1 Div 5) in this study had a high abundance of fast-growing species. The abundance of *Macaranga* sp. in Bukit Durang and Saremas 1 Div 5 is evident. Whitmore (1990) and Davies et al. (1998) stated that *Macaranga* is a pioneer species typically found in tropical forests. The high IVs of other fast-growing species like *Glochidion obscurum* in Bukit Durang and *Shorea parvifolia* and *Macaranga triloba* in Saremas 1 Div 5 demonstrated the high domination of fast-growing tree species in both forest areas.

These fast-growing tree species are commonly found to be dominant in a disturbed forest, as recorded by Demies et al. (2019). Their study in a logged-over area of Anap Muput FMU, Bintulu, Sarawak recorded that the forest was dominated by pioneer species such as *Macaranga* spp., *Nauclea* spp., *Porterandia* spp., *Glochidion* spp. and *Gironniera* spp. Other scholars have also documented the presence of abundant *Macaranga* spp. in other disturbed forest localities. The planted forest zone in Mina Wildlife Corridor, Bintulu, was also dominated by *M. hypoleuca* and the secondary forest of Universiti Teknologi Malaysia Recreational Forest, Skudai, was dominated by *M. gigantea* (Vilma et al., 2010; Isa et al., 2015). Ulu Muda Forest Reserve, Kedah, was dominated by *M. hosei* (Mardan et al., 2013).

The forests that had undergone disturbances, like Bukit Durang and Saremas 1 Div 5, tend to have high newly grown, fast-growing tree species. Sheil and Bongers (2020) stated that a forest that experiences a disturbance like timber cutting results in canopy openings, providing a chance for fast-growing pioneer species to establish themselves. These species, which were not previously present, usually will contribute to the increase in species diversity and overall volume growth within the forest.

In this study, the high abundance of *Dryobalanops aromatica* in Lambir Hills National Park concurred with what was reported by Lee et al. (2002). Their numerical findings from the Lambir Hills National Park forest plots indicated that *D. saromatica* dominated the entire study area's tree frequency and basal area. The findings reveal that the Lambir Hills National Park forest area possesses relatively stable environmental conditions over time, conducive to the growth and persistence of *D. aromatica*. The high abundance of *Syzygium havilandii* in Kubah National Park is in agreement with the earlier studies in the study area done by Abang Bohari (2015); Bukhori et al. (2019). They stated that the dominant species in Kubah National Park was *Syzygium havilandii*, followed by *Hopea dryobalanoides*, *Shorea macroptera*, *Santiria tomentosa* and *Shorea parvifolia*.

5.2.2 Species diversity in logged-over and primary forests

Generally, the diversity indices of logged-over and primary forests in this study vary in genus level and are relatively comparable in species level. The species diversity is important in forest AGB as most tropical regions recorded that diversity positively correlates with AGB (Vallet & Pérot, 2011; Van Con et al., 2013; Poorter et al., 2015; Fliess et al., 2020). Tropical forests tend to have more diverse tree populations, which

store more carbon (Poorter et al., 2015).

Both the logged-over and national parks primary forests in the study areas have a Shannon-Weiner index value of 4–5, considered high in genus and species abundance. These results are slightly higher than those of other reported studies. The H' values typically range from 1.5 to 3.5 but rarely reach 4.5 (Magurran, 2021). Lambir National Park species H' (4.09) was significantly lower than the other study areas. This indicates that the species abundance and evenness of the forest area were lesser than in the other forest studies.

As a comparison, Takeuchi et al., 2017 stated that the H' values in mixed dipterocarp forest in Lambir Hills National Park were 4.1–4.3. The H' values in Keniam forest, Pahang National Park, was within the range of 3.42–3.97 (Suratman, 2012). Riparian and lowland dipterocarp forests in Taman Negara Pahang had H' values of 3.38 and 4.84, respectively (Zani et al., 2013). The log-over forest in Anap Muput, Bintulu, had an H' of 3.44 (Demeis et al., 2019). The Planted Forest Zone (PFZ) of Sarawak and Semenggoh Arboretum recorded to have H' of 4.1 and 4.3, respectively (Ganivet et al. (2020).

In this study, Simpson's diversity index (D) for genera and species in both logged-over and forests also showed a high value ($D = 0.93-0.95$). This indicates that the tree genera and species within the study areas are rich and abundant. Species richness helps in carbon sequestration and promotes higher stand productivity (Liu et al., 2018). The previous study by Jana and Jusoh (2021) on the forest fringes of a forest fragment at Suai, Sarawak, found that the D was also high (0.99). Hayat et al. (2010) recorded that the D in Pasir Tengkorak Forest Reserve, Langkawi Island, Malaysia, was

0.96.

Pielou's evenness (E') index for genera and species of all study areas showed very small values (genus $E' = 0.17-.21$; species $E' = 0.18-0.20$). When the E' value is closer to 1, it suggests that the species or genera in the community are roughly equally abundant, and there is a balanced distribution of individuals among them. This indicates a higher level of diversity and a more balanced ecosystem. When the E' value is closer to 0, it suggests that one or a few species or genera dominate the community while others are much less abundant. This indicates that few species dominate the community and have a lower level of diversity. This indicated that the genera and species distribution is low. The assessment of the floristic composition of Kilim Geoforest Park, Langkawi, Malaysia, reported that the species evenness in the study area was also low (0.1–0.2) (Nabila et al., 2012).

Nevertheless, The E' values of genus level in both primary forests of Lambir Hills and Kubah National Park were significantly higher than both logged-over. This observation suggests that the primary forests displayed a more balanced distribution of genera when compared to their logged-over counterparts. The higher evenness in primary forests suggests that more variety of genera coexist without any one genus dominating the community than in logged-over forests. It may indicate a disruption in the natural balance of logged-over forests, with a higher number of genera becoming more dominant.

On the other hand, Saremas 1 Div 5 and Lambir Hills National Park showed dispersion values equal to 1.0. The results show that the study area's genus population are randomly distributed. This randomness suggests that the way genera are spread in

these areas does not follow a clear pattern. Instead, their presence seems more random or by chance. Factors such as environmental heterogeneity or chance dispersal events could contribute to this randomness in the distribution of genera in both study areas (Spiegel & Nathan, 2010; Salazar-Tortosa et al., 2019).

The findings of the study suggest that the tree density, stand DBH, and basal area in logged-over forests are comparable to those of primary forests, indicating that logged-over forests have the potential to recover and develop stand structures similar to those of primary forests. However, the species diversity in logged-over forests is lower than that of primary forests, indicating that forest fragmentation and disturbance may negatively impact species diversity.

5.3 Carbon stock

5.3.1 Carbon stock in logged-over and primary forests

Carbon stock in tropical forests fluctuates based on forest type, age, disturbance history, species composition, the density of large trees in various diameter classes and current anthropogenic disturbances, all collectively impacting the carbon sequestration rate (Devi & Yadava, 2015). This study found that the carbon stocks in both logged-over and primary forests varied. Carbon stock values for both logged-over forests and Kubah National Park study areas were within the range of 145–149 Mg C ha⁻¹, which is lower than the typical carbon stock for tropical forests, was estimated to be around 209 Mg C ha⁻¹ (Saatchi et al., 2011; Slik et al., 2013). The primary forests of Lambir Hills National Park have remarkably higher carbon stock (250.5 Mg C ha⁻¹) compared to the other study areas, surpassing the typical carbon stock levels found in tropical forests.

Despite being a primary forest, the remarkable low carbon stock recorded in Kubah National Park compared to Lambir Hills National Park is interesting. The lasting impact of past selective logging activities in the Kubah National Park as well as in Bukit Durang and Saremas 1 Div 5 logged-over forests, is also reflected in the carbon stock trend observed in this study. The results are expected as Nascimento and Laurance (2004) stated that disturbed forests had lower AGB than intact forests and suggested that this was due to increased disturbance and reduced habitat quality. Previous studies have shown that degraded forests that have experienced selective logging have lower carbon stock than old-growth forests (Berenguer et al., 2014; Rutishauser et al., 2015; Longo et al., 2016). This is because selective logging removes the large trees, leaving behind smaller and younger trees with lower carbon storage values. A study by Mills et al. (2023) in Bornean Forest discovered that the logged tropical forests are the net carbon source of the atmosphere. However, they found that the source persists at least 10 years after the logging activities stopped, suggesting that carbon sequestration rates in recovering tropical forests are likely to be minimal.

Even though both are disturbed forests, the notably higher carbon stock in Bukit Durang than in Saremas 1 Div 5 suggests that these forest areas have different carbon sequestration rates due to the distinct contribution of trees with large diameters. Bukit Durang was recorded to have a relatively higher number of trees with $DBH \geq 60$ cm (15 number of trees) compared to Saremas 1 Div 5 (7 number of trees). Key elements contributing to the differences in tree structure patterns in tropical forests include factors such as productivity, climatic variations, as well as edaphic and biotic influences (Dossa et al., 2013). It is also worth noting that Bukit Durang recorded more trees with larger diameters ($DBH \geq 60$ cm). These large trees are likely to contribute significantly to the

AGB within the forest areas.

The post-logging impact on carbon stock remains evident despite two decades since selective logging in both the logged-over forests and six decades in Kubah National Park. This study indicates that forest recovery occurs relatively slowly after several decades of disturbance. Nonetheless, the initiative of the HCV programme in both logged-over Bukit Durang and Saremas 1 Div 5 forests and gazetting Kubah forest as a national park has led to some degree of carbon recovery. According to Kiat et al. (2020), Sarawak experienced a positive outcome in terms of carbon influx. Between 2005 and 2014, there was an increase in biomass carbon stock, ranging from 28.76 Mt C or 105.44 CO₂ equivalent to 39.03 Mt C or 143.11 CO₂ equivalent. They also stated that since 2008, there has been a decline in emissions from wood removal, with a decrease from 6.28 Mt C to 4.64Mt C in 2013.

Lambir Hills National Park study area showed a remarkably high carbon stock value since the big and old trees dominated the forest. The intact primary forest tends to contain a considerable amount of AGB since it retains trees with greater diameter (Ngo et al., 2013). The old-growth forests generally have more AGB than logged forests, even after 20 years of logging. Rozendaal et al. (2022) reported in their meta-analysis study that the AGB values of old-growth forests were significantly higher than those of logged forests. This is because the old-growth forests have more time to accumulate carbon stock by retaining large trees, resulting in greater AGB values.

5.3.2 Tree diameter classes and carbon stock

The distribution of carbon stocks among different diameter tree size classes in both logged-over forests and primary forests reveals interesting patterns. In the logged-over forests of Bukit Durang and Saremas 1 Div 5, the carbon stock accumulation shows fluctuations across the diameter classes. However, a consistent trend is observed where the highest carbon stock is found in the larger diameter classes, particularly in the ≥ 60 cm diameter class category. This indicates that a substantial contribution to carbon storage in these forests comes from the presence of trees with larger diameters.

The contribution of large-diameter trees in the carbon stock of a disturbed forest can be observed when comparing Bukit Durang, which has a more significant accumulation of carbon stock within the diameter class of trees with DBH ≥ 60 cm, totalling 15 trees. In contrast, Saremas 1 Div 5 exhibits a lower carbon stock accumulation within the same ≥ 60 cm diameter class, with only seven trees. Smaller trees in the diameter range of 10 – 29.9 cm DBH appear to have a relatively smaller contribution to carbon stock despite their higher abundance. This finding concurs with previous studies by Poorter et al., 2007; Chave et al., 2005; Qie et al., 2017).

The primary forests of Lambir Hills National Park and Kubah National Park exhibit distinct carbon stock distribution patterns. In Lambir Hills National Park, the carbon stock is remarkably high in the diameter class of ≥ 60 cm (20 trees), indicating the substantial contribution of large trees to carbon storage. The other diameter classes recorded low carbon stock. This suggests that these large trees primarily drive the primary carbon storage in Lambir Hills National Park. In contrast, smaller diameter trees have a comparatively lesser impact on overall carbon accumulation in the forest.

In Kubah National Park, high carbon stock accumulation is observed in several diameter classes, including 20-24.9 cm, 35-39.9 cm, 40-44.9 cm and 55-59.9 cm. However, the carbon stock within the diameter class of ≥ 60 cm is lower than other diameter classes. This is because only a small number of trees (three trees) were enumerated within the sampling plots. Consequently, this contributed to the low carbon stock recorded in the study area of Kubah National Park. Lutz et al. (2018) stated that the limited presence of large tree populations in forest areas reduces carbon storage capacity in those ecosystems.

Generally, these findings highlight the importance of large trees in storing carbon within forest ecosystems. The higher accumulation of carbon stock from the large diameter trees recorded within almost all study areas underscores their significant role in sequestering carbon and contributing to overall carbon storage in these forests. Trees with greater diameter and heights are known to have higher biomass, leading to enhanced carbon sequestration (Chave et al., 2005). The presence of such trees in logged-over forests and primary forests suggests their significant role in maintaining or enhancing carbon stock. The limited contribution of smaller trees, despite their higher abundance, emphasises the need to focus conservation efforts on promoting the growth and protection of large trees, which have the potential to store substantial amounts of carbon.

5.3.3 Carbon stock distribution in family, genera and species of logged-over and primary forests

This study reveals that dipterocarp trees are the predominant contributors to carbon stocks in all study areas, surpassing non-dipterocarp trees, which encompass various families, genera and species. Specifically, Dipterocarpaceae accounts for 14% of the total carbon stock in Bukit Durang, 24% in Saremas 1 Div 5, 59% in Lambir Hills National Park and 33% in Kubah National Park. Dipterocarp trees are widely recognised as significant contributors to the carbon content in tropical forests. Ashton and Kettle (2012) state that dipterocarp trees are among the world's most important terrestrial carbon sinks.

In Lambir Hills National Park, the Dipterocarpaceae family exhibited a higher percentage of family abundance (33%) than the other study areas, consequently leading to a higher total carbon stock in the forest area. The relatively lower presence of Dipterocarpaceae, represented by mature, large-grown dipterocarp trees, in the historically disturbed forests in this study, such as logged-over forests of Bukit Durang (29.9%), Saremas 1 Div 5 (27.1%) and Kubah National Park (22%) suggests a possible decline in carbon stock within these study areas. This highlights the impact of past land use and selective logging activities on carbon storage in depleting dipterocarp trees. Selective logging commonly decreases the dipterocarp tree population within the forest, primarily because this family is often preferred for logging due to its favourable wood structure for the timber industry (Jamhuri et al., 2018). For example, the selective logging activities in Malua Forest Reserve, Sabah, Malaysian Borneo forests had reported a reduction of the dipterocarp tree population by 55–56% (Saner et al., 2012).

The common top ten dominant families with high carbon stocks in both logged-over and primary forests across the study areas are also represented by slow-growing non-dipterocarp families, including Euphorbiaceae, Moraceae, Burseraceae, Myrtaceae, Fagaceae and Fabaceae. These families are recognized for their substantial contribution to forest carbon stock due to their typically higher wood density. The contribution of other families to carbon storage within each study area varies.

Families like Phyllantaceae in Bukit Durang, Lauraceae in Saremas 1 Div 5, Polygalaceae and Anacardiaceae in Lambir Hills National Park and Sapotaceae in Kubah National Park make significant contributions to the carbon stocks in their respective study areas. Nevertheless, the contribution to carbon stock can differ between forest ecosystems. The impact of families on carbon stock can be influenced by factors such as particular species, tree structure, family richness and forest management practices (Mensah et al., 2020). The distribution of specific tree species within the study area resulted in varying levels of carbon accumulation among different tree species (Elias & Potvin, 2003; Yeboah, 2011). An increase in tree species richness also has been linked to higher carbon stock in forests (Warner et al., 2022).

The presence or absence of large-diameter tree species with high AGB significantly impacted the forest's overall carbon stock. Lambir Hills National Park recorded numerous large-diameter dipterocarp trees that substantially contributed to the total carbon stock values. The high possession of large diameter slow-grower old-growth tree species caused the high contribution of carbon stock in this national park. Trees with large diameters help maintain the forest structure and functioning and are exceptional contributors to maintaining the carbon stock (Clark & Clark, 1996). The study in the Hill Dipterocarp Forest of Pahang National Park, Malaysia, revealed that

large trees from the Dipterocarpaceae family account for a significant portion of this diameter class (Zani et al., 2018).

The study at Jengka Forest Reserve found that trees in the diameter class >65 cm contributed to a substantial percentage of the total tree biomass, with a biomass value of 247.12 t/ha (Kusin et al., 2014). Similarly, another study in virgin jungle reserves in Peninsular Malaysia revealed that a larger diameter class (≥ 75 cm) contained a higher proportion of AGB, with values ranging from 143.21 to 184.32 t/ha (Hikmat, 2005). This study agrees with these observations that the larger the diameter and density of a tree, the greater the biomass content of the tree stand, leading to a higher amount of carbon stock. According to Martínez-Sánchez et al. (2015), managing tree diameter in forestry practices can promote greater carbon storage in forests.

The significant domination of *Shorea* trees at the generic level contributed to the major carbon stock values in all study areas (logged-over and primary forests). This genus was also shown to be the most significant in terms of the genera's important value index in each study area. Results demonstrated that numerous *Shorea* spp. affect AGB and carbon stock. They include *S. pubistyla*, *S. parvifolia*, *S. beccariana*, *S. macrophylla*, *S. leprosula*, *S. mecistopteryx*, *S. macroptera*, *S. pinanga*, *S. havilandii*, *S. glaucescens* and *S. quadrinervis*. The wetter forest zone influences the aggregation of tree species with high wood density (Yeboah et al., 2014). The study areas are under the wet forests category and have a high annual rainfall of more than 1,700 mm to 5,800 mm per year (Malaysian Meteorological Department, 2020).

Generally, the slow-growing dipterocarp and non-dipterocarp tree species comprising the various family, genera and species dominated the carbon values in dipterocarp forests of these study areas. Slow-grower trees with greater DBH, height, wood density and basal area typically showed higher AGB and carbon stock (Yeboah et al., 2014). Slow-growing tree species were consistently found to contribute significantly to a high carbon stock in all study areas. Tree species *Elasteriospermum tapos* (13 Mg C ha⁻¹) in Bukit Durang, *Shorea macroptera* (8 Mg C ha⁻¹) in Saremas 1 Div 5, *Dryobalanops aromatica* (41 Mg C ha⁻¹) in Lambir Hills National Park and *Syzygium havilandii* (13 Mg C ha⁻¹) in Kubah National Park were the primary contributors to the high levels of carbon stock in their respective study areas.

The high population of tree species of *D. aromatica* from the family Dipterocarpaceae manifests the high contribution of carbon stock (41 Mg C ha⁻¹) in Lambir Hills National Park. In this study, *D. aromatica* was also recorded to possess a higher importance value (21.4), contrasting with the highest importance values of species in other study areas, which fell within the range of 4.5–6.9. For instance, in the mixed dipterocarp forest of Endau Rompin National Park, Johor, the non-dipterocarp trees such as *Litsea costata*, *Dillenia reticulata* and *Syzygium* sp. were recorded as major contributors to the total forest carbon with the values of more than 12 Mg C ha⁻¹ (Matthew et al., 2018). These non-dipterocarp tree species were recorded to have high numbers, large DBH, tall tree height and high wood density, contributing to the considerably high cumulative carbon content.

This difference in species-level attribution for carbon stock value is shown in Kubah National Park. The lack of old-growth trees with large diameters has recorded a lower carbon stock value in this forest area. This is the attribution of different dominant

tree species within the forest area that affects the tree AGB, as stated by Joshi and Dhyani (2019). In comparison, the contribution of carbon stocks in both logged-over Bukit Durang and Saremas 1 Div 5 forests was attributed to fast-growing tree species like *Macaranga triloba*, *Glochidion obscurum* and *Shorea parvifolia*. Research conducted in the Secondary Forest at the Universiti Teknologi Malaysia indicated that fast-growing tree species, particularly *M. gigantea*, was the primary contributor to the carbon stock in the disturbed forests (Isa et al., 2015). The forests that have been disturbed tend to have much nitrogen accumulation (Kenzo et al., 2010), which then leads to the domination of fast-growing tree species (Silvestrini et al., 2007).

The disturbed forests that are dominated by fast-growing tree species tend to have lower carbon stock. The fast-growing tree species often exhibit lower wood density and higher mortality rates, resulting in consistent AGB values over time and reducing carbon stock (Debell et al., 1994; Hietz et al., 2013; Tonouéwa et al., 2022). Therefore, this contributes to lower carbon stocks recorded in both logged-over forests of this study.

5.3.4 Contribution of species diversity to carbon stock in logged-over and primary forests

The species diversity within this study's logged-over and primary forest also contributes to the total carbon stocks. Vallet and Perot (2016) stated that the diversity of tree species contributes to higher carbon sequestration rates and carbon stock accumulation in tree biomass. Forests with high tree diversity, species richness and numerous emergent trees typically have high AGB, consequently possessing high carbon stock (Ashton, 1992; Tilman, 2001; Van Con et al., 2013). However, the study's

findings do not support the notion that forests with high tree diversity and species richness necessarily exhibit high AGB.

The results deviate from the expected trend. The Shannon-Weiner Diversity Index (H') for genera in Lambir Hills National Park (5.41) indicates relatively high diversity but is reduced to 4.09 at the species level. Nevertheless, this forest area possesses a significantly higher carbon stock than other study areas. For instance, Saremas 1 Div 5 records remarkably high H' values at both the genera (5.42) and species (5.07) levels. In contradiction, it possesses a lower carbon stock. The results are parallel to a study reported by Djuikouo et al. (2014), which stated that the higher stem density and basal area can reduce the species richness of an area.

Various factors can be attributed to the low carbon stock in the highly diverse Saremas 1 Div 5 forest area and the high carbon stock recorded in the significantly less diverse Lambir Hills National Park. According to Deere et al. (2018), Strassburg et al. (2010) and Sullivan et al. (2017), the correlation between biodiversity in tropical forests and AGB is almost constantly positive. It is also important to note that the relationship between carbon stock and species diversity is complex and can be influenced by other factors, such as environmental conditions, disturbance regimes and tree size distribution.

Despite high diversity, the specific species composition in Saremas 1 Div 5 may not be well-suited for carbon accumulation. Certain species might grow more slowly or have lower wood density, impacting the overall carbon storage. It is also possible that the dominant species in this region have younger trees or slower growth rates, resulting in less accumulated carbon over time. This is demonstrated through the prevalence of

abundant fast-growing species and a reduced number of trees with large diameters within the forest area. In contrast, Lambir Hills National Park also possesses many trees with large diameters, possessing abundant slow-grower tree species with high wood density in the forest area. According to Yeboah et al. (2014), wood density varies among species and could also affect the AGB. Structural diversity was consistently the strongest independent predictor of carbon storage at all levels of data aggregation (Aponte et al., 2022).

The Simpson Diversity Index (D) in both genera and species levels of both logged-over and primary forests of this study showed to be comparable. This indicates that, despite differences in carbon stocks and species diversity between the two forest types, they exhibit similar levels of abundance and dominance among the tree species present. This finding highlights a potential resilience in the forest ecosystem, suggesting that the logged-over forests may maintain a relatively high level of biodiversity and ecological function comparable to primary forests. These attributions play important roles in sustaining the consistent genetic distribution of trees within these forest areas (Ganivet et al., 2020). Ensuring a diverse range of species is maintained promotes genetic variation and resilience. Consequently, it may aid in preserving trees with a genetically high AGB.

The significantly high value of Pielou's evenness (E') in the genus level of both primary forests compared to both logged-over forests in this study does not establish a consistent pattern of higher carbon stock in primary forests. It is important to note that the primary forest of Kubah National Park does not exhibit a significant difference in carbon stock compared to the logged-over forests. The results suggest that the genera present in Kubah National Park and in both logged-over forest ecosystems are relatively

evenly distributed by the abundance of trees with lower carbon stock compared to Lambir Hills National Park, which possesses higher carbon stock trees.

5.4 Correlation between carbon stock and stand structure attributes and species composition in combined datasets of all study areas

This study's Pearson Correlation Coefficient (PCC) result revealed a positive linear correlation of carbon stock with stand DBH, basal area and SIV. The analysis emphasizes their noteworthy impact on the quantity of carbon stored in the forests. It highlights the importance of considering the unique characteristics of the forest study areas and the relationship between various variables when evaluating the influence of structural attributes on carbon stock. As a result, this study concluded that there is a linear correlation between the stand DBH, basal area, SIV and carbon stock.

5.4.1 Carbon stock and DBH

The stand DBH to have a linear positive correlation with carbon stock. The PCC analysis indicates that the increase of stand DBH will increase the carbon stock. This demonstrates that the large trees play a crucial role in contributing to a substantial portion of the carbon stock across the study areas. Kauppi et al. (2014) recorded that trees with large diameters significantly impact the carbon density in forests, suggesting that tree populations with large diameters are responsible for storing high amounts of carbon within the forests. These groups of trees also provide significant weight as the foundation structures in forest ecosystems. They are also crucial in forest ecosystems as a food provider, shelter, microclimate modulation and hydrological system (Lindenmayer et al., 2014; Slik et al., 2013; Thomas, 2013; Bradford & Murphy, 2019).

A study in Gunung Leuser National Park, Indonesia, recorded that carbon storage highly depends on the variation of tree diameters (Onrizal & Auliah, 2020). Research conducted in the moist tropical forests of Panama discovered that large stems (>50 cm) play a significant role in mediating carbon cycling without necessarily dominating it. This study deduced that the study area with a higher concentration of huge trees will have a higher carbon stock. This is demonstrable since there are more big trees in Lambir Hills National Park, which increases its carbon supply. Lambir Hills National Park also has the largest stem diameter across the overall study areas, with 198 cm DBH by *Artocarpus nitidus* from the family Moraceae. Most of the huge trees (≥ 60 cm DBH) in the study areas came from the families Phyllantaceae and Dipterocarpaceae.

The historical selective logging activities within these study areas apparently alter the composition and structure of the forests, including the size and distribution of trees. The involvement of heavy equipment during past logging activities might lead to soil compaction and reduced seedling recruitment and growth within parts of the forest areas (Whitman et al., 1997). Plus, selective logging also involves harvesting large trees, significantly reducing the number of large trees in determining carbon stock in these altered ecosystems. The decline in the number of large trees within both logged-over forest study areas might be due to fragmentation that corresponded with the intensification of oil palm agriculture. These factors are among the main reasons for the reduced number of large trees in tropical forests (Lindenmayer et al. (2014); Laurance et al. (2000); Van Mantgem et al., 2009). The historical selective logging activities in Kubah National Park that stopped in the 1960's (Abang Bohari, 2015) have evidently impacted the old and large tree population within the study area as well. This explained

the large difference in carbon stock values estimated in the Kubah National Park study area compared to the other primary forest (Lambir Hills National Park).

5.4.2 Carbon stock and basal area

As observed within PCC, the basal area exhibited a similar relationship to that of DBH with carbon stock. The PCC analysis showed a linear positive correlation between basal area and carbon stock. This suggests that the higher carbon stock will be found in the forest region with the bigger basal area. The result indicates that the basal area could be one of the important elements that indicate the carbon content of living trees in a forest. The finding is parallel to the studies done by Clark and Clark (1996), Becker et al. (1999), Dossa et al. (2013) and Jeyanny et al. (2014). The basal area contributes to the primary forest's carbon stock (Yamakura et al., 1986; Mensah et al., 2016). Wassihun et al. (2019) stated that an increase in basal area increases above-ground biomass and subsequently increases carbon stock.

The PCC revealed a relatively high score (0.442) of correlation between basal area and carbon stock across the overall study areas. DBH data's contribution might manifest these points that contribute to the overall dataset of basal area across the overall study areas. The low basal area of some trees can be observed in the historically disturbed forests (both logged-over forests and Kubah National Park) study areas. The study areas showed the forests are in the successional stage. Both logged-over forests exhibited a notable dominance of basal area by fast-growing tree species. Typically, the density of fast-growing trees increases along with basal area during the 20 years of succession, whereas the basal area continues to increase beyond 40 years of succession (Chazdon et al., 2010).

Dignac et al. (2017) stated that the relationship between carbon stock and basal area could vary depending on forest type and management. The study in forests in Vietnam has recorded that the basal area and AGB are positively correlated with trees of more than 30 cm DBH in old-growth forests (Van Do et al., 2020). Meanwhile, Ma et al. (2023) stated that basal area becomes more influential in determining AGB when forests are developed. In the managed forests where trees are thinned or harvested, the relationship between carbon stock and the basal area may be weaker due to changes in forest structure, age classes and tree species diversity. This indicates that the basal area of the stand population in these localities increased as the tree diameter increased.

5.4.3 Carbon stock and wood density

Wood density is a measure of the mass of wood per unit volume and is an important characteristic related to carbon storage and the quality of timber (Zanne et al., 2009). Trees with higher wood densities generally contain more carbon per unit volume, contributing to the forest carbon stock. However, this study found no significant correlation between wood density and carbon stock across the study areas based on the results of the PCC analysis. The results contradicted the studies done by some scholars (Dossa et al., 2013; Jeyanny et al., 2014; Yeboah et al., 2011). They stated that the wood density remarkably influences carbon stock in forests.

The ecological complexity within the study areas might be attributed to uncorrelated wood density with carbon stock. The wood density of trees within the study areas could be influenced by geographical area and species-specific factors, as stated by Henry et al. (2010). The population of trees with varied wood densities associated with specific species can have implications for the carbon storage potential

of these forests. Plus, different study areas are attributed to different sequestration rates, resulting in variations in carbon stock capacity.

Every locality is unique in terms of geographical and regional area; hence, precipitation, solar radiation, temperature and soil properties vary. According to Baul et al. (2021), the tree biomass carbon stock was significantly greater in inland and hillside forests due to greater stand density, indicating that factors beyond wood density, such as stand structure and species diversity, play a crucial role in carbon stock variation. The study also suggests that wood density alone may not be the sole determinant of carbon stock in tropical forests. The species composition, soil properties and climatic influences might have a higher dynamic influence on carbon (Saimun et al., 2021).

The significant positive correlation between wood density and SIV in PCA could contribute to the observed lack of correlation with carbon stock. According to Phillips et al. (2019), wood density emerges as a crucial determinant of species importance in tropical ecosystems and is frequently utilized in multispecies biomass models. The results indicated that each study area exhibits high tree species diversity, leading to variability in wood density. Wood density greatly varies across the tree species (Djomo et al., 2017). Chave et al. (2009) reported that the tree species with thick fibre walls exhibit higher mean wood density than species with thin fibre walls. This difference in fibre wall thickness may contribute to the variation in wood density among tree species.

The variation of wood density among species also causes differences in forest carbon sequestration rates and stocks (Vallet & Perot, 2016). The higher wood density of certain tree species can contribute to higher carbon storage potential. In comparison, the lower wood density of other tree species can result in lower carbon storage potential. Additionally, Flores and Coomes (2011) stated that the variation of wood density among species might affect the accuracy of carbon stock.

However, while most of the data from overall study areas contain many tree species with dense wood, fewer trees have large diameters. Tree species like *Dipterocarpus* sp., *Elateriospermum tapos*, *Syzygium nemestrinum*, *Dipterocarpus globosus* and *Diospyrus evena* have relatively high wood density within the study area but had smaller diameter found in the study areas.

5.4.4 Carbon stock and species importance

The result of PCC analysis showed a linear positive correlation between SIV and carbon stock. This suggests that the variety and abundance of tree species present throughout the research areas determines the amount of carbon stock. The result implies that in a linear relationship between species composition and carbon stocks, some tree species groups generally influenced the carbon stock across the study areas. This can be attributed to the domination of some tree species with high carbon stock, particularly dipterocarp and non-dipterocarp tree species. There are noteworthy tree species with remarkable SIV values and a high contribution of carbon stock. They are including *Macaranga triloba* (5.6 and 6 Mg C ha⁻¹), *Elateriospermum tapos* (4.5 and 13 Mg C ha⁻¹), *Shorea macroptera* (4.5 and 8 Mg C ha⁻¹), *Dryobalanops aromatica* (21.4 and 41 Mg C ha⁻¹), *S. falcifera* (11.5 and 17 Mg C ha⁻¹), *S. parvifolia* (10.5 and 16 Mg C ha⁻¹),

Xanthophyllum velutinum (18.6 and 12 Mg C ha⁻¹), *E. tapos* (7.1 and 12 Mg C ha⁻¹) and *Syzygium havilandii* (6.9 and 13 Mg C ha⁻¹).

Nevertheless, the correlation score between SIV and carbon stock across the overall study areas showed a relatively low ($r = 0.137$) near to 0.1. Schober et al. (2018) indicated that a coefficient of less than 0.1 signifies a negligible correlation. Thus, this demonstrated that the relationship between SIV and carbon stock is relatively weak. It suggests that variations in species importance have a weak influence on the carbon storage capacity of these forests. This indicates that factors other than species importance may play a more significant role in determining carbon stock levels. Different tree species had varying carbon sequestration rates (Pérez-Cruzado et al., 2012), hence, the forests that are dominated by low carbon sequestration trees have low carbon stock.

The fast-growing tree species make a noteworthy contribution to the SIV dataset across the study areas. Both logged-over forests (Bukit Durang and Seramas 1 Div 5) are found to have abundant contributions from the fast-growing trees. The fast-growing tree species typically have low-density wood and are more susceptible to mortality (Hietz et al., 2013; Tonouéwa et al., 2022). This implies that there is domination of low carbon stock tree species that subsequently have dominated the carbon stock. The finding is consistent with previous research that has demonstrated the impact of forest fragmentation and disturbance on tree species diversity, size and structural diversity (Kaushal & Baishya, 2021).

The weak influence of SIV on carbon stock could also be due to other variables not considered in the analysis. Many studies suggested that the species dominate or are highly abundant in the forests, with association with other tree structure attributes led to the increase of overall carbon storage capacity of these forests (Sullivan et al., 2017; Hu et al., 2015; Baul et al., 2021; Pyles et al., 2022). For instance, microclimatic conditions, soil properties or species interactions may contribute to carbon stock variation.

A meta-analysis study by van der Sande et al. (2017) reported that the average vegetation attributes (including community-mean traits and structural attributes) have a greater impact on carbon stock. Yuan et al. (2018) stated that the aboveground carbon stock was significantly affected by individual tree size inequality and trait composition, such as the community-weighted mean of maximum height. The correlation between biodiversity in tropical forests and carbon stock is almost constantly positive, however, it still varies among forest geographical and environmental conditions and is scale-dependent (Deere et al., 2018; Vallet & Perot, 2016; Strassburg et al., 2010; Sullivan et al., 2017). The unique tree structure and composition across the overall data of the study areas are evident in the significant variation observed in tree diameter, stem density and basal area. This is parallel to studies done by Paoli et al. (2008), King (1996) and Feldpausch et al. (2011).

5.5 Integration of carbon stock and stand structure characteristics and species composition in the context of forest management

The results of this study can assist forest managers in the decision-making process of forest management. The importance of carbon stock, stand structure characteristics, and species play a crucial role in understanding and optimizing the carbon sequestration potential of forests. The results provide valuable insights for sustainable forest management, conservation efforts and climate change mitigation strategies. The study demonstrated the significance of having large trees, a high basal area and a collection of important tree species in the forests for carbon storage.

This study indicated that historically disturbed forests, such as logged-over forests of Bukit Durang, Saremas 1 Division 5 and Kubah National Park, have declined certain characteristics typical of undisturbed virgin forests. This includes changes in the overall composition of forest species and a reduction in large tree diameters, thus decreasing carbon stock. The potential future forest fragmentation and disturbances could negatively impact the presence of large trees and species diversity.

The historical disturbed forests display a reduction in undisturbed forest characteristics, influencing forest degradation, including effects on tree density and regeneration across different forest types (Pandey et al., 2020). It could also cause the key species to shift, leading to notable biodiversity reduction, forest community structure and physical structure alteration (Foody & Culter, 2003; Putz et al., 2012). The impact of human-induced disturbance has been identified as a significant driver of tropical forest carbon stock, with forest degradation and fragmentation leading to long-term losses of carbon storage potential (Pyles et al., 2022).

The findings emphasize the necessity of conservation initiatives to confront the challenges associated with forest degradation and fragmentation. This is particularly crucial for preserving carbon stock and biodiversity in tropical forests. The study indicates that the historically disturbed forests (both logged-over forests and Kubah National Park) possess the potential for recovery, exhibiting the capability to develop stand structures comparable to primary forests. Forest regeneration is essential for sustainable forestry.

The study also reveals that dipterocarp trees are the predominant contributors to carbon stock in these study areas, surpassing non-dipterocarp trees, which encompass various families, genera, and species. Both logged-over forests (Bukit Durang and Saremas 1 Div 5) are recorded to have a unique mix of species, including some pioneers that excel in sequestering carbon despite the disturbances they have experienced.

However, treespecies have not been proven to impact carbon stock in these forests significantly. The study emphasizes the importance of promoting the growth and protection of large trees, particularly dipterocarp trees, in maintaining or enhancing carbon stock in both logged-over and primary forests.

5.6. Chapter summary

This chapter discusses the attributes of the stand structure, including tree density, species composition, DBH, and basal area in logged-over and primary forests. It also covers floristic composition, species diversity, carbon stock, tree diameter classes, distribution of carbon stocks among families, genera, and species and the correlation between carbon stock, stand structure attributes and species composition. The integration of these findings in the context of forest management is also discussed.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

This study has demonstrated that the stand structures of trees with DBH ≥ 10 cm among Bukit Durang, Saremas 1 Div 5, Lambir Hills National Park, and Kubah National Park are comparable in terms of the number of trees, families and genera. Saremas 1 Div 5 and Kubah National Park have the highest number of species. Lambir Hills National Park recorded the highest AGB and carbon stock among the study areas despite these attributes. Generally, tree DBH and basal area showed a significant positive correlation with forest carbon stock. Lambir Hills National Park recorded the highest basal area and high accumulation of large-diameter trees, which is associated with its highest carbon stock. Overall, large-diameter trees significantly contributed to high AGB and carbon stock, indicating the importance of large trees for carbon storage.

The Dipterocarpaceae family and the genus *Shorea* accumulated the highest carbon, being the most dominant family and genus across the study areas. However, species composition showed a weak positive correlation with forest stand carbon stock. The dominant species varied among the study areas, with uneven and spatially random tree species distribution across all study areas. *Macaranga triloba* and *Elateriospermum tapos* in Bukit Durang, *Shorea macroptera* and *Elateriospermum tapos* in Saremas 1 Div 5 and *Dryobalanops aromatica* in Lambir Hills National Park and *Syzygium havilandii* in Kubah National Park. The highest species diversity recorded in Saremas 1 Division 5 was not a determining factor for the carbon stock.

Despite historical disturbances, the logged-over forests and Kubah National Park appear to be achieving self-sustaining conditions in terms of structure, diversity and composition. The tree distribution by diameter class across the study areas exhibited the typical reverse-J pattern, suggesting good forest carbon regeneration in the study areas. Thus, these areas' sound forest management practices would enhance their carbon stock capacity.

6.2 Recommendations

The present study has provided valuable insights into the relationship between stand characteristics, wood density, species importance and carbon stock. However, it is constrained by a limited set of variables. Future studies should consider the inclusion of additional factors, such as tree height, belowground carbon stock (including carbon retention in soil and stand litter), soil properties and edge factors. Including these variables can offer a more comprehensive understanding of the intricate dynamics within forest ecosystems. Future studies should include more forest areas so that they will provide a better understanding of the correlation between carbon stock stand structure and species composition.

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APPENDICES

Appendix 1: List of sampled trees in Bukit Durang

Family	Species	Basal area (cm ²)	DBH (cm)	Wood Density (g/cm ³)	SIV	AGB (Mg ha ⁻¹)
Anacardiaceae	<i>Gluta aptera</i> (King) Ding Hou	0.04	22.60	0.63	0.76	0.03
Anacardiaceae	<i>Gluta aptera</i> (King) Ding Hou	0.02	14.70	0.63	0.76	0.07
Anacardiaceae	<i>Gluta aptera</i> (King) Ding Hou	0.01	13.40	0.63	0.76	0.08
Anacardiaceae	<i>Gluta aptera</i> (King) Ding Hou	0.01	13.10	0.63	0.76	0.10
Anacardiaceae	<i>Gluta aptera</i> (King) Ding Hou	0.01	9.60	0.63	0.76	0.31
Anacardiaceae	<i>Gluta wallichii</i> Bentham	0.44	74.70	0.57	0.89	0.03
Anacardiaceae	<i>Gluta wallichii</i> Bentham	0.01	11.40	0.57	0.89	0.05
Anacardiaceae	<i>Gluta wallichii</i> Bentham	0.01	9.70	0.57	0.89	5.74
Anacardiaceae	<i>Mangifera foetida</i> Loureiro	0.15	43.40	0.62	0.44	0.17
Anacardiaceae	<i>Mangifera foetida</i> Loureiro	0.03	18.00	0.62	0.44	1.66
Anacardiaceae	<i>Melanochyla tomentosa</i> Blume	0.03	20.50	0.60	0.89	0.04
Anacardiaceae	<i>Melanochyla tomentosa</i> Blume	0.02	17.00	0.60	0.89	0.06
Anacardiaceae	<i>Melanochyla tomentosa</i> Blume	0.02	15.40	0.60	0.89	0.11
Anacardiaceae	<i>Melanochyla tomentosa</i> Blume	0.01	12.30	0.60	0.89	0.14
Anacardiaceae	<i>Melanochyla tomentosa</i> Blume	0.01	10.30	0.60	0.89	0.23
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.02	17.50	0.56	0.35	0.13
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.02	17.00	0.56	0.35	0.14
Anacardiaceae	<i>Semecarpus glauca</i> Blume	0.05	24.60	0.38	0.29	0.02
Anacardiaceae	<i>Semecarpus glauca</i> Blume	0.02	15.60	0.38	0.29	0.07
Anacardiaceae	<i>Semecarpus glauca</i> Blume	0.01	10.30	0.38	0.29	0.24
Annonaceae	<i>Mezzetia havilandi</i> Ridley	0.05	24.60	0.65	0.30	0.41
Annonaceae	<i>Polyalthia cauliflora</i> Hook	0.01	11.80	0.65	0.39	0.03
Annonaceae	<i>Polyalthia cauliflora</i> Hook	0.01	9.70	0.65	0.39	0.06
Annonaceae	<i>Polyalthia jenkinsii</i> Ridsdale	0.01	12.40	0.62	0.75	0.06
Annonaceae	<i>Polyalthia jenkinsii</i> Ridsdale	0.04	21.60	0.62	0.75	0.05
Annonaceae	<i>Polyalthia jenkinsii</i> Ridsdale	0.02	14.60	0.62	0.75	0.06
Annonaceae	<i>Polyalthia jenkinsii</i> Ridsdale	0.02	14.10	0.62	0.75	0.08
Annonaceae	<i>Polyalthia jenkinsii</i> Ridsdale	0.01	13.70	0.62	0.75	0.09
Annonaceae	<i>Polyalthia jenkinsii</i> Ridsdale	0.01	12.10	0.62	0.75	0.10
Annonaceae	<i>Polyalthia jenkinsii</i> Ridsdale	0.01	11.60	0.62	0.75	0.27
Annonaceae	<i>Polyalthia xanthopetala</i> (Hook. f. & Thomson) Ridl.	0.01	12.00	0.62	0.13	0.06
Annonaceae	<i>Xylopia ferruginea</i> Blume	0.14	42.60	0.62	0.82	0.06
Annonaceae	<i>Xylopia ferruginea</i> Blume	0.10	35.80	0.62	0.82	1.02
Annonaceae	<i>Xylopia ferruginea</i> Blume	0.01	12.40	0.62	0.82	1.59
Annonaceae	<i>Xylopia pulchella</i> Ridley	0.02	16.00	0.62	0.48	0.09
Annonaceae	<i>Xylopia pulchella</i> Ridley	0.02	14.40	0.62	0.48	0.12

Appendix 1: Continued

Annonaceae	<i>Xylopia pulchella</i> Ridley	0.02	16.70	0.62	0.48	0.14
Annonaceae	<i>Alphonsea johorensis</i> Ridley	0.06	26.50	0.79	0.18	0.60
Apocynaceae	<i>Dyera costulata</i> (Miq.) Hook.f.	0.35	66.80	0.41	0.51	3.21
Burseraceae	<i>Dacryodes costata</i> Miquel	0.08	32.50	0.80	0.93	0.03
Burseraceae	<i>Dacryodes costata</i> Miquel	0.01	10.40	0.80	0.93	0.05
Burseraceae	<i>Dacryodes costata</i> Miquel	0.01	8.60	0.80	0.93	0.53
Burseraceae	<i>Dacryodes costata</i> Miquel	0.10	34.90	0.80	0.93	1.03
Burseraceae	<i>Dacryodes costata</i> Miquel	0.05	25.10	0.80	0.93	1.24
Burseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. rostrata	0.15	44.20	0.57	0.35	0.07
Burseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. rostrata	0.01	13.10	0.57	0.35	1.60
Burseraceae	<i>Santiria dacryodifolia</i> Blume	0.06	28.20	0.65	0.19	0.58
Burseraceae	<i>Santiria megaphylla</i> Burck	0.18	47.60	0.65	1.40	0.92
Burseraceae	<i>Santiria megaphylla</i> Burck	0.09	33.80	0.65	1.40	2.20
Burseraceae	<i>Santiria microphylla</i> Ridley	0.01	12.40	0.65	1.40	0.07
Burseraceae	<i>Santiria microphylla</i> Ridley	0.09	34.40	0.65	1.06	0.04
Burseraceae	<i>Santiria microphylla</i> Ridley	0.07	30.00	0.65	1.06	0.08
Burseraceae	<i>Santiria microphylla</i> Ridley	0.18	47.50	0.65	1.06	0.68
Burseraceae	<i>Santiria microphylla</i> Ridley	0.01	13.00	0.65	1.06	0.97
Burseraceae	<i>Santiria microphylla</i> Ridley	0.01	10.30	0.65	1.06	2.18
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.07	29.20	0.65	0.45	0.63
Calophyllaceae	<i>Calophyllum soulatri</i> (Willd.) Kurz	0.08	31.80	0.51	0.47	0.04
Calophyllaceae	<i>Calophyllum soulatri</i> (Willd.) Kurz	0.01	10.70	0.51	0.47	0.62
Cannabaceae	<i>Gironniera nervosa</i> (Roxb.) Baill.	0.03	17.90	0.63	1.70	0.04
Cannabaceae	<i>Gironniera nervosa</i> (Roxb.) Baill.	0.02	16.40	0.63	1.70	0.05
Cannabaceae	<i>Gironniera nervosa</i> (Roxb.) Baill.	0.02	15.40	0.63	1.70	0.08
Cannabaceae	<i>Gironniera nervosa</i> (Roxb.) Baill.	0.02	14.60	0.63	1.70	0.10
Cannabaceae	<i>Gironniera nervosa</i> (Roxb.) Baill.	0.01	13.20	0.63	1.70	0.11
Cannabaceae	<i>Gironniera nervosa</i> (Roxb.) Baill.	0.01	11.20	0.63	1.70	0.13
Cannabaceae	<i>Gironniera nervosa</i> (Roxb.) Baill.	0.01	10.60	0.63	1.70	0.15
Cannabaceae	<i>Gironniera nervosa</i> (Roxb.) Baill.	0.01	9.90	0.63	1.70	0.17
Cannabaceae	<i>Gironniera nervosa</i> (Roxb.) Baill.	0.03	18.10	0.63	1.70	0.17
Cannabaceae	<i>Gironniera nervosa</i> (Roxb.) Baill.	0.02	17.10	0.63	1.70	0.04
Celastraceae	<i>Kokoona coriacea</i> (Miq.) Benth	0.06	27.70	0.85	0.34	0.29
Celastraceae	<i>Kokoona coriacea</i> (Miq.) Benth	0.03	19.40	0.85	0.34	0.72

Appendix 1: Continued

Chrysobalanaceae	<i>Parinari villamillii</i> (Pierre) Prance	0.02	15.70	0.80	0.36	0.15
Clusiaceae	<i>Mesua elmeri</i> (Merr.) Kosterm.	0.02	15.40	0.83	0.14	0.15
Clusiaceae	<i>Garcinia parvifolia</i> (Miq.) Miq.	0.02	16.60	0.70	0.33	0.12
Clusiaceae	<i>Garcinia parvifolia</i> (Miq.) Miq.	0.02	14.90	0.70	0.33	0.16
Combretaceae	<i>Terminalia phellocarpa</i> (DC.) Engl.	0.02	15.70	0.63	0.45	0.04
Combretaceae	<i>Terminalia phellocarpa</i> (DC.) Engl.	0.01	10.00	0.63	0.45	0.12
Cornaceae	<i>Mastixia macrocarpa</i> (Miq.) Benth.	0.03	19.00	0.60	0.35	0.13
Cornaceae	<i>Mastixia macrocarpa</i> (Miq.) Benth.	0.02	16.60	0.60	0.35	0.19
Dilleniaceae	<i>Dillenia excelsa</i> (Jack) Gaertn.	0.04	22.10	0.72	0.72	0.07
Dilleniaceae	<i>Dillenia excelsa</i> (Jack) Gaertn.	0.01	13.00	0.72	0.72	0.29
Dilleniaceae	<i>Dillenia excelsa</i> (Jack) Gaertn.	0.01	12.10	0.72	0.72	0.34
Dilleniaceae	<i>Dillenia excelsa</i> (Jack) Gaertn.	0.03	20.70	0.72	0.72	0.08
Dipterocarpaceae	<i>Antisoptera grossivenia</i> (K. Schum. & Lauterb.) H.J. Lam	0.04	22.00	0.67	0.16	0.31
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.28	59.90	0.79	1.27	0.29
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.06	27.30	0.79	1.27	3.94
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.03	18.40	0.75	1.27	0.06
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.02	17.10	0.75	1.27	0.18
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.02	15.00	0.75	1.27	0.22
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.01	13.20	0.75	1.27	0.61
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.01	11.00	0.75	1.27	4.46
Dipterocarpaceae	<i>Dryobalanops beccarii</i> (K. Heyne) H.J. Lam	0.01	10.00	0.58	1.01	0.03
Dipterocarpaceae	<i>Dryobalanops beccarii</i> (K. Heyne) H.J. Lam	0.02	14.00	0.58	1.01	0.04
Dipterocarpaceae	<i>Dryobalanops beccarii</i> (K. Heyne) H.J. Lam	0.01	12.50	0.58	1.01	0.06
Dipterocarpaceae	<i>Dryobalanops beccarii</i> (K. Heyne) H.J. Lam	0.01	10.30	0.58	1.01	0.08
Dipterocarpaceae	<i>Hopea beccariana</i> (K. Heyne) Blume	0.03	18.30	0.71	0.28	0.05
Dipterocarpaceae	<i>Hopea beccariana</i> (K. Heyne) Blume	0.01	11.00	0.71	0.28	0.20
Dipterocarpaceae	<i>Hopea kerangasensis</i> Symington	0.44	75.00	0.60	0.92	0.05
Dipterocarpaceae	<i>Hopea kerangasensis</i> Symington	0.03	20.10	0.60	0.92	0.22
Dipterocarpaceae	<i>Hopea kerangasensis</i> Symington	0.01	11.50	0.60	0.92	6.12
Dipterocarpaceae	<i>Hopea treubii</i> (H.J. Lam) Symington	0.11	37.70	0.66	0.25	1.24
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.03	19.80	0.52	0.55	0.06
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.02	17.70	0.52	0.55	0.06

Appendix 1: Continued

Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.01	12.90	0.52	0.55	0.13
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.01	12.80	0.52	0.55	0.18
Dipterocarpaceae	<i>Shorea argentifolia</i> (Blume) Merr.	0.02	14.00	0.52	0.19	0.03
Dipterocarpaceae	<i>Shorea argentifolia</i> (Blume) Merr.	0.01	9.60	0.52	0.19	0.08
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.57	85.00	0.60	1.56	0.03
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.19	49.00	0.60	1.56	0.05
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.16	45.60	0.60	1.56	0.06
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.07	29.70	0.60	1.56	0.53
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.01	12.60	0.60	1.56	1.59
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.01	12.10	0.60	1.56	1.90
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.01	10.00	0.60	1.56	7.16
Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.08	32.00	0.54	0.48	0.13
Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.02	17.80	0.60	0.48	0.16
Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.02	16.50	0.54	0.48	0.74
Dipterocarpaceae	<i>Shorea faguetiana</i> (Miq.) C.F.Gaertn.	0.04	23.10	0.58	0.77	0.06
Dipterocarpaceae	<i>Shorea faguetiana</i> (Miq.) C.F.Gaertn.	0.05	26.00	0.81	0.77	0.11
Dipterocarpaceae	<i>Shorea faguetiana</i> (Miq.) C.F.Gaertn.	0.03	21.10	0.81	0.77	0.12
Dipterocarpaceae	<i>Shorea faguetiana</i> (Miq.) C.F.Gaertn.	0.02	16.60	0.60	0.77	0.12
Dipterocarpaceae	<i>Shorea faguetiana</i> (Miq.) C.F.Gaertn.	0.02	16.40	0.81	0.77	0.23
Dipterocarpaceae	<i>Shorea faguetiana</i> (Miq.) C.F.Gaertn.	0.02	15.80	0.81	0.77	0.29
Dipterocarpaceae	<i>Shorea faguetiana</i> (Miq.) C.F.Gaertn.	0.01	13.10	0.81	0.77	0.39
Dipterocarpaceae	<i>Shorea falciferoides</i> (Miq.) C.F.Gaertn.	0.13	40.20	0.60	1.14	0.11
Dipterocarpaceae	<i>Shorea falciferoides</i> (Miq.) C.F.Gaertn.	0.08	32.80	0.60	1.14	0.59
Dipterocarpaceae	<i>Shorea falciferoides</i> (Miq.) C.F.Gaertn.	0.07	29.00	0.60	1.14	0.77
Dipterocarpaceae	<i>Shorea falciferoides</i> (Miq.) C.F.Gaertn.	0.05	26.20	0.60	1.14	1.06
Dipterocarpaceae	<i>Shorea falciferoides</i> (Miq.) C.F.Gaertn.	0.01	13.80	0.60	1.14	1.78
Dipterocarpaceae	<i>Shorea flava</i> (Miq.) Blume	0.02	14.20	0.58	0.64	0.04
Dipterocarpaceae	<i>Shorea flava</i> (Miq.) Blume	0.03	20.10	0.47	0.64	0.08
Dipterocarpaceae	<i>Shorea flava</i> (Miq.) Blume	0.02	16.70	0.47	0.64	0.09

Appendix 1: Continued

Dipterocarpaceae	<i>Shorea flava</i> (Miq.) Blume	0.02	15.60	0.47	0.64	0.11
Dipterocarpaceae	<i>Shorea flava</i> (Miq.) Blume	0.01	13.40	0.47	0.64	0.14
Dipterocarpaceae	<i>Shorea flava</i> (Miq.) Blume	0.01	10.50	0.47	0.64	0.22
Dipterocarpaceae	<i>Shorea leprosula</i> (Miq.) Blume	0.41	72.30	0.47	1.64	0.06
Dipterocarpaceae	<i>Shorea leprosula</i> (Miq.) Blume	0.13	41.20	0.60	1.64	0.06
Dipterocarpaceae	<i>Shorea leprosula</i> (Miq.) Blume	0.09	34.70	0.47	1.64	0.25
Dipterocarpaceae	<i>Shorea leprosula</i> (Miq.) Blume	0.07	29.50	0.60	1.64	0.48
Dipterocarpaceae	<i>Shorea leprosula</i> (Miq.) Blume	0.04	23.00	0.60	1.64	0.72
Dipterocarpaceae	<i>Shorea leprosula</i> (Miq.) Blume	0.01	13.70	0.60	1.64	1.12
Dipterocarpaceae	<i>Shorea leprosula</i> (Miq.) Blume	0.01	13.40	0.60	1.64	4.43
Dipterocarpaceae	<i>Shorea leptoclados</i> Blume	0.02	16.30	0.60	0.14	0.13
Dipterocarpaceae	<i>Shorea macrophylla</i> (de Vriese) P.S.Ashton	0.39	70.20	0.60	1.51	0.04
Dipterocarpaceae	<i>Shorea macrophylla</i> (de Vriese) P.S.Ashton	0.11	36.80	0.60	1.51	0.06
Dipterocarpaceae	<i>Shorea macrophylla</i> (de Vriese) P.S.Ashton	0.06	26.90	0.60	1.51	0.09
Dipterocarpaceae	<i>Shorea macrophylla</i> (de Vriese) P.S.Ashton	0.04	22.20	0.60	1.51	0.16
Dipterocarpaceae	<i>Shorea macrophylla</i> (de Vriese) P.S.Ashton	0.04	21.20	0.60	1.51	0.22
Dipterocarpaceae	<i>Shorea macrophylla</i> (de Vriese) P.S.Ashton	0.03	20.00	0.60	1.51	0.25
Dipterocarpaceae	<i>Shorea macrophylla</i> (de Vriese) P.S.Ashton	0.02	17.60	0.60	1.51	0.29
Dipterocarpaceae	<i>Shorea macrophylla</i> (de Vriese) P.S.Ashton	0.02	14.60	0.60	1.51	0.47
Dipterocarpaceae	<i>Shorea macrophylla</i> (de Vriese) P.S.Ashton	0.01	12.40	0.60	1.51	1.06
Dipterocarpaceae	<i>Shorea macrophylla</i> (de Vriese) P.S.Ashton	0.01	10.10	0.60	1.51	5.23
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.07	30.60	0.43	0.72	0.16
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.03	20.90	0.60	0.72	0.24
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.03	20.80	0.60	0.72	0.24
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.02	17.80	0.60	0.72	0.66
Dipterocarpaceae	<i>Shorea mecistopteryx</i> (Ridl.) Symington	0.33	64.40	0.43	1.11	0.63
Dipterocarpaceae	<i>Shorea mecistopteryx</i> (Ridl.) Symington	0.11	37.30	0.60	1.11	0.75
Dipterocarpaceae	<i>Shorea mecistopteryx</i> (Ridl.) Symington	0.08	32.10	0.60	1.11	1.10
Dipterocarpaceae	<i>Shorea mecistopteryx</i> (Ridl.) Symington	0.07	30.00	0.60	1.11	4.25
Dipterocarpaceae	<i>Shorea ovalis</i> Blume	0.04	23.40	0.60	0.69	0.09
Dipterocarpaceae	<i>Shorea ovalis</i> Blume	0.04	23.40	0.60	0.69	0.13
Dipterocarpaceae	<i>Shorea ovalis</i> Blume	0.04	23.20	0.60	0.69	0.27

Appendix 1: Continued

Dipterocarpaceae	<i>Shorea ovalis</i> Blume	0.04	21.70	0.60	0.69	0.32
Dipterocarpaceae	<i>Shorea ovalis</i> Blume	0.02	16.40	0.60	0.69	0.33
Dipterocarpaceae	<i>Shorea ovalis</i> Blume	0.02	14.20	0.60	0.69	0.33
Dipterocarpaceae	<i>Shorea ovata</i> (Roxb.) C.F.Gaertn	0.27	58.30	0.60	1.54	0.04
Dipterocarpaceae	<i>Shorea ovata</i> (Roxb.) C.F.Gaertn	0.05	24.50	0.60	1.54	0.05
Dipterocarpaceae	<i>Shorea ovata</i> (Roxb.) C.F.Gaertn	0.04	23.10	0.60	1.54	0.08
Dipterocarpaceae	<i>Shorea ovata</i> (Roxb.) C.F.Gaertn	0.03	18.00	0.60	1.54	0.09
Dipterocarpaceae	<i>Shorea ovata</i> (Roxb.) C.F.Gaertn	0.02	15.30	0.60	1.54	0.09
Dipterocarpaceae	<i>Shorea ovata</i> (Roxb.) C.F.Gaertn	0.02	14.30	0.60	1.54	0.11
Dipterocarpaceae	<i>Shorea ovata</i> (Roxb.) C.F.Gaertn	0.01	13.60	0.60	1.54	0.17
Dipterocarpaceae	<i>Shorea ovata</i> (Roxb.) C.F.Gaertn	0.01	11.40	0.60	1.54	0.32
Dipterocarpaceae	<i>Shorea ovata</i> (Roxb.) C.F.Gaertn	0.01	10.50	0.60	1.54	0.37
Dipterocarpaceae	<i>Shorea ovata</i> (Roxb.) C.F.Gaertn	0.01	9.80	0.60	1.54	3.34
Dipterocarpaceae	<i>Shorea ovata</i> (Roxb.) C.F.Gaertn	0.02	14.20	0.52	1.54	0.03
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.31	62.60	0.60	3.51	0.04
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.19	49.80	0.60	3.51	0.06
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.16	45.30	0.60	3.51	0.08
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.16	45.30	0.60	3.51	0.08
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.06	27.60	0.60	3.51	0.09
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.05	25.70	0.60	3.51	0.12
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.05	24.30	0.60	3.51	0.13
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.04	23.60	0.60	3.51	0.13
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.04	21.70	0.60	3.51	0.14
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.03	19.90	0.60	3.51	0.19
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.03	19.60	0.60	3.51	0.19
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.03	19.00	0.60	3.51	0.21
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.03	18.80	0.60	3.51	0.22
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.02	16.90	0.60	3.51	0.27
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.02	16.60	0.60	3.51	0.34
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.02	16.50	0.60	3.51	0.36
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.02	16.20	0.60	3.51	0.42
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.02	14.30	0.60	3.51	0.51
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.01	13.60	0.60	3.51	1.79
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.01	13.50	0.60	3.51	1.79
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.01	12.20	0.60	3.51	2.27
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.01	10.80	0.60	3.51	3.97

Appendix 1: Continued

Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.02	13.90	0.60	3.51	0.08
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.27	58.20	0.60	0.14	0.05
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.24	55.60	0.60	0.14	0.06
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.18	47.70	0.60	0.14	0.09
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.15	43.50	0.60	0.14	0.09
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.12	39.30	0.60	0.14	0.10
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.10	35.60	0.60	0.14	0.11
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.06	26.50	0.60	0.14	0.12
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.05	24.50	0.60	0.14	0.12
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.03	20.00	0.60	0.14	0.12
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.03	18.00	0.60	0.14	0.17
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.02	16.20	0.60	0.14	0.22
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.02	15.70	0.60	0.14	0.37
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.02	15.70	0.52	0.14	0.46
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.02	15.40	0.60	0.14	0.97
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.02	15.00	0.60	0.14	1.25
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.02	14.50	0.60	0.14	1.62
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.02	14.10	0.52	0.14	2.04
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.01	12.50	0.60	0.14	2.97
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.01	11.20	0.60	0.14	3.33
Dipterocarpaceae	<i>Shorea pubistyla</i> Symington	0.11	38.10	0.52	0.14	1.16
Dipterocarpaceae	<i>Shorea sagittata</i> P.S.Ashton	0.02	14.90	0.52	0.14	0.10
Dipterocarpaceae	<i>Shorea scabrida</i> Symington	0.07	29.90	0.52	0.30	0.54
Dipterocarpaceae	<i>Shorea scaberrima</i> Burck	0.08	31.90	0.52	0.88	0.03
Dipterocarpaceae	<i>Shorea scaberrima</i> Burck	0.04	22.00	0.52	0.88	0.04
Dipterocarpaceae	<i>Shorea scaberrima</i> Burck	0.02	15.30	0.52	0.88	0.05
Dipterocarpaceae	<i>Shorea scaberrima</i> Burck	0.02	14.50	0.60	0.88	0.07
Dipterocarpaceae	<i>Shorea scaberrima</i> Burck	0.02	13.90	0.60	0.88	0.08
Dipterocarpaceae	<i>Shorea scaberrima</i> Burck	0.01	11.70	0.60	0.88	0.09
Dipterocarpaceae	<i>Shorea scaberrima</i> Burck	0.01	11.40	0.60	0.88	0.24
Dipterocarpaceae	<i>Shorea scaberrima</i> Burck	0.01	10.00	0.52	0.88	0.63
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.07	29.30	0.60	3.03	0.05
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.05	24.80	0.60	3.03	0.06
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.05	24.20	0.60	3.03	0.07
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.04	23.00	0.60	3.03	0.08
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.03	20.50	0.60	3.03	0.11
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.03	19.60	0.60	3.03	0.11
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.03	19.20	0.60	3.03	0.13
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.03	18.00	0.60	3.03	0.14
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.02	17.10	0.60	3.03	0.17
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.02	16.30	0.60	3.03	0.20
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.02	15.30	0.60	3.03	0.20
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.01	13.40	0.60	3.03	0.21

Appendix 1: Continued

Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.01	12.90	0.60	3.03	0.23
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.01	12.50	0.60	3.03	0.31
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.16	45.50	0.60	3.03	0.34
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.05	24.80	0.60	3.03	0.36
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.04	23.60	0.60	3.03	0.38
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.03	19.30	0.60	3.03	0.38
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.02	15.50	0.60	3.03	0.59
Dipterocarpaceae	<i>Shorea subcylindrica</i> Slooten	0.01	11.10	0.60	3.03	1.81
Dipterocarpaceae	<i>Upuna borneensis</i> Sym.	0.02	15.50	0.95	0.14	0.18
Dipterocarpaceae	<i>Vatica micrantha</i> Slooten	0.11	37.10	0.87	0.37	1.57
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	10.30	0.75	0.13	0.05
Ebenaceae	<i>Diospyros bantamensis</i> Koord. & Valetton ex Bakh.	0.06	27.00	0.80	1.07	0.04
Ebenaceae	<i>Diospyros bantamensis</i> Koord. & Valetton ex Bakh.	0.05	26.30	0.80	1.07	0.06
Ebenaceae	<i>Diospyros bantamensis</i> Koord. & Valetton ex Bakh.	0.02	16.00	0.80	1.07	0.12
Ebenaceae	<i>Diospyros bantamensis</i> Koord. & Valetton ex Bakh.	0.02	14.50	0.80	1.07	0.16
Ebenaceae	<i>Diospyros bantamensis</i> Koord. & Valetton ex Bakh.	0.01	11.20	0.80	1.07	0.60
Ebenaceae	<i>Diospyros bantamensis</i> Koord. & Valetton ex Bakh.	0.01	9.80	0.80	1.07	0.64
Ebenaceae	<i>Diospyros evena</i> Bakh.	0.28	59.50	0.65	0.86	0.07
Ebenaceae	<i>Diospyros evena</i> Bakh.	0.01	12.80	0.65	0.86	3.80
Ebenaceae	<i>Diospyros sumatrana</i> Miq.	0.07	30.10	0.75	0.20	0.79
Elaeocarpaceae	<i>Elaeocarpus clementis</i> R. Knuth	0.01	12.90	0.58	0.26	0.07
Euphorbiaceae	<i>Blumeodendron calophyllum</i> Airy Shaw	0.06	27.20	0.63	0.67	0.03
Euphorbiaceae	<i>Blumeodendron calophyllum</i> Airy Shaw	0.06	27.00	0.63	0.67	0.04
Euphorbiaceae	<i>Blumeodendron calophyllum</i> Airy Shaw	0.02	15.60	0.63	0.67	0.12
Euphorbiaceae	<i>Blumeodendron calophyllum</i> Airy Shaw	0.01	10.50	0.63	0.67	0.50
Euphorbiaceae	<i>Blumeodendron calophyllum</i> Airy Shaw	0.01	9.80	0.63	0.67	0.51
Euphorbiaceae	<i>Chaetocarpus castanocarpus</i> (Roxb.) Thawaites	0.09	32.90	0.88	0.27	0.05
Euphorbiaceae	<i>Chaetocarpus castanocarpus</i> (Roxb.) Thawaites	0.01	9.70	0.88	0.27	1.17
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.02	17.30	0.95	4.61	0.05
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.02	15.30	0.95	4.61	0.07
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.01	12.20	0.95	4.61	0.08
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.30	62.30	0.95	4.61	0.09
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.23	54.00	0.95	4.61	0.09
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.20	50.00	0.95	4.61	0.12
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.12	39.00	0.95	4.61	0.17

Appendix 1: Continued

Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.10	35.00	0.95	4.61	0.20
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.08	32.10	0.95	4.61	0.21
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.08	31.30	0.95	4.61	0.23
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.07	30.60	0.95	4.61	0.25
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.05	25.20	0.95	4.61	0.32
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.04	22.90	0.95	4.61	0.38
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.03	20.70	0.95	4.61	0.49
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.03	19.50	0.95	4.61	0.63
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.02	17.80	0.95	4.61	1.04
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.02	16.60	0.95	4.61	1.10
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.02	16.20	0.95	4.61	1.18
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.01	13.40	0.95	4.61	1.47
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.01	12.30	0.95	4.61	1.55
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.01	11.30	0.95	4.61	1.94
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.01	11.20	0.95	4.61	3.61
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.01	10.00	0.95	4.61	4.37
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.10	35.70	0.95	4.61	6.19
Euphorbiaceae	<i>Homalanthus populneus</i> (Geiseler) Pax.	0.03	20.80	0.35	0.16	0.14
Euphorbiaceae	<i>Macaranga conifera</i> (Rchb.f. & Zoll.) Müll.Arg.	0.07	30.50	0.36	0.95	0.06
Euphorbiaceae	<i>Macaranga conifera</i> (Rchb.f. & Zoll.) Müll.Arg.	0.07	30.10	0.36	0.95	0.18
Euphorbiaceae	<i>Macaranga conifera</i> (Rchb.f. & Zoll.) Müll.Arg.	0.07	29.70	0.36	0.95	0.34
Euphorbiaceae	<i>Macaranga conifera</i> (Rchb.f. & Zoll.) Müll.Arg.	0.06	28.70	0.36	0.95	0.37
Euphorbiaceae	<i>Macaranga conifera</i> (Rchb.f. & Zoll.) Müll.Arg.	0.04	22.60	0.36	0.95	0.38
Euphorbiaceae	<i>Macaranga conifera</i> (Rchb.f. & Zoll.) Müll.Arg.	0.02	14.90	0.36	0.95	0.40
Euphorbiaceae	<i>Macaranga hosei</i> King ex Hook.f.	0.07	29.40	0.29	1.37	0.02
Euphorbiaceae	<i>Macaranga hosei</i> King ex Hook.f.	0.07	29.10	0.29	1.37	0.03
Euphorbiaceae	<i>Macaranga hosei</i> King ex Hook.f.	0.05	26.00	0.29	1.37	0.07
Euphorbiaceae	<i>Macaranga hosei</i> King ex Hook.f.	0.05	25.60	0.29	1.37	0.07
Euphorbiaceae	<i>Macaranga hosei</i> King ex Hook.f.	0.04	21.60	0.29	1.37	0.07
Euphorbiaceae	<i>Macaranga hosei</i> King ex Hook.f.	0.02	17.00	0.29	1.37	0.13
Euphorbiaceae	<i>Macaranga hosei</i> King ex Hook.f.	0.02	16.80	0.29	1.37	0.20
Euphorbiaceae	<i>Macaranga hosei</i> King ex Hook.f.	0.02	16.70	0.29	1.37	0.21
Euphorbiaceae	<i>Macaranga hosei</i> King ex Hook.f.	0.01	12.80	0.29	1.37	0.28

Appendix 1: Continued

Euphorbiaceae	<i>Macaranga hosei</i> King ex Hook.f.	0.01	10.20	0.29	1.37	0.29
Euphorbiaceae	<i>Macaranga hullettii</i> King ex Hook.f.	0.05	25.80	0.32	0.41	0.07
Euphorbiaceae	<i>Macaranga hullettii</i> King ex Hook.f.	0.04	22.10	0.32	0.41	0.15
Euphorbiaceae	<i>Macaranga hullettii</i> King ex Hook.f.	0.02	16.70	0.32	0.41	0.23
Euphorbiaceae	<i>Macaranga pruinosa</i> (Miq.) Müll. Arg.	0.10	36.00	0.48	0.92	0.08
Euphorbiaceae	<i>Macaranga pruinosa</i> (Miq.) Müll. Arg.	0.06	27.00	0.48	0.92	0.08
Euphorbiaceae	<i>Macaranga pruinosa</i> (Miq.) Müll. Arg.	0.04	22.70	0.48	0.92	0.17
Euphorbiaceae	<i>Macaranga pruinosa</i> (Miq.) Müll. Arg.	0.03	20.10	0.48	0.92	0.24
Euphorbiaceae	<i>Macaranga pruinosa</i> (Miq.) Müll. Arg.	0.02	15.00	0.48	0.92	0.38
Euphorbiaceae	<i>Macaranga pruinosa</i> (Miq.) Müll. Arg.	0.02	14.90	0.48	0.92	0.79
Euphorbiaceae	<i>Macaranga tanarius</i> Muell. Arg.	0.05	25.50	0.48	0.18	0.33
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.12	39.50	0.48	5.74	0.02
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.10	36.50	0.48	5.74	0.03
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.10	35.00	0.48	5.74	0.04
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.09	33.30	0.48	5.74	0.04
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.08	32.50	0.48	5.74	0.04
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.08	32.30	0.48	5.74	0.05
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.06	27.20	0.48	5.74	0.05
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.06	26.90	0.48	5.74	0.05
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.05	25.00	0.48	5.74	0.07
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.05	24.40	0.48	5.74	0.07
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.05	24.20	0.48	5.74	0.07
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.04	23.80	0.48	5.74	0.08
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.04	23.70	0.48	5.74	0.09
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.04	23.60	0.48	5.74	0.10
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.04	21.60	0.48	5.74	0.10
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.04	21.50	0.48	5.74	0.12

Appendix 1: Continued

Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.03	20.70	0.48	5.74	0.12
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.03	20.40	0.48	5.74	0.12
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.03	19.30	0.48	5.74	0.12
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.03	18.90	0.48	5.74	0.12
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.03	18.80	0.48	5.74	0.12
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.03	18.80	0.48	5.74	0.13
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.03	18.50	0.48	5.74	0.13
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.03	18.10	0.48	5.74	0.14
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.02	17.80	0.48	5.74	0.15
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.02	17.60	0.48	5.74	0.15
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.02	17.50	0.48	5.74	0.15
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.02	17.50	0.48	5.74	0.16
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.02	17.20	0.48	5.74	0.18
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.02	17.20	0.48	5.74	0.19
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.02	17.20	0.48	5.74	0.21
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.02	16.20	0.48	5.74	0.21
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.02	16.10	0.48	5.74	0.27
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.02	14.30	0.48	5.74	0.27
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.02	14.30	0.48	5.74	0.27
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.02	13.90	0.48	5.74	0.28
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.01	12.80	0.48	5.74	0.29
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.01	12.70	0.48	5.74	0.31
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.01	12.50	0.48	5.74	0.32
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.01	12.00	0.48	5.74	0.37
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.01	11.50	0.48	5.74	0.39
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.01	11.00	0.48	5.74	0.60
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.01	10.50	0.48	5.74	0.61

Appendix 1: Continued

Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.01	9.60	0.48	5.74	0.65
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.11	37.10	0.48	5.74	0.74
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.05	25.40	0.48	5.74	0.82
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.02	15.60	0.48	5.74	1.00
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.02	14.90	0.48	5.74	0.86
Euphorbiaceae	<i>Mallotus wrayi</i> King ex Hook.f.	0.11	37.20	0.60	1.18	0.10
Euphorbiaceae	<i>Mallotus wrayi</i> King ex Hook.f.	0.24	55.50	0.60	1.18	0.11
Euphorbiaceae	<i>Mallotus wrayi</i> King ex Hook.f.	0.02	15.30	0.60	1.18	1.09
Euphorbiaceae	<i>Mallotus wrayi</i> King ex Hook.f.	0.02	15.10	0.60	1.18	2.96
Fabaceae	<i>Dialium indum</i> L. var. <i>indum</i>	0.03	19.50	0.90	0.28	0.30
Fabaceae	<i>Sindora beccariana</i> De Wit	0.29	61.10	0.62	0.45	3.89
Fagaceae	<i>Castanopsis costata</i> (Blume) A.DC.	0.02	14.30	0.65	0.14	0.10
Fagaceae	<i>Castanopsis motleyana</i> King	0.22	52.50	0.76	0.36	3.29
Fagaceae	<i>Lithocarpus bennettii</i> (Miq.) Rehder	0.24	55.00	0.75	0.64	0.15
Fagaceae	<i>Lithocarpus bennettii</i> (Miq.) Rehder	0.06	28.70	0.75	0.64	0.70
Fagaceae	<i>Lithocarpus bennettii</i> (Miq.) Rehder	0.02	16.00	0.75	0.64	3.60
Fagaceae	<i>Lithocarpus dasystachya</i> (Miq.) Rehder	0.37	68.80	0.65	1.03	0.06
Fagaceae	<i>Lithocarpus dasystachya</i> (Miq.) Rehder	0.05	25.00	0.65	1.03	0.07
Fagaceae	<i>Lithocarpus dasystachya</i> (Miq.) Rehder	0.01	12.80	0.65	1.03	0.42
Fagaceae	<i>Lithocarpus dasystachya</i> (Miq.) Rehder	0.01	11.80	0.65	1.03	5.40
Fagaceae	<i>Lithocarpus leptogyne</i> (Korth.) Soepadmo	0.06	28.20	0.65	0.19	0.58
Fagaceae	<i>Lithocarpus meijeri</i> Soepadmo	0.15	44.20	0.65	0.48	1.46
Fagaceae	<i>Lithocarpus meijeri</i> Soepadmo	0.13	40.50	0.65	0.48	1.82
Fagaceae	<i>Lithocarpus sundaicus</i> (Blume) Rehder	0.03	20.10	0.65	0.16	0.24
Ixonanthaceae	<i>Alanthospermum boneense</i> Forman	0.01	10.10	1.08	0.59	0.06
Ixonanthaceae	<i>Alanthospermum boneense</i> Forman	0.07	30.40	1.08	0.59	0.07
Ixonanthaceae	<i>Alanthospermum boneense</i> Forman	0.01	10.60	1.08	0.59	1.17
Lauraceae	<i>Actinodaphne borneensis</i> Meisn.	0.04	22.90	0.50	0.37	0.17
Lauraceae	<i>Actinodaphne borneensis</i> Meisn.	0.03	19.50	0.50	0.37	0.26
Lauraceae	<i>Beilsemedia madang</i> Blume	0.02	16.20	0.55	0.14	0.11
Lauraceae	<i>Dehassia elmeri</i> H.J.Lam	0.03	19.50	0.60	0.34	0.08

Appendix 1: Continued

Lauraceae	<i>Dehassia elmeri</i> H.J.Lam	0.02	14.00	0.60	0.34	0.20
Lauraceae	<i>Litsea aurea</i> Kosterm.	0.02	14.00	0.46	0.27	0.06
Lauraceae	<i>Litsea castanea</i> Hook. f.	0.07	29.00	0.43	0.20	0.44
Lauraceae	<i>Litsea grandis</i> Hook. f.	0.03	19.20	0.43	0.33	0.14
Lauraceae	<i>Phoebe opaca</i> Blume	0.01	13.10	0.53	0.14	0.06
Lecythidaceae	<i>Barringtonia angusta</i> Kurz	0.02	13.90	0.60	0.14	0.08
Lecythidaceae	<i>Barringtonia lanceolata</i> (Ridl.) Knuth	0.04	23.60	0.60	0.83	0.09
Lecythidaceae	<i>Barringtonia lanceolata</i> (Ridl.) Knuth	0.03	19.80	0.60	0.83	0.13
Lecythidaceae	<i>Barringtonia lanceolata</i> (Ridl.) Knuth	0.02	16.40	0.60	0.83	0.21
Lecythidaceae	<i>Barringtonia lanceolata</i> (Ridl.) Knuth	0.02	14.10	0.60	0.83	0.34
Lecythidaceae	<i>Barringtonia lanceolata</i> (Ridl.) Knuth	0.01	9.70	0.60	0.83	0.03
Malvaceae	<i>Brownlowia peltata</i> Benth.	0.01	13.80	0.53	0.14	0.07
Malvaceae	<i>Durio kutejensis</i> (Hassk.) Becc.	0.09	32.90	0.54	0.34	0.72
Malvaceae	<i>Microcos gracilis</i> Stapf ex Ridl.	0.01	10.10	0.55	0.13	0.03
Malvaceae	<i>Pentace borneensis</i> Pierre	0.02	16.10	0.58	0.27	0.12
Melastomaceae	<i>Memecylon garcinoides</i> Blume	0.01	11.10	0.75	0.13	0.06
Melastomaceae	<i>pternandra agustifolia</i> J.F.Maxwell	0.01	10.60	0.55	0.19	0.04
Melastomaceae	<i>pternandra agustifolia</i> J.F.Maxwell	0.01	10.50	0.55	0.19	0.04
Meliaceae	<i>Aglaia affinis</i> Merr.	0.10	35.60	0.72	0.64	0.11
Meliaceae	<i>Aglaia affinis</i> Merr.	0.09	34.00	0.72	0.64	1.04
Meliaceae	<i>Aglaia affinis</i> Merr.	0.02	14.30	0.72	0.64	1.17
Meliaceae	<i>Aglaia beccariana</i> Harms	0.01	13.30	0.65	0.14	0.08
Meliaceae	<i>Aglaia rugulosa</i> Pannell	0.02	16.00	0.65	0.14	0.13
Meliaceae	<i>Dysoxylum pachyrhache</i> Merr.	0.05	26.20	0.68	0.18	0.50
Meliaceae	<i>Sandoricum borneense</i> Miq.	0.01	12.90	0.50	0.14	0.06
Moraceae	<i>Artocarpus anisophyllus</i> Miq.	0.02	14.60	0.74	0.63	0.24
Moraceae	<i>Artocarpus anisophyllus</i> Miq.	0.33	64.80	0.74	0.63	5.32
Moraceae	<i>Artocarpus kemando</i> Miq. subsp. kemando	0.03	20.90	0.50	0.36	0.06
Moraceae	<i>Artocarpus kemando</i> Miq. subsp. kemando	0.02	14.60	0.50	0.36	0.08
Moraceae	<i>Artocarpus kemando</i> Miq. subsp. kemando	0.01	13.20	0.50	0.36	0.20
Moraceae	<i>Artocarpus obtusus</i> Jarrett	0.09	33.80	0.63	0.48	0.05
Moraceae	<i>Artocarpus obtusus</i> Jarrett	0.01	11.70	0.63	0.48	0.89
Moraceae	<i>Ficus aurata</i> Miq. (Miq.)	0.22	53.50	0.43	0.87	0.02
Moraceae	<i>Ficus aurata</i> Miq. (Miq.)	0.02	15.50	0.43	0.87	0.04
Moraceae	<i>Ficus aurata</i> Miq. (Miq.)	0.02	15.00	0.43	0.87	0.04
Moraceae	<i>Ficus aurata</i> Miq. (Miq.)	0.01	12.50	0.43	0.87	0.07

Appendix 1: Continued

Moraceae	<i>Ficus aurata</i> Miq. (Miq.)	0.01	11.90	0.43	0.87	0.08
Moraceae	<i>Ficus aurata</i> Miq. (Miq.)	0.01	8.50	0.43	0.87	1.92
Moraceae	<i>Ficus gecharis</i> Corner	0.23	54.00	0.43	0.51	0.02
Moraceae	<i>Ficus gecharis</i> Corner	0.01	9.90	0.43	0.51	1.96
Moraceae	<i>Ficus parietalis</i> Blume	0.01	10.80	0.43	0.13	0.03
Myristicaceae	<i>Gymnacranthera contracta</i> Warb.	0.06	28.50	0.50	1.15	0.05
Myristicaceae	<i>Gymnacranthera contracta</i> Warb.	0.04	23.30	0.50	1.15	0.10
Myristicaceae	<i>Gymnacranthera contracta</i> Warb.	0.03	19.50	0.50	1.15	0.11
Myristicaceae	<i>Gymnacranthera contracta</i> Warb.	0.02	16.70	0.50	1.15	0.11
Myristicaceae	<i>Gymnacranthera contracta</i> Warb.	0.02	16.50	0.50	1.15	0.17
Myristicaceae	<i>Gymnacranthera contracta</i> Warb.	0.02	16.20	0.50	1.15	0.27
Myristicaceae	<i>Gymnacranthera contracta</i> Warb.	0.01	12.50	0.50	1.15	0.46
Myristicaceae	<i>Gymnacranthera forbesii</i> (King) Warb.	0.04	21.30	0.58	0.47	0.09
Myristicaceae	<i>Gymnacranthera forbesii</i> (King) Warb.	0.02	14.40	0.58	0.47	0.25
Myristicaceae	<i>Horsfieldia grandis</i> (Hook.fil.) Warb.	0.01	10.60	0.55	0.57	0.13
Myristicaceae	<i>Horsfieldia reticulata</i> Warb.	0.04	23.20	0.55	0.54	0.21
Myristicaceae	<i>Horsfieldia reticulata</i> Warb.	0.03	20.40	0.55	0.54	0.30
Myristicaceae	<i>Horsfieldia grandis</i> (Hook.fil.) Warb.	0.02	15.00	0.39	0.57	0.07
Myristicaceae	<i>Knema ashtonii</i> J.Sinclair	0.01	10.50	0.58	0.13	0.04
Myristicaceae	<i>Knema intermedia</i> (Blume) Warb.	0.03	19.10	0.58	0.66	0.06
Myristicaceae	<i>Knema intermedia</i> (Blume) Warb.	0.03	18.10	0.58	0.66	0.07
Myristicaceae	<i>Knema intermedia</i> (Blume) Warb.	0.02	15.00	0.58	0.66	0.10
Myristicaceae	<i>Knema intermedia</i> (Blume) Warb.	0.01	13.30	0.58	0.66	0.16
Myristicaceae	<i>Knema intermedia</i> (Blume) Warb.	0.01	12.50	0.58	0.66	0.19
Myristicaceae	<i>Knema laurina</i> (Blume) Warb.	0.02	15.20	0.58	0.59	0.04
Myristicaceae	<i>Knema laurina</i> (Blume) Warb.	0.01	13.70	0.58	0.59	0.08
Myristicaceae	<i>Knema laurina</i> (Blume) Warb.	0.01	11.20	0.58	0.59	0.10
Myristicaceae	<i>Knema laurina</i> (Blume) Warb.	0.01	9.60	0.58	0.59	0.03
Myristicaceae	<i>Knema pectinata</i> Warb.	0.01	13.60	0.58	0.14	0.08
Myristicaceae	<i>Knema rufa</i> Warb.	0.06	26.50	0.58	0.44	0.44
Myristicaceae	<i>Myristica beccarii</i> Warb.	0.14	41.60	0.53	1.07	0.03
Myristicaceae	<i>Myristica beccarii</i> Warb.	0.13	41.10	0.53	1.07	0.83
Myristicaceae	<i>Myristica beccarii</i> Warb.	0.10	35.30	0.53	1.07	1.23

Appendix 1: Continued

Myristicaceae	<i>Myristica beccarii</i> Warb.	0.01	9.90	0.53	1.07	1.27
Myristicaceae	<i>Myristica iners</i> Blume	0.03	20.10	0.53	0.43	0.10
Myristicaceae	<i>Myristica iners</i> Blume	0.03	20.00	0.53	0.43	0.19
Myristicaceae	<i>Myristica iners</i> Blume	0.02	15.70	0.53	0.43	0.19
Myristicaceae	<i>Myristica malaccensis</i> Hook.f.	0.11	36.60	0.53	0.58	0.09
Myristicaceae	<i>Myristica malaccensis</i> Hook.f.	0.07	30.10	0.53	0.58	0.55
Myristicaceae	<i>Myristica malaccensis</i> Hook.f.	0.02	15.10	0.53	0.58	0.91
Myristicaceae	<i>Myristica papyracea</i> J.Sinclair	0.03	18.20	0.53	0.15	0.15
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.21	52.00	0.75	1.07	0.09
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.03	18.50	0.75	1.07	0.10
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.02	15.10	0.75	1.07	0.13
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.01	13.70	0.75	1.07	0.22
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.01	13.00	0.75	1.07	0.51
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.05	25.50	0.70	1.07	0.13
Myrtaceae	<i>Syzygium barringtoniodes</i> (Ridl.) Masam.	0.05	24.40	0.70	0.17	0.43
Myrtaceae	<i>Syzygium beccarii</i> (Ridl.) Merr. & L.M.Perry	0.01	12.70	0.70	0.14	0.08
Myrtaceae	<i>Syzygium elliptilimum</i> (Merr.) Merr. & L.M.Perry	0.01	10.00	0.70	0.13	0.04
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.02	14.90	0.70	0.42	0.09
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.01	13.70	0.70	0.42	0.12
Myrtaceae	<i>syzygium tenuicaudatum</i> Merr. & L.M.Perry	0.03	20.30	0.70	0.16	0.26
Myrtaceae	<i>Tristaniopsis whiteana</i> (Griff.) Paul G.Wilson & J.T.Waterh.	0.07	28.80	0.96	0.35	0.33
Myrtaceae	<i>Tristaniopsis whiteana</i> (Griff.) Paul G.Wilson & J.T.Waterh.	0.03	19.60	0.96	0.35	0.91
Olacaceae	<i>Ochanostachys amentacea</i> Mast.	0.04	22.00	0.88	0.16	0.41
Olacaceae	<i>Scodorocarpus borneensis</i> Becc.	0.11	37.80	0.82	0.51	0.08
Olacaceae	<i>Scodorocarpus borneensis</i> Becc.	0.02	16.60	0.82	0.51	0.16
Olacaceae	<i>Scodorocarpus borneensis</i> Becc.	0.02	15.90	0.82	0.51	0.18
Olacaceae	<i>Scodorocarpus borneensis</i> Becc.	0.01	12.20	0.82	0.51	1.55
Phyllanthaceae	<i>Aporusa bentamiana</i> Hook. f.	0.05	25.70	0.65	0.61	0.05
Phyllanthaceae	<i>Aporusa bentamiana</i> Hook. f.	0.03	20.10	0.65	0.61	0.14
Phyllanthaceae	<i>Aporusa bentamiana</i> Hook. f.	0.03	18.20	0.65	0.61	0.18
Phyllanthaceae	<i>Aporusa bentamiana</i> Hook. f.	0.02	16.50	0.65	0.61	0.24
Phyllanthaceae	<i>Aporusa bentamiana</i> Hook. f.	0.01	11.00	0.65	0.61	0.46

Appendix 1: Continued

Phyllanthaceae	<i>Baccaurea macrophylla</i> Pax & K. Hoffm.	0.15	44.30	0.79	0.50	0.29
Phyllanthaceae	<i>Baccaurea macrophylla</i> Pax & K. Hoffm.	0.03	20.00	0.79	0.50	2.23
Phyllanthaceae	<i>Cleisanthus deccurens</i> Hook. f.	0.02	17.20	0.63	0.92	0.01
Phyllanthaceae	<i>Cleisanthus deccurens</i> Hook. f.	0.03	20.10	0.63	0.92	0.06
Phyllanthaceae	<i>Cleisanthus deccurens</i> Hook. f.	0.02	17.60	0.63	0.92	0.09
Phyllanthaceae	<i>Cleisanthus deccurens</i> Hook. f.	0.02	13.90	0.63	0.92	0.15
Phyllanthaceae	<i>Cleisanthus deccurens</i> Hook. f.	0.01	11.90	0.63	0.92	0.16
Phyllanthaceae	<i>Cleisanthus deccurens</i> Hook. f.	0.00	6.30	0.63	0.92	0.23
Phyllanthaceae	<i>Cleisanthus deccurens</i> Hook. f.	0.03	20.50	0.63	0.92	0.24
Phyllanthaceae	<i>Cleistanthus vestitus</i> Jabl.	0.01	10.00	0.63	0.13	0.04
Phyllanthaceae	<i>Glochidion arborescens</i> Blume	0.04	23.90	0.66	0.17	0.38
Phyllanthaceae	<i>Glochidion lutescens</i> Blume	0.01	12.60	0.63	0.14	0.07
Phyllanthaceae	<i>Glochidion obscurum</i> Blume	0.85	104.00	0.63	1.06	13.55
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.15	44.10	0.77	1.53	0.05
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.14	42.50	0.77	1.53	0.05
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.07	30.60	0.77	1.53	0.12
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.05	24.80	0.77	1.53	0.22
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.04	21.50	0.77	1.53	0.34
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.03	18.40	0.77	1.53	0.49
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.02	14.40	0.77	1.53	0.85
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.01	10.10	0.77	1.53	1.96
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.01	10.10	0.77	1.53	2.15
Polygalaceae	<i>Xanthophyllum beccarianum</i> Chodat	0.06	28.50	0.80	0.81	0.08
Polygalaceae	<i>Xanthophyllum beccarianum</i> Chodat	0.04	22.20	0.80	0.81	0.22
Polygalaceae	<i>Xanthophyllum beccarianum</i> Chodat	0.03	18.00	0.80	0.81	0.38
Polygalaceae	<i>Xanthophyllum beccarianum</i> Chodat	0.01	12.10	0.80	0.81	0.73
Polygalaceae	<i>Xanthophyllum ovatifolium</i> Chodat	0.02	17.00	0.80	0.29	0.16
Polygalaceae	<i>Xanthophyllum ovatifolium</i> Chodat	0.02	15.80	0.80	0.29	0.19
Rhizophoraceae	<i>Pelacalyx axilaris</i> Korth.	0.08	32.80	0.43	0.59	0.09
Rhizophoraceae	<i>Pelacalyx axilaris</i> Korth.	0.04	22.60	0.43	0.59	0.09
Rhizophoraceae	<i>Pelacalyx axilaris</i> Korth.	0.02	15.90	0.43	0.59	0.22
Rhizophoraceae	<i>Pelacalyx axilaris</i> Korth.	0.02	16.40	0.43	0.59	0.57

Appendix 1: Continued

Rosaceae	<i>prunus polystachia</i> (Hook.f.) Kalkman	0.01	10.80	0.68	0.13	0.05
Rubiaceae	<i>Canthium glabrum</i> Blume	0.01	10.40	0.70	0.13	0.04
Rubiaceae	<i>Neolamarckia cadamba</i> (Roxb.) Bosser	0.06	28.10	0.48	0.19	0.42
Rubiaceae	<i>Neonauclea calycina</i> (Bartl. ex DC.) Merr.	0.02	16.90	0.74	0.15	0.17
Rubiaceae	<i>psychotria robusta</i> Blume	0.04	22.10	0.60	0.16	0.28
Rubiaceae	<i>Tarenna cumingiana</i> (S.Vidal) Elmer	0.02	16.70	0.69	0.26	0.05
Rubiaceae	<i>Tarenna cumingiana</i> (S.Vidal) Elmer	0.02	15.10	0.69	0.26	0.12
Rubiaceae	<i>Tarenna cumingiana</i> (S.Vidal) Elmer	0.01	11.00	0.69	0.26	0.16
Rutaceae	<i>Euodia glabra</i> Blume	0.09	34.30	0.35	0.22	0.52
Rutaceae	<i>Euodia malayana</i> Ridl.	0.01	10.40	0.40	0.26	0.03
Sapindaceae	<i>Nephelium beccarianum</i> (Radlk.) Leenh.	0.09	33.60	0.75	0.35	0.05
Sapindaceae	<i>Nephelium beccarianum</i> (Radlk.) Leenh.	0.01	10.30	0.75	0.35	1.05
Sapindaceae	<i>Nephelium cuspidatum</i> Blume	0.01	10.20	0.87	0.64	0.05
Sapindaceae	<i>Pometia pinnata</i> J. R. Forst. & G. Forst.	0.02	14.70	0.71	0.14	0.11
Sapindaceae	<i>Xerospermum noronhianum</i> Blume	0.21	52.00	0.81	1.24	0.08
Sapindaceae	<i>Xerospermum noronhianum</i> Blume	0.21	51.10	0.81	1.24	0.37
Sapindaceae	<i>Xerospermum noronhianum</i> Blume	0.10	35.00	0.81	1.24	0.79
Sapindaceae	<i>Xerospermum noronhianum</i> Blume	0.07	29.60	0.81	1.24	0.81
Sapindaceae	<i>Xerospermum noronhianum</i> Blume	0.07	29.30	0.81	1.24	1.25
Sapindaceae	<i>Xerospermum noronhianum</i> Blume	0.04	21.90	0.81	1.24	3.24
Sapindaceae	<i>Xerospermum noronhianum</i> Blume	0.01	12.40	0.81	1.24	3.38
Sapotaceae	<i>Madhuca costulata</i> (Pierre ex Dubard) H.J.Lam	0.03	19.40	0.75	0.15	0.25
Sapotaceae	<i>Palaquium dasyphyllum</i> Pierre ex Dubard	0.02	16.00	0.58	0.20	0.04
Sapotaceae	<i>Palaquium dasyphyllum</i> Pierre ex Dubard	0.01	10.50	0.58	0.20	0.12
Sapotaceae	<i>Palaquium decurrens</i> H.J.Lam	0.01	10.30	0.75	0.13	0.05
Sapotaceae	<i>Palaquium rigidum</i> Pierre ex Dubard	0.01	13.10	0.75	0.14	0.09
Simaroubaceae	<i>Brucea javanica</i> (L.) Merr.	0.01	10.20	0.53	0.13	0.03
Sterculiaceae	<i>Scaphium macropodum</i> (Miq.) Beumee ex K.Heyne	0.02	15.60	0.53	0.43	0.03
Sterculiaceae	<i>Scaphium macropodum</i> (Miq.) Beumee ex K.Heyne	0.01	12.00	0.53	0.43	0.05

Appendix 1: Continued

Sterculiaceae	<i>Scaphium macropodum</i> (Miq.) Beumee ex K.Heyne	0.01	9.70	0.53	0.43	0.10
Sterculiaceae	<i>Sterculia cordata</i> Blume	0.04	22.20	0.48	0.70	0.04
Sterculiaceae	<i>Sterculia cordata</i> Blume	0.01	11.40	0.48	0.70	0.23
Symplocaceae	<i>Symplocos polyandra</i> (Blanco) Brand	0.03	19.20	0.57	0.35	0.10
Symplocaceae	<i>Symplocos polyandra</i> (Blanco) Brand	0.02	15.00	0.57	0.35	0.19
Verbenaceae	<i>Teijsmanniodendron sarawakanum</i> H.Pearson) Kosterm.	0.05	25.40	0.77	0.31	0.07
Verbenaceae	<i>Teijsmanniodendron sarawakanum</i> H.Pearson) Kosterm.	0.01	12.00	0.77	0.31	0.52

Appendix 2: List of sampled trees in Saremas 1 Div 5 forest

Family	Species	Basal area (cm ²)	DBH (cm)	Wood Density (g/cm ³)	SIV	AGB (Mg ha ⁻¹)
Achariaceae	<i>Hydnocarpus anomala</i> (Merr.) Sleumer	0.02	13.40	0.70	0.36	0.10
Achariaceae	<i>Hydnocarpus anomala</i> (Merr.) Sleumer	0.01	14.50	0.70	0.36	0.13
Achariaceae	<i>Hydnocarpus anomala</i> (Merr.) Sleumer	0.13	33.60	0.70	0.36	1.13
Actinidiaceae	<i>Saurauia cordata</i> Quisumb.	0.04	24.00	0.46	0.14	0.31
Actinidiaceae	<i>Saurauia glabra</i> Merr.	0.02	22.40	0.46	0.14	0.26
Actinidiaceae	<i>Saurauia nudiflora</i> DC.	0.02	10.00	0.43	0.66	0.03
Actinidiaceae	<i>Saurauia nudiflora</i> DC.	0.01	10.00	0.43	0.66	0.03
Actinidiaceae	<i>Saurauia nudiflora</i> DC.	0.01	11.20	0.43	0.66	0.04
Actinidiaceae	<i>Saurauia nudiflora</i> DC.	0.01	11.80	0.43	0.66	0.04
Actinidiaceae	<i>Saurauia nudiflora</i> DC.	0.04	14.90	0.43	0.66	0.08
Actinidiaceae	<i>Saurauia nudiflora</i> DC.	0.02	15.20	0.43	0.66	0.09
Actinidiaceae	<i>Saurauia nudiflora</i> DC.	0.03	17.80	0.43	0.66	0.13
Actinidiaceae	<i>Saurauia nudiflora</i> DC.	0.01	20.10	0.43	0.66	0.18
Actinidiaceae	<i>Saurauia nudiflora</i> DC.	0.02	22.80	0.43	0.66	0.25
Alangiaceae	<i>Alangium nobile</i> Harms	0.01	10.70	0.82	0.11	0.07
Alangiaceae	<i>Alangium ridleyi</i> King	0.01	9.90	0.82	0.18	0.05
Alangiaceae	<i>Alangium ridleyi</i> King	0.04	10.60	0.82	0.18	0.06
Alangiaceae	<i>Alangium ridleyi</i> King	0.02	21.40	0.82	0.18	0.41
Anacardiaceae	<i>Gluta aptera</i> (King) Ding Hou	0.02	10.90	0.65	1.02	0.05
Anacardiaceae	<i>Gluta aptera</i> (King) Ding Hou	0.02	11.00	0.65	1.02	0.06
Anacardiaceae	<i>Gluta aptera</i> (King) Ding Hou	0.03	11.70	0.65	1.02	0.07
Anacardiaceae	<i>Gluta aptera</i> (King) Ding Hou	0.05	14.90	0.65	1.02	0.13
Anacardiaceae	<i>Gluta aptera</i> (King) Ding Hou	0.01	16.50	0.65	1.02	0.16
Anacardiaceae	<i>Gluta aptera</i> (King) Ding Hou	0.01	17.40	0.65	1.02	0.19
Anacardiaceae	<i>Gluta aptera</i> (King) Ding Hou	0.01	18.60	0.65	1.02	0.22

Appendix 2: Continued

Anacardiaceae	<i>Gluta aptera</i> (King) Ding Hou	0.03	19.00	0.65	1.02	0.24
Anacardiaceae	<i>Gluta aptera</i> (King) Ding Hou	0.01	26.30	0.65	1.02	0.56
Anacardiaceae	<i>Gluta laxiflora</i> Ridl.	0.02	10.00	0.50	0.17	0.03
Anacardiaceae	<i>Gluta laxiflora</i> Ridl.	0.04	17.00	0.50	0.17	0.14
Anacardiaceae	<i>Mangifera foetida</i> Loureiro	0.08	23.30	0.62	0.14	0.39
Anacardiaceae	<i>Melanochyla elmeri</i> Merr.	0.01	10.60	0.60	0.29	0.05
Anacardiaceae	<i>Melanochyla elmeri</i> Merr.	0.06	31.90	0.60	0.29	0.85
Anacardiaceae	<i>Melanorrhoea oba</i> Merr.	0.14	27.80	0.70	0.35	0.69
Anacardiaceae	<i>Melanorrhoea oba</i> Merr.	0.01	42.00	0.70	0.35	1.99
Anacardiaceae	<i>Parishia paucijuga</i> Engl.	0.02	24.50	0.62	0.15	0.44
Anacardiaceae	<i>Semecarpus glauca</i> Engl.	0.02	17.80	0.38	0.58	0.12
Anacardiaceae	<i>Semecarpus glauca</i> Engl.	0.04	20.00	0.38	0.58	0.16
Anacardiaceae	<i>Semecarpus glauca</i> Engl.	0.04	21.50	0.38	0.58	0.19
Anacardiaceae	<i>Semecarpus glauca</i> Engl.	0.05	21.80	0.38	0.58	0.20
Anacardiaceae	<i>Semecarpus glauca</i> Engl.	0.03	21.80	0.38	0.58	0.20
Anacardiaceae	<i>Semecarpus glauca</i> Engl.	0.01	24.80	0.38	0.58	0.28
Anacardiaceae	<i>Semecarpus heterophylla</i> Blume	0.01	10.30	0.38	1.44	0.03
Anacardiaceae	<i>Semecarpus heterophylla</i> Blume	0.01	10.70	0.38	1.44	0.03
Anacardiaceae	<i>Semecarpus heterophylla</i> Blume	0.01	10.70	0.38	1.44	0.03
Anacardiaceae	<i>Semecarpus heterophylla</i> Blume	0.01	11.10	0.38	1.44	0.03
Anacardiaceae	<i>Semecarpus heterophylla</i> Blume	0.04	11.40	0.38	1.44	0.04
Anacardiaceae	<i>Semecarpus heterophylla</i> Blume	0.02	11.50	0.38	1.44	0.04
Anacardiaceae	<i>Semecarpus heterophylla</i> Blume	0.01	11.50	0.38	1.44	0.04
Anacardiaceae	<i>Semecarpus heterophylla</i> Blume	0.01	12.00	0.38	1.44	0.04
Anacardiaceae	<i>Semecarpus heterophylla</i> Blume	0.01	12.70	0.38	1.44	0.05
Anacardiaceae	<i>Semecarpus heterophylla</i> Blume	0.11	14.40	0.38	1.44	0.07
Anacardiaceae	<i>Semecarpus heterophylla</i> Blume	0.01	15.70	0.38	1.44	0.08
Anacardiaceae	<i>Semecarpus ridleyi</i> Merr.	0.03	10.50	0.38	0.22	0.03
Anacardiaceae	<i>Semecarpus ridleyi</i> Merr.	0.09	18.80	0.38	0.22	0.14
Anacardiaceae	<i>Semecarpus ridleyi</i> Merr.	0.02	33.60	0.38	0.22	0.61
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.02	10.40	0.67	1.27	0.05
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.02	12.50	0.67	1.27	0.08
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.01	15.60	0.67	1.27	0.15
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.02	15.80	0.67	1.27	0.15
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.02	16.50	0.67	1.27	0.17
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.05	17.00	0.67	1.27	0.18
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.05	24.40	0.67	1.27	0.47
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.09	24.40	0.67	1.27	0.47
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.01	26.40	0.67	1.27	0.58
Annonaceae	<i>Mezzettia leptopoda</i> (Hook.f. & Thomson) Oliv.	0.06	11.30	0.65	0.98	0.06
Annonaceae	<i>Mezzettia leptopoda</i> (Hook.f. & Thomson) Oliv.	0.04	11.30	0.65	0.98	0.06

Appendix 2: Continued

Annonaceae	<i>Mezzettia leptopoda</i> (Hook.f. & Thomson) Oliv.	0.01	22.00	0.65	0.98	0.35
Annonaceae	<i>Mezzettia leptopoda</i> (Hook.f. & Thomson) Oliv.	0.01	27.10	0.65	0.98	0.60
Annonaceae	<i>Mezzettia leptopoda</i> (Hook.f. & Thomson) Oliv.	0.06	27.10	0.65	0.98	0.60
Annonaceae	<i>Mezzettia leptopoda</i> (Hook.f. & Thomson) Oliv.	0.01	51.60	0.65	0.98	3.08
Annonaceae	<i>Monocarpia marginalis</i> (Hook.f. & Thomson) I.M. Turner	0.02	11.10	0.55	0.22	0.05
Annonaceae	<i>Monocarpia marginalis</i> (Hook.f. & Thomson) I.M. Turner	0.02	15.80	0.55	0.22	0.12
Annonaceae	<i>Polyalthia glauca</i> (Hassk.) F.Muell.	0.01	11.30	0.56	0.43	0.05
Annonaceae	<i>Polyalthia glauca</i> (Hassk.) F.Muell.	0.02	15.70	0.56	0.43	0.12
Annonaceae	<i>Polyalthia glauca</i> (Hassk.) F.Muell.	0.01	22.40	0.56	0.43	0.32
Annonaceae	<i>Polyalthia hypoleuca</i> Hook. f. & Thomson	0.02	12.40	0.64	0.34	0.08
Annonaceae	<i>Polyalthia hypoleuca</i> Hook. f. & Thomson	0.01	12.50	0.64	0.34	0.08
Annonaceae	<i>Polyalthia hypoleuca</i> Hook. f. & Thomson	0.03	17.40	0.64	0.34	0.19
Annonaceae	<i>Polyalthia insignis</i> (Hook.f.) Airy Shaw	0.01	20.90	0.43	0.13	0.20
Annonaceae	<i>Polyalthia jenkinsii</i> Ridsdale	0.01	10.00	0.62	0.15	0.04
Annonaceae	<i>Polyalthia jenkinsii</i> Ridsdale	0.01	10.00	0.62	0.15	0.04
Annonaceae	<i>Polyalthia rumphii</i> (Blume ex Hensch.) Merr.	0.03	10.10	0.62	0.10	0.04
Annonaceae	<i>Xylophia elliptica</i> Maingay ex Hook.f. & Thomson	0.01	12.50	0.62	0.24	0.07
Annonaceae	<i>Xylophia elliptica</i> Maingay ex Hook.f. & Thomson	0.09	33.70	0.62	0.24	1.01
Apocynaceae	<i>Alstonia scholaris</i> (L.) R.Br.	0.05	20.80	0.40	0.13	0.18
Apocynaceae	<i>Dyera costulata</i> (Miq.) Hook.f.	0.04	32.80	0.41	0.32	0.63
Apocynaceae	<i>Tabernaemontana macrocarpa</i> Jack	0.02	16.50	0.44	0.24	0.11
Apocynaceae	<i>Tabernaemontana macrocarpa</i> Jack	0.02	16.50	0.44	0.24	0.11
Apocynaceae	<i>Tabernaemontana pauciflora</i> Blume	0.03	20.00	0.59	0.13	0.25
Araliaceae	<i>Arthrophyllum diversifolium</i> Blume	0.13	10.30	0.40	0.11	0.03
Burseraceae	<i>Canarium caudatum</i> King	0.03	13.80	0.37	0.33	0.06
Burseraceae	<i>Canarium apertum</i> H.J.Lam	0.01	26.40	0.57	0.15	0.49
Burseraceae	<i>Canarium caudatum</i> King	0.01	13.20	0.37	0.33	0.05
Burseraceae	<i>Canarium caudatum</i> King	0.01	13.20	0.37	0.33	0.05
Burseraceae	<i>Dacroydes costata</i> Miquel	0.20	10.00	0.80	0.82	0.05
Burseraceae	<i>Dacroydes costata</i> Miquel	0.01	10.00	0.80	0.82	0.05
Burseraceae	<i>Dacroydes costata</i> Miquel	0.01	10.10	0.80	0.82	0.06
Burseraceae	<i>Dacroydes costata</i> Miquel	0.04	15.00	0.80	0.82	0.16
Burseraceae	<i>Dacroydes costata</i> Miquel	0.02	23.30	0.80	0.82	0.50
Burseraceae	<i>Dacroydes costata</i> Miquel	0.39	50.40	0.80	0.82	3.60

Appendix 2: Continued

Burseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. rostrata	0.01	9.90	0.57	0.72	0.04
Burseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. rostrata	0.01	10.50	0.57	0.72	0.04
Burseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. rostrata	0.01	11.20	0.57	0.72	0.05
Burseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. rostrata	0.14	70.40	0.57	0.72	5.76
Burseraceae	<i>Santiria megaphylla</i> Burck	0.01	13.60	0.65	0.37	0.10
Burseraceae	<i>Santiria megaphylla</i> Burck	0.01	13.60	0.65	0.37	0.10
Burseraceae	<i>Santiria megaphylla</i> Burck	0.01	24.60	0.65	0.37	0.47
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.01	10.00	0.65	0.76	0.04
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.01	10.00	0.65	0.76	0.04
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.01	10.70	0.65	0.76	0.05
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.01	12.50	0.65	0.76	0.08
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.03	13.20	0.65	0.76	0.09
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.06	18.10	0.65	0.76	0.21
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.05	26.50	0.65	0.76	0.57
Calophyllaceae	<i>Calophyllum laenigerum</i> Miq.	0.03	10.00	0.56	0.10	0.04
Calophyllaceae	<i>Calophyllum teijsmanii</i> Miq.	0.05	20.70	0.63	0.13	0.29
Calophyllaceae	<i>Mesua elmeri</i> (Merr.) Kosterm.	0.01	10.80	0.83	0.52	0.07
Calophyllaceae	<i>Mesua elmeri</i> (Merr.) Kosterm.	0.01	11.00	0.83	0.52	0.07
Calophyllaceae	<i>Mesua elmeri</i> (Merr.) Kosterm.	0.01	13.70	0.83	0.52	0.13
Calophyllaceae	<i>Mesua elmeri</i> (Merr.) Kosterm.	0.02	15.70	0.83	0.52	0.18
Calophyllaceae	<i>Mesua hexapetala</i> (Hook.fil.) P.S.Ashton	0.21	10.10	0.83	0.10	0.06
Cannabaceae	<i>Gironniera nervosa</i> (Roxb.) Baill.	0.04	47.00	0.63	0.42	2.36
Celastraceae	<i>Kokoona reflexa</i> Hook.f.	0.08	18.00	0.88	0.30	0.28
Celastraceae	<i>Kokoona reflexa</i> Hook.f.	0.02	32.00	0.88	0.30	1.25
Celastraceae	<i>Bhesa paniculata</i> Arn.	0.03	12.00	0.71	0.44	0.08
Celastraceae	<i>Bhesa paniculata</i> Arn.	0.04	17.40	0.71	0.44	0.21
Celastraceae	<i>Bhesa paniculata</i> Arn.	0.01	18.20	0.71	0.44	0.23
Celastraceae	<i>Bhesa paniculata</i> Arn.	0.01	23.40	0.71	0.44	0.45
Chrysobalanaceae	<i>Parinari villamillii</i> (Pierre) Prance	0.05	12.00	0.80	0.11	0.09
Clusiaceae	<i>Mesua elmeri</i> (Merr.) Kosterm.	0.01	22.70	0.83	0.52	0.48
Clusiaceae	<i>Garcinia bancana</i> Miq.	0.02	13.20	0.70	0.11	0.10
Clusiaceae	<i>Garcinia brevipes</i> Pierre	0.04	16.40	0.70	0.12	0.17
Clusiaceae	<i>Garcinia parvifolia</i> (Miq.) Miq.	0.02	23.30	0.70	0.14	0.44
Ctenolophonaceae	<i>Ctenolophon parvifolius</i> Oliv.	0.01	10.70	0.84	0.24	0.07
Ctenolophonaceae	<i>Ctenolophon parvifolius</i> Oliv.	0.01	20.00	0.84	0.24	0.35
Dilleniaceae	<i>Dillenia excelsa</i> (Jack) Gilg	0.02	10.00	0.72	0.66	0.05
Dilleniaceae	<i>Dillenia excelsa</i> (Jack) Gilg	0.03	13.70	0.72	0.66	0.11
Dilleniaceae	<i>Dillenia excelsa</i> (Jack) Gilg	0.01	16.20	0.72	0.66	0.17
Dilleniaceae	<i>Dillenia excelsa</i> (Jack) Gilg	0.09	20.30	0.72	0.66	0.31

Appendix 2: Continued

Dilleniaceae	<i>Dillenia excelsa</i> (Jack) Gilg	0.01	34.40	0.72	0.66	1.24
Dilleniaceae	<i>Dillenia reticulata</i> King	0.05	10.00	0.69	0.10	0.05
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.02	8.50	0.50	1.53	0.02
Dipterocarpaceae	<i>Anisoptera laevis</i> Ridl.	0.01	27.80	0.58	0.16	0.58
Dipterocarpaceae	<i>Dipterocarpus lowii</i> Hook.f.	0.02	11.00	0.78	0.72	0.07
Dipterocarpaceae	<i>Dipterocarpus lowii</i> Hook.f.	0.10	14.20	0.78	0.72	0.13
Dipterocarpaceae	<i>Dipterocarpus lowii</i> Hook.f.	0.04	14.30	0.78	0.72	0.13
Dipterocarpaceae	<i>Dipterocarpus lowii</i> Hook.f.	0.06	22.30	0.78	0.72	0.43
Dipterocarpaceae	<i>Dipterocarpus lowii</i> Hook.f.	0.03	27.80	0.78	0.72	0.77
Dipterocarpaceae	<i>Dipterocarpus lowii</i> Hook.f.	0.01	34.80	0.78	0.72	1.37
Dipterocarpaceae	<i>Dipterocarpus sarawakensis</i> Slooten	0.02	20.20	0.75	0.13	0.32
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.02	10.30	0.75	0.22	0.05
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.01	14.40	0.75	0.22	0.13
Dipterocarpaceae	<i>Dipterocarpus sublamellatus</i> Foxw.	0.39	11.40	0.73	0.87	0.07
Dipterocarpaceae	<i>Dipterocarpus sublamellatus</i> Foxw.	0.04	15.70	0.73	0.87	0.16
Dipterocarpaceae	<i>Dipterocarpus sublamellatus</i> Foxw.	0.02	21.90	0.73	0.87	0.39
Dipterocarpaceae	<i>Dipterocarpus sublamellatus</i> Foxw.	0.02	70.80	0.73	0.87	7.46
Dipterocarpaceae	<i>Dryobalanops lanceolata</i> Burck	0.01	10.40	0.70	1.38	0.05
Dipterocarpaceae	<i>Dryobalanops lanceolata</i> Burck	0.02	10.60	0.70	1.38	0.05
Dipterocarpaceae	<i>Dryobalanops lanceolata</i> Burck	0.03	11.00	0.70	1.38	0.06
Dipterocarpaceae	<i>Dryobalanops lanceolata</i> Burck	0.01	12.20	0.70	1.38	0.08
Dipterocarpaceae	<i>Dryobalanops lanceolata</i> Burck	0.02	12.50	0.70	1.38	0.08
Dipterocarpaceae	<i>Dryobalanops lanceolata</i> Burck	0.03	12.70	0.70	1.38	0.09
Dipterocarpaceae	<i>Dryobalanops lanceolata</i> Burck	0.01	13.00	0.70	1.38	0.09
Dipterocarpaceae	<i>Dryobalanops lanceolata</i> Burck	0.01	16.50	0.70	1.38	0.18
Dipterocarpaceae	<i>Dryobalanops lanceolata</i> Burck	0.01	17.30	0.70	1.38	0.20
Dipterocarpaceae	<i>Dryobalanops lanceolata</i> Burck	0.01	17.80	0.70	1.38	0.21
Dipterocarpaceae	<i>Dryobalanops lanceolata</i> Burck	0.04	19.00	0.70	1.38	0.26
Dipterocarpaceae	<i>Dryobalanops lanceolata</i> Burck	0.05	19.80	0.70	1.38	0.28
Dipterocarpaceae	<i>Dryobalanops lanceolata</i> Burck	0.01	23.70	0.70	1.38	0.46
Dipterocarpaceae	<i>Dryobalanops lanceolata</i> Burck	0.02	25.10	0.70	1.38	0.53
Dipterocarpaceae	<i>Dryobalanops lanceolata</i> Burck	0.02	26.90	0.70	1.38	0.63
Dipterocarpaceae	<i>Hopea beccariana</i> (K. Heyne) Blume	0.02	15.00	0.71	0.36	0.14
Dipterocarpaceae	<i>Hopea beccariana</i> (K. Heyne) Blume	0.03	15.80	0.71	0.36	0.16
Dipterocarpaceae	<i>Hopea beccariana</i> (K. Heyne) Blume	0.02	18.50	0.71	0.36	0.24
Dipterocarpaceae	<i>Hopea dryobalanoiodes</i> Miq.	0.01	10.60	0.60	0.41	0.05
Dipterocarpaceae	<i>Hopea dryobalanoiodes</i> Miq.	0.02	11.00	0.60	0.41	0.05
Dipterocarpaceae	<i>Hopea dryobalanoiodes</i> Miq.	0.01	14.70	0.60	0.41	0.11
Dipterocarpaceae	<i>Hopea dryobalanoiodes</i> Miq.	0.04	16.60	0.60	0.41	0.15
Dipterocarpaceae	<i>Hopea dryobalanoiodes</i> Miq.	0.04	21.40	0.60	0.41	0.30
Dipterocarpaceae	<i>Hopea kerangasensis</i> P.S.Ashton	0.01	10.50	0.60	0.30	0.05
Dipterocarpaceae	<i>Hopea kerangasensis</i> P.S.Ashton	0.01	13.50	0.60	0.30	0.09

Appendix 2: Continued

Dipterocarpaceae	<i>Hopea kerangasensis</i> P.S.Ashton	0.01	21.40	0.60	0.30	0.30
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.01	12.00	0.50	1.53	0.05
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.07	13.00	0.50	1.53	0.07
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.01	13.40	0.50	1.53	0.07
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.06	15.70	0.50	1.53	0.11
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.06	16.50	0.50	1.53	0.13
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.04	21.80	0.50	1.53	0.26
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.08	26.80	0.50	1.53	0.45
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.01	26.80	0.50	1.53	0.45
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.01	28.00	0.50	1.53	0.50
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.07	28.80	0.50	1.53	0.54
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.07	29.00	0.50	1.53	0.55
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.02	29.50	0.50	1.53	0.57
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.06	30.10	0.50	1.53	0.60
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.07	31.80	0.50	1.53	0.70
Dipterocarpaceae	<i>Shorea argentifolia</i> (Blume) Merr.	0.01	13.70	0.58	0.18	0.09
Dipterocarpaceae	<i>Shorea argentifolia</i> (Blume) Merr.	0.02	16.80	0.58	0.18	0.15
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.18	10.50	0.52	1.56	0.04
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.01	10.80	0.52	1.56	0.04
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.01	11.20	0.52	1.56	0.05
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.01	11.60	0.52	1.56	0.05
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.01	12.30	0.52	1.56	0.06
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.01	13.20	0.52	1.56	0.07
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.03	13.50	0.52	1.56	0.08
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.03	13.50	0.52	1.56	0.08
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.13	18.00	0.52	1.56	0.17
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.01	19.50	0.52	1.56	0.21
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.08	20.10	0.52	1.56	0.22
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.01	32.10	0.52	1.56	0.75
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.01	40.50	0.52	1.56	1.36
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.03	48.40	0.52	1.56	2.13
Dipterocarpaceae	<i>Shorea collaris</i> Slooten	0.03	18.00	0.60	0.35	0.19
Dipterocarpaceae	<i>Shorea collaris</i> Slooten	0.12	39.00	0.60	0.35	1.42
Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.01	10.90	0.60	0.52	0.05

Appendix 2: Continued

Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.03	12.10	0.60	0.52	0.07
Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.02	12.60	0.60	0.52	0.07
Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.01	15.20	0.60	0.52	0.12
Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.01	16.40	0.60	0.52	0.15
Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.02	20.00	0.60	0.52	0.25
Dipterocarpaceae	<i>Shorea curtisii</i> Dyer ex King	0.03	18.10	0.57	0.12	0.18
Dipterocarpaceae	<i>Shorea dasyphylla</i> (Foxw.) P.S.Ashton & J.Heck.	0.03	20.70	0.60	0.32	0.28
Dipterocarpaceae	<i>Shorea dasyphylla</i> (Foxw.) P.S.Ashton & J.Heck.	0.08	32.50	0.60	0.32	0.89
Dipterocarpaceae	<i>Shorea dolichocarpa</i> Slooten	0.06	12.10	0.60	0.27	0.07
Dipterocarpaceae	<i>Shorea dolichocarpa</i> Slooten	0.01	28.50	0.60	0.27	0.63
Dipterocarpaceae	<i>Shorea faguetiana</i> Heim.	0.07	14.60	0.54	0.60	0.10
Dipterocarpaceae	<i>Shorea faguetiana</i> Heim.	0.02	17.40	0.54	0.60	0.16
Dipterocarpaceae	<i>Shorea faguetiana</i> Heim.	0.02	17.40	0.54	0.60	0.16
Dipterocarpaceae	<i>Shorea faguetiana</i> Heim.	0.02	29.90	0.54	0.60	0.65
Dipterocarpaceae	<i>Shorea faguetiana</i> Heim.	0.09	33.00	0.54	0.60	0.84
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.04	21.20	0.95	0.13	0.46
Dipterocarpaceae	<i>Shorea fallax</i> Dyer ex King	0.05	12.80	0.56	0.49	0.07
Dipterocarpaceae	<i>Shorea fallax</i> Dyer ex King	0.01	13.20	0.56	0.49	0.08
Dipterocarpaceae	<i>Shorea fallax</i> Dyer ex King	0.01	14.60	0.56	0.49	0.10
Dipterocarpaceae	<i>Shorea fallax</i> Dyer ex King	0.02	18.70	0.56	0.49	0.20
Dipterocarpaceae	<i>Shorea fallax</i> Dyer ex King	0.03	24.30	0.56	0.49	0.39
Dipterocarpaceae	<i>Shorea ferrugenia</i> Dyer ex Brandis	0.01	9.80	0.42	0.28	0.03
Dipterocarpaceae	<i>Shorea ferrugenia</i> Dyer ex Brandis	0.01	11.10	0.42	0.28	0.04
Dipterocarpaceae	<i>Shorea ferrugenia</i> Dyer ex Brandis	0.12	39.50	0.42	0.28	1.03
Dipterocarpaceae	<i>Shorea flava</i> (Miq.) Blume	0.11	10.20	0.60	0.61	0.04
Dipterocarpaceae	<i>Shorea flava</i> (Miq.) Blume	0.01	11.20	0.60	0.61	0.05
Dipterocarpaceae	<i>Shorea flava</i> (Miq.) Blume	0.03	12.10	0.60	0.61	0.07
Dipterocarpaceae	<i>Shorea flava</i> (Miq.) Blume	0.01	19.20	0.60	0.61	0.23
Dipterocarpaceae	<i>Shorea flava</i> (Miq.) Blume	0.01	38.00	0.60	0.61	1.33
Dipterocarpaceae	<i>Shorea foxworthyi</i> Symington	0.02	13.00	0.90	0.29	0.12
Dipterocarpaceae	<i>Shorea foxworthyi</i> Symington	0.01	13.60	0.90	0.29	0.14
Dipterocarpaceae	<i>Shorea foxworthyi</i> Symington	0.01	16.50	0.90	0.29	0.23
Dipterocarpaceae	<i>Shorea leptoclados</i> Blume	0.04	13.30	0.60	0.19	0.09
Dipterocarpaceae	<i>Shorea leptoclados</i> Blume	0.01	22.60	0.60	0.19	0.35
Dipterocarpaceae	<i>Shorea macrantha</i> Brandis	0.02	10.70	0.67	0.67	0.05
Dipterocarpaceae	<i>Shorea macrantha</i> Brandis	0.01	13.00	0.67	0.67	0.09
Dipterocarpaceae	<i>Shorea macrantha</i> Brandis	0.02	14.80	0.67	0.67	0.13
Dipterocarpaceae	<i>Shorea macrantha</i> Brandis	0.01	14.90	0.67	0.67	0.13
Dipterocarpaceae	<i>Shorea macrantha</i> Brandis	0.02	16.10	0.67	0.67	0.16
Dipterocarpaceae	<i>Shorea macrantha</i> Brandis	0.06	16.40	0.67	0.67	0.17
Dipterocarpaceae	<i>Shorea macrantha</i> Brandis	0.02	27.70	0.67	0.67	0.66

Appendix 2: Continued

Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	10.00	0.60	4.54	0.04
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.02	9.80	0.60	4.54	0.04
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	10.00	0.60	4.54	0.04
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.02	10.00	0.60	4.54	0.04
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	10.00	0.60	4.54	0.04
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	10.30	0.60	4.54	0.04
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.03	10.30	0.60	4.54	0.04
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.02	10.40	0.60	4.54	0.04
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	10.60	0.60	4.54	0.05
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.04	10.80	0.60	4.54	0.05
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.02	11.00	0.60	4.54	0.05
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	11.80	0.60	4.54	0.06
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	11.80	0.60	4.54	0.06
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	11.90	0.60	4.54	0.06
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.03	12.40	0.60	4.54	0.07
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.02	12.60	0.60	4.54	0.07
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.03	12.80	0.60	4.54	0.08
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	13.20	0.60	4.54	0.08
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	13.40	0.60	4.54	0.09
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.04	13.80	0.60	4.54	0.09
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.03	14.20	0.60	4.54	0.10
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.02	14.20	0.60	4.54	0.10
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	14.40	0.60	4.54	0.11
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	14.80	0.60	4.54	0.11
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	14.90	0.60	4.54	0.12
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	15.10	0.60	4.54	0.12
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.02	15.50	0.60	4.54	0.13
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	16.00	0.60	4.54	0.14
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.11	16.20	0.60	4.54	0.14
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.02	16.20	0.60	4.54	0.14
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	18.10	0.60	4.54	0.19
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	19.50	0.60	4.54	0.24
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	19.80	0.60	4.54	0.24
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	20.00	0.60	4.54	0.25
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.02	21.20	0.60	4.54	0.29
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.13	23.50	0.60	4.54	0.38
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.02	24.00	0.60	4.54	0.41
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.05	25.10	0.60	4.54	0.46
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	37.00	0.60	4.54	1.24
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.05	40.50	0.60	4.54	1.56
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.04	9.70	0.60	4.54	0.04
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	12.40	0.60	4.54	0.07

Appendix 2: Continued

Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.02	17.30	0.60	4.54	0.17
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.58	20.80	0.60	4.54	0.28
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.08	22.60	0.60	4.54	0.35
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.03	31.70	0.60	4.54	0.83
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	85.90	0.60	4.54	9.69
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.01	9.80	0.59	1.40	0.04
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.02	11.50	0.59	1.40	0.06
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.03	13.20	0.59	1.40	0.08
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.12	13.40	0.59	1.40	0.09
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.03	14.60	0.59	1.40	0.11
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.01	18.50	0.59	1.40	0.20
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.04	18.70	0.59	1.40	0.21
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.01	22.80	0.59	1.40	0.35
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.01	39.00	0.59	1.40	1.40
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.01	10.20	0.59	1.40	0.04
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.01	10.20	0.59	1.40	0.04
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.03	10.60	0.59	1.40	0.05
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.02	11.00	0.59	1.40	0.05
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.01	13.30	0.59	1.40	0.08
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.01	13.30	0.59	1.40	0.08
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.02	15.10	0.59	1.40	0.12
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.01	15.60	0.59	1.40	0.13
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.01	17.70	0.59	1.40	0.18
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.02	18.60	0.59	1.40	0.21
Dipterocarpaceae	<i>Shorea ovata</i> (Roxb.) C.F.Gaertn	0.04	22.90	0.60	0.70	0.36
Dipterocarpaceae	<i>Shorea ovata</i> (Roxb.) C.F.Gaertn	0.17	46.80	0.60	0.70	2.24
Dipterocarpaceae	<i>Shorea ovata</i> (Roxb.) C.F.Gaertn	0.17	46.80	0.60	0.70	2.24
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.01	12.30	0.60	1.43	0.07
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.04	13.40	0.60	1.43	0.09
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.07	15.60	0.60	1.43	0.13
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.01	23.00	0.60	1.43	0.36
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.11	25.10	0.60	1.43	0.46
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.24	29.10	0.60	1.43	0.67
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.05	33.40	0.60	1.43	0.95
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.02	37.90	0.60	1.43	1.32
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.09	54.80	0.60	1.43	3.31
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.06	28.20	0.60	1.43	0.62
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.04	10.60	0.60	1.29	0.05
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.16	13.00	0.60	1.29	0.08
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.01	13.50	0.60	1.29	0.09
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.04	23.40	0.60	1.29	0.38
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.11	23.90	0.60	1.29	0.40

Appendix 2: Continued

Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.01	37.20	0.60	1.29	1.26
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.01	44.80	0.60	1.29	2.01
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.07	29.40	0.60	1.29	0.69
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.10	34.90	0.60	1.29	1.07
Dipterocarpaceae	<i>Shorea quadrinervis</i> Slooten	0.10	35.50	0.50	0.20	0.93
Dipterocarpaceae	<i>Shorea sagittata</i> P.S.Ashton	0.01	17.80	0.60	0.34	0.18
Dipterocarpaceae	<i>Shorea sagittata</i> P.S.Ashton	0.01	10.30	0.54	0.34	0.04
Dipterocarpaceae	<i>Shorea sagittata</i> P.S.Ashton	0.01	12.40	0.54	0.34	0.06
Dipterocarpaceae	<i>Shorea scaberrima</i> Burck	0.10	12.00	0.54	0.48	0.06
Dipterocarpaceae	<i>Shorea scaberrima</i> Burck	0.01	13.00	0.54	0.48	0.07
Dipterocarpaceae	<i>Shorea scaberrima</i> Burck	0.01	15.20	0.54	0.48	0.11
Dipterocarpaceae	<i>Shorea scaberrima</i> Burck	0.02	36.00	0.54	0.48	1.04
Dipterocarpaceae	<i>Shorea</i> sp.	0.01	11.00	0.60	0.22	0.05
Dipterocarpaceae	<i>Shorea</i> sp.	0.02	14.20	0.60	0.22	0.10
Dipterocarpaceae	<i>Vatica havilandii</i> Brandis	0.01	10.10	0.85	0.50	0.06
Dipterocarpaceae	<i>Vatica havilandii</i> Brandis	0.01	10.20	0.85	0.50	0.06
Dipterocarpaceae	<i>Vatica havilandii</i> Brandis	0.02	11.10	0.85	0.50	0.08
Dipterocarpaceae	<i>Vatica havilandii</i> Brandis	0.02	16.10	0.85	0.50	0.20
Dipterocarpaceae	<i>Vatica havilandii</i> Brandis	0.01	17.00	0.85	0.50	0.23
Dipterocarpaceae	<i>Vatica micrantha</i> Slooten	0.02	9.60	0.87	0.48	0.05
Dipterocarpaceae	<i>Vatica micrantha</i> Slooten	0.01	20.40	0.87	0.48	0.38
Dipterocarpaceae	<i>Vatica micrantha</i> Slooten	0.01	13.30	0.87	0.48	0.12
Dipterocarpaceae	<i>Vatica micrantha</i> Slooten	0.03	15.10	0.87	0.48	0.17
Dipterocarpaceae	<i>Vatica micrantha</i> Slooten	0.03	19.20	0.87	0.48	0.33
Dipterocarpaceae	<i>Vatica nitens</i> King	0.02	24.40	0.75	0.89	0.53
Dipterocarpaceae	<i>Vatica nitens</i> King	0.05	13.40	0.75	0.89	0.11
Dipterocarpaceae	<i>Vatica nitens</i> King	0.06	15.50	0.75	0.89	0.16
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	16.20	0.75	0.89	0.18
Dipterocarpaceae	<i>Vatica nitens</i> King	0.10	21.40	0.75	0.89	0.37
Dipterocarpaceae	<i>Vatica nitens</i> King	0.02	28.50	0.75	0.89	0.79
Dipterocarpaceae	<i>Vatica nitens</i> King	0.04	36.50	0.75	0.89	1.49
Dipterocarpaceae	<i>Vatica oblongifolia</i> Hook.f.	0.01	10.50	0.80	0.11	0.06
Dipterocarpaceae	<i>Vatica</i> sp.	0.02	16.00	0.78	0.12	0.18
Ebenaceae	<i>Diospyros bantamensis</i> Koord. & Valeton ex Bakh.	0.01	10.10	0.80	0.69	0.05
Ebenaceae	<i>Diospyros bantamensis</i> Koord. & Valeton ex Bakh.	0.01	13.00	0.80	0.69	0.11
Ebenaceae	<i>Diospyros bantamensis</i> Koord. & Valeton ex Bakh.	0.02	16.30	0.80	0.69	0.20
Ebenaceae	<i>Diospyros bantamensis</i> Koord. & Valeton ex Bakh.	0.04	17.00	0.80	0.69	0.22
Ebenaceae	<i>Diospyros bantamensis</i> Koord. & Valeton ex Bakh.	0.02	23.50	0.80	0.69	0.51
Ebenaceae	<i>Diospyros bantamensis</i> Koord. & Valeton ex Bakh.	0.01	24.40	0.80	0.69	0.57

Appendix 2: Continued

Ebenaceae	<i>Diospyros bantamensis</i> Koord. & Valetton ex Bakh.	0.02	13.40	0.65	0.23	0.09
Ebenaceae	<i>Diospyros bantamensis</i> Koord. & Valetton ex Bakh.	0.24	17.40	0.65	0.23	0.19
Ebenaceae	<i>Diospyros evena</i> Bakh.	0.01	55.20	0.65	0.35	3.65
Ebenaceae	<i>Diospyros havilandii</i> Bakh.	0.01	10.10	0.75	0.33	0.05
Ebenaceae	<i>Diospyros havilandii</i> Bakh.	0.03	10.40	0.75	0.33	0.06
Ebenaceae	<i>Diospyros havilandii</i> Bakh.	0.01	12.00	0.75	0.33	0.08
Ebenaceae	<i>Diospyros havilandii</i> Bakh.	0.02	18.40	0.75	0.33	0.25
Ebenaceae	<i>Diospyros lanceifolia</i> Roxb.	0.01	14.00	0.75	0.11	0.12
Ebenaceae	<i>Diospyros siamang</i> Bakh.	0.01	10.80	0.61	0.32	0.05
Ebenaceae	<i>Diospyros siamang</i> Bakh.	0.01	11.40	0.61	0.32	0.06
Ebenaceae	<i>Diospyros siamang</i> Bakh.	0.01	11.40	0.61	0.32	0.06
Elaeocarpaceae	<i>Elaeocarpus</i> spp.	0.19	37.40	0.58	0.21	1.22
Euphorbiaceae	<i>Acalypha caturus</i> Blume	0.05	26.20	0.34	0.15	0.29
Euphorbiaceae	<i>Agrostistachys longifolia</i> Müll.Arg.	0.01	11.40	0.82	0.11	0.08
Euphorbiaceae	<i>Baccaurea</i> sp.	0.05	10.70	0.79	0.25	0.06
Euphorbiaceae	<i>Baccaurea</i> sp.	0.01	24.90	0.79	0.25	0.59
Euphorbiaceae	<i>Baccaurea sumatrana</i> (Miq.) Müll. Arg.	0.01	10.70	0.79	0.16	0.06
Euphorbiaceae	<i>Baccaurea sumatrana</i> (Miq.) Müll. Arg.	0.02	12.40	0.79	0.16	0.09
Euphorbiaceae	<i>Cephalomappa beccariana</i> Baill.	0.01	10.50		0.89	0.00
Euphorbiaceae	<i>Cephalomappa beccariana</i> Baill.	0.01	11.70		0.89	0.00
Euphorbiaceae	<i>Cephalomappa beccariana</i> Baill.	0.01	11.70		0.89	0.00
Euphorbiaceae	<i>Cephalomappa beccariana</i> Baill.	0.02	12.40		0.89	0.00
Euphorbiaceae	<i>Cephalomappa beccariana</i> Baill.	0.08	13.80		0.89	0.00
Euphorbiaceae	<i>Cephalomappa beccariana</i> Baill.	0.01	13.80		0.89	0.00
Euphorbiaceae	<i>Cephalomappa beccariana</i> Baill.	0.01	15.90		0.89	0.00
Euphorbiaceae	<i>Cephalomappa beccariana</i> Baill.	0.01	31.00		0.89	0.00
Euphorbiaceae	<i>Drypetes stipulare</i> Leandri	0.00	17.50	0.55	0.12	0.16
Euphorbiaceae	<i>Drypetes crassipes</i> Pax & K.Hoffm.	0.02	6.10	0.55	0.12	0.01
Euphorbiaceae	<i>Drypetes crassipes</i> Pax & K.Hoffm.	0.04	16.00	0.55	0.52	0.13
Euphorbiaceae	<i>Drypetes stipulare</i> Leandri	0.01	9.90	0.78	0.52	0.05
Euphorbiaceae	<i>Drypetes stipulare</i> Leandri	0.03	12.90	0.78	0.52	0.10
Euphorbiaceae	<i>Drypetes stipulare</i> Leandri	0.03	14.10	0.78	0.52	0.13
Euphorbiaceae	<i>Drypetes stipulare</i> Leandri	0.01	18.70	0.78	0.52	0.27
Euphorbiaceae	<i>Drypetes stipulare</i> Leandri	0.02	20.80	0.78	0.52	0.36
Euphorbiaceae	<i>Drypetes stipulare</i> Leandri	0.08	23.80	0.78	0.52	0.51
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.02	9.80	0.95	1.65	0.06
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.03	9.90	0.95	1.65	0.06
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.03	10.90	0.95	1.65	0.08
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.02	11.40	0.95	1.65	0.09
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.14	14.50	0.95	1.65	0.17

Appendix 2: Continued

Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.02	16.00	0.95	1.65	0.22
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.01	17.00	0.95	1.65	0.26
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.01	18.10	0.95	1.65	0.30
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.01	20.20	0.95	1.65	0.41
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.01	24.20	0.95	1.65	0.65
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.05	25.40	0.95	1.65	0.74
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.05	42.60	0.95	1.65	2.79
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.01	49.00	0.95	1.65	3.96
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.06	12.10	0.95	1.65	0.10
Euphorbiaceae	<i>Macaranga hoesi</i> King ex Hook.f.	0.06	12.30	0.29	0.27	0.03
Euphorbiaceae	<i>Macaranga hoesi</i> King ex Hook.f.	0.01	28.10	0.29	0.27	0.30
Euphorbiaceae	<i>Macaranga hullettii</i> King ex Hook.f.	0.08	13.00	0.32	0.30	0.04
Euphorbiaceae	<i>Macaranga hullettii</i> King ex Hook.f.	0.01	32.70	0.32	0.30	0.48
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.03	10.50	0.48	1.43	0.04
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.01	11.30	0.48	1.43	0.04
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.15	12.60	0.48	1.43	0.06
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.03	12.70	0.48	1.43	0.06
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.08	13.20	0.48	1.43	0.07
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.01	18.40	0.48	1.43	0.16
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.06	20.90	0.48	1.43	0.22
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.01	21.90	0.48	1.43	0.25
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.04	28.50	0.48	1.43	0.50
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.01	32.70	0.48	1.43	0.72
Euphorbiaceae	<i>Macaranga triloba</i> (Thunb.) Müll.Arg.	0.01	43.90	0.48	1.43	1.51
Euphorbiaceae	<i>Mallotus wrayi</i> King ex Hook.f.	0.03	9.50	0.60	0.94	0.03
Euphorbiaceae	<i>Mallotus wrayi</i> King ex Hook.f.	0.02	9.80	0.60	0.94	0.04
Euphorbiaceae	<i>Mallotus wrayi</i> King ex Hook.f.	0.02	10.40	0.60	0.94	0.04
Euphorbiaceae	<i>Mallotus wrayi</i> King ex Hook.f.	0.01	14.40	0.60	0.94	0.11
Euphorbiaceae	<i>Mallotus wrayi</i> King ex Hook.f.	0.01	14.50	0.60	0.94	0.11
Euphorbiaceae	<i>Mallotus wrayi</i> King ex Hook.f.	0.02	15.20	0.60	0.94	0.12
Euphorbiaceae	<i>Mallotus wrayi</i> King ex Hook.f.	0.02	16.40	0.60	0.94	0.15
Euphorbiaceae	<i>Mallotus wrayi</i> King ex Hook.f.	0.03	17.90	0.60	0.94	0.19
Euphorbiaceae	<i>Mallotus wrayi</i> King ex Hook.f.	0.01	20.80	0.60	0.94	0.28
Euphorbiaceae	<i>Mallotus wrayi</i> King ex Hook.f.	0.04	31.50	0.60	0.94	0.82
Euphorbiaceae	<i>Neoscortechinia kingii</i> (Hook.f.) Pax & K.Hoffm.	0.01	10.00	0.62	1.14	0.04
Euphorbiaceae	<i>Neoscortechinia kingii</i> (Hook.f.) Pax & K.Hoffm.	0.12	10.00	0.62	1.14	0.04
Euphorbiaceae	<i>Neoscortechinia kingii</i> (Hook.f.) Pax & K.Hoffm.	0.01	10.40	0.62	1.14	0.05
Euphorbiaceae	<i>Neoscortechinia kingii</i> (Hook.f.) Pax & K.Hoffm.	0.16	10.40	0.62	1.14	0.05
Euphorbiaceae	<i>Neoscortechinia kingii</i> (Hook.f.) Pax & K.Hoffm.	0.01	10.50	0.62	1.14	0.05

Appendix 2: Continued

Euphorbiaceae	<i>Neoscortechinia kingii</i> (Hook.f.) Pax & K.Hoffm.	0.03	12.20	0.62	1.14	0.07
Euphorbiaceae	<i>Neoscortechinia kingii</i> (Hook.f.) Pax & K.Hoffm.	0.01	20.20	0.62	1.14	0.27
Euphorbiaceae	<i>Neoscortechinia kingii</i> (Hook.f.) Pax & K.Hoffm.	0.01	38.50	0.62	1.14	1.42
Euphorbiaceae	<i>Neoscortechinia kingii</i> (Hook.f.) Pax & K.Hoffm.	0.03	45.40	0.62	1.14	2.15
Euphorbiaceae	<i>Ptychopyxis arborea</i> (Merr.) Airy Shaw	0.18	12.30	0.73	0.11	0.08
Fabaceae	<i>Dialium indum</i> L. var. <i>indum</i>	0.01	12.30	0.90	0.98	0.10
Fabaceae	<i>Dialium indum</i> L. var. <i>indum</i>	0.02	15.20	0.90	0.98	0.18
Fabaceae	<i>Dialium indum</i> L. var. <i>indum</i>	0.02	15.20	0.90	0.98	0.18
Fabaceae	<i>Dialium indum</i> L. var. <i>indum</i>	0.01	19.30	0.90	0.98	0.34
Fabaceae	<i>Dialium indum</i> L. var. <i>indum</i>	0.06	28.30	0.90	0.98	0.93
Fabaceae	<i>Dialium indum</i> L. var. <i>indum</i>	0.01	40.90	0.90	0.98	2.39
Fabaceae	<i>Dialium indum</i> L. var. <i>indum</i>	0.03	9.80	0.90	0.98	0.06
Fabaceae	<i>Dialium indum</i> L. var. <i>indum</i>	0.01	11.40	0.90	0.98	0.08
Fabaceae	<i>Dialium platysepalum</i> Baker	0.01	10.70	0.80	0.43	0.06
Fabaceae	<i>Dialium platysepalum</i> Baker	0.11	12.90	0.80	0.43	0.11
Fabaceae	<i>Dialium platysepalum</i> Baker	0.02	38.00	0.80	0.43	1.77
Fabaceae	<i>Fordia coriaca</i> Dunn	0.03	10.10	0.65	0.55	0.04
Fabaceae	<i>Fordia coriaca</i> Dunn	0.01	10.30	0.65	0.55	0.05
Fabaceae	<i>Fordia coriaca</i> Dunn	0.01	11.10	0.65	0.55	0.06
Fabaceae	<i>Fordia coriaca</i> Dunn	0.01	11.60	0.65	0.55	0.06
Fabaceae	<i>Fordia coriaca</i> Dunn	0.01	18.00	0.65	0.55	0.21
Fabaceae	<i>Koompassia excelsa</i> (Becc.) Taub.	0.18	15.90	0.76	0.12	0.17
Fabaceae	<i>Sindora beccariana</i> De Wit	0.35	25.80	0.62	0.37	0.51
Fabaceae	<i>Sindora beccariana</i> De Wit	0.05	29.00	0.62	0.37	0.69
Fabaceae	<i>Sindora beccariana</i> De Wit	0.07	66.30	0.62	0.37	5.46
Fagaceae	<i>Lithocarpus bennettii</i> (Miq.) Rehder	0.08	9.80	0.75	0.11	0.05
Fagaceae	<i>Lithocarpus bennettii</i> (Miq.) Rehder	0.02	11.10	0.75	0.11	0.07
Fagaceae	<i>Lithocarpus bennettii</i> (Miq.) Rehder	0.19	11.40	0.75	0.11	0.07
Fagaceae	<i>Lithocarpus bennettii</i> (Miq.) Rehder	0.01	14.80	0.75	0.11	0.14
Fagaceae	<i>Lithocarpus bennettii</i> (Miq.) Rehder	0.01	25.90	0.75	0.11	0.61
Fagaceae	<i>Lithocarpus bennettii</i> (Miq.) Rehder	0.05	32.70	0.75	0.11	1.12
Fagaceae	<i>Lithocarpus bennettii</i> (Miq.) Rehder	0.02	48.50	0.75	0.11	3.04
Fagaceae	<i>Lithocarpus bennettii</i> (Miq.) Rehder	0.16	48.80	0.75	0.11	3.09
Fagaceae	<i>Lithocarpus gracilis</i> (Korth.) Soepadmo	0.02	17.30	0.65	0.23	0.19
Fagaceae	<i>Lithocarpus pulcher</i> (King) Markgr.	0.06	16.70	0.65	0.68	0.17
Fagaceae	<i>Lithocarpus pulcher</i> (King) Markgr.	0.20	28.20	0.65	0.68	0.67
Fagaceae	<i>Lithocarpus pulcher</i> (King) Markgr.	0.01	44.60	0.65	0.68	2.15
Fagaceae	<i>Lithocarpus pulcher</i> (King) Markgr.	0.01	50.00	0.65	0.68	2.86
Hypericaceae	<i>Cratoxylum formosum</i> (Jack) Dyer	0.03	27.00	0.73	0.16	0.67

Appendix 2: Continued

Ixonanthaceae	<i>Alanthospermum boneense</i> Forman	0.01	12.20		0.31	0.12
Ixonanthaceae	<i>Alanthospermum boneense</i> Forman	0.05	15.00		0.31	0.21
Ixonanthaceae	<i>Alanthospermum boneense</i> Forman	0.03	24.00		0.31	0.00
Lauraceae	<i>Dehaasia firma</i> (Blume) Miq.	0.12	39.00	0.63	0.46	1.49
Lauraceae	<i>Dehaasia firma</i> (Blume) Miq.	0.13	41.80	0.63	0.46	1.77
Lauraceae	<i>Endiandra clavigera</i> Kosterm.	0.04	22.40	0.68	0.43	0.38
Lauraceae	<i>Endiandra clavigera</i> Kosterm.	0.04	22.80	0.68	0.43	0.40
Lauraceae	<i>Endiandra clavigera</i> Kosterm.	0.09	26.70	0.68	0.43	0.60
Lauraceae	<i>Eusideroxylon zwageri</i> Teijsm. & Binn.	0.07	44.90	0.80	0.26	2.69
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.05	9.80	0.47	1.43	0.03
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.02	10.10	0.47	1.43	0.03
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.10	11.00	0.47	1.43	0.04
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.01	15.40	0.47	1.43	0.10
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.01	15.70	0.47	1.43	0.10
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.11	16.20	0.47	1.43	0.11
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.04	16.20	0.47	1.43	0.11
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.02	16.40	0.47	1.43	0.12
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.02	20.80	0.47	1.43	0.22
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.02	21.20	0.47	1.43	0.23
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.03	23.10	0.47	1.43	0.29
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.01	24.00	0.47	1.43	0.32
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.04	36.20	0.47	1.43	0.92
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.01	37.30	0.47	1.43	0.99
Lauraceae	<i>Litsea castanea</i> Hook. f.	0.01	10.40	0.46	0.74	0.03
Lauraceae	<i>Litsea castanea</i> Hook. f.	0.01	11.80	0.46	0.74	0.05
Lauraceae	<i>Litsea castanea</i> Hook. f.	0.05	11.80	0.46	0.74	0.05
Lauraceae	<i>Litsea castanea</i> Hook. f.	0.04	23.30	0.46	0.74	0.29
Lauraceae	<i>Litsea castanea</i> Hook. f.	0.13	26.40	0.46	0.74	0.40
Lauraceae	<i>Litsea castanea</i> Hook. f.	0.09	40.60	0.46	0.74	1.20
Lauraceae	<i>Litsea cordata</i> (Jack) Hook. fil.	0.01	34.20	0.39	0.19	0.65
Lauraceae	<i>Litsea elliptica</i> Blume	0.01	12.00	0.43	0.37	0.05
Lauraceae	<i>Litsea elliptica</i> Blume	0.06	12.30	0.43	0.37	0.05
Lauraceae	<i>Litsea elliptica</i> Blume	0.03	26.70	0.43	0.37	0.38
Lauraceae	<i>Litsea fulva</i> (Blume) Fern.-Vill.	0.04	11.80	0.58	0.26	0.06
Lauraceae	<i>Litsea fulva</i> (Blume) Fern.-Vill.	0.01	20.80	0.58	0.26	0.27
Lauraceae	<i>Litsea fulva</i> (Blume) Fern.-Vill.	0.02	21.20	0.58	0.26	0.28
Lauraceae	<i>Litsea oppositifolia</i> Gibbs	0.02	15.20	0.51	0.23	0.10
Lauraceae	<i>Litsea oppositifolia</i> Gibbs	0.03	15.20	0.51	0.23	0.10
Lauraceae	<i>Litsea resinosa</i> Blume	0.03	18.80	0.43	0.20	0.15
Lauraceae	<i>Litsea resinosa</i> Blume	0.01	18.80	0.43	0.20	0.15
Lecythydaceae	<i>Barringtonia lanceolata</i> (Ridl.) Knuth	0.01	17.80	0.60	0.12	0.18
Lecythydaceae	<i>Barringtonia sarcostachys</i> Miq.	0.01	12.40	0.60	0.39	0.07

Appendix 2: Continued

Lecythidaceae	<i>Barringtonia sarcostachys</i> Miq.	0.02	39.10	0.60	0.39	1.43
Magnoliaceae	<i>Magnolia maingayi</i> King	0.02	13.20	0.58	0.23	0.08
Magnoliaceae	<i>Magnolia maingayi</i> King	0.08	17.20	0.58	0.23	0.16
Malvaceae	<i>Neesia glabra</i> Becc.	0.02	16.50	0.53	0.25	0.13
Malvaceae	<i>Neesia glabra</i> Becc.	0.01	20.80	0.53	0.25	0.24
Malvaceae	<i>Pentace borneensis</i> Pierre	0.01	12.10	0.58	0.87	0.06
Malvaceae	<i>Pentace borneensis</i> Pierre	0.13	13.50	0.58	0.87	0.09
Malvaceae	<i>Pentace borneensis</i> Pierre	0.04	22.70	0.58	0.87	0.34
Malvaceae	<i>Pentace borneensis</i> Pierre	0.08	32.10	0.58	0.87	0.83
Malvaceae	<i>Pentace borneensis</i> Pierre	0.15	41.30	0.58	0.87	1.58
Malvaceae	<i>Pentace borneensis</i> Pierre	0.15	43.50	0.58	0.87	1.80
Malvaceae	<i>Pentace corneri</i> Kosterm.	0.04	11.00	0.58	0.66	0.05
Malvaceae	<i>Pentace corneri</i> Kosterm.	0.01	11.80	0.58	0.66	0.06
Malvaceae	<i>Pentace corneri</i> Kosterm.	0.01	13.30	0.58	0.66	0.08
Malvaceae	<i>Pentace corneri</i> Kosterm.	0.01	22.20	0.58	0.66	0.32
Malvaceae	<i>Pentace corneri</i> Kosterm.	0.04	43.50	0.58	0.66	1.80
Melastomaceae	<i>Kibessia galeata</i> (Korth.) Cogn.	0.02	17.00	0.55	0.12	0.15
Melastomaceae	<i>Memecylon edule</i> Roxb.	0.01	10.80	0.68	0.22	0.06
Melastomaceae	<i>Memecylon edule</i> Roxb.	0.02	15.40	0.68	0.22	0.14
Melastomaceae	<i>Memecylon elmeri</i> Merr.	0.04	15.40	0.77	0.12	0.16
Melastomaceae	<i>Pternandra multiflora</i> Cogn.	0.01	8.00	0.55	0.55	0.02
Melastomaceae	<i>Pternandra multiflora</i> Cogn.	0.12	11.00	0.55	0.55	0.05
Melastomaceae	<i>Pternandra multiflora</i> Cogn.	0.01	11.60	0.55	0.55	0.05
Melastomaceae	<i>Pternandra multiflora</i> Cogn.	0.02	13.40	0.55	0.55	0.08
Melastomaceae	<i>Pternandra multiflora</i> Cogn.	0.01	16.50	0.55	0.55	0.14
Melastomaceae	<i>Pternandra multiflora</i> Cogn.	0.01	38.50	0.55	0.55	1.26
Meliaceae	<i>Aglaiia affinis</i> Merr.	0.06	12.40	0.72	0.72	0.08
Meliaceae	<i>Aglaiia affinis</i> Merr.	0.21	23.10	0.72	0.72	0.44
Meliaceae	<i>Aglaiia affinis</i> Merr.	0.01	27.10	0.72	0.72	0.67
Meliaceae	<i>Aglaiia affinis</i> Merr.	0.01	51.60	0.72	0.72	3.42
Meliaceae	<i>Aglaiia affinis</i> Merr.	0.02	12.40	0.80	0.33	0.09
Meliaceae	<i>Aglaiia affinis</i> Merr.	0.01	12.50	0.80	0.33	0.10
Meliaceae	<i>Aglaiia affinis</i> Merr.	0.01	14.10	0.80	0.33	0.13
Moraceae	<i>Artocarpus anisophyllus</i> Miq.	0.19	40.30	0.74	0.79	1.90
Moraceae	<i>Artocarpus anisophyllus</i> Miq.	0.01	12.20	0.63	0.79	0.07
Moraceae	<i>Artocarpus anisophyllus</i> Miq.	0.11	37.60	0.63	0.79	1.35
Moraceae	<i>Artocarpus anisophyllus</i> Miq.	0.02	49.00	0.63	0.79	2.62
Moraceae	<i>Artocarpus dadah</i> Miq. Var. pubescens Miq.	0.01	11.90	0.73	0.52	0.08
Moraceae	<i>Artocarpus dadah</i> Miq. Var. pubescens Miq.	0.04	16.30	0.73	0.52	0.18
Moraceae	<i>Artocarpus dadah</i> Miq. Var. pubescens Miq.	0.20	23.60	0.73	0.52	0.47
Moraceae	<i>Artocarpus elasticus</i> Reinw.	0.02	12.10	0.48	1.02	0.05

Appendix 2: Continued

Moraceae	<i>Artocarpus elasticus</i> Reinw.	0.01	16.80	0.48	1.02	0.13
Moraceae	<i>Artocarpus elasticus</i> Reinw.	0.01	50.80	0.48	1.02	2.19
Moraceae	<i>Artocarpus integer</i> Merr. var. <i>silvestris</i> Corner	0.19	12.30	0.70	0.51	0.08
Moraceae	<i>Artocarpus integer</i> Merr. var. <i>silvestris</i> Corner	0.01	12.30	0.70	0.51	0.08
Moraceae	<i>Artocarpus integer</i> Merr. var. <i>silvestris</i> Corner	0.02	49.10	0.70	0.51	2.95
Moraceae	<i>Artocarpus kemando</i> Miq. subsp. <i>kemando</i>	0.01	11.50	0.50	0.34	0.05
Moraceae	<i>Artocarpus kemando</i> Miq. subsp. <i>kemando</i>	0.01	12.00	0.50	0.34	0.05
Moraceae	<i>Artocarpus kemando</i> Miq. subsp. <i>kemando</i>	0.07	17.40	0.50	0.34	0.15
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.12	16.00	0.63	0.58	0.15
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.02	16.70	0.63	0.58	0.16
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.20	39.70	0.63	0.58	1.54
Moraceae	<i>Artocarpus ovatus</i> Merr.	0.01	50.80	0.63	0.31	2.86
Moraceae	<i>Ficus gecharis</i> Corner	0.01	28.80	0.43	0.17	0.46
Moraceae	<i>Parartocarpus bracteatus</i> (King) Becc.	0.03	48.30	0.55	0.29	2.22
Moraceae	<i>Parartocarpus venenosu</i> Becc.	0.01	20.80	0.55	0.13	0.26
Myristicaceae	<i>Gymnacranthera eugeniifolia</i> (A.DC.) J.Sinclair	0.02	10.40	0.70	0.11	0.05
Myristicaceae	<i>Gymnacranthera forbesii</i> (King) Warb.	0.01	9.60	0.58	0.23	0.03
Myristicaceae	<i>Gymnacranthera forbesii</i> (King) Warb.	0.01	11.60	0.58	0.23	0.06
Myristicaceae	<i>Gymnacranthera forbesii</i> (King) Warb.	0.02	17.40	0.58	0.23	0.17
Myristicaceae	<i>Horsfieldia grandis</i> (Hook.fil.) Warb.	0.01	10.20	0.39	0.21	0.03
Myristicaceae	<i>Horsfieldia grandis</i> (Hook.fil.) Warb.	0.01	11.80	0.39	0.21	0.04
Myristicaceae	<i>Horsfieldia reticulata</i> Warb.	0.03	12.90	0.55	0.24	0.07
Myristicaceae	<i>Horsfieldia reticulata</i> Warb.	0.03	20.80	0.55	0.24	0.26
Myristicaceae	<i>Horsfieldia wallichii</i> (Hook.f. & Thoms.) Warb.	0.03	18.80	0.50	0.26	0.18
Myristicaceae	<i>Horsfieldia wallichii</i> (Hook.f. & Thoms.) Warb.	0.09	20.80	0.50	0.26	0.23
Myristicaceae	<i>Knema elmeri</i> Merr.	0.03	14.40	0.58	0.11	0.10
Myristicaceae	<i>Knema intermedia</i> (Blume) Warb.	0.03	19.00	0.58	0.26	0.21
Myristicaceae	<i>Knema intermedia</i> (Blume) Warb.	0.03	20.20	0.58	0.26	0.25
Myristicaceae	<i>Knema latifolia</i> Warb.	0.02	7.60	0.50	0.31	0.02
Myristicaceae	<i>Knema latifolia</i> Warb.	0.02	16.00	0.50	0.31	0.12
Myristicaceae	<i>Knema latifolia</i> Warb.	0.00	16.30	0.50	0.31	0.12
Myristicaceae	<i>Knema latifolia</i> Warb.	0.01	18.60	0.50	0.31	0.17
Myristicaceae	<i>Knema rufa</i> Warb.	0.01	10.40	0.58	0.22	0.04
Myristicaceae	<i>Knema rufa</i> Warb.	0.03	13.10	0.58	0.22	0.08
Myristicaceae	<i>Myristica iners</i> Blume	0.10	15.10	0.53	0.62	0.10
Myristicaceae	<i>Myristica iners</i> Blume	0.10	28.00	0.53	0.62	0.53
Myristicaceae	<i>Myristica iners</i> Blume	0.06	35.60	0.53	0.62	0.98

Appendix 2: Continued

Myristicaceae	<i>Myristica iners</i> Blume	0.01	35.70	0.53	0.62	0.99
Myristicaceae	<i>Myristica intermedia</i> (Blume) Warb.	0.01	12.80	0.53	0.11	0.07
Myristicaceae	<i>Myristica lowiana</i> King	0.07	9.70	0.48	0.11	0.03
Myristicaceae	<i>Myristica maxima</i> Warb.	0.08	10.00	0.48	0.80	0.03
Myristicaceae	<i>Myristica maxima</i> Warb.	0.08	10.00	0.48	0.80	0.03
Myristicaceae	<i>Myristica maxima</i> Warb.	0.01	12.00	0.48	0.80	0.05
Myristicaceae	<i>Myristica maxima</i> Warb.	0.01	29.30	0.48	0.80	0.54
Myristicaceae	<i>Myristica maxima</i> Warb.	0.01	32.30	0.48	0.80	0.69
Myristicaceae	<i>Myristica maxima</i> Warb.	0.03	32.30	0.48	0.80	0.69
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.06	9.70	0.70	0.16	0.04
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.01	9.70	0.70	0.16	0.04
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.01	28.00	0.70	0.16	0.71
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.09	10.50	0.75	0.64	0.06
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.02	14.50	0.75	0.64	0.13
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.01	34.50	0.75	0.64	1.29
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.02	10.60	0.75	0.64	0.06
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.01	17.10	0.75	0.64	0.21
Myrtaceae	<i>Syzygium cerinum</i> (M.R.Hend.) I.M.Turner	0.02	15.50	0.70	0.78	0.15
Myrtaceae	<i>Syzygium ochneocarpa</i> Diels	0.01	11.00	0.70	0.22	0.06
Myrtaceae	<i>Syzygium</i> sp.	0.05	24.70	0.70	0.90	0.51
Olacaceae	<i>Scodorocarpus borneensis</i> Becc.	0.04	16.60	0.82	0.12	0.21
Olacaceae	<i>Strombosia ceylanica</i> Gardn.	0.10	35.10	0.85	0.20	1.54
Olacaceae	<i>Strombosia lucida</i> Teijsm. & Binn.	0.03	11.80	0.82	0.56	0.08
Olacaceae	<i>Strombosia lucida</i> Teijsm. & Binn.	0.01	18.20	0.82	0.56	0.27
Olacaceae	<i>Strombosia lucida</i> Teijsm. & Binn.	0.04	22.00	0.82	0.56	0.44
Olacaceae	<i>Strombosia lucida</i> Teijsm. & Binn.	0.09	33.40	0.82	0.56	1.30
Pentaphylacaceae	<i>Adinandra dumosa</i> Miq.	0.05	19.80	0.61	0.80	0.25
Pentaphylacaceae	<i>Ternstroemia citrina</i> Ridl.	0.34	65.70	0.65	0.91	5.57
Pentaphylacaceae	<i>Ternstroemia citrina</i> Ridl.	0.40	71.00	0.65	0.91	6.71
Phyllanthaceae	<i>Antidesma stipulare</i> Blume	0.01	10.20	0.70	0.10	0.05
Phyllanthaceae	<i>Aporusa aurea</i> Hook. f.	0.01	11.80	0.72	0.22	0.08
Phyllanthaceae	<i>Aporusa aurea</i> Hook. f.	0.01	13.20	0.72	0.22	0.10
Phyllanthaceae	<i>Aporusa</i> spp.	0.38	13.70	0.65	0.11	0.10
Phyllanthaceae	<i>Cleistanthus baramicus</i> Jabl.	0.02	11.20	0.63	0.11	0.06
Phyllanthaceae	<i>Cleistanthus deccurens</i> Hook. f.	0.06	16.00	0.63	0.12	0.15
Polygalaceae	<i>Xanthophyllum affine</i> Korth. ex Miq.	0.03	13.50	0.69	1.28	0.10
Polygalaceae	<i>Xanthophyllum affine</i> Korth. ex Miq.	0.01	13.90	0.69	1.28	0.11
Polygalaceae	<i>Xanthophyllum affine</i> Korth. ex Miq.	0.02	14.80	0.69	1.28	0.13
Polygalaceae	<i>Xanthophyllum affine</i> Korth. ex Miq.	0.10	19.60	0.69	1.28	0.27

Appendix 2: Continued

Polygalaceae	<i>Xanthophyllum affine</i> Korth. ex Miq.	0.16	30.10	0.69	1.28	0.84
Polygalaceae	<i>Xanthophyllum affine</i> Korth. ex Miq.	0.05	36.40	0.69	1.28	1.37
Polygalaceae	<i>Xanthophyllum affine</i> Korth. ex Miq.	0.07	44.50	0.69	1.28	2.27
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.02	15.50	0.77	0.23	0.16
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.02	16.10	0.77	0.23	0.18
Polygalaceae	<i>Xanthophyllum beccarianum</i> Chodat	0.02	17.20	0.80	0.12	0.23
Polygalaceae	<i>Xanthophyllum brevipes</i> Meijden	0.01	10.80	0.80	0.11	0.07
Polygalaceae	<i>Xanthophyllum ellipticum</i> Korth. ex Miq.	0.02	11.00	0.80	0.46	0.07
Polygalaceae	<i>Xanthophyllum ellipticum</i> Korth. ex Miq.	0.08	15.10	0.80	0.46	0.16
Polygalaceae	<i>Xanthophyllum ellipticum</i> Korth. ex Miq.	0.01	16.00	0.80	0.46	0.19
Polygalaceae	<i>Xanthophyllum ellipticum</i> Korth. ex Miq.	0.02	31.20	0.80	0.46	1.07
Polygalaceae	<i>Xanthophyllum ferrugineum</i> Meijden	0.01	7.00	0.80	0.68	0.02
Polygalaceae	<i>Xanthophyllum ferrugineum</i> Meijden	0.09	12.50	0.80	0.68	0.10
Polygalaceae	<i>Xanthophyllum ferrugineum</i> Meijden	0.00	18.90	0.80	0.68	0.29
Polygalaceae	<i>Xanthophyllum ferrugineum</i> Meijden	0.15	34.10	0.80	0.68	1.34
Polygalaceae	<i>Xanthophyllum ferrugineum</i> Meijden	0.03	43.00	0.80	0.68	2.42
Primulaceae	<i>Ardisia hosei</i> Merr.	0.01	11.40	0.60	0.11	0.06
Rhizophoraceae	<i>Pelacalyx axilaris</i> Korth.	0.01	15.00	0.43	0.11	0.08
Rosaceae	<i>Prunus forbesii</i> Koehne	0.01	20.10	0.71	0.13	0.30
Rosaceae	<i>Prunus lamponga</i> (Miq.) Kalkman	0.01	12.00	0.68	0.11	0.07
Rubiaceae	<i>Canthium glabrum</i> Blume	0.02	15.80	0.70	0.42	0.16
Rubiaceae	<i>Canthium glabrum</i> Blume	0.13	30.80	0.70	0.42	0.90
Rubiaceae	<i>Canthium glabrum</i> Blume	0.07	19.00	0.70	0.42	0.26
Rubiaceae	<i>Diplospora beccariana</i> King & Gamble	0.06	11.90	0.70	0.38	0.07
Rubiaceae	<i>Diplospora beccariana</i> King & Gamble	0.01	27.50	0.70	0.38	0.67
Rubiaceae	<i>Diplospora beccariana</i> King & Gamble	0.01	9.70	0.70	0.38	0.04
Rubiaceae	<i>Diplospora beccariana</i> King & Gamble	0.02	14.00	0.70	0.38	0.11
Rubiaceae	<i>Displospora siamang</i>	0.06	14.00	0.70	0.11	0.11
Rubiaceae	<i>Gardenia tubifera</i> Wall.	0.02	10.20	0.67	0.95	0.05
Rubiaceae	<i>Gardenia tubifera</i> Wall.	0.03	10.80	0.67	0.95	0.05
Rubiaceae	<i>Gardenia tubifera</i> Wall.	0.01	10.80	0.67	0.95	0.05
Rubiaceae	<i>Gardenia tubifera</i> Wall.	0.02	10.90	0.67	0.95	0.06
Rubiaceae	<i>Gardenia tubifera</i> Wall.	0.02	10.90	0.67	0.95	0.06
Rubiaceae	<i>Gardenia tubifera</i> Wall.	0.01	11.80	0.67	0.95	0.07
Rubiaceae	<i>Gardenia tubifera</i> Wall.	0.01	12.40	0.67	0.95	0.08
Rubiaceae	<i>Gardenia tubifera</i> Wall.	0.01	14.50	0.67	0.95	0.12
Rubiaceae	<i>Gardenia tubifera</i> Wall.	0.01	14.70	0.67	0.95	0.12
Rubiaceae	<i>Gardenia tubifera</i> Wall.	0.01	15.50	0.67	0.95	0.14
Rubiaceae	<i>Gardenia tubifera</i> Wall.	0.01	16.70	0.67	0.95	0.17
Rubiaceae	<i>Gardenia tubifera</i> Wall.	0.17	18.70	0.67	0.95	0.24

Appendix 2: Continued

Rubiaceae	<i>Tarenna winkleri</i> Valetton	0.02	14.40	0.69	0.11	0.12
Rubiaceae	<i>Timonius flavescens</i> (Jacq.) Baker	0.01	10.80	0.64	0.11	0.05
Sabiaceae	<i>Meliosma sumatrana</i> (Jack) Walp.	0.02	10.60	0.45	0.11	0.04
Sapindaceae	<i>Nephelium beccarianum</i> (Radlk.) Leenh.	0.01	12.30	0.75	0.23	0.09
Sapindaceae	<i>Nephelium beccarianum</i> (Radlk.) Leenh.	0.02	17.90	0.75	0.23	0.23
Sapindaceae	<i>Nephelium cuspidatum</i> Blume	0.02	15.40	0.87	0.43	0.18
Sapindaceae	<i>Nephelium cuspidatum</i> Blume	0.03	15.80	0.87	0.43	0.20
Sapindaceae	<i>Nephelium cuspidatum</i> Blume	0.02	16.20	0.87	0.43	0.21
Sapindaceae	<i>Nephelium cuspidatum</i> Blume	0.02	20.70	0.87	0.43	0.40
Sapindaceae	<i>Nephelium lappaceum</i> L.	0.01	16.50	0.75	0.12	0.19
Sapindaceae	<i>Nephelium maingayi</i> Hiern	0.02	10.50	0.75	0.67	0.06
Sapindaceae	<i>Nephelium maingayi</i> Hiern	0.02	12.40	0.75	0.67	0.09
Sapindaceae	<i>Nephelium maingayi</i> Hiern	0.01	12.50	0.75	0.67	0.09
Sapindaceae	<i>Nephelium maingayi</i> Hiern	0.02	13.90	0.75	0.67	0.12
Sapindaceae	<i>Nephelium maingayi</i> Hiern	0.01	13.90	0.75	0.67	0.12
Sapindaceae	<i>Nephelium maingayi</i> Hiern	0.03	17.80	0.75	0.67	0.23
Sapindaceae	<i>Pometia pinnata</i> J. R. Forst. & G. Forst.	0.03	18.70	0.71	0.13	0.25
Sapotaceae	<i>Ganua kingii</i> (Brace)	0.01	10.40	0.70	0.21	0.05
Sapotaceae	<i>Ganua kingii</i> (Brace)	0.01	10.40	0.70	0.21	0.05
Sapotaceae	<i>Ganua motleyana</i> (de Vr.)	0.01	10.40	0.54	0.11	0.04
Sapotaceae	<i>Isonandra lanceolata</i> Wight	0.02	41.10	1.04	0.24	2.80
Sapotaceae	<i>Palaquium decurrens</i> H.J.Lam	0.02	19.70	0.75	0.13	0.30
Sapotaceae	<i>Palaquium dasyphyllum</i> Pierre ex Dubard	0.01	10.80	0.58	0.86	0.05
Sapotaceae	<i>Palaquium dasyphyllum</i> Pierre ex Dubard	0.01	13.00	0.58	0.86	0.08
Sapotaceae	<i>Palaquium dasyphyllum</i> Pierre ex Dubard	0.04	17.30	0.58	0.86	0.16
Sapotaceae	<i>Palaquium dasyphyllum</i> Pierre ex Dubard	0.04	17.80	0.58	0.86	0.18
Sapotaceae	<i>Palaquium dasyphyllum</i> Pierre ex Dubard	0.09	22.20	0.58	0.86	0.32
Sapotaceae	<i>Palaquium dasyphyllum</i> Pierre ex Dubard	0.02	23.60	0.58	0.86	0.37
Sapotaceae	<i>Palaquium dasyphyllum</i> Pierre ex Dubard	0.02	25.70	0.58	0.86	0.47
Sapotaceae	<i>Palaquium dasyphyllum</i> Pierre ex Dubard	0.05	33.20	0.58	0.86	0.90
Sapotaceae	<i>Palaquium decurrens</i> H.J.Lam	0.01	9.70	0.75	1.09	0.05
Sapotaceae	<i>Palaquium decurrens</i> H.J.Lam	0.01	10.50	0.75	1.09	0.06
Sapotaceae	<i>Palaquium decurrens</i> H.J.Lam	0.01	10.60	0.75	1.09	0.06
Sapotaceae	<i>Palaquium decurrens</i> H.J.Lam	0.01	12.20	0.75	1.09	0.08
Sapotaceae	<i>Palaquium decurrens</i> H.J.Lam	0.01	12.70	0.75	1.09	0.09
Sapotaceae	<i>Palaquium decurrens</i> H.J.Lam	0.07	13.40	0.75	1.09	0.11

Appendix 2: Continued

Sapotaceae	<i>Palaquium decurrens</i> H.J.Lam	0.01	13.70	0.75	1.09	0.12
Sapotaceae	<i>Palaquium decurrens</i> H.J.Lam	0.02	14.30	0.75	1.09	0.13
Sapotaceae	<i>Palaquium decurrens</i> H.J.Lam	0.01	15.40	0.75	1.09	0.16
Sapotaceae	<i>Palaquium decurrens</i> H.J.Lam	0.02	25.70	0.75	1.09	0.61
Sapotaceae	<i>Palaquium decurrens</i> H.J.Lam	0.02	30.40	0.75	1.09	0.94
Sapotaceae	<i>Palaquium pseudorostratum</i> H.J.Lam	0.01	10.50	0.49	1.46	0.04
Sapotaceae	<i>Palaquium pseudorostratum</i> H.J.Lam	0.01	11.20	0.49	1.46	0.04
Sapotaceae	<i>Palaquium pseudorostratum</i> H.J.Lam	0.02	12.40	0.49	1.46	0.06
Sapotaceae	<i>Palaquium pseudorostratum</i> H.J.Lam	0.01	12.40	0.49	1.46	0.06
Sapotaceae	<i>Palaquium pseudorostratum</i> H.J.Lam	0.02	12.40	0.49	1.46	0.06
Sapotaceae	<i>Palaquium pseudorostratum</i> H.J.Lam	0.03	13.40	0.49	1.46	0.07
Sapotaceae	<i>Palaquium pseudorostratum</i> H.J.Lam	0.02	14.70	0.49	1.46	0.09
Sapotaceae	<i>Palaquium pseudorostratum</i> H.J.Lam	0.02	15.70	0.49	1.46	0.11
Sapotaceae	<i>Palaquium pseudorostratum</i> H.J.Lam	0.10	16.50	0.49	1.46	0.12
Sapotaceae	<i>Palaquium pseudorostratum</i> H.J.Lam	0.01	16.50	0.49	1.46	0.12
Sapotaceae	<i>Palaquium pseudorostratum</i> H.J.Lam	0.01	16.80	0.49	1.46	0.13
Sapotaceae	<i>Palaquium pseudorostratum</i> H.J.Lam	0.01	18.20	0.49	1.46	0.16
Sapotaceae	<i>Palaquium pseudorostratum</i> H.J.Lam	0.02	36.40	0.49	1.46	0.96
Sapotaceae	<i>Palaquium ridleii</i> King & Gamble	0.03	9.80	0.93	1.18	0.06
Sapotaceae	<i>Palaquium ridleii</i> King & Gamble	0.01	10.20	0.93	1.18	0.07
Sapotaceae	<i>Palaquium ridleii</i> King & Gamble	0.01	10.70	0.93	1.18	0.07
Sapotaceae	<i>Palaquium ridleii</i> King & Gamble	0.01	10.70	0.93	1.18	0.07
Sapotaceae	<i>Palaquium ridleii</i> King & Gamble	0.01	10.70	0.93	1.18	0.07
Sapotaceae	<i>Palaquium ridleii</i> King & Gamble	0.01	10.80	0.93	1.18	0.08
Sapotaceae	<i>Palaquium ridleii</i> King & Gamble	0.02	10.90	0.93	1.18	0.08
Sapotaceae	<i>Palaquium ridleii</i> King & Gamble	0.02	12.80	0.93	1.18	0.12
Sapotaceae	<i>Palaquium ridleii</i> King & Gamble	0.01	14.20	0.93	1.18	0.16
Sapotaceae	<i>Palaquium ridleii</i> King & Gamble	0.01	15.30	0.93	1.18	0.19
Sapotaceae	<i>Palaquium ridleii</i> King & Gamble	0.02	15.70	0.93	1.18	0.21
Sapotaceae	<i>Palaquium ridleii</i> King & Gamble	0.01	17.30	0.93	1.18	0.27
Sapotaceae	<i>Palaquium ridleii</i> King & Gamble	0.02	20.70	0.93	1.18	0.43
Simaroubaceae	<i>Quassia borneensis</i> Noot.	0.18	48.20	0.50	0.58	2.01
Simaroubaceae	<i>Quassia borneensis</i> Noot.	0.05	48.20	0.50	0.58	2.01
Sterculiaceae	<i>Sterculia cordata</i> Blume	0.03	18.90	0.48	0.13	0.17
Sterculiaceae	<i>Sterculia rubiginosa</i> Vent.	0.01	26.70	0.48	0.31	0.42
Sterculiaceae	<i>Sterculia rubiginosa</i> Vent.	0.06	8.20	0.48	0.31	0.02
Sterculiaceae	<i>Sterculia rubiginosa</i> Vent.	0.06	26.50	0.48	0.31	0.42
Symplocaceae	<i>Symplocos crassipes</i> C.B.Clarke	0.05	24.60	0.57	0.15	0.41
Theaceae	<i>Adinandra dumosa</i> Miq.	0.03	11.80	0.61	0.80	0.06
Theaceae	<i>Adinandra dumosa</i> Miq.	0.01	11.90	0.61	0.80	0.06
Theaceae	<i>Adinandra dumosa</i> Miq.	0.01	12.00	0.61	0.80	0.07
Theaceae	<i>Adinandra dumosa</i> Miq.	0.03	12.80	0.61	0.80	0.08

Appendix 2: Continued

Theaceae	<i>Adinandra dumosa</i> Miq.	0.02	17.00	0.61	0.80	0.17
Theaceae	<i>Adinandra dumosa</i> Miq.	0.01	19.70	0.61	0.80	0.24
Theaceae	<i>Adinandra dumosa</i> Miq.	0.04	24.90	0.61	0.80	0.45
Thymelaeaceae	<i>Aquilaria microcarpa</i> Baill.	0.01	69.50	0.34	0.50	3.34
Thymelaeaceae	<i>Gonystylus bancanus</i> (Miq.) Kurz	0.02	15.90	0.58	0.20	0.13
Thymelaeaceae	<i>Gonystylus bancanus</i> (Miq.) Kurz	0.01	21.20	0.58	0.20	0.29
Ulmaceae	<i>Gironniera nervosa</i> (Roxb.) Baill.	0.04	9.80	0.63	0.42	0.04
Ulmaceae	<i>Gironniera nervosa</i> (Roxb.) Baill.	0.01	23.70	0.63	0.42	0.41
Ulmaceae	<i>Gironniera parvifolia</i> Planch.	0.03	18.00	0.63	0.56	0.20
Ulmaceae	<i>Gironniera parvifolia</i> Planch.	0.04	22.10	0.63	0.56	0.34
Ulmaceae	<i>Gironniera parvifolia</i> Planch.	0.11	22.50	0.63	0.56	0.36
Ulmaceae	<i>Gironniera parvifolia</i> Planch.	0.02	37.80	0.63	0.56	1.36
Verbenaceae	<i>Teijsmanniodendron sarawakanum</i> H.Pearson) Kosterm.	0.01	18.40	0.77	0.48	0.26
Verbenaceae	<i>Teijsmanniodendron sarawakanum</i> H.Pearson) Kosterm.	0.01	10.10	0.77	0.48	0.05
Verbenaceae	<i>Teijsmanniodendron sarawakanum</i> H.Pearson) Kosterm.	0.03	10.20	0.77	0.48	0.05

Appendix 3: List of sample samples trees in Lambir Hills National Park

Family	Species	Basal area (cm ²)	DBH (cm)	Wood Density (g/cm ³)	SIV	AGB (Mg ha ⁻¹)
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.01	10.50	0.80	0.94	0.05
Anacardiaceae	<i>Mangifera foetida</i> Loureiro	0.18	48.00	0.62	0.94	2.13
Anacardiaceae	<i>Dipterocarpus globosus</i> Vesque	0.28	60.00	0.79	6.10	4.69
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.01	12.40	0.80	1.13	0.08
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.02	14.40	0.80	1.13	0.12
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.01	11.90	0.80	0.75	0.07
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.01	13.70	0.80	0.75	0.11
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.01	11.40	0.80	1.96	0.07
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.01	10.50	0.80	1.96	0.05
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.01	11.00	0.80	1.13	0.06
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.04	23.50	0.80	2.77	0.44
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.01	13.30	0.80	2.77	0.10
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.02	15.00	0.80	6.10	0.14
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.15	43.60	0.80	6.10	2.17
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.04	22.80	0.80	6.10	0.41
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.01	10.50	0.80	6.10	0.05
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.02	17.10	0.80	6.10	0.19
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.02	15.40	0.80	6.10	0.15
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.01	13.50	0.80	6.10	0.10
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.02	14.00	0.80	6.10	0.11
Anacardiaceae	<i>Drimycarpus luridus</i> (Hook. f. Ding Hou)	0.04	22.50	0.80	6.10	0.40
Anacardiaceae	<i>Drypetes eriocarpa</i> Airy Shaw	0.01	10.70	0.78	2.77	0.05
Anacardiaceae	<i>Drypetes longifolia</i> (Blume) Pax & K.Hoffm.	0.01	11.00	0.78	1.83	0.06
Anacardiaceae	<i>Gluta macrocarpa</i> (Engl.) Ding Hou	0.03	19.00	0.50	1.81	0.16
Anacardiaceae	<i>Gluta macrocarpa</i> (Engl.) Ding Hou	0.02	14.00	0.50	1.81	0.07
Anacardiaceae	<i>Mangifera foetida</i> Loureiro	0.03	20.90	0.62	2.77	0.25
Anacardiaceae	<i>Mangifera quadrifida</i> Jack ex Roxb.	0.02	14.00	0.65	0.36	0.09
Anacardiaceae	<i>Mangifera quadrifida</i> Jack ex Roxb.	0.04	22.80	0.65	1.61	0.33
Anacardiaceae	<i>Mangifera quadrifida</i> Jack ex Roxb.	0.05	24.60	0.65	2.77	0.41

Appendix 3: Continued

Anacardiaceae	<i>Mangifera quadrifida</i> Jack ex Roxb.	0.02	16.00	0.65	2.77	0.13
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.01	10.20	0.56	0.94	0.03
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.11	37.40	0.56	0.49	1.02
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.04	21.40	0.56	1.96	0.24
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.07	29.30	0.56	1.96	0.55
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.13	40.00	0.56	1.96	1.21
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.07	30.10	0.56	1.81	0.59
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.06	27.00	0.56	1.81	0.44
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.01	13.00	0.56	1.81	0.06
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.01	11.70	0.56	1.83	0.05
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.01	10.40	0.56	1.83	0.04
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.01	12.40	0.56	1.83	0.06
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.03	18.40	0.56	1.13	0.16
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.01	12.70	0.56	1.13	0.06
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.02	14.00	0.56	2.77	0.08
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.02	15.50	0.56	6.10	0.10
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.10	36.20	0.56	6.10	0.94
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.03	20.20	0.56	6.10	0.21
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.03	19.00	0.56	1.13	0.18
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.05	26.30	0.56	0.45	0.41
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.04	22.70	0.56	6.10	0.28
Anisophylleaceae	<i>Anisophyllea disticha</i> (Jack) Baill.	0.01	10.40	0.78	6.10	0.05
Annonaceae	<i>Anaxagorea javanica</i> Blume	0.01	12.20	0.57	2.64	0.06
Annonaceae	<i>Anaxagorea javanica</i> Blume	0.02	15.50	0.57	2.64	0.10
Annonaceae	<i>Mezzettia macrocarpa</i> Heyden & Kessler	0.08	32.00	0.65	2.64	0.80
Annonaceae	<i>Mezzettia macrocarpa</i> Heyden & Kessler	0.02	14.00	0.65	0.92	0.09
Annonaceae	<i>Monocarpia marginalis</i> (Hook.f. & Thomson) I.M. Turner	0.02	16.20	0.55	2.16	0.11
Annonaceae	<i>Monocarpia marginalis</i> (Hook.f. & Thomson) I.M. Turner	0.01	11.50	0.55	0.92	0.05
Annonaceae	<i>Polyalthia flagellaris</i> (Becc.) Airy Shaw	0.02	14.10	0.62	2.16	0.09
Annonaceae	<i>Polyalthia glauca</i> (Hassk.) F.Muell.	0.01	12.80	0.56	5.46	0.06
Annonaceae	<i>Polyalthia glauca</i> (Hassk.) F.Muell.	0.01	10.80	0.56	5.46	0.04
Annonaceae	<i>Polyalthia glauca</i> (Hassk.) F.Muell.	0.01	11.20	0.56	2.64	0.04
Annonaceae	<i>Polyalthia glauca</i> (Hassk.) F.Muell.	0.01	11.50	0.56	2.16	0.05
Annonaceae	<i>Polyalthia glauca</i> (Hassk.) F.Muell.	0.02	16.00	0.56	0.38	0.11
Annonaceae	<i>Polyalthia hypoleuca</i> Hook. f. & Thomson	0.01	12.20	0.64	2.64	0.06
Annonaceae	<i>Polyalthia hypoleuca</i> Hook. f. & Thomson	0.02	14.70	0.64	2.64	0.10

Appendix 3: Continued

Annonaceae	<i>Polyalthia hypoleuca</i> Hook. f. & Thomson	0.01	10.50	0.64	2.16	0.04
Annonaceae	<i>Polyalthia hypoleuca</i> Hook. f. & Thomson	0.02	14.00	0.64	5.46	0.09
Annonaceae	<i>Polyalthia hypoleuca</i> Hook. f. & Thomson	0.02	17.30	0.64	5.46	0.16
Annonaceae	<i>Polyalthia hypoleuca</i> Hook. f. & Thomson	0.03	21.00	0.64	5.46	0.26
Annonaceae	<i>Polyalthia hypoleuca</i> Hook. f. & Thomson	0.01	10.70	0.64	5.46	0.04
Annonaceae	<i>Xylopia ferruginea</i> (Hook.f. & Thomson) Baill.	0.11	37.10	0.62	0.92	1.12
Apocynaceae	<i>Alstonia angustiloba</i> Miq.	0.06	28.70	0.65	5.46	0.60
Bombaceae	<i>Durio affinis</i> Becc.	0.07	30.00	0.63	5.46	0.65
Bombaceae	<i>Durio affinis</i> Becc.	0.03	19.80	0.63	5.46	0.22
Burseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. rostrata	0.02	15.70	0.57	5.46	0.11
Burseraceae	<i>Santiria griffithii</i> Engl.	0.13	40.00	0.65	5.46	1.42
Burseraceae	<i>Santiria megaphylla</i> Kalkman	0.05	25.00	0.65	5.46	0.42
Burseraceae	<i>Santiria rubiginosa</i> Blume	0.01	10.60	0.65	5.46	0.04
Burseraceae	<i>Santiria rubiginosa</i> Blume	0.04	23.00	0.65	5.46	0.34
Burseraceae	<i>Santiria rubiginosa</i> Blume	0.03	18.50	0.65	0.41	0.19
Burseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. rostrata	0.01	10.30	0.57	0.74	0.04
Burseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. rostrata	0.07	28.80	0.57	0.74	0.54
Burseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. rostrata	0.14	42.30	0.57	3.52	1.43
Burseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. rostrata	0.12	39.20	0.57	3.52	1.18
Burseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. rostrata	0.01	12.60	0.57	3.52	0.06
Burseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. rostrata	0.01	11.30	0.57	4.04	0.05
Burseraceae	<i>Santiria griffithii</i> Engl.	0.02	14.40	0.65	0.38	0.10
Burseraceae	<i>Santiria griffithii</i> Engl.	0.16	45.50	0.65	4.04	1.96
Burseraceae	<i>Santiria griffithii</i> Engl.	0.02	15.40	0.65	4.04	0.12
Burseraceae	<i>Santiria megaphylla</i> Kalkman	0.12	39.00	0.65	0.41	1.33
Burseraceae	<i>Santiria megaphylla</i> Kalkman	0.04	23.00	0.65	1.11	0.34
Burseraceae	<i>Santiria megaphylla</i> Kalkman	0.07	30.30	0.65	1.11	0.70
Burseraceae	<i>Santiria megaphylla</i> Kalkman	0.01	12.10	0.65	1.11	0.06
Burseraceae	<i>Santiria megaphylla</i> Kalkman	0.02	17.00	0.65	3.52	0.15
Burseraceae	<i>Santiria megaphylla</i> Kalkman	0.02	14.40	0.65	3.52	0.10
Burseraceae	<i>Santiria megaphylla</i> Kalkman	0.01	10.20	0.65	3.52	0.04
Burseraceae	<i>Santiria megaphylla</i> Kalkman	0.01	10.20	0.65	3.52	0.04
Burseraceae	<i>Santiria megaphylla</i> Kalkman	0.04	21.30	0.65	3.52	0.28
Burseraceae	<i>Santiria rubiginosa</i> Blume	0.01	12.70	0.65	3.52	0.07
Burseraceae	<i>Santiria rubiginosa</i> Blume	0.02	14.80	0.65	0.38	0.11

Appendix 3: Continued

Buseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. <i>rostrata</i>	0.07	29.50	0.57	4.04	0.57
Buseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. <i>rostrata</i>	0.02	15.30	0.57	4.04	0.10
Calophyllaceae	<i>Calophyllum grandiflorum</i> J.J.Sm.	0.04	23.10	0.53	4.04	0.28
Calophyllaceae	<i>Calophyllum grandiflorum</i> J.J.Sm.	0.04	23.20	0.53	1.69	0.28
Calophyllaceae	<i>Calophyllum grandiflorum</i> J.J.Sm.	0.07	29.20	0.53	0.36	0.52
Calophyllaceae	<i>Calophyllum grandiflorum</i> J.J.Sm.	0.08	31.30	0.53	1.62	0.62
Calophyllaceae	<i>Calophyllum grandiflorum</i> J.J.Sm.	0.01	13.50	0.53	1.62	0.07
Calophyllaceae	<i>Calophyllum grandiflorum</i> J.J.Sm.	0.05	24.00	0.53	1.62	0.31
Calophyllaceae	<i>Calophyllum grandiflorum</i> J.J.Sm.	0.01	12.20	0.53	1.62	0.05
Calophyllaceae	<i>Calophyllum grandiflorum</i> J.J.Sm.	0.06	28.50	0.53	1.62	0.49
Calophyllaceae	<i>Calophyllum grandiflorum</i> J.J.Sm.	0.05	24.50	0.53	1.62	0.33
Calophyllaceae	<i>Calophyllum grandiflorum</i> J.J.Sm.	0.02	16.70	0.53	1.62	0.12
Calophyllaceae	<i>Calophyllum grandiflorum</i> J.J.Sm.	0.01	11.90	0.76	4.04	0.07
Calophyllaceae	<i>Calophyllum grandiflorum</i> J.J.Sm.	0.01	13.40	0.76	4.04	0.10
Calophyllaceae	<i>Calophyllum grandiflorum</i> J.J.Sm.	0.02	14.70	0.76	1.69	0.12
Calophyllaceae	<i>Calophyllum grandiflorum</i> J.J.Sm.	0.01	10.50	0.76	1.62	0.05
Calophyllaceae	<i>Mesua beccariana</i> (Baill.) Kosterm.	0.03	19.00	0.78	4.04	0.25
Calophyllaceae	<i>Mesua beccariana</i> (Baill.) Kosterm.	0.03	21.00	0.78	4.04	0.32
Calophyllaceae	<i>Mesua beccariana</i> (Baill.) Kosterm.	0.02	15.00	0.78	0.74	0.13
Calophyllaceae	<i>Mesua beccariana</i> (Baill.) Kosterm.	0.01	11.70	0.78	0.74	0.07
Calophyllaceae	<i>Mesua beccariana</i> (Baill.) Kosterm.	0.04	23.50	0.78	1.69	0.43
Calophyllaceae	<i>Mesua beccariana</i> (Baill.) Kosterm.	0.01	12.20	0.78	4.92	0.08
Calophyllaceae	<i>Mesua beccariana</i> (Baill.) Kosterm.	0.05	25.00	0.78	1.62	0.51
Calophyllaceae	<i>Mesua beccariana</i> (Baill.) Kosterm.	0.03	19.20	0.78	1.62	0.25
Calophyllaceae	<i>Mesua beccariana</i> (Baill.) Kosterm.	0.02	16.30	0.78	1.62	0.17
Calophyllaceae	<i>Mesua beccariana</i> (Baill.) Kosterm.	0.04	23.40	0.78	1.62	0.43
Calophyllaceae	<i>Mesua beccariana</i> (Baill.) Kosterm.	0.01	12.30	0.78	1.62	0.08
Celastraceae	<i>Bhesa paniculata</i> Arn.	0.02	16.60	0.71	1.62	0.16
Celastraceae	<i>Bhesa paniculata</i> Arn.	0.02	14.80	0.71	0.36	0.12
Celastraceae	<i>Bhesa paniculata</i> Arn.	0.01	11.20	0.71	0.83	0.06
Dilleniaceae	<i>Dillenia excelsa</i> (Jack) Gilg	0.02	15.30	0.72	11.13	0.13
Dilleniaceae	<i>Dillenia excelsa</i> (Jack) Gilg	0.01	10.70	0.72	11.13	0.05
Dilleniaceae	<i>Dillenia sumatrana</i> Miq.	0.18	48.40	0.58	11.13	2.02
Dilleniaceae	<i>Dillenia sumatrana</i> Miq.	0.13	41.20	0.58	11.13	1.35
Dilleniaceae	<i>Dillenia sumatrana</i> Miq.	0.06	26.50	0.58	11.13	0.44
Dipterocarpaceae	<i>Anisoptera grossivenia</i> Slooten	0.54	83.00	0.67	2.76	8.68
Dipterocarpaceae	<i>Cotylelobium flavum</i> Pierre	0.03	21.10	0.93	11.13	0.39
Dipterocarpaceae	<i>Dipterocarpus crinatus</i> Dyer	0.21	52.00	0.84	1.65	3.53
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.03	19.50	0.79	5.70	0.27
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.05	25.20	0.79	21.45	0.52
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.01	12.50	0.79	21.45	0.08

Appendix 3: Continued

Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.09	34.00	0.79	21.45	1.13
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.25	56.80	0.79	21.45	4.10
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.08	32.20	0.79	7.11	0.99
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.01	13.20	0.79	0.91	0.10
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.01	13.00	0.79	1.05	0.09
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.01	13.20	0.79	0.76	0.10
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.01	11.20	0.79	0.67	0.06
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.16	44.80	0.79	1.95	2.28
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.07	30.70	0.79	1.95	0.87
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.05	24.40	0.79	1.99	0.48
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.03	20.00	0.79	3.34	0.29
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.02	14.00	0.79	0.98	0.11
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.07	29.30	0.79	6.03	0.77
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.02	16.80	0.79	6.03	0.18
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.08	31.00	0.79	6.03	0.89
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.07	30.00	0.79	0.46	0.82
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.05	24.80	0.79	0.79	0.50
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.01	13.00	0.79	9.21	0.09
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.01	13.80	0.79	9.21	0.11
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.01	13.80	0.79	9.21	0.11
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.01	11.20	0.79	11.13	0.06
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.01	11.40	0.79	21.45	0.06
Dipterocarpaceae	<i>Dipterocarpus globosus</i> Vesque	0.20	50.00	0.79	7.11	3.00
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.02	16.20	0.78	11.13	0.16
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.18	47.60	0.78	5.70	2.65
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.01	10.30	0.78	9.21	0.05
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.01	11.00	0.78	11.13	0.06
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.33	65.00	0.78	11.13	5.68
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.02	16.20	0.78	11.13	0.16
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.07	30.20	0.78	11.13	0.84
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.31	62.60	0.78	11.13	5.19
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.04	22.70	0.78	5.70	0.40
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.24	55.30	0.78	5.70	3.84
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.10	35.00	0.78	5.70	1.22
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.17	47.20	0.78	5.70	2.59

Appendix 3: Continued

Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.16	45.60	0.78	5.70	2.38
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.16	45.00	0.78	5.70	2.30
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.12	39.20	0.78	21.45	1.63
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.11	38.00	0.78	21.45	1.50
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.04	21.30	0.78	21.45	0.34
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.15	44.00	0.78	21.45	2.18
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.05	26.30	0.78	21.45	0.58
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.03	19.40	0.78	21.45	0.26
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.01	11.00	0.78	21.45	0.06
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.25	55.90	0.78	21.45	3.94
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.17	46.40	0.78	21.45	2.49
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.54	82.90	0.78	7.11	10.12
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.51	80.20	0.78	7.11	9.36
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.17	46.60	0.78	3.87	2.51
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.06	26.50	0.78	3.81	0.60
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.01	13.10	0.78	3.81	0.09
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.43	74.20	0.78	3.81	7.80
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.16	45.00	0.78	6.03	2.30
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.15	44.30	0.78	6.03	2.21
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.09	34.00	0.78	6.03	1.13
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.07	30.00	0.78	6.03	0.82
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.03	20.70	0.78	6.03	0.31
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.09	33.50	0.78	6.03	1.09
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.01	11.00	0.78	9.21	0.06
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.01	13.60	0.78	9.21	0.10
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.08	31.00	0.78	9.21	0.89
Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.16	45.00	0.78	9.21	2.30

Appendix 3: Continued

Dipterocarpaceae	<i>Dryobalanops aromatica</i> C.F Gaertn	0.04	23.70	0.78	9.21	0.44
Dipterocarpaceae	<i>Dryobalanops lanceolata</i> Burck	0.02	15.50	0.70	11.13	0.13
Dipterocarpaceae	<i>Dryobalanops lanceolata</i> Burck	0.07	30.70	0.70	3.34	0.77
Dipterocarpaceae	<i>Dryobalanops lanceolata</i> Burck	0.33	65.00	0.70	9.21	5.05
Dipterocarpaceae	<i>Hopea ferruginea</i> Parijs	0.38	70.00	0.64	7.11	5.57
Dipterocarpaceae	<i>Parashorea macrophylla</i> Wyatt-Sm. ex P.S.Ashton	0.01	12.10	0.60	21.45	0.06
Dipterocarpaceae	<i>Parashorea macrophylla</i> Wyatt-Sm. ex P.S.Ashton	0.04	22.00	0.60	21.45	0.28
Dipterocarpaceae	<i>Parashorea macrophylla</i> Wyatt-Sm. ex P.S.Ashton	0.03	19.50	0.60	21.45	0.20
Dipterocarpaceae	<i>Parashorea macrophylla</i> Wyatt-Sm. ex P.S.Ashton	0.01	13.50	0.60	21.45	0.08
Dipterocarpaceae	<i>Parashorea macrophylla</i> Wyatt-Sm. ex P.S.Ashton	0.01	10.50	0.60	0.36	0.04
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.20	50.00	0.50	6.03	1.89
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.08	32.40	0.50	9.21	0.63
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.06	28.00	0.50	11.13	0.43
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.17	46.00	0.50	0.36	1.54
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.23	54.00	0.50	7.11	2.29
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.06	27.40	0.52	21.45	0.43
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.01	12.20	0.52	2.01	0.05
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.11	37.00	0.52	0.71	0.94
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.04	23.50	0.52	0.75	0.29
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.02	15.00	0.52	0.75	0.09
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.01	11.00	0.52	3.87	0.04
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.04	23.30	0.52	9.21	0.28
Dipterocarpaceae	<i>Shorea beccariana</i> (K. Heyne) Blume	0.01	11.80	0.52	9.21	0.05
Dipterocarpaceae	<i>Shorea cordata</i> P.S. Ashton	0.01	13.50	0.60	2.76	0.08
Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.22	53.30	0.60	11.13	2.68
Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.01	13.40	0.60	21.45	0.08
Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.10	35.30	0.60	21.45	0.95
Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.02	15.20	0.60	21.45	0.11
Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.03	19.60	0.60	21.45	0.21
Dipterocarpaceae	<i>Shorea dispar</i> P.S. Ashton	0.02	17.60	0.60	21.45	0.16
Dipterocarpaceae	<i>Shorea dispar</i> P.S. Ashton	0.01	13.30	0.60	0.41	0.07

Appendix 3: Continued

Dipterocarpaceae	<i>Shorea faguetiana</i> (Miq.) C.F.Gaertn.	0.03	20.50	0.54	11.13	0.21
Dipterocarpaceae	<i>Shorea faguetiana</i> (Miq.) C.F.Gaertn.	0.04	23.60	0.54	11.13	0.30
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.02	16.20	0.95	5.70	0.20
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.04	22.20	0.95	5.70	0.45
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.01	13.50	0.95	11.13	0.12
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.01	10.40	0.95	11.13	0.06
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.04	21.70	0.95	5.70	0.43
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.01	11.50	0.95	5.70	0.08
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.24	55.00	0.95	5.70	4.56
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.08	32.80	0.95	21.45	1.24
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.21	52.00	0.95	21.45	3.97
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.02	14.50	0.95	21.45	0.15
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.13	40.20	0.95	21.45	2.09
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.01	11.00	0.95	3.87	0.07
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.16	45.00	0.95	1.99	2.77
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.15	44.00	0.95	1.99	2.62
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.06	28.60	0.95	1.99	0.87
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.02	16.40	0.95	2.21	0.20
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.02	14.40	0.95	2.21	0.14
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.01	12.00	0.95	3.34	0.09
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.07	30.40	0.95	3.34	1.02
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.03	19.90	0.95	3.34	0.34
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.03	19.00	0.95	0.97	0.30
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.01	10.20	0.95	3.81	0.06
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.17	46.00	0.95	0.30	2.93
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.16	45.00	0.95	0.91	2.77
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.16	45.40	0.95	6.03	2.84
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.16	44.50	0.95	1.70	2.70
Dipterocarpaceae	<i>Shorea falcifera</i> Dyer ex Brandis	0.01	11.40	0.95	9.21	0.08
Dipterocarpaceae	<i>Shorea fraguetiana</i>	0.24	55.00	0.60	7.11	2.90
Dipterocarpaceae	<i>Shorea macrophylla</i> (de Vriese) P.S.Ashton	0.03	19.70	0.60	3.34	0.21
Dipterocarpaceae	<i>Shorea macrophylla</i> (de Vriese) P.S.Ashton	0.33	65.00	0.60	9.21	4.35
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.03	19.80	0.60	21.45	0.21
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.03	18.80	0.60	2.21	0.19
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.20	50.00	0.60	3.34	2.29
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.06	27.70	0.60	1.65	0.51
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.05	25.80	0.60	3.81	0.42
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	13.40	0.60	3.81	0.08
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.09	33.20	0.60	0.38	0.81
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.16	45.00	0.60	6.03	1.76

Appendix 3: Continued

Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.57	85.00	0.60	1.10	8.20
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.10	35.00	0.60	1.10	0.93
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.01	10.30	0.59	3.34	0.04
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.03	20.00	0.59	3.34	0.22
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.03	19.50	0.59	0.97	0.20
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.01	11.00	0.59	1.65	0.04
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.02	14.00	0.59	1.70	0.08
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.02	14.50	0.59	9.21	0.09
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.05	24.80	0.60	21.45	0.38
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.16	45.00	0.60	0.75	1.76
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.13	40.30	0.60	5.70	1.33
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.27	58.10	0.60	5.70	3.31
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.75	98.00	0.60	5.70	11.37
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.09	34.20	0.60	21.45	0.88
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.24	55.50	0.60	21.45	2.96
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.13	40.40	0.60	21.45	1.34
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.10	36.20	0.60	7.11	1.02
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.16	45.60	0.60	2.41	1.82
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.07	30.60	0.60	2.41	0.66
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.02	17.50	0.60	1.23	0.15
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.06	27.10	0.60	0.38	0.48
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.13	40.80	0.60	1.65	1.38
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.12	38.60	0.60	0.75	1.20
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.12	39.60	0.60	6.03	1.28
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.17	47.20	0.60	11.13	1.98
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.36	68.00	0.60	2.41	4.84
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.03	20.20	0.60	2.41	0.22
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.10	36.50	0.60	21.45	1.04
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.06	26.80	0.60	21.45	0.47
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.11	37.90	0.60	0.71	1.14
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.08	31.30	0.60	7.11	0.70
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.22	53.50	0.60	7.11	2.71
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.05	26.30	0.60	7.11	0.45
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.29	61.00	0.60	2.41	3.73
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.02	14.00	0.60	0.76	0.08
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.50	80.10	0.60	1.99	7.14
Dipterocarpaceae	<i>Shorea pinanga</i> Scheff	0.26	57.20	0.60	9.21	3.19
Dipterocarpaceae	<i>Shorea quadrinervis</i> Slooten	0.02	17.50	0.50	21.45	0.13
Dipterocarpaceae	<i>Shorea scabrida</i> Symington	0.36	68.00	0.52	5.70	4.18

Appendix 3: Continued

Dipterocarpaceae	<i>Shorea scabrida</i> Symington	0.07	30.20	0.52	1.95	0.55
Dipterocarpaceae	<i>Shorea scabrida</i> Symington	0.08	32.30	0.52	3.87	0.65
Dipterocarpaceae	<i>Shorea scabrida</i> Symington	0.03	20.30	0.52	2.76	0.20
Dipterocarpaceae	<i>Shorea uliginosa</i> Foxworthy	0.87	105.00	0.60	11.13	13.29
Dipterocarpaceae	<i>Vatica cinerea</i> King	0.02	16.10	1.03	11.13	0.21
Dipterocarpaceae	<i>Vatica nitens</i> King	0.02	14.50	0.75	11.13	0.12
Dipterocarpaceae	<i>Vatica nitens</i> King	0.02	16.50	0.75	11.13	0.16
Dipterocarpaceae	<i>Vatica nitens</i> King	0.03	18.50	0.75	11.13	0.22
Dipterocarpaceae	<i>Vatica nitens</i> King	0.04	21.70	0.75	11.13	0.34
Dipterocarpaceae	<i>Vatica nitens</i> King	0.03	20.90	0.75	5.70	0.30
Dipterocarpaceae	<i>Vatica nitens</i> King	0.05	25.70	0.75	5.70	0.52
Dipterocarpaceae	<i>Vatica nitens</i> King	0.05	24.80	0.75	21.45	0.48
Dipterocarpaceae	<i>Vatica nitens</i> King	0.06	28.20	0.75	21.45	0.67
Dipterocarpaceae	<i>Vatica nitens</i> King	0.05	25.50	0.75	21.45	0.51
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	13.70	0.75	21.45	0.10
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	12.70	0.75	2.01	0.08
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	10.80	0.75	2.01	0.05
Dipterocarpaceae	<i>Vatica nitens</i> King	0.05	24.00	0.75	7.11	0.44
Dipterocarpaceae	<i>Vatica nitens</i> King	0.02	14.00	0.75	7.11	0.11
Dipterocarpaceae	<i>Vatica nitens</i> King	0.02	13.90	0.75	7.11	0.10
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	12.80	0.75	7.11	0.08
Dipterocarpaceae	<i>Vatica nitens</i> King	0.02	14.30	0.75	0.91	0.11
Dipterocarpaceae	<i>Vatica nitens</i> King	0.18	48.00	0.75	0.64	2.58
Dipterocarpaceae	<i>Vatica nitens</i> King	0.04	23.40	0.75	1.47	0.41
Dipterocarpaceae	<i>Vatica nitens</i> King	0.02	17.30	0.75	0.59	0.19
Dipterocarpaceae	<i>Vatica nitens</i> King	0.02	15.80	0.75	0.59	0.15
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	12.40	0.75	1.05	0.08
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	10.30	0.75	2.41	0.05
Dipterocarpaceae	<i>Vatica nitens</i> King	0.09	33.10	0.75	2.41	1.01
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	12.60	0.75	0.76	0.08
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	10.20	0.75	1.95	0.05
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	10.20	0.75	1.95	0.05
Dipterocarpaceae	<i>Vatica nitens</i> King	0.06	26.70	0.75	0.38	0.58
Dipterocarpaceae	<i>Vatica nitens</i> King	0.02	14.80	0.75	3.87	0.12
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	12.00	0.75	3.87	0.07
Dipterocarpaceae	<i>Vatica nitens</i> King	0.06	28.30	0.75	3.87	0.67
Dipterocarpaceae	<i>Vatica nitens</i> King	0.04	21.60	0.75	0.36	0.33
Dipterocarpaceae	<i>Vatica nitens</i> King	0.03	18.70	0.75	2.76	0.23
Dipterocarpaceae	<i>Vatica nitens</i> King	0.02	16.00	0.75	2.76	0.15
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	13.30	0.75	2.76	0.09
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	12.30	0.75	2.76	0.07
Dipterocarpaceae	<i>Vatica nitens</i> King	0.03	20.50	0.75	1.99	0.29

Appendix 3: Continued

Dipterocarpaceae	<i>Vatica nitens</i> King	0.02	14.00	0.75	2.21	0.11
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	12.70	0.75	3.34	0.08
Dipterocarpaceae	<i>Vatica nitens</i> King	0.02	17.30	0.75	0.41	0.19
Dipterocarpaceae	<i>Vatica nitens</i> King	0.02	16.40	0.75	0.98	0.16
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	12.80	0.75	1.65	0.08
Dipterocarpaceae	<i>Vatica nitens</i> King	0.05	25.00	0.75	3.81	0.49
Dipterocarpaceae	<i>Vatica nitens</i> King	0.03	18.30	0.75	3.81	0.21
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	13.80	0.75	3.81	0.10
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	12.80	0.75	3.81	0.08
Dipterocarpaceae	<i>Vatica nitens</i> King	0.04	22.50	0.75	6.03	0.37
Dipterocarpaceae	<i>Vatica nitens</i> King	0.02	15.70	0.75	6.03	0.14
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	12.90	0.75	6.03	0.09
Dipterocarpaceae	<i>Vatica nitens</i> King	0.06	27.30	0.75	6.03	0.61
Dipterocarpaceae	<i>Vatica nitens</i> King	0.11	38.00	0.75	6.03	1.43
Dipterocarpaceae	<i>Vatica nitens</i> King	0.03	20.70	0.75	0.79	0.30
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	12.00	0.75	1.70	0.07
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	12.30	0.75	0.53	0.07
Dipterocarpaceae	<i>Vatica nitens</i> King	0.06	28.50	0.75	9.21	0.69
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	13.00	0.75	9.21	0.09
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	12.50	0.75	9.21	0.08
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	11.50	0.75	9.21	0.06
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	11.80	0.75	9.21	0.07
Dipterocarpaceae	<i>Vatica nitens</i> King	0.03	20.40	0.75	9.21	0.29
Dipterocarpaceae	<i>Vatica oblongifolia</i> Hook.f.	0.02	15.50	0.80	3.81	0.15
Ebenaceae	<i>Diospyros amarus</i>	0.01	13.60	0.75	0.36	0.10
Ebenaceae	<i>Diospyros lanceifolia</i> Roxb.	0.04	22.80	0.75	9.21	0.38
Ebenaceae	<i>Diospyros lanceifolia</i> Roxb.	0.05	24.50	0.75	9.21	0.46
Ebenaceae	<i>Diospyros lanceifolia</i> Roxb.	0.02	15.50	0.75	9.21	0.14
Ebenaceae	<i>Diospyros lanceifolia</i> Roxb.	0.01	11.50	0.75	0.38	0.06
Ebenaceae	<i>Diospyros lanceifolia</i> Roxb.	0.02	14.40	0.75	1.32	0.11
Ebenaceae	<i>Diospyros lanceifolia</i> Roxb.	0.01	12.80	0.75	1.32	0.08
Ebenaceae	<i>Diospyros lanceifolia</i> Roxb.	0.02	17.70	0.75	1.32	0.20
Ebenaceae	<i>Diospyros lanceifolia</i> Roxb.	0.02	15.70	0.75	1.32	0.14
Ebenaceae	<i>Diospyros lanceifolia</i> Roxb.	0.01	13.70	0.75	4.38	0.10
Ebenaceae	<i>Diospyros lanceifolia</i> Roxb.	0.02	15.20	0.75	4.38	0.13
Ebenaceae	<i>Diospyros lanceifolia</i> Roxb.	0.01	12.00	0.75	4.38	0.07
Ebenaceae	<i>Diospyros lanceifolia</i> Roxb.	0.02	16.00	0.75	4.38	0.15
Ebenaceae	<i>Diospyros lanceifolia</i> Roxb.	0.01	12.80	0.75	4.38	0.08
Ebenaceae	<i>Diospyros lanceifolia</i> Roxb.	0.01	10.00	0.75	0.43	0.04
Ebenaceae	<i>Diospyros lanceifolia</i> Roxb.	0.01	10.20	0.70	1.32	0.04
Euphobiaceae	<i>Elateriospermum tapos</i> Blume	0.03	18.80	0.95	4.38	0.29
Euphobiaceae	<i>Elateriospermum tapos</i> Blume	0.03	18.70	0.95	4.38	0.29

Appendix 3: Continued

Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.02	14.20	0.95	4.38	0.14
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.01	13.20	0.95	4.38	0.11
Euphorbiaceae	<i>Aporosa sphaeritophora</i> Merr.	0.09	33.10	0.52	4.38	0.70
Euphorbiaceae	<i>Aporosa sphaeritophora</i> Merr.	0.04	23.50	0.52	6.92	0.29
Euphorbiaceae	<i>Aporosa sphaeritophora</i> Merr.	0.03	18.80	0.52	6.92	0.16
Euphorbiaceae	<i>Aporosa sphaeritophora</i> Merr.	0.01	10.50	0.52	6.92	0.03
Euphorbiaceae	<i>Aporosa sphaeritophora</i> Merr.	0.04	21.60	0.52	1.84	0.23
Euphorbiaceae	<i>Baccaurea racemosa</i> (Blume) Müll. Arg.	0.03	20.80	0.62	4.38	0.25
Euphorbiaceae	<i>Baccaurea racemosa</i> (Blume) Müll. Arg.	0.01	11.60	0.62	6.92	0.05
Euphorbiaceae	<i>Baccaurea racemosa</i> (Blume) Müll. Arg.	0.04	22.00	0.62	6.92	0.29
Euphorbiaceae	<i>Baccaurea racemosa</i> (Blume) Müll. Arg.	0.02	16.80	0.62	4.38	0.14
Euphorbiaceae	<i>Baccaurea racemosa</i> (Blume) Müll. Arg.	0.01	11.00	0.62	6.92	0.05
Euphorbiaceae	<i>Baccaurea racemosa</i> (Blume) Müll. Arg.	0.01	13.10	0.62	6.92	0.07
Euphorbiaceae	<i>Baccaurea racemosa</i> (Blume) Müll. Arg.	0.01	10.50	0.62	6.92	0.04
Euphorbiaceae	<i>Baccaurea racemosa</i> (Blume) Müll. Arg.	0.01	10.50	0.62	6.92	0.04
Euphorbiaceae	<i>Baccaurea reticulata</i> Hook. f.	0.04	22.00	0.78	0.36	0.36
Euphorbiaceae	<i>Baccaurea reticulata</i> Hook. f.	0.01	12.20	0.78	4.38	0.08
Euphorbiaceae	<i>Baccaurea reticulata</i> Hook. f.	0.09	33.80	0.78	6.92	1.11
Euphorbiaceae	<i>Baccaurea reticulata</i> Hook. f.	0.05	25.00	0.78	0.46	0.51
Euphorbiaceae	<i>Baccaurea reticulata</i> Hook. f.	0.01	13.00	0.78	1.84	0.09
Euphorbiaceae	<i>Chaetocarpus castanocarpus</i> (Roxb.) Thawaïtes	0.01	10.90	0.58	6.92	0.04
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.04	21.70	0.95	6.92	0.43
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.02	15.90	0.95	6.92	0.19
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.05	25.00	0.95	6.92	0.62
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.03	20.30	0.95	6.92	0.36
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.02	14.00	0.95	6.92	0.13
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.06	27.70	0.95	6.92	0.81
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.02	13.90	0.95	0.36	0.13
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.12	39.00	0.95	0.55	1.94
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.03	21.00	0.95	0.38	0.39
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.74	97.10	0.95	1.84	17.57
Euphorbiaceae	<i>Elateriospermum tapos</i> Blume	0.01	10.30	0.95	1.84	0.06
Euphorbiaceae	<i>Endospermum diadenum</i> (Miq.) Air Shaw	0.13	40.50	0.35	6.92	0.79
Euphorbiaceae	<i>Koilodepas longifolium</i>	0.02	17.00	0.90	6.92	0.21
Euphorbiaceae	<i>Koilodepas longifolium</i>	0.01	12.00	0.90	0.55	0.08
Euphorbiaceae	<i>Moultonianthus leembruggianus</i> (Boerl. & Koord.) Steenis	0.02	14.90	0.77	6.92	0.13

Appendix 3: Continued

Fabaceae	<i>Dialium laurinum</i> Baker	0.15	44.00	0.80	3.69	2.22
Fabaceae	<i>Dialium laurinum</i> Baker	0.01	11.10	0.80	3.69	0.06
Fabaceae	<i>Dialium laurinum</i> Baker	0.01	11.50	0.80	3.69	0.07
Fabaceae	<i>Dialium laurinum</i> Baker	0.06	28.00	0.80	3.69	0.70
Fabaceae	<i>Dialium laurinum</i> Baker	0.01	10.70	0.80	3.69	0.06
Fabaceae	<i>Dialium laurinum</i> Baker	0.02	14.50	0.80	0.41	0.12
Fabaceae	<i>Dialium laurinum</i> Baker	0.11	38.00	0.80	1.91	1.53
Fabaceae	<i>Dialium laurinum</i> Baker	0.02	15.20	0.80	1.91	0.14
Fabaceae	<i>Dialium laurinum</i> Baker	0.02	15.00	0.80	1.91	0.14
Fabaceae	<i>Dialium laurinum</i> Baker	0.04	23.70	0.80	3.47	0.45
Fabaceae	<i>Koompassia malaccensis</i> Maing. ex Benth.	0.14	42.00	0.83	1.84	2.04
Fabaceae	<i>Koompassia malaccensis</i> Maing. ex Benth.	0.18	48.30	0.83	3.69	2.89
Fabaceae	<i>Koompassia malaccensis</i> Maing. ex Benth.	0.07	30.00	0.83	3.69	0.86
Fabaceae	<i>Koompassia malaccensis</i> Maing. ex Benth.	0.06	27.70	0.83	3.69	0.70
Fabaceae	<i>Koompassia malaccensis</i> Maing. ex Benth.	0.13	40.40	0.83	3.69	1.85
Fabaceae	<i>Koompassia malaccensis</i> Maing. ex Benth.	0.06	27.40	0.83	0.46	0.68
Fabaceae	<i>Koompassia malaccensis</i> Maing. ex Benth.	0.09	33.30	0.83	1.91	1.13
Fabaceae	<i>Parkia singularis</i> Miq.	0.01	13.80	0.56	3.69	0.08
Fagaceae	<i>Castanopsis motleyana</i> King	0.03	20.00	0.76	3.47	0.28
Fagaceae	<i>Lithocarpus gracilis</i> (Korth.) Soepadmo	0.01	12.00	0.65	3.47	0.06
Flacourtiaceae	<i>Hydnocarpus gracilis</i> (Slooten) Sleumer	0.02	15.80	0.56	3.47	0.11
Flacourtiaceae	<i>Hydnocarpus gracilis</i> (Slooten) Sleumer	0.20	51.00	0.56	3.47	2.24
Flacourtiaceae	<i>Hydnocarpus gracilis</i> (Slooten) Sleumer	0.02	17.50	0.56	3.47	0.14
Flacourtiaceae	<i>Hydnocarpus gracilis</i> (Slooten) Sleumer	0.02	14.70	0.56	3.47	0.09
Flacourtiaceae	<i>Hydnocarpus gracilis</i> (Slooten) Sleumer	0.02	16.50	0.56	3.47	0.12
Icacinaeae	<i>Gonocaryum macrophyllum</i> (Blume) Sleumer	0.03	18.80	0.73	3.47	0.22
Icacinaeae	<i>Stemonurus malaccensis</i> (Mast.) Sleumer	0.05	25.30	0.78	1.74	0.52
Icacinaeae	<i>Stemonurus umbellatus</i> Becc.	0.13	41.30	0.61	3.47	1.44
Ixonanthaceae	<i>Alanthospermum boneense</i> Forman	0.05	24.40	0.65	1.74	0.40
Lauaceae	<i>Litsea gracilipes</i> Hook. f.	0.15	43.90	0.37	1.74	1.02
Lauraceae	<i>Actinodaphne pruinosa</i> Nees	0.03	19.00	0.50	0.84	0.16
Lauraceae	<i>Actinodaphne pruinosa</i> Nees	0.01	12.80	0.50	0.84	0.06
Lauraceae	<i>Actinodaphne pruinosa</i> Nees	0.01	12.50	0.50	11.46	0.05
Lauraceae	<i>Dehaasia caesia</i> Blume	0.02	15.70	0.77	1.24	0.15

Appendix 3: Continued

Lauraceae	<i>Endiandra coriacea</i> Merr.	0.09	33.20	0.68	3.42	0.92
Lauraceae	<i>Endiandra coriacea</i> Merr.	0.01	13.20	0.68	2.60	0.08
Lauraceae	<i>Litsea castanea</i> Hook. f.	0.02	15.80	0.46	2.60	0.09
Lauraceae	<i>Litsea castanea</i> Hook. f.	0.04	22.50	0.46	2.60	0.23
Lauraceae	<i>Litsea castanea</i> Hook. f.	0.05	24.40	0.46	0.36	0.28
Lauraceae	<i>Litsea castanea</i> Hook. f.	0.06	27.70	0.46	1.24	0.39
Lauraceae	<i>Litsea castanea</i> Hook. f.	0.05	24.40	0.46	11.46	0.28
Lauraceae	<i>Litsea castanea</i> Hook. f.	0.02	16.10	0.46	11.46	0.09
Lauraceae	<i>Litsea castanea</i> Hook. f.	0.02	16.00	0.46	11.46	0.09
Lauraceae	<i>Litsea cubeba</i> (Lour.) Pers.	0.01	10.30	0.35	1.74	0.02
Lauraceae	<i>Litsea cubeba</i> (Lour.) Pers.	0.03	18.40	0.35	3.42	0.10
Lauraceae	<i>Litsea cubeba</i> (Lour.) Pers.	0.03	18.60	0.35	2.60	0.11
Lauraceae	<i>Litsea cubeba</i> (Lour.) Pers.	0.03	20.40	0.35	2.60	0.13
Lauraceae	<i>Litsea cubeba</i> (Lour.) Pers.	0.03	18.60	0.35	2.39	0.11
Lauraceae	<i>Litsea cubeba</i> (Lour.) Pers.	0.04	21.90	0.35	11.46	0.16
Lauraceae	<i>Litsea gracilipes</i> Hook. f.	0.04	22.50	0.37	2.39	0.18
Lauraceae	<i>Litsea gracilipes</i> Hook. f.	0.02	17.70	0.37	2.39	0.10
Lauraceae	<i>Litsea gracilipes</i> Hook. f.	0.06	28.50	0.37	2.60	0.34
Lauraceae	<i>Litsea gracilipes</i> Hook. f.	0.03	19.70	0.37	11.46	0.13
Lauraceae	<i>Litsea nidularis</i> (Wall. ex Nees) Hook.f.	0.02	15.90	0.36	1.74	0.07
Lauraceae	<i>Litsea nidularis</i> (Wall. ex Nees) Hook.f.	0.01	13.70	0.36	3.42	0.05
Lauraceae	<i>Litsea nidularis</i> (Wall. ex Nees) Hook.f.	0.02	15.30	0.36	3.42	0.06
Lauraceae	<i>Litsea nidularis</i> (Wall. ex Nees) Hook.f.	0.06	27.70	0.36	2.60	0.30
Lauraceae	<i>Litsea nidularis</i> (Wall. ex Nees) Hook.f.	0.04	23.80	0.36	2.60	0.21
Lauraceae	<i>Litsea nidularis</i> (Wall. ex Nees) Hook.f.	0.02	16.40	0.36	2.39	0.08
Lauraceae	<i>Litsea nidularis</i> (Wall. ex Nees) Hook.f.	0.02	14.00	0.36	2.39	0.05
Lauraceae	<i>Litsea nidularis</i> (Wall. ex Nees) Hook.f.	0.01	10.70	0.36	1.24	0.02
Lauraceae	<i>Litsea nidularis</i> (Wall. ex Nees) Hook.f.	0.01	13.20	0.36	11.46	0.04
Lauraceae	<i>Litsea nidularis</i> (Wall. ex Nees) Hook.f.	0.03	19.10	0.36	11.46	0.12
Lauraceae	<i>Phoebe grandis</i> (Nees) Merr.	0.03	20.10	0.54	3.42	0.20
Lecythidaceae	<i>Barringtonia lanceolata</i> (Ridl.) Knuth	0.02	15.40	0.60	11.46	0.11
Linaceae	<i>Ctenolophon parvifolius</i> Oliv.	0.02	15.50	0.84	11.46	0.15
Linaceae	<i>Cyathocalyx havilandii</i> Boerl.	0.02	14.50	0.60	11.46	0.09
Linaceae	<i>Cyathocalyx havilandii</i> Boerl.	0.01	13.70	0.60	11.46	0.08
Linaceae	<i>Cyathocalyx havilandii</i> Boerl.	0.01	11.50	0.60	11.46	0.05
Loganiaceae	<i>Fagraea fragrans</i> Roxb.	0.48	77.90	0.84	11.46	9.35

Appendix 3: Continued

Magnoliaceae	<i>Magnolia ashtonii</i> Dandy ex Noot.	0.03	18.20	0.58	11.46	0.16
Meliaceae	<i>Aglaiia borneensis</i> Merrill	0.02	17.00	0.65	11.46	0.15
Meliaceae	<i>Aglaiia borneensis</i> Merrill	0.01	11.00	0.65	11.46	0.05
Meliaceae	<i>Aglaiia borneensis</i> Merrill	0.02	14.40	0.65	11.46	0.10
Meliaceae	<i>Chisocheton erythrocarpus</i> Hayata & Kaneh	0.02	14.50	0.58	11.46	0.09
Meliaceae	<i>Sandoricum borneense</i> Miq.	0.05	26.00	0.50	11.46	0.36
Moraceae	<i>Artocarpus anisophyllus</i> Miql	0.02	14.20	0.70	0.90	0.10
Moraceae	<i>Artocarpus anisophyllus</i> Miql	0.03	20.20	0.70	6.19	0.26
Moraceae	<i>Artocarpus anisophyllus</i> Miql	0.02	17.40	0.70	1.88	0.17
Moraceae	<i>Artocarpus anisophyllus</i> Miql	0.04	23.50	0.70	1.88	0.39
Moraceae	<i>Artocarpus anisophyllus</i> Miql	0.02	17.00	0.70	1.88	0.16
Moraceae	<i>Artocarpus dadah</i> Miq. Var. pubescens Miq.	0.06	27.00	0.73	11.46	0.58
Moraceae	<i>Artocarpus dadah</i> Miq. Var. pubescens Miq.	0.10	35.30	0.73	11.46	1.15
Moraceae	<i>Artocarpus dadah</i> Miq. Var. pubescens Miq.	0.02	16.60	0.73	10.52	0.16
Moraceae	<i>Artocarpus dadah</i> Miq. Var. pubescens Miq.	0.03	18.80	0.73	10.52	0.22
Moraceae	<i>Artocarpus elasticus</i> Reinw.	0.02	17.50	0.48	11.46	0.12
Moraceae	<i>Artocarpus elasticus</i> Reinw.	0.02	14.00	0.48	11.46	0.07
Moraceae	<i>Artocarpus elasticus</i> Reinw.	0.01	12.10	0.48	1.52	0.05
Moraceae	<i>Artocarpus kemando</i> Miq. subsp. kemando	0.02	14.70	0.50	1.52	0.08
Moraceae	<i>Artocarpus kemando</i> Miq. subsp. kemando	0.01	12.10	0.50	6.19	0.05
Moraceae	<i>Artocarpus kemando</i> Miq. subsp. kemando	0.01	11.10	0.50	6.19	0.04
Moraceae	<i>Artocarpus kemando</i> Miq. subsp. kemando	0.03	20.00	0.50	6.19	0.18
Moraceae	<i>Artocarpus kemando</i> Miq. subsp. kemando	0.03	19.40	0.50	6.19	0.17
Moraceae	<i>Artocarpus kemando</i> Miq. subsp. kemando	0.02	15.30	0.50	6.19	0.09
Moraceae	<i>Artocarpus kemando</i> Miq. subsp. kemando	0.10	34.80	0.50	6.19	0.77
Moraceae	<i>Artocarpus kemando</i> Miq. subsp. kemando	0.07	30.80	0.50	10.52	0.56
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.03	19.80	0.63	11.46	0.22
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.06	28.50	0.63	11.46	0.57
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.02	14.50	0.63	6.19	0.10
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.01	12.70	0.63	6.19	0.07
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.02	14.30	0.63	6.19	0.09
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.10	36.30	0.63	1.88	1.07
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.09	33.30	0.63	1.88	0.86
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.02	14.20	0.63	1.88	0.09
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.16	44.50	0.63	10.52	1.78

Appendix 3: Continued

Moraceae	<i>Artocarpus nitidus</i> Trécul	0.01	10.80	0.63	10.52	0.04
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.11	37.30	0.63	10.52	1.14
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.03	19.20	0.63	10.52	0.20
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.09	34.00	0.63	10.52	0.90
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.02	15.20	0.63	10.52	0.11
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.03	19.20	0.63	10.52	0.20
Moraceae	<i>Parartocarpus bracteatus</i> (King) Becc.	0.02	15.70	0.55	11.46	0.11
Moraceae	<i>Parartocarpus venenosus</i> Becc.	0.04	22.40	0.55	6.19	0.27
Myristicaceae	<i>Gymnacranthera farquhariana</i> (Wall. ex Hook.f. & Thomson) Warb.	0.01	11.00	0.70	10.52	0.05
Myristicaceae	<i>Gymnacranthera farquhariana</i> (Wall. ex Hook.f. & Thomson) Warb.	0.03	20.00	0.70	10.52	0.25
Myristicaceae	<i>Gymnacranthera farquhariana</i> (Wall. ex Hook.f. & Thomson) Warb.	0.02	15.40	0.70	8.50	0.13
Myristicaceae	<i>Gymnacranthera farquhariana</i> (Wall. ex Hook.f. & Thomson) Warb.	0.01	12.90	0.70	8.50	0.08
Myristicaceae	<i>Gymnacranthera farquhariana</i> (Wall. ex Hook.f. & Thomson) Warb.	0.01	13.70	0.70	8.50	0.09
Myristicaceae	<i>Gymnacranthera farquhariana</i> (Wall. ex Hook.f. & Thomson) Warb.	0.01	11.30	0.70	8.50	0.06
Myristicaceae	<i>Gymnacranthera farquhariana</i> (Wall. ex Hook.f. & Thomson) Warb.	0.01	10.80	0.70	4.24	0.05
Myristicaceae	<i>Horsfieldia reticulata</i> Warb.	0.03	20.30	0.55	10.52	0.21
Myristicaceae	<i>Horsfieldia reticulata</i> Warb.	0.03	18.30	0.55	8.50	0.16
Myristicaceae	<i>Horsfieldia reticulata</i> Warb.	0.01	10.50	0.55	8.50	0.04
Myristicaceae	<i>Horsfieldia wallichii</i> (Hook.f. & Thoms.) Warb.	0.14	42.30	0.50	2.44	1.26
Myristicaceae	<i>Knema</i> spp.	0.02	16.70	0.78	2.44	0.17
Myristicaceae	<i>Myristica lowiana</i> King	0.01	12.00	0.53	10.52	0.05
Myristicaceae	<i>Myristica lowiana</i> King	0.04	22.00	0.53	8.50	0.25
Myristicaceae	<i>Myristica lowiana</i> King	0.01	11.20	0.53	8.50	0.04
Myristicaceae	<i>Myristica lowiana</i> King	0.02	17.10	0.53	8.50	0.13
Myristicaceae	<i>Myristica lowiana</i> King	0.01	10.40	0.53	8.50	0.03
Myristicaceae	<i>Myristica lowiana</i> King	0.07	30.40	0.53	8.50	0.57
Myristicaceae	<i>Myristica lowiana</i> King	0.02	15.00	0.53	8.50	0.09
Myristicaceae	<i>Myristica lowiana</i> King	0.01	11.10	0.53	0.38	0.04
Myristicaceae	<i>Myristica lowiana</i> King	0.04	23.00	0.53	2.44	0.28
Myristicaceae	<i>Myristica lowiana</i> King	0.01	12.50	0.53	2.44	0.05
Myristicaceae	<i>Myristica lowiana</i> King	0.08	31.10	0.53	2.37	0.60
Myristicaceae	<i>Myristica lowiana</i> King	0.03	21.10	0.53	0.46	0.22

Appendix 3: Continued

Myristicaceae	<i>Myristica lowiana</i> King	0.03	20.60	0.53	0.65	0.21
Myristicaceae	<i>Myristica lowiana</i> King	0.03	19.00	0.53	1.84	0.17
Myristicaceae	<i>Myristica lowiana</i> King	0.13	40.20	0.53	1.84	1.16
Myristicaceae	<i>Myristica lowiana</i> King	0.02	14.00	0.53	1.84	0.07
Myristicaceae	<i>Myristica lowiana</i> King	0.01	13.20	0.53	0.46	0.06
Myristicaceae	<i>Myristica lowiana</i> King	0.01	11.30	0.53	4.24	0.04
Myristicaceae	<i>Myristica lowiana</i> King	0.03	19.70	0.53	4.24	0.18
Myristicaceae	<i>Myristica maxima</i> Warb.	0.05	25.00	0.48	10.52	0.31
Myristicaceae	<i>Myristica villosa</i> Warb.	0.02	16.40	0.67	10.52	0.14
Myristicaceae	<i>Myristica villosa</i> Warb.	0.03	20.30	0.67	8.50	0.25
Myrtaceae	<i>Lansium domesticum</i> Jack	0.02	15.70	0.58	4.24	0.11
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.03	18.10	0.75	4.24	0.21
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.08	32.40	0.75	4.24	0.95
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.07	29.70	0.75	4.24	0.76
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.06	26.60	0.75	4.24	0.57
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.02	14.40	0.75	6.06	0.11
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.05	26.10	0.75	6.06	0.54
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.04	23.10	0.75	6.06	0.40
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.07	30.70	0.75	1.34	0.83
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.01	12.60	0.75	0.39	0.08
Myrtaceae	<i>Syzygium acuminatissimum</i> DC.	0.11	37.50	0.75	16.97	1.38
Myrtaceae	<i>Syzygium aromaticum</i> L.	0.01	12.80	0.70	4.24	0.08
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.02	16.20	0.70	4.24	0.15
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.03	20.20	0.70	0.36	0.26
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.02	17.20	0.70	6.06	0.17
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.02	17.50	0.70	6.06	0.18
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.02	14.40	0.70	6.06	0.11
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.05	25.00	0.70	6.06	0.46
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.01	11.80	0.70	6.06	0.06
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.04	22.00	0.70	6.06	0.33
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.01	13.00	0.70	6.06	0.08
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.09	34.40	0.70	6.06	1.04
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.01	12.70	0.70	6.06	0.08
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.03	18.50	0.70	6.06	0.21
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.01	11.30	0.70	1.34	0.06

Appendix 3: Continued

Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.01	13.00	0.70	1.34	0.08
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.03	18.60	0.70	1.34	0.21
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.04	21.80	0.70	0.38	0.32
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.03	20.00	0.70	0.53	0.25
Myrtaceae	<i>Syzygium zeylanicum</i> DC.	0.02	14.70	0.70	6.06	0.11
Myrtaceae	<i>Syzygium zeylanicum</i> DC.	0.04	21.70	0.70	6.06	0.32
Myrtaceae	<i>Syzygium zeylanicum</i> DC.	0.01	13.70	0.70	6.06	0.09
Myrtaceae	<i>Syzygium zeylanicum</i> DC.	0.01	13.20	0.70	6.06	0.08
Olacaceae	<i>Ochanostachys amentacea</i> Mast.	0.14	42.20	0.88	16.97	2.19
Olacaceae	<i>Ochanostachys amentacea</i> Mast.	0.04	22.00	0.88	16.97	0.41
Olacaceae	<i>Strombosia ceylanica</i> Gardn.	0.05	24.60	0.85	16.97	0.53
Passifloraceae	<i>Paropsia vareciformis</i> (Griff.) Mast.	0.09	34.00	0.73	16.97	1.05
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.03	19.70	0.80	16.97	0.28
Polygalaceae	<i>Xanthophyllum apinae</i>	0.01	11.40	0.80	16.97	0.07
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.04	23.40	0.80	16.97	0.44
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	10.30	0.80	16.97	0.05
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.09	34.40	0.80	16.97	1.19
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	13.20	0.80	16.97	0.10
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	13.70	0.80	16.97	0.11
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.03	19.80	0.80	16.97	0.28
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.19	48.60	0.80	16.97	2.84
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.03	20.50	0.80	16.97	0.31
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	13.80	0.80	16.97	0.11
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	10.40	0.80	16.97	0.05
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	10.30	0.80	16.97	0.05
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.09	34.10	0.80	16.97	1.16
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.05	25.00	0.80	16.97	0.52
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.02	14.00	0.80	16.97	0.11
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.02	17.00	0.80	16.97	0.19
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.06	28.40	0.80	16.97	0.73
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.04	23.70	0.80	16.97	0.45
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.05	24.20	0.80	16.97	0.48
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.04	23.30	0.80	16.97	0.43
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	10.40	0.80	16.97	0.05
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.07	29.00	0.80	16.97	0.77
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.04	21.80	0.80	16.97	0.36
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.03	20.80	0.80	16.97	0.32
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	11.00	0.80	16.97	0.06
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.08	31.70	0.80	16.97	0.96
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.02	15.50	0.80	16.97	0.15

Appendix 3: Continued

Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.02	15.00	0.80	16.97	0.14
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.06	27.40	0.80	16.97	0.66
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.03	18.20	0.80	16.97	0.23
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	13.00	0.80	16.97	0.09
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	11.70	0.80	16.97	0.07
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.04	22.00	0.80	16.97	0.37
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.03	19.20	0.80	16.97	0.26
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.03	19.00	0.80	16.97	0.25
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.02	15.80	0.80	16.97	0.16
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	12.00	0.80	16.97	0.08
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.05	24.40	0.80	16.97	0.49
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.03	18.50	0.80	16.97	0.24
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.02	16.70	0.80	16.97	0.18
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.02	16.20	0.80	16.97	0.17
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	12.20	0.80	16.97	0.08
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	11.60	0.80	16.97	0.07
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	10.80	0.80	16.97	0.06
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.03	19.30	0.80	16.97	0.26
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	10.10	0.80	16.97	0.05
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.02	14.50	0.80	16.97	0.12
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	13.00	0.80	16.97	0.09
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.10	35.40	0.80	16.97	1.28
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.16	45.00	0.80	16.97	2.35
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.02	14.50	0.80	16.97	0.12
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	12.50	0.80	16.97	0.08
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.03	20.20	0.80	16.97	0.30
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.02	16.00	0.80	0.38	0.16
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.14	42.00	0.80	0.36	1.97
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.05	24.20	0.80	18.55	0.48
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.04	21.50	0.80	18.55	0.35
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.02	15.10	0.80	18.55	0.14
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	11.80	0.80	18.55	0.07
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	10.30	0.80	18.55	0.05
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.02	15.70	0.80	18.55	0.15
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.02	16.40	0.80	16.97	0.17
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.01	12.50	0.80	18.55	0.08
Polygalaceae	<i>Xanthophyllum velutinum</i> Chodat	0.02	16.80	0.62	16.97	0.14
Rosaceae	<i>Parastemon spicatum</i> (Wall. ex A.DC.) A.DC.	0.01	10.30	0.96	18.55	0.06
Rosaceae	<i>Parastemon spicatum</i> (Wall. ex A.DC.) A.DC.	0.03	19.60	0.96	18.55	0.33
Rosaceae	<i>Parastemon spicatum</i> (Wall. ex A.DC.) A.DC.	0.01	12.00	0.96	18.55	0.09

Appendix 3: Continued

Rosaceae	<i>Parastemon spicatum</i> (Wall. ex A.DC.) A.DC.	0.01	11.20	0.96	18.55	0.08
Rosaceae	<i>Parastemon spicatum</i> (Wall. ex A.DC.) A.DC.	0.02	14.00	0.96	18.55	0.14
Rosaceae	<i>Parastemon spicatum</i> (Wall. ex A.DC.) A.DC.	0.01	13.80	0.96	18.55	0.13
Rosaceae	<i>Parastemon spicatum</i> (Wall. ex A.DC.) A.DC.	0.03	19.10	0.96	18.55	0.31
Rosaceae	<i>Parastemon spicatum</i> (Wall. ex A.DC.) A.DC.	0.06	28.30	0.96	18.55	0.87
Rosaceae	<i>Parastemon spicatum</i> (Wall. ex A.DC.) A.DC.	0.02	15.80	0.96	18.55	0.19
Rosaceae	<i>Parastemon spicatum</i> (Wall. ex A.DC.) A.DC.	0.02	14.20	0.96	18.55	0.14
Rosaceae	<i>Parastemon spicatum</i> (Wall. ex A.DC.) A.DC.	0.01	11.60	0.96	18.55	0.08
Rosaceae	<i>Prunus arborea</i> (Blume) Kalkman	0.03	19.10	0.47	18.55	0.15
Rubiaceae	<i>Diplospora beccariana</i> King & Gamble	0.01	13.70	0.70	18.55	0.09
Rubiaceae	<i>Neoscortechinia kingii</i> (Hook.f.) Pax & K.Hoffm.	0.20	50.00	0.62	18.55	2.38
Rubiaceae	<i>Neoscortechinia kingii</i> (Hook.f.) Pax & K.Hoffm.	0.01	12.70	0.62	18.55	0.07
Rubiaceae	<i>Neoscortechinia kingii</i> (Hook.f.) Pax & K.Hoffm.	0.01	12.00	0.62	18.55	0.06
Rubiaceae	<i>Neoscortechinia kingii</i> (Hook.f.) Pax & K.Hoffm.	0.01	13.20	0.62	18.55	0.08
Rubiaceae	<i>Neoscortechinia sumatrensis</i> S.Moore	0.01	10.30	0.60	18.55	0.04
Sapindaceae	<i>Nephelium lappaceum</i> L.	0.08	32.50	0.75	18.55	0.96
Sapotaceae	<i>Madhuca motleyana</i> (de Vriese) J.F.Macbr.	0.08	31.60	0.54	18.55	0.64
Sapotaceae	<i>Madhuca motleyana</i> (de Vriese) J.F.Macbr.	0.05	24.20	0.54	18.55	0.32
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.02	14.80	0.78	18.55	0.13
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.03	20.40	0.78	18.55	0.30
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.18	48.00	0.78	18.55	2.70
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.03	20.80	0.78	18.55	0.32
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.01	10.20	0.78	18.55	0.05
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.06	27.00	0.78	18.55	0.62
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.04	23.90	0.78	18.55	0.45
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.02	17.70	0.78	18.55	0.21
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.02	15.60	0.78	18.55	0.15
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.02	14.00	0.78	18.55	0.11
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.01	11.50	0.78	18.55	0.07
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.01	13.30	0.78	18.55	0.10
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.01	12.50	0.78	18.55	0.08
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.30	62.30	0.78	18.55	5.11
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.01	10.60	0.78	18.55	0.05

Appendix 3: Continued

Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.03	20.00	0.78	18.55	0.28
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.05	25.20	0.78	18.55	0.52
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.02	17.00	0.78	18.55	0.19
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.02	14.00	0.78	18.55	0.11
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.01	11.00	0.78	18.55	0.06
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.10	35.70	0.78	18.55	1.28
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.07	28.90	0.78	18.55	0.74
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.02	15.70	0.78	18.55	0.15
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.01	12.10	0.78	18.55	0.08
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.01	11.20	0.78	18.55	0.06
Sapotaceae	<i>Palaquium leiocarpum</i> Boerl.	0.10	36.00	0.78	18.55	1.31
Sapotaceae	<i>Palaquium ridleyi</i> King & Gamble	0.01	11.00	0.93	18.55	0.07
Sterculiaceae	<i>Sterculia rubiginosa</i> Vent.	0.04	22.00	0.48	18.55	0.22
Sterculiaceae	<i>Sterculia rubiginosa</i> Vent.	0.11	38.00	0.48	18.55	0.91
Sterculiaceae	<i>Sterculia rubiginosa</i> Vent.	0.20	50.20	0.48	18.55	1.83
Thymelaeaceae	<i>Gonystylus xylocarpus</i> Airy Shaw	0.15	43.60	0.68	18.55	1.83
Thymelaeaceae	<i>Gonystylus xylocarpus</i> Airy Shaw	0.01	10.80	0.68	18.55	0.05
Tiliaceae	<i>Pentace laxiflora</i> Merr.	0.09	34.70	0.58	18.55	0.88
Verbenaceae	<i>Teijsmanniodendron</i> sp.	0.02	15.70	0.79	18.55	0.15
Verbenaceae	<i>Teijsmanniodendron sarawakanum</i> H.Pearson) Kosterm.	0.08	32.40	0.79	0.60	1.00

Appendix 4: List of sampled trees in Kubah National Park

Family	Species	Basal area (cm ²)	DBH (cm)	Wood Density (g/cm ³)	SIV	AGB (Mg ha ⁻¹)
Achariaceae	<i>Hydnocarpus anomala</i> (Merr.) Sleumer	0.03	20.20	0.70	0.15	0.26
Achariaceae	<i>Hydnocarpus anomala</i> (Merr.) Sleumer	0.01	11.90	0.70	0.12	0.06
Alangiaceae	<i>Alangium griffithii</i> Harms	0.04	10.20	0.79	0.59	0.05
Alangiaceae	<i>Alangium griffithii</i> Harms	0.01	17.90	0.79	0.59	0.21
Alangiaceae	<i>Alangium griffithii</i> Harms	0.05	22.20	0.79	0.59	0.38
Alangiaceae	<i>Alangium griffithii</i> Harms	0.03	25.10	0.79	0.59	0.52
Anacardiaceae	<i>Gluta aptera</i> (King) Ding Hou	0.03	11.70	0.63	0.29	0.05
Anacardiaceae	<i>Gluta aptera</i> (King) Ding Hou	0.03	19.90	0.63	0.29	0.22
Anacardiaceae	<i>Gluta aptera</i> (King) Ding Hou	0.01	20.20	0.63	0.29	0.23
Anacardiaceae	<i>Gluta laxiflora</i> Ridl.	0.01	12.40	0.50	0.13	0.05
Anacardiaceae	<i>Mangifera foetida</i> Loureiro	0.01	12.20	0.62	0.13	0.06
Anacardiaceae	<i>Mangifera havilandii</i> Ridl.	0.02	14.50	0.65	0.27	0.10
Anacardiaceae	<i>Mangifera havilandii</i> Ridl.	0.02	16.90	0.65	0.27	0.15
Anacardiaceae	<i>Melanorrhoea curtisii</i> Hook.f.	0.03	19.60	0.73	0.15	0.25
Anacardiaceae	<i>Melanorrhoea oba</i> Merr.	0.01	11.40	0.70	0.80	0.06
Anacardiaceae	<i>Melanorrhoea oba</i> Merr.	0.24	44.60	0.70	0.80	2.01
Anacardiaceae	<i>Melanorrhoea oba</i> Merr.	0.16	55.00	0.70	0.80	3.38
Anacardiaceae	<i>Parishia insignis</i> Hook.f.	0.25	56.00	0.56	0.40	2.80
Anacardiaceae	<i>Parishia paucijuga</i> Engl.	0.01	12.10	0.62	0.13	0.06
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.03	10.40	0.67	1.16	0.04
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.01	10.40	0.67	1.16	0.04
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.01	10.70	0.67	1.16	0.05
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.08	11.10	0.67	1.16	0.05
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.05	11.90	0.67	1.16	0.06
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.01	13.50	0.67	1.16	0.09
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.03	18.90	0.67	1.16	0.21
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.01	21.00	0.67	1.16	0.28
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.01	24.20	0.67	1.16	0.40
Anisophylleaceae	<i>Anisophyllea beccariana</i> Baill.	0.01	32.40	0.67	1.16	0.85
Annonaceae	<i>Mezzettia leptopoda</i> (Hook.f. & Thomson) Oliv.	0.07	18.60	0.65	0.33	0.19
Annonaceae	<i>Mezzettia leptopoda</i> (Hook.f. & Thomson) Oliv.	0.03	28.80	0.65	0.33	0.61
Annonaceae	<i>Monocarpia marginalis</i> (Hook.f. & Thomson) I.M. Turner	0.03	16.60	0.55	0.45	0.12
Annonaceae	<i>Monocarpia marginalis</i> (Hook.f. & Thomson) I.M. Turner	0.02	18.00	0.55	0.45	0.15
Annonaceae	<i>Monocarpia marginalis</i> (Hook.f. & Thomson) I.M. Turner	0.05	24.60	0.55	0.45	0.34
Annonaceae	<i>Polyalthia cinnamomea</i> Hook.f. & Thomson	0.02	10.70	0.58	0.25	0.04
Annonaceae	<i>Polyalthia cinnamomea</i> Hook.f. & Thomson	0.01	11.40	0.58	0.25	0.05

Appendix 4: Continued

Annonaceae	<i>Polyalthia glauca</i> (Hassk.) F.Muell.	0.01	12.30	0.56	0.45	0.06
Annonaceae	<i>Polyalthia glauca</i> (Hassk.) F.Muell.	0.01	17.40	0.56	0.45	0.14
Annonaceae	<i>Polyalthia glauca</i> (Hassk.) F.Muell.	0.05	21.40	0.56	0.45	0.24
Annonaceae	<i>Polyalthia glauca</i> (Hassk.) F.Muell.	0.04	25.00	0.56	0.45	0.37
Annonaceae	<i>Polyalthia pisocarpa</i> (Hassk.) I.M.Turner	0.01	10.40	0.62	0.12	0.04
Annonaceae	<i>Polyalthia subsessiliflora</i> (Ast) Bân	0.02	13.90	0.62	0.13	0.09
Annonaceae	<i>Polyalthia sumatrana</i> (Miq.) Kurz	0.03	17.00	0.52	0.22	0.12
Annonaceae	<i>Polyalthia sumatrana</i> (Miq.) Kurz	0.02	19.90	0.52	0.22	0.19
Annonaceae	<i>Xylopia elliptica</i> Maingay ex Hook.f. & Thomson	0.01	11.10	0.62	0.67	0.05
Annonaceae	<i>Xylopia elliptica</i> Maingay ex Hook.f. & Thomson	0.03	15.40	0.62	0.67	0.11
Annonaceae	<i>Xylopia elliptica</i> Maingay ex Hook.f. & Thomson	0.02	15.50	0.62	0.67	0.11
Annonaceae	<i>Xylopia elliptica</i> Maingay ex Hook.f. & Thomson	0.07	19.80	0.62	0.67	0.22
Annonaceae	<i>Xylopia elliptica</i> Maingay ex Hook.f. & Thomson	0.02	29.60	0.62	0.67	0.63
Annonaceae	<i>Xylopia ferruginea</i> (Hook.f. & Thomson) Baill.	0.02	15.70	0.62	0.41	0.12
Annonaceae	<i>Xylopia ferruginea</i> (Hook.f. & Thomson) Baill.	0.02	15.90	0.62	0.41	0.12
Annonaceae	<i>Xylopia ferruginea</i> (Hook.f. & Thomson) Baill.	0.03	18.00	0.62	0.41	0.17
Annonaceae	<i>Xylopia stenopetala</i> Oliv.	0.09	32.90	0.62	0.21	0.82
Apocynaceae	<i>Kopsia tenuis</i> Leenh. & Steems	0.02	16.70	0.66	0.14	0.15
Bombaceae	<i>Durio affinis</i> Becc.	0.10	35.70	0.63	0.23	1.02
Burseraceae	<i>Canarium caudatum</i> King	0.01	11.40	0.37	0.20	0.03
Burseraceae	<i>Canarium caudatum</i> King	0.03	18.60	0.37	0.20	0.11
Burseraceae	<i>Dacroydes costata</i> Miquel	0.15	9.70	0.80	0.82	0.04
Burseraceae	<i>Dacroydes costata</i> Miquel	0.01	10.00	0.80	0.82	0.05
Burseraceae	<i>Dacroydes costata</i> Miquel	0.02	13.00	0.80	0.82	0.09
Burseraceae	<i>Dacroydes costata</i> Miquel	0.01	16.60	0.80	0.82	0.18
Burseraceae	<i>Dacroydes costata</i> Miquel	0.03	19.00	0.80	0.82	0.25
Burseraceae	<i>Dacroydes costata</i> Miquel	0.01	43.60	0.80	0.82	2.18
Burseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. rostrata	0.02	14.00	0.73	0.13	0.10
Burseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. rostrata	0.02	10.30	0.57	0.38	0.04
Burseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. rostrata	0.01	11.30	0.57	0.38	0.05
Burseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. rostrata	0.01	11.70	0.57	0.38	0.05
Burseraceae	<i>Dacryodes rostrata</i> (Blume) H. J. Lam f. rostrata	0.01	17.80	0.57	0.38	0.15
Burseraceae	<i>Santiria rubiginosa</i> Blume	0.11	10.40	0.65	2.13	0.04
Burseraceae	<i>Santiria rubiginosa</i> Blume	0.24	10.70	0.65	2.13	0.05

Appendix 4: Continued

Burseraceae	<i>Santiria rubiginosa</i> Blume	0.04	14.20	0.65	2.13	0.10
Burseraceae	<i>Santiria rubiginosa</i> Blume	0.02	15.40	0.65	2.13	0.12
Burseraceae	<i>Santiria rubiginosa</i> Blume	0.27	22.00	0.65	2.13	0.30
Burseraceae	<i>Santiria rubiginosa</i> Blume	0.01	35.10	0.65	2.13	1.02
Burseraceae	<i>Santiria rubiginosa</i> Blume	0.10	38.00	0.65	2.13	1.25
Burseraceae	<i>Santiria rubiginosa</i> Blume	0.17	47.10	0.65	2.13	2.14
Burseraceae	<i>Santiria rubiginosa</i> Blume	0.02	55.30	0.65	2.13	3.18
Burseraceae	<i>Santiria rubiginosa</i> Blume	0.01	59.00	0.65	2.13	3.72
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.01	9.80	0.65	2.69	0.04
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.02	9.80	0.65	2.69	0.04
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.19	10.30	0.65	2.69	0.04
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.01	10.40	0.65	2.69	0.04
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.02	11.00	0.65	2.69	0.05
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.10	12.40	0.65	2.69	0.07
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.01	12.90	0.65	2.69	0.07
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.01	14.20	0.65	2.69	0.10
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.05	15.00	0.65	2.69	0.11
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.02	15.60	0.65	2.69	0.12
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.01	16.90	0.65	2.69	0.15
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.12	23.20	0.65	2.69	0.35
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.18	25.20	0.65	2.69	0.43
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.04	33.90	0.65	2.69	0.93
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.01	36.50	0.65	2.69	1.12
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.11	37.20	0.65	2.69	1.18
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.01	38.50	0.65	2.69	1.29
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.02	48.30	0.65	2.69	2.28
Burseraceae	<i>Santiria tomentosa</i> (Jack) Blume	0.09	48.60	0.65	2.69	2.31
Calophyllaceae	<i>Calophyllum laenigerum</i> Miq.	0.01	12.50	0.56	0.54	0.06
Calophyllaceae	<i>Calophyllum laenigerum</i> Miq.	0.07	17.90	0.56	0.54	0.15
Calophyllaceae	<i>Calophyllum laenigerum</i> Miq.	0.13	30.80	0.56	0.54	0.63
Calophyllaceae	<i>Calophyllum laenigerum</i> Miq.	0.03	41.30	0.56	0.54	1.33
Calophyllaceae	<i>Calophyllum</i> spp.	0.02	14.10	0.63	0.20	0.09
Calophyllaceae	<i>Calophyllum</i> spp.	0.02	14.90	0.63	0.20	0.10
Calophyllaceae	<i>Mammea kaya</i>	0.01	11.60	0.80	0.12	0.07
Calophyllaceae	<i>Mesua calophylloides</i> (Ridl.) Kosterm.	0.06	26.60	0.83	0.18	0.63
Celastraceae	<i>Lophopetalum beccarianum</i> Ridl.	0.07	30.70	0.60	0.20	0.66
Celastraceae	<i>Lophopetalum glabrum</i> Ding Hou	0.02	15.70	0.60	0.13	0.12
Clusiaceae	<i>Garcinia bancana</i> Miq.	0.03	18.20	0.70	0.60	0.20
Clusiaceae	<i>Garcinia bancana</i> Miq.	0.04	19.80	0.70	0.60	0.25
Clusiaceae	<i>Garcinia bancana</i> Miq.	0.03	20.30	0.70	0.60	0.26
Clusiaceae	<i>Garcinia bancana</i> Miq.	0.03	22.10	0.70	0.60	0.33
Clusiaceae	<i>Garcinia brevipes</i> Pierre	0.11	10.70	0.70	0.63	0.05

Appendix 4: Continued

Clusiaceae	<i>Garcinia brevipes</i> Pierre	0.01	15.20	0.70	0.63	0.12
Clusiaceae	<i>Garcinia brevipes</i> Pierre	0.02	15.90	0.70	0.63	0.14
Clusiaceae	<i>Garcinia brevipes</i> Pierre	0.02	37.00	0.70	0.63	1.25
Clusiaceae	<i>Garcinia elmeri</i>	0.01	12.10	0.70	0.25	0.07
Clusiaceae	<i>Garcinia elmeri</i>	0.01	13.30	0.70	0.25	0.09
Clusiaceae	<i>Garcinia parvifolia</i> (Miq.) Miq.	0.11	20.00	0.70	0.39	0.25
Clusiaceae	<i>Garcinia parvifolia</i> (Miq.) Miq.	0.03	37.70	0.70	0.39	1.31
Combretaceae	<i>Terminalia subspathulata</i> King	0.01	13.60	0.63	0.13	0.08
Crypteroniaceae	<i>Dactylocladus stenostachys</i> Oliv.	0.16	45.00	0.52	0.30	1.53
Dilleniaceae	<i>Dillenia excelsa</i> (Jack) Gilg	0.02	13.90	0.72	0.13	0.10
Dilleniaceae	<i>Dillenia reticulata</i> King	0.01	12.70	0.69	0.13	0.08
Dipterocarpaceae	<i>Anisoptera grossivenia</i> Slooten	0.04	18.40	0.67	0.71	0.20
Dipterocarpaceae	<i>Anisoptera grossivenia</i> Slooten	0.31	23.10	0.67	0.71	0.36
Dipterocarpaceae	<i>Anisoptera grossivenia</i> Slooten	0.03	62.70	0.67	0.71	4.46
Dipterocarpaceae	<i>Dipterocarpus crinatus</i> Dyer	0.15	44.30	0.84	0.29	2.37
Dipterocarpaceae	<i>Dipterocarpus gracilis</i> Blume	0.06	26.90	0.66	0.18	0.52
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.02	10.10	0.75	2.85	0.04
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.02	11.80	0.75	2.85	0.07
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.01	11.80	0.75	2.85	0.07
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.02	12.10	0.75	2.85	0.07
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.01	12.30	0.75	2.85	0.08
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.03	13.10	0.75	2.85	0.09
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.03	13.70	0.75	2.85	0.10
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.04	14.10	0.75	2.85	0.11
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.04	14.40	0.75	2.85	0.11
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.19	14.50	0.75	2.85	0.12
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.01	16.90	0.75	2.85	0.17
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.01	17.90	0.75	2.85	0.20
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.01	19.50	0.75	2.85	0.25
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.13	20.00	0.75	2.85	0.27
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.03	20.20	0.75	2.85	0.28
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.01	21.60	0.75	2.85	0.33
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.04	22.10	0.75	2.85	0.35
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.03	22.30	0.75	2.85	0.36
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.18	25.80	0.75	2.85	0.53
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.02	40.00	0.75	2.85	1.64
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.01	47.90	0.75	2.85	2.57
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.05	49.50	0.75	2.85	2.79
Dipterocarpaceae	<i>Dipterocarpus</i> sp.	0.01	11.00	0.75	2.85	0.06
Dipterocarpaceae	<i>Dipterocarpus sublamellatus</i> Foxw.	0.05	24.40	0.73	0.17	0.45
Dipterocarpaceae	<i>Hopea beccariana</i> (K. Heyne) Blume	0.01	9.60	0.71	0.38	0.04
Dipterocarpaceae	<i>Hopea beccariana</i> (K. Heyne) Blume	0.01	10.10	0.71	0.38	0.04

Appendix 4: Continued

Dipterocarpaceae	<i>Hopea beccariana</i> (K. Heyne) Blume	0.02	16.20	0.71	0.38	0.15
Dipterocarpaceae	<i>Hopea dryobalanoiodes</i> Miq.	0.01	10.80	0.60	0.92	0.04
Dipterocarpaceae	<i>Hopea dryobalanoiodes</i> Miq.	0.01	11.50	0.60	0.92	0.05
Dipterocarpaceae	<i>Hopea dryobalanoiodes</i> Miq.	0.03	9.80	0.60	0.92	0.03
Dipterocarpaceae	<i>Hopea dryobalanoiodes</i> Miq.	0.01	13.00	0.60	0.92	0.07
Dipterocarpaceae	<i>Hopea dryobalanoiodes</i> Miq.	0.06	13.60	0.60	0.92	0.08
Dipterocarpaceae	<i>Hopea dryobalanoiodes</i> Miq.	0.01	19.80	0.60	0.92	0.21
Dipterocarpaceae	<i>Hopea dryobalanoiodes</i> Miq.	0.01	20.70	0.60	0.92	0.24
Dipterocarpaceae	<i>Hopea dryobalanoiodes</i> Miq.	0.03	28.00	0.60	0.92	0.53
Dipterocarpaceae	<i>Hopea kerangasensis</i> P.S.Ashton	0.01	10.20	0.60	0.18	0.04
Dipterocarpaceae	<i>Hopea kerangasensis</i> P.S.Ashton	0.01	10.40	0.60	0.18	0.04
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.05	19.10	0.50	0.41	0.16
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.03	22.60	0.50	0.41	0.25
Dipterocarpaceae	<i>Shorea amplexicaulis</i> (Blume) H.J. Lam	0.04	25.50	0.50	0.41	0.34
Dipterocarpaceae	<i>Shorea collaris</i> Slooten	0.09	34.50	0.60	0.61	0.90
Dipterocarpaceae	<i>Shorea collaris</i> Slooten	0.24	55.00	0.60	0.61	2.90
Dipterocarpaceae	<i>Shorea coriacea</i> Burk	0.02	11.90	0.66	0.43	0.06
Dipterocarpaceae	<i>Shorea coriacea</i> Burk	0.02	14.80	0.66	0.43	0.11
Dipterocarpaceae	<i>Shorea coriacea</i> Burk	0.04	17.60	0.66	0.43	0.17
Dipterocarpaceae	<i>Shorea coriacea</i> Burk	0.01	22.90	0.66	0.43	0.34
Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.02	10.30	0.60	0.54	0.04
Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.02	11.30	0.60	0.54	0.05
Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.03	14.20	0.60	0.54	0.09
Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.01	16.80	0.60	0.54	0.14
Dipterocarpaceae	<i>Shorea crassa</i> P. S. Ashton	0.01	20.70	0.60	0.54	0.24
Dipterocarpaceae	<i>Shorea elliptica</i> Burck	0.04	21.50	0.87	0.55	0.38
Dipterocarpaceae	<i>Shorea elliptica</i> Burck	0.24	55.70	0.87	0.55	4.33
Dipterocarpaceae	<i>Shorea ferrugenia</i> Dyer ex Brandis	0.21	10.00	0.42	1.42	0.02
Dipterocarpaceae	<i>Shorea ferrugenia</i> Dyer ex Brandis	0.01	12.00	0.42	1.42	0.04
Dipterocarpaceae	<i>Shorea ferrugenia</i> Dyer ex Brandis	0.07	21.30	0.42	1.42	0.18
Dipterocarpaceae	<i>Shorea ferrugenia</i> Dyer ex Brandis	0.18	22.20	0.42	1.42	0.20
Dipterocarpaceae	<i>Shorea ferrugenia</i> Dyer ex Brandis	0.04	29.80	0.42	1.42	0.44
Dipterocarpaceae	<i>Shorea ferrugenia</i> Dyer ex Brandis	0.01	30.10	0.42	1.42	0.45
Dipterocarpaceae	<i>Shorea ferrugenia</i> Dyer ex Brandis	0.04	48.00	0.42	1.42	1.46
Dipterocarpaceae	<i>Shorea ferrugenia</i> Dyer ex Brandis	0.07	51.20	0.42	1.42	1.71
Dipterocarpaceae	<i>Shorea flava</i> (Miq.) Blume	0.02	13.90	0.60	0.13	0.08
Dipterocarpaceae	<i>Shorea glaucescens</i> Meijer	0.04	23.90	0.94	0.78	0.54
Dipterocarpaceae	<i>Shorea glaucescens</i> Meijer	0.15	44.20	0.94	0.78	2.64
Dipterocarpaceae	<i>Shorea glaucescens</i> Meijer	0.24	55.00	0.94	0.78	4.53
Dipterocarpaceae	<i>Shorea havilandii</i> Brandis	0.01	10.60	0.99	1.24	0.07
Dipterocarpaceae	<i>Shorea havilandii</i> Brandis	0.04	11.10	0.99	1.24	0.08

Appendix 4: Continued

Dipterocarpaceae	<i>Shorea havilandii</i> Brandis	0.01	11.20	0.99	1.24	0.08
Dipterocarpaceae	<i>Shorea havilandii</i> Brandis	0.01	13.40	0.99	1.24	0.12
Dipterocarpaceae	<i>Shorea havilandii</i> Brandis	0.01	15.00	0.99	1.24	0.17
Dipterocarpaceae	<i>Shorea havilandii</i> Brandis	0.38	17.20	0.99	1.24	0.24
Dipterocarpaceae	<i>Shorea havilandii</i> Brandis	0.02	19.80	0.99	1.24	0.35
Dipterocarpaceae	<i>Shorea havilandii</i> Brandis	0.03	22.60	0.99	1.24	0.49
Dipterocarpaceae	<i>Shorea havilandii</i> Brandis	0.02	69.20	0.99	1.24	8.29
Dipterocarpaceae	<i>Shorea leprosula</i> (Miq.) Blume	0.10	35.60	0.47	0.23	0.77
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.02	9.70	0.47	2.13	0.03
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	9.80	0.47	2.13	0.03
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.02	9.90	0.47	2.13	0.03
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	10.90	0.47	2.13	0.03
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	11.00	0.47	2.13	0.04
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.04	11.00	0.47	2.13	0.04
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	12.00	0.47	2.13	0.04
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.02	12.10	0.47	2.13	0.05
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	12.40	0.47	2.13	0.05
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.03	15.80	0.47	2.13	0.09
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.09	15.90	0.47	2.13	0.09
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.04	15.90	0.47	2.13	0.09
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.02	16.00	0.47	2.13	0.10
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.03	16.20	0.47	2.13	0.10
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.03	16.40	0.47	2.13	0.10
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	18.40	0.47	2.13	0.14
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	18.60	0.47	2.13	0.14
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.02	18.70	0.47	2.13	0.14
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	20.50	0.47	2.13	0.18
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.03	21.10	0.47	2.13	0.20
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.03	22.70	0.47	2.13	0.24
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.02	23.40	0.47	2.13	0.26
Dipterocarpaceae	<i>Shorea macroptera</i> (Miq.) Blume	0.01	34.10	0.47	2.13	0.69
Dipterocarpaceae	<i>Shorea multiflora</i> (Burck) Symington	0.09	33.50	0.59	0.21	0.83
Dipterocarpaceae	<i>Shorea ocrasia</i>	0.04	23.70	0.60	0.16	0.34
Dipterocarpaceae	<i>Shorea ovata</i> (Roxb.) C.F.Gaertn	0.25	16.40	0.60	0.90	0.13
Dipterocarpaceae	<i>Shorea ovata</i> (Roxb.) C.F.Gaertn	0.02	52.70	0.60	0.90	2.61
Dipterocarpaceae	<i>Shorea ovata</i> (Roxb.) C.F.Gaertn	0.22	56.20	0.60	0.90	3.05
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.09	9.90	0.60	1.77	0.03
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.09	10.70	0.60	1.77	0.04
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.02	12.70	0.60	1.77	0.07
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.02	13.80	0.60	1.77	0.08
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.02	14.70	0.60	1.77	0.10
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.05	14.80	0.60	1.77	0.10

Appendix 4: Continued

Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.01	16.60	0.60	1.77	0.13
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.23	17.20	0.60	1.77	0.15
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.01	24.90	0.60	1.77	0.39
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.01	33.20	0.60	1.77	0.81
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.01	33.40	0.60	1.77	0.83
Dipterocarpaceae	<i>Shorea parvifolia</i> Dyer	0.02	54.60	0.60	1.77	2.84
Dipterocarpaceae	<i>Shorea quadrinervis</i> Slooten	0.02	11.00	0.50	1.62	0.04
Dipterocarpaceae	<i>Shorea quadrinervis</i> Slooten	0.01	13.20	0.50	1.62	0.06
Dipterocarpaceae	<i>Shorea quadrinervis</i> Slooten	0.14	13.80	0.50	1.62	0.07
Dipterocarpaceae	<i>Shorea quadrinervis</i> Slooten	0.01	16.10	0.50	1.62	0.10
Dipterocarpaceae	<i>Shorea quadrinervis</i> Slooten	0.01	20.40	0.50	1.62	0.19
Dipterocarpaceae	<i>Shorea quadrinervis</i> Slooten	0.25	20.70	0.50	1.62	0.20
Dipterocarpaceae	<i>Shorea quadrinervis</i> Slooten	0.15	22.60	0.50	1.62	0.25
Dipterocarpaceae	<i>Shorea quadrinervis</i> Slooten	0.03	42.00	0.50	1.62	1.24
Dipterocarpaceae	<i>Shorea quadrinervis</i> Slooten	0.04	44.40	0.50	1.62	1.43
Dipterocarpaceae	<i>Shorea quadrinervis</i> Slooten	0.03	56.10	0.50	1.62	2.55
Dipterocarpaceae	<i>Shorea scaberrima</i> Burck	0.01	10.30	0.54	0.53	0.03
Dipterocarpaceae	<i>Shorea scaberrima</i> Burck	0.04	10.60	0.54	0.53	0.04
Dipterocarpaceae	<i>Shorea scaberrima</i> Burck	0.01	11.70	0.54	0.53	0.05
Dipterocarpaceae	<i>Shorea scaberrima</i> Burck	0.01	23.50	0.54	0.53	0.30
Dipterocarpaceae	<i>Shorea scabrida</i> Symington	0.09	12.40	0.52	0.41	0.05
Dipterocarpaceae	<i>Shorea scabrida</i> Symington	0.01	16.60	0.52	0.41	0.11
Dipterocarpaceae	<i>Shorea scabrida</i> Symington	0.02	33.30	0.52	0.41	0.71
Dipterocarpaceae	<i>Shorea</i> sp.	0.05	8.40	0.60	2.15	0.02
Dipterocarpaceae	<i>Shorea</i> sp.	0.01	10.20	0.60	2.15	0.04
Dipterocarpaceae	<i>Shorea</i> sp.	0.19	10.20	0.60	2.15	0.04
Dipterocarpaceae	<i>Shorea</i> sp.	0.04	14.40	0.60	2.15	0.09
Dipterocarpaceae	<i>Shorea</i> sp.	0.04	17.10	0.60	2.15	0.14
Dipterocarpaceae	<i>Shorea</i> sp.	0.05	19.70	0.60	2.15	0.21
Dipterocarpaceae	<i>Shorea</i> sp.	0.02	22.10	0.60	2.15	0.28
Dipterocarpaceae	<i>Shorea</i> sp.	0.02	22.30	0.60	2.15	0.29
Dipterocarpaceae	<i>Shorea</i> sp.	0.16	24.30	0.60	2.15	0.36
Dipterocarpaceae	<i>Shorea</i> sp.	0.13	25.30	0.60	2.15	0.40
Dipterocarpaceae	<i>Shorea</i> sp.	0.01	32.40	0.60	2.15	0.77
Dipterocarpaceae	<i>Shorea</i> sp.	0.03	40.50	0.60	2.15	1.35
Dipterocarpaceae	<i>Shorea</i> sp.	0.08	45.10	0.60	2.15	1.77
Dipterocarpaceae	<i>Shorea</i> sp.	0.01	49.30	0.60	2.15	2.21
Dipterocarpaceae	<i>Shorea stenophylla</i>	0.01	9.60	0.60	0.19	0.03
Dipterocarpaceae	<i>Shorea stenophylla</i>	0.07	29.20	0.60	0.19	0.59
Dipterocarpaceae	<i>Shorea xanthophylla</i> Symington	0.07	30.10	0.60	0.19	0.63
Dipterocarpaceae	<i>Upuna borneensis</i> Sym.	0.06	26.80	0.64	0.18	0.50
Dipterocarpaceae	<i>Vatica nitens</i> King	0.02	11.00	0.75	1.46	0.06

Appendix 4: Continued

Dipterocarpaceae	<i>Vatica nitens</i> King	0.22	15.20	0.75	1.46	0.13
Dipterocarpaceae	<i>Vatica nitens</i> King	0.07	18.60	0.75	1.46	0.22
Dipterocarpaceae	<i>Vatica nitens</i> King	0.03	20.40	0.75	1.46	0.29
Dipterocarpaceae	<i>Vatica nitens</i> King	0.05	23.60	0.75	1.46	0.42
Dipterocarpaceae	<i>Vatica nitens</i> King	0.05	25.50	0.75	1.46	0.51
Dipterocarpaceae	<i>Vatica nitens</i> King	0.10	26.30	0.75	1.46	0.56
Dipterocarpaceae	<i>Vatica nitens</i> King	0.03	29.00	0.75	1.46	0.72
Dipterocarpaceae	<i>Vatica nitens</i> King	0.04	35.00	0.75	1.46	1.16
Dipterocarpaceae	<i>Vatica nitens</i> King	0.01	53.20	0.75	1.46	3.32
Dipterocarpaceae	<i>Vatica oblongifolia</i> Hook.f.	0.04	21.80	0.80	0.16	0.36
Dipterocarpaceae	<i>Vatica sarawakensis</i> F.Heim	0.02	9.60	0.78	0.50	0.04
Dipterocarpaceae	<i>Vatica sarawakensis</i> F.Heim	0.01	13.40	0.78	0.50	0.10
Dipterocarpaceae	<i>Vatica sarawakensis</i> F.Heim	0.01	16.70	0.78	0.50	0.17
Dipterocarpaceae	<i>Vatica sarawakensis</i> F.Heim	0.04	17.10	0.78	0.50	0.19
Dipterocarpaceae	<i>Vatica sarawakensis</i> F.Heim	0.02	21.80	0.78	0.50	0.35
Ebenaceae	<i>Diospyros bantamensis</i> Koord. & Valeton ex Bakh.	0.03	10.70	0.80	0.43	0.06
Ebenaceae	<i>Diospyros bantamensis</i> Koord. & Valeton ex Bakh.	0.05	17.90	0.80	0.43	0.22
Ebenaceae	<i>Diospyros bantamensis</i> Koord. & Valeton ex Bakh.	0.01	25.30	0.80	0.43	0.54
Ebenaceae	<i>Diospyros bantamensis</i> Koord. & Valeton ex Bakh.	0.03	19.60	0.64	0.15	0.22
Ebenaceae	<i>Diospyros costata</i> L.f.	0.01	10.10	0.75	0.12	0.04
Ebenaceae	<i>Diospyros evena</i> Bakh.	0.04	23.70	0.65	0.16	0.37
Ebenaceae	<i>Diospyros siamang</i> Bakh.	0.01	9.60	0.75	0.16	0.04
Ebenaceae	<i>Diospyros sumatrana</i> Miq.	0.03	20.80	0.75	0.15	0.30
Elaeocarpaceae	<i>Elaeocarpus clementis</i> R. Knuth	0.01	13.50	0.58	0.46	0.07
Elaeocarpaceae	<i>Elaeocarpus clementis</i> R. Knuth	0.02	16.90	0.58	0.46	0.13
Elaeocarpaceae	<i>Elaeocarpus clementis</i> R. Knuth	0.07	30.50	0.58	0.46	0.63
Elaeocarpaceae	<i>Elaeocarpus griffithii</i> Merr.	0.13	12.00	0.58	0.61	0.05
Elaeocarpaceae	<i>Elaeocarpus griffithii</i> Merr.	0.02	14.10	0.58	0.61	0.08
Elaeocarpaceae	<i>Elaeocarpus griffithii</i> Merr.	0.03	21.00	0.58	0.61	0.24
Elaeocarpaceae	<i>Elaeocarpus griffithii</i> Merr.	0.01	41.10	0.58	0.61	1.34
Elaeocarpaceae	<i>Elaeocarpus paboom</i>	0.01	9.80	0.58	0.61	0.03
Elaeocarpaceae	<i>Elaeocarpus stipularis</i> Blume	0.03	11.10	0.58	0.83	0.04
Elaeocarpaceae	<i>Elaeocarpus stipularis</i> Blume	0.01	12.50	0.58	0.83	0.06
Elaeocarpaceae	<i>Elaeocarpus stipularis</i> Blume	0.05	17.90	0.58	0.83	0.16
Elaeocarpaceae	<i>Elaeocarpus stipularis</i> Blume	0.01	20.60	0.58	0.83	0.23
Elaeocarpaceae	<i>Elaeocarpus stipularis</i> Blume	0.06	25.00	0.58	0.83	0.37
Elaeocarpaceae	<i>Elaeocarpus stipularis</i> Blume	0.03	28.50	0.58	0.83	0.53
Euphorbiaceae	<i>Agrostistachys longifolia</i> Müll.Arg.	0.01	10.90	0.65	0.55	0.05
Euphorbiaceae	<i>Agrostistachys longifolia</i> Müll.Arg.	0.03	17.50	0.65	0.55	0.17
Euphorbiaceae	<i>Agrostistachys longifolia</i> Müll.Arg.	0.02	17.90	0.65	0.55	0.18

Appendix 4: Continued

Euphorbiaceae	<i>Agrostistachys longifolia</i> Müll.Arg.	0.03	18.60	0.65	0.55	0.20
Euphorbiaceae	<i>Baccaurea racemosa</i> (Blume) Müll. Arg.	0.01	20.40	0.62	0.85	0.24
Euphorbiaceae	<i>Baccaurea racemosa</i> (Blume) Müll. Arg.	0.08	31.50	0.62	0.85	0.73
Euphorbiaceae	<i>Baccaurea racemosa</i> (Blume) Müll. Arg.	0.01	13.20	0.62	0.85	0.07
Euphorbiaceae	<i>Baccaurea racemosa</i> (Blume) Müll. Arg.	0.01	9.80	0.62	0.85	0.03
Euphorbiaceae	<i>Baccaurea racemosa</i> (Blume) Müll. Arg.	0.01	10.10	0.62	0.85	0.04
Euphorbiaceae	<i>Baccaurea racemosa</i> (Blume) Müll. Arg.	0.01	12.30	0.62	0.85	0.06
Euphorbiaceae	<i>Baccaurea racemosa</i> (Blume) Müll. Arg.	0.03	12.40	0.62	0.85	0.06
Euphorbiaceae	<i>Baccaurea sumatrana</i> (Miq.) Müll. Arg.	0.03	11.90	0.79	1.14	0.07
Euphorbiaceae	<i>Baccaurea sumatrana</i> (Miq.) Müll. Arg.	0.02	12.20	0.79	1.14	0.08
Euphorbiaceae	<i>Baccaurea sumatrana</i> (Miq.) Müll. Arg.	0.02	15.00	0.79	1.14	0.13
Euphorbiaceae	<i>Baccaurea sumatrana</i> (Miq.) Müll. Arg.	0.01	16.50	0.79	1.14	0.17
Euphorbiaceae	<i>Baccaurea sumatrana</i> (Miq.) Müll. Arg.	0.12	20.00	0.79	1.14	0.29
Euphorbiaceae	<i>Baccaurea sumatrana</i> (Miq.) Müll. Arg.	0.01	39.40	0.79	1.14	1.66
Euphorbiaceae	<i>Baccaurea sumatrana</i> (Miq.) Müll. Arg.	0.15	43.00	0.79	1.14	2.07
Euphorbiaceae	<i>Blumeodendron calophyllum</i> Airy Shaw	0.03	19.50	0.53	0.15	0.18
Euphorbiaceae	<i>Cephalomappa penangensis</i> Ridl.	0.01	11.00	0.88	0.12	0.07
Euphorbiaceae	<i>Chaetocarpus castanocarpus</i> (Roxb.) Thwaites	0.11	37.70	0.88	0.24	1.65
Myrtaceae	<i>Syzygium acuminatissimum</i> (Blume)	0.01	10.20	0.75	0.12	0.05
Myrtaceae	<i>Syzygium acuminatissimum</i> (Blume)	0.04	11.90	0.80	0.44	0.07
Myrtaceae	<i>Syzygium acuminatissimum</i> (Blume)	0.01	21.90	0.80	0.44	0.37
Myrtaceae	<i>Syzygium acuminatissimum</i> (Blume)	0.04	22.00	0.80	0.44	0.37
Myrtaceae	<i>Syzygium incarnatum</i> (Elmer) Merr. & L.M.Perry	0.02	12.10	0.84	0.50	0.08
Myrtaceae	<i>Syzygium incarnatum</i> (Elmer) Merr. & L.M.Perry	0.02	14.90	0.84	0.50	0.14
Myrtaceae	<i>Syzygium incarnatum</i> (Elmer) Merr. & L.M.Perry	0.01	17.40	0.84	0.50	0.21
Myrtaceae	<i>Syzygium incarnatum</i> (Elmer) Merr. & L.M.Perry	0.05	24.20	0.84	0.50	0.51
Myrtaceae	<i>Syzygium chloranthum</i> (Duthie) Merr. & L.M.Perry	0.01	9.80	0.80	0.13	0.04
Myrtaceae	<i>Syzygium chloranthum</i> (Duthie) Merr. & L.M.Perry	0.01	12.30	0.80	0.13	0.08

Appendix 4: Continued

Myrtaceae	<i>Syzygium subsessilifolium</i> (Merr.) Merr. & L.M.Perry	0.06	15.50	0.80	1.31	0.15
Myrtaceae	<i>Syzygium subsessilifolium</i> (Merr.) Merr. & L.M.Perry	0.01	18.20	0.80	1.31	0.23
Myrtaceae	<i>Syzygium subsessilifolium</i> (Merr.) Merr. & L.M.Perry	0.01	22.00	0.80	1.31	0.37
Myrtaceae	<i>Syzygium subsessilifolium</i> (Merr.) Merr. & L.M.Perry	0.01	26.90	0.80	1.31	0.63
Myrtaceae	<i>Syzygium subsessilifolium</i> (Merr.) Merr. & L.M.Perry	0.01	32.00	0.80	1.31	0.99
Euphorbiaceae	<i>Heliciopsis artocarpoides</i> (Elmer) Sleumer	0.04	10.50	0.55	0.39	0.04
Euphorbiaceae	<i>Heliciopsis artocarpoides</i> (Elmer) Sleumer	0.03	11.50	0.55	0.39	0.05
Euphorbiaceae	<i>Heliciopsis artocarpoides</i> (Elmer) Sleumer	0.14	16.60	0.55	0.39	0.12
Euphorbiaceae	<i>Heliciopsis artocarpoides</i> (Elmer) Sleumer	0.01	20.70	0.55	0.39	0.22
Euphorbiaceae	<i>Heliciopsis artocarpoides</i> (Elmer) Sleumer	0.01	22.50	0.55	0.39	0.27
Euphorbiaceae	<i>Heliciopsis artocarpoides</i> (Elmer) Sleumer	0.02	42.70	0.55	0.39	1.42
Euphorbiaceae	<i>Heliciopsis artocarpoides</i> (Elmer) Sleumer	0.04	21.90	0.55	0.39	0.25
Euphorbiaceae	<i>Ptychopyxis arborea</i> (Merr.) Airy Shaw	0.03	18.60	0.60	0.37	0.18
Euphorbiaceae	<i>Ptychopyxis arborea</i> (Merr.) Airy Shaw	0.10	36.20	0.60	0.37	1.02
Fabaceae	<i>Dialium indum</i> L. var. <i>indum</i>	0.01	9.60	0.90	0.89	0.05
Fabaceae	<i>Dialium indum</i> L. var. <i>indum</i>	0.02	11.00	0.90	0.89	0.07
Fabaceae	<i>Dialium indum</i> L. var. <i>indum</i>	0.01	14.60	0.90	0.89	0.14
Fabaceae	<i>Dialium indum</i> L. var. <i>indum</i>	0.02	16.00	0.90	0.89	0.18
Fabaceae	<i>Dialium indum</i> L. var. <i>indum</i>	0.06	26.80	0.90	0.89	0.70
Fabaceae	<i>Dialium indum</i> L. var. <i>indum</i>	0.08	27.20	0.90	0.89	0.73
Fabaceae	<i>Dialium indum</i> L. var. <i>indum</i>	0.06	32.80	0.90	0.89	1.18
Fabaceae	<i>Dialium platysepalum</i> Baker	0.03	18.00	0.80	0.29	0.22
Fabaceae	<i>Dialium platysepalum</i> Baker	0.03	21.00	0.80	0.29	0.33
Fabaceae	<i>Fordia coriaca</i> Dunn	0.05	10.50	0.65	0.29	0.04
Fabaceae	<i>Fordia coriaca</i> Dunn	0.01	25.40	0.65	0.29	0.44
Fabaceae	<i>Koompassia malaccensis</i> Maing. ex Benth.	0.02	15.10	0.83	1.52	0.14
Fabaceae	<i>Koompassia malaccensis</i> Maing. ex Benth.	0.24	15.30	0.83	1.52	0.15
Fabaceae	<i>Koompassia malaccensis</i> Maing. ex Benth.	0.05	16.10	0.83	1.52	0.17
Fabaceae	<i>Koompassia malaccensis</i> Maing. ex Benth.	0.10	19.40	0.83	1.52	0.28
Fabaceae	<i>Koompassia malaccensis</i> Maing. ex Benth.	0.18	24.60	0.83	1.52	0.52
Fabaceae	<i>Koompassia malaccensis</i> Maing. ex Benth.	0.03	35.00	0.83	1.52	1.28

Appendix 4: Continued

Fabaceae	<i>Koompassia malaccensis</i> Maing. ex Benth.	0.02	48.00	0.83	1.52	2.84
Fabaceae	<i>Parkia speciosa</i> Hassk.	0.01	12.40	0.40	0.39	0.04
Fabaceae	<i>Parkia speciosa</i> Hassk.	0.02	15.10	0.40	0.39	0.07
Fabaceae	<i>Parkia speciosa</i> Hassk.	0.02	15.70	0.40	0.39	0.08
Fabaceae	<i>Sindora beccariana</i> De Wit	0.04	23.60	0.62	0.16	0.35
Fagaceae	<i>Castanopsis evansii</i> Elmer	0.03	12.20	0.68	1.92	0.07
Fagaceae	<i>Castanopsis evansii</i> Elmer	0.02	12.40	0.68	1.92	0.07
Fagaceae	<i>Castanopsis evansii</i> Elmer	0.08	13.00	0.68	1.92	0.08
Fagaceae	<i>Castanopsis evansii</i> Elmer	0.12	13.50	0.68	1.92	0.09
Fagaceae	<i>Castanopsis evansii</i> Elmer	0.01	14.20	0.68	1.92	0.10
Fagaceae	<i>Castanopsis evansii</i> Elmer	0.01	14.20	0.68	1.92	0.10
Fagaceae	<i>Castanopsis evansii</i> Elmer	0.01	14.60	0.68	1.92	0.11
Fagaceae	<i>Castanopsis evansii</i> Elmer	0.16	15.50	0.68	1.92	0.13
Fagaceae	<i>Castanopsis evansii</i> Elmer	0.03	17.90	0.68	1.92	0.18
Fagaceae	<i>Castanopsis evansii</i> Elmer	0.05	19.90	0.68	1.92	0.24
Fagaceae	<i>Castanopsis evansii</i> Elmer	0.02	24.70	0.68	1.92	0.43
Fagaceae	<i>Castanopsis evansii</i> Elmer	0.02	31.00	0.68	1.92	0.77
Fagaceae	<i>Castanopsis evansii</i> Elmer	0.02	39.60	0.68	1.92	1.44
Fagaceae	<i>Castanopsis evansii</i> Elmer	0.01	44.60	0.68	1.92	1.94
Fagaceae	<i>Castanopsis meijeri</i>	0.01	9.80	0.88		0.05
Fagaceae	<i>Lithocarpus bennettii</i> (Miq.) Rehder	0.03	14.70	0.75	0.44	0.12
Fagaceae	<i>Lithocarpus bennettii</i> (Miq.) Rehder	0.05	18.00	0.75	0.44	0.21
Fagaceae	<i>Lithocarpus bennettii</i> (Miq.) Rehder	0.02	24.60	0.75	0.44	0.47
Fagaceae	<i>Lithocarpus caudatifolius</i> (Merr.) Rehder	0.01	12.00	0.65	0.13	0.06
Fagaceae	<i>Lithocarpus meijeri</i> Soepadmo	0.01	11.90	0.65	0.12	0.06
Hypericaceae	<i>Cratoxylum arborescens</i> (Vahl) Blume	0.02	15.90	0.47	0.31	0.09
Hypericaceae	<i>Cratoxylum arborescens</i> (Vahl) Blume	0.05	25.50	0.47	0.31	0.32
Icacinaeae	<i>Gonocaryum minus</i> Sleumer	0.01	9.80	0.73	0.67	0.04
Icacinaeae	<i>Gonocaryum minus</i> Sleumer	0.01	10.40	0.73	0.67	0.05
Icacinaeae	<i>Gonocaryum minus</i> Sleumer	0.01	11.00	0.73	0.67	0.05
Icacinaeae	<i>Gonocaryum minus</i> Sleumer	0.01	11.40	0.73	0.67	0.06
Icacinaeae	<i>Gonocaryum minus</i> Sleumer	0.04	18.30	0.73	0.67	0.21
Icacinaeae	<i>Gonocaryum minus</i> Sleumer	0.03	22.00	0.73	0.67	0.34
Ixonanthaceae	<i>Alanthospermum boneense</i> Forman	0.01	13.50	0.68	0.62	0.09
Ixonanthaceae	<i>Alanthospermum boneense</i> Forman	0.08	32.00	0.68	0.62	0.84
Ixonanthaceae	<i>Alanthospermum boneense</i> Forman	0.15	44.30	0.68	0.62	1.93
Lamiceae	<i>Vitex pubescens</i> Vahl	0.02	14.10	0.78	0.13	0.11
Lauraceae	<i>Alseodaphne bancana</i> Miq.	0.02	17.80	0.68	0.14	0.18
Lauraceae	<i>Alseodaphne bancana</i> Miq.	0.01	10.40	0.61	0.12	0.04
Lauraceae	<i>Beilschmiedia kunstleri</i> Gamble	0.02	16.90	0.55	0.14	0.13
Lauraceae	<i>Dehaasia elmeri</i> Merr.	0.08	31.70	0.60	0.20	0.72

Appendix 4: Continued

Lauraceae	<i>Dehaasia longipedicellata</i> (Ridl.) Kosterm.	0.05	24.10	0.60	0.16	0.36
Lauraceae	<i>Endiandra clavigera</i> Kosterm.	0.07	28.80	0.68	0.19	0.64
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.01	9.60	0.46	0.80	0.02
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.01	11.50	0.46	0.80	0.04
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.05	13.80	0.46	0.80	0.06
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.03	20.00	0.46	0.80	0.17
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.16	24.10	0.46	0.80	0.27
Lauraceae	<i>Litsea accedens</i> (Blume) Boerl.	0.01	45.00	0.46	0.80	1.35
Lauraceae	<i>Litsea castanea</i> Hook. f.	0.05	10.40	0.46	0.48	0.03
Lauraceae	<i>Litsea castanea</i> Hook. f.	0.01	10.60	0.46	0.48	0.03
Lauraceae	<i>Litsea castanea</i> Hook. f.	0.01	11.20	0.46	0.48	0.04
Lauraceae	<i>Litsea castanea</i> Hook. f.	0.01	26.00	0.46	0.48	0.33
Lauraceae	<i>Litsea elliptica</i> Blume	0.08	14.60	0.43	0.76	0.07
Lauraceae	<i>Litsea elliptica</i> Blume	0.02	15.20	0.43	0.76	0.07
Lauraceae	<i>Litsea elliptica</i> Blume	0.07	20.10	0.43	0.76	0.16
Lauraceae	<i>Litsea elliptica</i> Blume	0.03	30.80	0.43	0.76	0.48
Lauraceae	<i>Litsea elliptica</i> Blume	0.02	32.40	0.43	0.76	0.54
Lauraceae	<i>Litsea fulva</i> (Blume) Fern.-Vill.	0.02	12.20	0.58	0.53	0.06
Lauraceae	<i>Litsea fulva</i> (Blume) Fern.-Vill.	0.02	14.60	0.58	0.53	0.09
Lauraceae	<i>Litsea fulva</i> (Blume) Fern.-Vill.	0.03	14.70	0.58	0.53	0.09
Lauraceae	<i>Litsea fulva</i> (Blume) Fern.-Vill.	0.01	19.20	0.58	0.53	0.19
Lauraceae	<i>Litsea nidularis</i> (Wall. ex Nees) Hook.f.	0.05	10.80	0.36	0.63	0.03
Lauraceae	<i>Litsea nidularis</i> (Wall. ex Nees) Hook.f.	0.06	21.90	0.36	0.63	0.17
Lauraceae	<i>Litsea nidularis</i> (Wall. ex Nees) Hook.f.	0.01	26.00	0.36	0.63	0.26
Lauraceae	<i>Litsea nidularis</i> (Wall. ex Nees) Hook.f.	0.04	27.60	0.36	0.63	0.30
Lauraceae	<i>Litsea oppositifolia</i> Gibbs	0.01	12.70	0.51	0.13	0.06
Lauraceae	<i>Phoebe opaca</i> Blume	0.01	9.80	0.53	0.29	0.03
Lauraceae	<i>Phoebe opaca</i> Blume	0.01	13.10	0.53	0.29	0.06
Lauraceae	<i>Phoebe opaca</i> Blume	0.04	23.90	0.53	0.29	0.30
Lecythidaceae	<i>Barringtonia sarcostachys</i> Miq.	0.10	12.70	0.60	0.84	0.07
Lecythidaceae	<i>Barringtonia sarcostachys</i> Miq.	0.01	13.70	0.60	0.84	0.08
Lecythidaceae	<i>Barringtonia sarcostachys</i> Miq.	0.10	14.10	0.60	0.84	0.09
Lecythidaceae	<i>Barringtonia sarcostachys</i> Miq.	0.02	34.90	0.60	0.84	0.93
Lecythidaceae	<i>Barringtonia sarcostachys</i> Miq.	0.01	35.80	0.60	0.84	0.99
Leguminosae	<i>Millettia chaperii</i> Gagnep.	0.04	23.60	0.71	0.16	0.40
Linaceae	<i>Cyathocalyx carinatus</i> (Ridl.) J.Sinclair	0.01	9.20	0.32	0.29	0.01
Linaceae	<i>Cyathocalyx carinatus</i> (Ridl.) J.Sinclair	0.05	9.60	0.32	0.29	0.02
Linaceae	<i>Cyathocalyx carinatus</i> (Ridl.) J.Sinclair	0.01	10.40	0.32	0.29	0.02
Linaceae	<i>Cyathocalyx carinatus</i> (Ridl.) J.Sinclair	0.01	24.20	0.32	0.29	0.19
Loganiaceae	<i>Norrisia maior</i> Solered.	0.11	38.00	0.43	0.24	0.81

Appendix 4: Continued

Magnoliaceae	<i>Mallotus beccarii</i> Airy Shaw	0.01	10.30	0.56	0.33	0.04
Magnoliaceae	<i>Mallotus beccarii</i> Airy Shaw	0.03	14.20	0.56	0.33	0.08
Magnoliaceae	<i>Mallotus beccarii</i> Airy Shaw	0.02	18.40	0.56	0.33	0.16
Malvaceae	<i>Coelostegia borneensis</i> Becc.	0.03	18.70	0.69	0.14	0.21
Malvaceae	<i>Coelostegia griffithii</i> Benth. & Hook.f.	0.01	12.70	0.63	0.13	0.07
Malvaceae	<i>Copaifera palustris</i> (Symington) dw Wit	0.13	40.90	0.63	0.26	1.45
Malvaceae	<i>Neesia glabra</i> Becc.	0.01	10.10	0.53	0.24	0.03
Malvaceae	<i>Neesia glabra</i> Becc.	0.01	10.60	0.53	0.24	0.04
Ixonanthaceae	<i>Ixonanthes beccarii</i> Hallier f.	0.04	10.40	0.68	0.28	0.04
Ixonanthaceae	<i>Ixonanthes beccarii</i> Hallier f.	0.01	21.90	0.68	0.28	0.31
Melastomaceae	<i>Kibessia azurea</i> (Blume) DC.	0.03	10.80	0.69	0.71	0.05
Melastomaceae	<i>Kibessia azurea</i> (Blume) DC.	0.02	10.90	0.69	0.71	0.05
Melastomaceae	<i>Kibessia azurea</i> (Blume) DC.	0.01	10.90	0.69	0.71	0.05
Melastomaceae	<i>Kibessia azurea</i> (Blume) DC.	0.01	12.70	0.69	0.71	0.07
Melastomaceae	<i>Kibessia azurea</i> (Blume) DC.	0.01	15.00	0.69	0.71	0.12
Melastomaceae	<i>Kibessia azurea</i> (Blume) DC.	0.01	18.00	0.69	0.71	0.19
Meliaceae	<i>Aglaia affinis</i> Merr.	0.01	13.60	0.65	0.13	0.09
Meliaceae	<i>Chisocheton medusae</i> Airy Shaw	0.03	18.00	0.63	0.14	0.17
Moraceae	<i>Artocarpus borneensis</i> Merr.	0.02	17.10	0.63	0.22	0.15
Moraceae	<i>Artocarpus borneensis</i> Merr.	0.03	20.20	0.63	0.22	0.23
Moraceae	<i>Artocarpus dadah</i> Miq. Var. pubescens Miq.	0.08	10.50	0.73	0.33	0.05
Moraceae	<i>Artocarpus dadah</i> Miq. Var. pubescens Miq.	0.01	31.70	0.73	0.33	0.87
Moraceae	<i>Artocarpus kemando</i> Miq. subsp. Kemando	0.02	11.80	0.50	0.54	0.04
Moraceae	<i>Artocarpus kemando</i> Miq. subsp. Kemando	0.02	15.90	0.50	0.54	0.10
Moraceae	<i>Artocarpus kemando</i> Miq. subsp. Kemando	0.02	15.90	0.50	0.54	0.10
Moraceae	<i>Artocarpus kemando</i> Miq. subsp. Kemando	0.01	17.80	0.50	0.54	0.13
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.01	13.10	0.83	0.30	0.10
Moraceae	<i>Artocarpus nitidus</i> Trécul	0.05	25.00	0.83	0.30	0.54
Moraceae	<i>Parartocarpus bracteatus</i> (King) Becc.	0.01	11.30	0.55	0.12	0.04
Myristicaceae	<i>Gymnacranthera forbesii</i> (King) Warb.	0.01	10.60	0.58	0.39	0.04
Myristicaceae	<i>Gymnacranthera forbesii</i> (King) Warb.	0.02	14.50	0.58	0.39	0.09
Myristicaceae	<i>Gymnacranthera forbesii</i> (King) Warb.	0.02	15.10	0.55	0.39	0.10
Myristicaceae	<i>Horsfieldia grandis</i> (Hook.fil.) Warb.	0.03	9.80	0.39		0.02
Myristicaceae	<i>Horsfieldia grandis</i> (Hook.fil.) Warb.	0.01	10.80	0.39		0.03
Myristicaceae	<i>Horsfieldia grandis</i> (Hook.fil.) Warb.	0.03	18.30	0.39		0.11
Myristicaceae	<i>Horsfieldia grandis</i> (Hook.fil.) Warb.	0.03	18.90	0.39		0.12
Myristicaceae	<i>Horsfieldia grandis</i> (Hook.fil.) Warb.	0.01	19.50	0.39		0.13
Myristicaceae	<i>Knema conferta</i> (King) Warb.	0.01	5.60	0.53	0.59	0.01

Appendix 4: Continued

Myristicaceae	<i>Knema conferta</i> (King) Warb.	0.02	9.60	0.53	0.59	0.03
Myristicaceae	<i>Knema conferta</i> (King) Warb.	0.01	11.40	0.53	0.59	0.04
Myristicaceae	<i>Knema conferta</i> (King) Warb.	0.01	11.70	0.53	0.59	0.05
Myristicaceae	<i>Knema conferta</i> (King) Warb.	0.01	13.10	0.53	0.59	0.06
Myristicaceae	<i>Knema conferta</i> (King) Warb.	0.00	15.00	0.53	0.59	0.09
Myristicaceae	<i>Knema conferta</i> (King) Warb.	0.03	18.80	0.53	0.59	0.16
Myristicaceae	<i>Knema intermedia</i> (Blume) Warb.	0.03	10.90	0.58	0.52	0.04
Myristicaceae	<i>Knema intermedia</i> (Blume) Warb.	0.01	12.40	0.58	0.52	0.06
Myristicaceae	<i>Knema intermedia</i> (Blume) Warb.	0.01	12.70	0.58	0.52	0.06
Myristicaceae	<i>Knema intermedia</i> (Blume) Warb.	0.01	18.20	0.58	0.52	0.16
Myristicaceae	<i>Knema rufa</i> Warb.	0.01	11.50	0.58	0.25	0.05
Myristicaceae	<i>Knema rufa</i> Warb.	0.01	13.10	0.58	0.25	0.07
Myristicaceae	<i>Myristica iners</i> Blume	0.01	9.70	0.53	0.58	0.03
Myristicaceae	<i>Myristica iners</i> Blume	0.01	12.00	0.53	0.58	0.05
Myristicaceae	<i>Myristica iners</i> Blume	0.04	13.90	0.53	0.58	0.07
Myristicaceae	<i>Myristica iners</i> Blume	0.05	22.20	0.53	0.58	0.25
Myristicaceae	<i>Myristica iners</i> Blume	0.02	25.80	0.53	0.58	0.37
Myristicaceae	<i>Myristica lowiana</i> King	0.02	11.60	0.53	0.20	0.05
Myristicaceae	<i>Myristica lowiana</i> King	0.01	16.90	0.53	0.20	0.12
Myristicaceae	<i>Myristica maxima</i> Warb.	0.07	10.40	0.48	0.55	0.03
Myristicaceae	<i>Myristica maxima</i> Warb.	0.02	17.60	0.48	0.55	0.12
Myristicaceae	<i>Myristica maxima</i> Warb.	0.01	23.20	0.48	0.55	0.26
Myristicaceae	<i>Myristica maxima</i> Warb.	0.04	29.00	0.48	0.55	0.46
Myrtaceae	<i>Syzygium alcinae</i> (Merr.) Merr. & L.M.Perry	0.01	13.60	0.70	0.20	0.09
Myrtaceae	<i>Syzygium alcinae</i> (Merr.) Merr. & L.M.Perry	0.02	17.10	0.70	0.20	0.17
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.02	16.00	0.70	0.23	0.14
Myrtaceae	<i>Syzygium arcuatinervium</i> (Merr.) Craven & Biffin	0.04	21.30	0.70	0.23	0.30
Myrtaceae	<i>Syzygium chloranthum</i> (Duthie) Merr. & L.M.	0.02	15.50	0.70	0.13	0.13
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.12	9.70	0.70	6.86	0.04
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.08	9.90	0.70	6.86	0.04
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.01	10.00	0.70	6.86	0.04
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.01	10.10	0.70	6.86	0.04
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.07	10.60	0.70	6.86	0.05
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.13	10.80	0.70	6.86	0.05
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.01	12.00	0.70	6.86	0.07

Appendix 4: Continued

Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.02	12.20	0.70	6.86	0.07
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.04	12.50	0.70	6.86	0.07
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.13	12.50	0.70	6.86	0.07
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.07	12.60	0.70	6.86	0.07
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.01	12.70	0.70	6.86	0.08
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.01	13.20	0.70	6.86	0.08
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.10	13.20	0.70	6.86	0.08
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.01	13.80	0.70	6.86	0.10
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.01	14.00	0.70	6.86	0.10
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.07	14.10	0.70	6.86	0.10
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.02	14.20	0.70	6.86	0.10
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.07	14.30	0.70	6.86	0.10
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.06	14.50	0.70	6.86	0.11
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.02	15.30	0.70	6.86	0.13
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.01	15.60	0.70	6.86	0.13
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.01	15.70	0.70	6.86	0.13
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.06	16.10	0.70	6.86	0.14
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.01	18.70	0.70	6.86	0.21
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.01	20.00	0.70	6.86	0.25
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.01	20.20	0.70	6.86	0.26
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.04	20.80	0.70	6.86	0.28
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.12	21.80	0.70	6.86	0.32
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.01	21.90	0.70	6.86	0.32
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.03	22.00	0.70	6.86	0.33
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.07	22.40	0.70	6.86	0.34
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.07	22.60	0.70	6.86	0.35
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.04	24.20	0.70	6.86	0.42

Appendix 4: Continued

Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.06	24.80	0.70	6.86	0.45
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.09	26.00	0.70	6.86	0.51
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.02	26.50	0.70	6.86	0.53
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.02	27.00	0.70	6.86	0.56
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.02	27.10	0.70	6.86	0.56
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.03	27.70	0.70	6.86	0.60
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.03	27.90	0.70	6.86	0.61
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.05	27.90	0.70	6.86	0.61
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.04	28.50	0.70	6.86	0.64
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.01	28.90	0.70	6.86	0.67
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.02	28.90	0.70	6.86	0.67
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.02	29.30	0.70	6.86	0.69
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.06	30.00	0.70	6.86	0.73
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.04	30.30	0.70	6.86	0.75
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.01	30.60	0.70	6.86	0.77
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.05	31.10	0.70	6.86	0.80
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.06	33.50	0.70	6.86	0.97
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.22	35.00	0.70	6.86	1.09
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.03	39.50	0.70	6.86	1.48
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.06	39.60	0.70	6.86	1.49
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.02	40.00	0.70	6.86	1.53
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.05	40.70	0.70	6.86	1.60
Myrtaceae	<i>Syzygium havilandii</i> (Merr.) Merr. & L.M.Perry	0.06	52.50	0.70	6.86	3.01
Myrtaceae	<i>Syzygium lineata</i> (DC.) Merr. & LM Perry	0.01	9.70	0.81	0.32	0.04
Myrtaceae	<i>Syzygium lineata</i> (DC.) Merr. & LM Perry	0.01	10.00	0.81	0.32	0.05
Myrtaceae	<i>Syzygium lineata</i> (DC.) Merr. & LM Perry	0.01	10.00	0.81	0.32	0.05
Myrtaceae	<i>Syzygium lineata</i> (DC.) Merr. & LM Perry	0.03	19.00	0.81	0.32	0.26

Appendix 4: Continued

Myrtaceae	<i>Syzygium nemestrinum</i> (M.R.Hend.) I.M.Turner	0.01	12.60	0.70	0.13	0.07
Myrtaceae	<i>Syzygium subrufa</i> King	0.02	11.60	0.62	1.73	0.05
Myrtaceae	<i>Syzygium subrufa</i> King	0.01	12.20	0.62	1.73	0.06
Myrtaceae	<i>Syzygium subrufa</i> King	0.03	12.50	0.62	1.73	0.07
Myrtaceae	<i>Syzygium subrufa</i> King	0.02	14.00	0.62	1.73	0.09
Myrtaceae	<i>Syzygium subrufa</i> King	0.03	14.70	0.62	1.73	0.10
Myrtaceae	<i>Syzygium subrufa</i> King	0.01	16.10	0.62	1.73	0.13
Myrtaceae	<i>Syzygium subrufa</i> King	0.03	18.60	0.62	1.73	0.19
Myrtaceae	<i>Syzygium subrufa</i> King	0.01	18.70	0.62	1.73	0.19
Myrtaceae	<i>Syzygium subrufa</i> King	0.01	19.70	0.62	1.73	0.22
Myrtaceae	<i>Syzygium subrufa</i> King	0.04	19.70	0.62	1.73	0.22
Myrtaceae	<i>Syzygium subrufa</i> King	0.02	22.40	0.62	1.73	0.31
Myrtaceae	<i>Syzygium subrufa</i> King	0.03	22.50	0.62	1.73	0.31
Myrtaceae	<i>Syzygium subsessilifolium</i> (Merr.) Merr. & L.M.Perry	0.14	42.50	0.70	0.28	1.78
Olacaceae	<i>Ochanostachys amentacea</i> Mast.	0.01	11.90	0.88	0.31	0.08
Olacaceae	<i>Ochanostachys amentacea</i> Mast.	0.07	29.20	0.88	0.31	0.85
Olacaceae	<i>Strombosia lucida</i> Teijsm. & Binn.	0.08	17.60	0.82	0.34	0.21
Olacaceae	<i>Strombosia lucida</i> Teijsm. & Binn.	0.02	31.00	0.82	0.34	0.93
Olacaceae	<i>Strombosia rotundifolia</i> King	0.04	22.60	0.79	0.16	0.40
Phyllanthaceae	<i>Aporusa symplocoides</i> (Hook.f.) Gage	0.01	9.90	0.63		0.04
Phyllanthaceae	<i>Baccaurea brevipes</i> Hook.f.	0.06	26.80	0.79	0.18	0.62
Phyllanthaceae	<i>Cleistanthus coriaceus</i> Airy Shaw	0.02	15.70	0.63	0.13	0.12
Phyllanthaceae	<i>Glochidion lutescens</i> Blume	0.01	10.50	0.63	0.12	0.04
Picrodendraceae	<i>Austrobuxus nitidus</i> Miq.	0.03	20.60	0.83	0.15	0.33
Polygalaceae	<i>Xanthophyllum affine</i> Korth. ex Miq.	0.02	10.10	0.69	0.70	0.04
Polygalaceae	<i>Xanthophyllum affine</i> Korth. ex Miq.	0.01	16.30	0.69	0.70	0.15
Polygalaceae	<i>Xanthophyllum affine</i> Korth. ex Miq.	0.02	17.80	0.69	0.70	0.18
Polygalaceae	<i>Xanthophyllum affine</i> Korth. ex Miq.	0.03	18.60	0.69	0.70	0.21
Polygalaceae	<i>Xanthophyllum affine</i> Korth. ex Miq.	0.10	35.00	0.69	0.70	1.07
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.02	9.80	0.77	0.95	0.04
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.01	11.00	0.77	0.95	0.06
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.01	11.50	0.77	0.95	0.06
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.01	13.20	0.77	0.95	0.09
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.03	15.90	0.77	0.95	0.15
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.02	17.10	0.77	0.95	0.19
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.04	19.10	0.77	0.95	0.25
Polygalaceae	<i>Xanthophyllum amoenum</i> Chodat	0.01	22.90	0.77	0.95	0.40
Polygalaceae	<i>Xanthophyllum beccarianum</i> Chodat	0.01	9.80	0.80	0.19	0.04
Polygalaceae	<i>Xanthophyllum beccarianum</i> Chodat	0.06	28.50	0.80	0.19	0.73
Polygalaceae	<i>Xanthophyllum borneense</i> Miq.	0.02	9.80	0.80	0.14	0.04
Polygalaceae	<i>Xanthophyllum borneense</i> Miq.	0.01	16.00	0.80	0.14	0.16

Appendix 4: Continued

Polygalaceae	<i>Xanthophyllum ellipticum</i> Korth. ex Miq.	0.02	14.80	0.80	0.42	0.13
Polygalaceae	<i>Xanthophyllum ellipticum</i> Korth. ex Miq.	0.03	16.50	0.80	0.42	0.17
Polygalaceae	<i>Xanthophyllum ellipticum</i> Korth. ex Miq.	0.02	21.10	0.80	0.42	0.33
Polygalaceae	<i>Xanthophyllum griffithii</i> Meijden	0.01	10.20	0.80	0.12	0.05
Polygalaceae	<i>Xanthophyllum ovatifolium</i> Chodat	0.01	12.40	0.80	0.13	0.08
Polygalaceae	<i>Xanthophyllum vitellinum</i> (Blume) Dietr.	0.01	11.00	0.80	0.12	0.06
Rosaceae	<i>Parastemon spicatum</i> (Wall. ex A.DC.) A.DC.	0.09	33.50	0.96	0.21	1.34
Rosaceae	<i>Prunus beccarii</i> (Ridl.) Kalkman	0.02	14.80	0.62	0.51	0.10
Rosaceae	<i>Prunus beccarii</i> (Ridl.) Kalkman	0.08	25.60	0.62	0.51	0.43
Rosaceae	<i>Prunus beccarii</i> (Ridl.) Kalkman	0.05	32.70	0.62	0.51	0.80
Rubiaceae	<i>Diplospora singularis</i> Kurz	0.01	12.20	0.70	0.13	0.07
Rubiaceae	<i>Gardenia tentaculata</i> Hook.f.	0.06	26.70	0.63	0.18	0.48
Rubiaceae	<i>Nauclea subdita</i> (Korth.) Steud.	0.01	13.30	0.60	0.26	0.07
Rubiaceae	<i>Nauclea subdita</i> (Korth.) Steud.	0.02	15.80	0.60	0.26	0.12
Rubiaceae	<i>Neoscortechinia kingii</i> (Hook.f.) Pax & K.Hoffm.	0.01	10.50	0.62	0.52	0.04
Rubiaceae	<i>Neoscortechinia kingii</i> (Hook.f.) Pax & K.Hoffm.	0.02	12.70	0.62	0.52	0.07
Rubiaceae	<i>Neoscortechinia kingii</i> (Hook.f.) Pax & K.Hoffm.	0.01	13.30	0.62	0.52	0.08
Rubiaceae	<i>Neoscortechinia kingii</i> (Hook.f.) Pax & K.Hoffm.	0.02	13.90	0.62	0.52	0.09
Rubiaceae	<i>Neoscortechinia kingii</i> (Hook.f.) Pax & K.Hoffm.	0.01	17.20	0.62	0.52	0.15
Rubiaceae	<i>Neoscortechinia</i> sp.	0.01	9.00	0.87		0.04
Rubiaceae	<i>Timonius flavescens</i> (Jacq.) Baker	0.03	20.60	0.68	0.15	0.27
Sapindaceae	<i>Nephelium cuspidatum</i> Blume	0.02	11.90	0.87	0.41	0.08
Sapindaceae	<i>Nephelium cuspidatum</i> Blume	0.03	15.40	0.87	0.41	0.16
Sapindaceae	<i>Nephelium cuspidatum</i> Blume	0.01	20.10	0.87	0.41	0.32
Sapindaceae	<i>Nephelium havilandii</i> Leenh.	0.02	13.00	0.75	0.13	0.09
Sapindaceae	<i>Nephelium havilandii</i> Leenh.	0.01	16.00	0.75	0.13	0.15
Sapindaceae	<i>Nephelium maingayi</i> Hiern	0.02	14.30	0.75	0.44	0.11
Sapindaceae	<i>Nephelium maingayi</i> Hiern	0.03	20.20	0.75	0.44	0.28
Sapindaceae	<i>Nephelium maingayi</i> Hiern	0.04	22.80	0.75	0.44	0.38
Sapindaceae	<i>Pometia pinnata</i> J. R. Forst. & G. Forst.	0.01	13.60	0.71	0.13	0.09
Sapotaceae	<i>Gaertnera fractiflexa</i> Beusekom	0.01	11.80	0.70	0.19	0.06
Sapotaceae	<i>Gaertnera fractiflexa</i> Beusekom	0.01	12.20	0.70	0.19	0.07
Sapotaceae	<i>Ganua kingii</i> (Brace)	0.01	12.20	0.70	0.67	0.07
Sapotaceae	<i>Ganua kingii</i> (Brace)	0.01	13.40	0.70	0.67	0.09
Sapotaceae	<i>Ganua kingii</i> (Brace)	0.02	14.10	0.70	0.67	0.10
Sapotaceae	<i>Ganua kingii</i> (Brace)	0.02	14.40	0.70	0.67	0.11

Appendix 4: Continued

Sapotaceae	<i>Ganua kingii</i> (Brace)	0.02	16.90	0.70	0.67	0.16
Sapotaceae	<i>Palaquium decurrens</i> H.J.Lam	0.04	15.20	0.75	0.55	0.13
Sapotaceae	<i>Palaquium decurrens</i> H.J.Lam	0.13	23.60	0.75	0.55	0.42
Sapotaceae	<i>Palaquium decurrens</i> H.J.Lam	0.02	40.00	0.75	0.55	1.64
Sapotaceae	<i>Palaquium gutta</i> (Hook.) Baill.	0.03	14.30	0.75	0.73	0.11
Sapotaceae	<i>Palaquium gutta</i> (Hook.) Baill.	0.05	19.20	0.75	0.73	0.24
Sapotaceae	<i>Palaquium gutta</i> (Hook.) Baill.	0.02	25.30	0.75	0.73	0.50
Sapotaceae	<i>Palaquium gutta</i> (Hook.) Baill.	0.15	43.10	0.75	0.73	1.98
Sapotaceae	<i>Palaquium hexadrum</i> (Griff.) Baill.	0.01	12.00	0.55	0.13	0.05
Sapotaceae	<i>Palaquium obovatum</i> (Griff.) Engl.	0.06	11.50	0.60	0.30	0.05
Sapotaceae	<i>Palaquium obovatum</i> (Griff.) Engl.	0.01	27.40	0.60	0.30	0.49
Sapotaceae	<i>Palaquium ridleyi</i> King & Gamble	0.02	9.80	0.93	1.21	0.05
Sapotaceae	<i>Palaquium ridleyi</i> King & Gamble	0.01	10.70	0.93	1.21	0.06
Sapotaceae	<i>Palaquium ridleyi</i> King & Gamble	0.05	11.10	0.93	1.21	0.07
Sapotaceae	<i>Palaquium ridleyi</i> King & Gamble	0.04	15.30	0.93	1.21	0.17
Sapotaceae	<i>Palaquium ridleyi</i> King & Gamble	0.02	15.80	0.93	1.21	0.18
Sapotaceae	<i>Palaquium ridleyi</i> King & Gamble	0.10	16.60	0.93	1.21	0.21
Sapotaceae	<i>Palaquium ridleyi</i> King & Gamble	0.01	23.10	0.93	1.21	0.49
Sapotaceae	<i>Palaquium ridleyi</i> King & Gamble	0.01	24.60	0.93	1.21	0.58
Sapotaceae	<i>Palaquium ridleyi</i> King & Gamble	0.02	36.00	0.93	1.21	1.55
Sapotaceae	<i>Palaquium stenophyllum</i> Pierre ex Dubard	0.34	66.10	0.75	0.51	5.66
Sapotaceae	<i>Palaquium walsuraefolium</i> Pierre ex Dubard	0.05	14.70	0.57	0.30	0.09
Sapotaceae	<i>Palaquium walsuraefolium</i> Pierre ex Dubard	0.02	25.00	0.57	0.30	0.37
Sapotaceae	<i>Pouteria malaccensis</i> (C.B.Clarke) Baehni	0.06	27.70	0.70	0.18	0.60
Sterculiaceae	<i>Scaphium macropodum</i> (Miq.) Beumee ex K.Heyne	0.04	14.00	0.53	0.43	0.07
Sterculiaceae	<i>Scaphium macropodum</i> (Miq.) Beumee ex K.Heyne	0.02	18.90	0.53	0.43	0.16
Sterculiaceae	<i>Scaphium macropodum</i> (Miq.) Beumee ex K.Heyne	0.03	22.60	0.53	0.43	0.26
Sterculiaceae	<i>Sterculia cordata</i> Blume	0.17	46.70	0.48	0.31	1.53
Sterculiaceae	<i>Sterculia stipulaata</i> Korth.	0.01	12.10	0.48	0.13	0.05
Symplocaceae	<i>Symplocos rubigenosa</i> Wall.	0.01	10.60	0.57	0.25	0.04
Symplocaceae	<i>Symplocos rubigenosa</i> Wall.	0.01	12.00	0.57	0.25	0.05
Thymelaeaceae	<i>Archidendron</i> sp.	0.02	16.50	0.63	0.14	0.14
Thymelaeaceae	<i>Gonystylus bancanus</i> (Miq.) Kurz	0.01	10.50	0.58	0.12	0.04
Thymelaeaceae	<i>Gonystylus forbesii</i> Gilg	0.03	14.00	0.59	0.83	0.08
Thymelaeaceae	<i>Gonystylus forbesii</i> Gilg	0.06	15.00	0.59	0.83	0.10
Thymelaeaceae	<i>Gonystylus forbesii</i> Gilg	0.16	20.20	0.59	0.83	0.22
Thymelaeaceae	<i>Gonystylus forbesii</i> Gilg	0.02	28.00	0.59	0.83	0.51
Thymelaeaceae	<i>Gonystylus forbesii</i> Gilg	0.02	45.20	0.59	0.83	1.74

Appendix 4: Continued

Thymelaeaceae	<i>Gonystylus pendulus</i> Airy Shaw	0.06	27.00	0.63	0.18	0.50
Ulmaceae	<i>Gironniera nervosa</i> (Roxb.) Baill.	0.01	10.70	0.63	0.48	0.04
Ulmaceae	<i>Gironniera nervosa</i> (Roxb.) Baill.	0.01	12.60	0.63	0.48	0.07
Ulmaceae	<i>Gironniera nervosa</i> (Roxb.) Baill.	0.01	12.70	0.63	0.48	0.07
Ulmaceae	<i>Gironniera nervosa</i> (Roxb.) Baill.	0.05	24.20	0.63	0.48	0.37
Ulmaceae	<i>Gironniera parvifolia</i> Planch.	0.12	39.70	0.63	0.26	1.34
Verbenaceae	<i>Teijsmanniodendron ahernianum</i> (Merr.) Bakh.	0.10	35.00	1.12	0.22	1.74
Verbenaceae	<i>Teijsmanniodendron sarawakanum</i> H.Pearson) Kosterm.	0.10	35.30	0.79	0.23	1.25
Myrtaceae	<i>Syzygium subsessilifolium</i> (Merr.) Merr. & L.M.Perry	0.08	10.10	0.80	1.31	0.05
Myrtaceae	<i>Syzygium subsessilifolium</i> (Merr.) Merr. & L.M.Perry	0.04	10.40	0.80	1.31	0.05
Myrtaceae	<i>Syzygium subsessilifolium</i> (Merr.) Merr. & L.M.Perry	0.03	10.70	0.80	1.31	0.06
Myrtaceae	<i>Syzygium subsessilifolium</i> (Merr.) Merr. & L.M.Perry	0.02	12.00	0.80	1.31	0.08
Myrtaceae	<i>Syzygium subsessilifolium</i> (Merr.) Merr. & L.M.Perry	0.01	13.70	0.80	1.31	0.11
Sapotaceae	<i>Ganua kingii</i> (Brace)	0.02	15.40	0.70	0.67	0.13
Sapotaceae	<i>Ganua kingii</i> (Brace)	0.02	16.20	0.70	0.67	0.15

Appendix 5: List of dominant families in Bukit Durang forest

No	Family	Genus		Species		Individual	
		No.	%	No.		No.	%
1	Dipterocarpaceae	7	6.19	41	16.53	235	29.75
2	Euphorbiaceae	11	9.73	22	8.87	148	18.73
3	Myristicaceae	4	3.54	17	6.85	57	7.22
4	Anacardiaceae	8	7.08	11	4.44	27	3.42
5	Moraceae	2	1.77	10	4.03	24	3.04
6	Annonaceae	6	5.31	11	4.44	23	2.91
7	Myrtaceae	2	1.77	14	5.65	23	2.91
8	Polygalaceae	1	0.88	5	2.02	22	2.78
9	Rubiaceae	8	7.08	8	3.23	22	2.78
10	Phyllanthaceae	4	3.54	10	4.03	21	2.66
11	Burseraceae	2	1.77	7	2.82	18	2.28
12	Lauraceae	5	4.42	10	4.03	18	2.28
13	Sapotaceae	4	3.54	10	4.03	14	1.77
14	Fagaceae	2	1.77	7	2.82	13	1.65
15	Sapindaceae	3	2.65	4	1.61	11	1.39
16	Cannabaceae	1	0.88	1	0.40	9	1.14
17	Actinidiaceae	1	0.88	2	0.81	8	1.01
18	Ebenaceae	1	0.88	5	2.02	8	1.01
19	Malvaceae	5	4.42	7	2.82	8	1.01

Appendix 5: Continued

20	Symplocaceae	1	0.88	2	0.81	3	0.38
21	Celastraceae	1	0.88	1	0.40	2	0.25
22	Chrysobalanaceae	1	0.88	2	0.81	2	0.25
23	Combretaceae	1	0.88	1	0.40	2	0.25
24	Lamiaceae	1	0.88	1	0.40	2	0.25
25	Rosaceae	2	1.77	2	0.81	2	0.25
26	Rutaceae	1	0.88	2	0.81	2	0.25
27	Sterculiaceae	1	0.88	1	0.40	2	0.25
28	Apocynaceae	1	0.88	1	0.40	1	0.13
29	Elaeocarpaceae	1	0.88	1	0.40	1	0.13
30	Simaroubaceae	1	0.88	1	0.40	1	0.13
31	Lecythidaceae	1	0.88	2	0.81	5	0.63
32	Olacaceae	2	1.77	2	0.81	5	0.63
33	Rhizophoraceae	2	1.77	2	0.81	5	0.63
34	Dilleniaceae	1	0.88	1	0.40	4	0.51
35	Ixonanthaceae	2	1.77	2	0.81	4	0.51
36	Melastomataceae	2	1.77	2	0.81	4	0.51
37	Calophyllaceae	3	2.65	2	0.81	3	0.38
38	Cornaceae	2	1.77	4	1.61	7	0.89
39	Meliaceae	3	2.65	5	2.02	7	0.89
40	Clusiaceae	2	1.77	4	1.61	6	0.76
41	Icacinaceae	1	0.88	2	0.81	6	0.76
42	Fabaceae	3	2.65	3	1.21	5	0.63

Appendix 6: List of dominant families in Saremas 1 Div 5 forest

N0	Family	Genus		Species		Individual	
		No.	%	No.	%	No.	%
2	Dipterocarpaceae	7	6.6	38	17.2	216	27.1
3	Euphorbiaceae	9	8.5	12	5.4	64	8.0
4	Lauraceae	5	4.7	15	6.8	52	6.5
5	Sapotaceae	3	2.8	10	4.5	51	6.4
6	Anacardiaceae	5	4.7	8	3.6	41	5.1
7	Myrtaceae	2	1.9	15	6.8	40	5.0
8	Moraceae	3	2.8	12	5.4	33	4.1
9	Myristicaceae	4	3.8	12	5.4	28	3.5
10	Burseraceae	3	2.8	6	2.7	23	2.9
11	Annonaceae	4	3.8	9	4.1	22	2.8
12	Polygalaceae	1	0.9	6	2.7	22	2.8
13	Fabaceae	4	3.54	6	2.4	20	2.39
14	Rubiaceae	5	4.42	6	2.4	20	2.39
15	Ebenaceae	1	0.88	6	2.4	17	2.03
16	Fagaceae	2	1.77	6	2.4	16	1.91
17	Malvaceae	3	2.65	4	1.6	16	1.91
18	Sapindaceae	2	1.77	4	1.6	15	1.79
19	Actinidiaceae	1	0.88	3	1.2	11	1.32
20	Anisophylleaceae	1	0.88	1	0.4	10	1.20
21	Phyllanthaceae	4	3.54	7	2.8	10	1.20

Appendix 6: Continued

22	Melastomaceae	3	2.65	4	1.6	9	1.08
23	Meliaceae	1	0.88	2	0.8	8	0.96
24	Apocynaceae	3	2.65	5	2	7	0.84
25	Calophyllaceae	2	1.77	4	1.6	7	0.84
26	Dilleniaceae	1	0.88	2	0.8	7	0.84
27	Olacaceae	2	1.77	3	1.2	6	0.72
28	Theaceae	1	0.88	1	0.4	6	0.72
29	Ulmaceae	1	0.88	2	0.8	5	0.60
30-	Celestraceae	1	0.88	1	0.4	4	0.48
31	Lecythidaceae	1	0.88	2	0.8	4	0.48
32	Achariaceae	1	0.88	1	0.4	3	0.36
33	Alangiaceae	1	0.88	2	0.8	3	0.359
34	Clusiaceae	1	0.88	3	1.2	3	0.359
35	Pentaphylacaceae	2	1.77	2	0.8	3	0.359
36	Simaroubaceae	2	1.77	2	0.8	3	0.359
37	Verbenaceae	1	0.88	1	0.4	3	0.359
38	Celastraceae	1	0.88	1	0.4	2	0.239
39	Ctenolophonaceae	1	0.88	1	0.4	2	0.239
40	Ixonanthaceae	1	0.88	1	0.4	2	0.239
41	Magnoliaceae	1	0.88	1	0.4	2	0.239
42	Rosaceae	1	0.88	2	0.8	2	0.239
43	Sterculiaceae	1	0.88	2	0.8	2	0.239
44	Thymelaeaceae	1	0.88	1	0.4	2	0.239
45	Araliaceae	1	0.88	1	0.4	1	0.120
46	Burseracea	1	0.88	1	0.4	1	0.120
47	Cannabaceae	1	0.88	1	0.4	1	0.120
48	Chrysobalanaceae	1	0.88	1	0.4	1	0.120
49	Cluciaceae	1	0.88	1	0.4	1	0.120
50	Elaeocarpaceae	1	0.88	1	0.4	1	0.120
51	Hypericaceae	1	0.88	1	0.4	1	0.120
52	Lamiaceae	1	0.88	1	0.4	1	0.120
53	Primulaceae	1	0.88	1	0.4	1	0.120
54	Rhizophoracea	1	0.88	1	0.4	1	0.120
55	Sabiaceae	1	0.88	1	0.4	1	0.120
56	Symplocaceae	1	0.88	1	0.4	1	0.120

Appendix 7: List of dominant families in Lambir Hills National Park forest

No	Family	Genus		Species		Individual	
		No.	%	No.	%	No.	%
1	Dipterocarpaceae	9	10.6	29	22.1	248	33.2
2	Polygalaceae	1	1.2	2	1.5	65	8.7
3	Anacardiaceae	6	7.1	8	6.1	51	6.8
4	Euphorbiaceae	8	9.4	9	6.9	37	5.0
5	Moraceae	2	2.4	7	5.3	37	5.0
6	Lauraceae	5	5.9	8	6.1	35	4.7
7	Myristicaceae	4	4.7	7	5.3	34	4.6
8	Myrtaceae	2	2.4	5	3.8	33	4.4
9	Sapotaceae	2	2.4	3	2.3	29	3.9
10	Buseraceae	3	3.5	9	6.9	28	3.7
11	Calophyllaceae	2	2.4	2	1.5	25	3.3
12	Annonaceae	4	4.7	6	4.6	23	3.1
13	Fabaceae	3	3.5	3	2.3	18	2.4
14	Ebenaceae	1	1.2	2	1.5	16	2.1
15	Rosaceae	2	2.4	2	1.5	14	1.9
16	Rubiaceae	2	2.4	2	1.5	6	0.8
17	Dilleniaceae	2	2.4	1	0.8	5	0.7
18	Flacourtiaceae	1	1.2	1	0.8	5	0.7
19	Meliaceae	3	3.5	3	2.3	5	0.7
20	Linaceae	2	2.4	2	1.5	4	0.5
21	Celastraceae	1	1.2	1	0.8	3	0.4
22	Icacinaceae	3	3.5	2	1.5	3	0.4
23	Olacaceae	2	2.4	2	1.5	3	0.4
24	Sterculiaceae	1	1.2	1	0.8	3	0.4
25	Bombaceae	1	1.2	1	0.8	2	0.3
26	Fagaceae	2	2.4	2	1.5	2	0.3
27	Thymelaeaceae	1	1.2	1	0.8	2	0.3
28	Verbenaceae	1	1.2	1	0.8	2	0.3
29	Anisophylleaceae	1	1.2	1	0.8	1	0.1
30	Apocynaceae	1	1.2	1	0.8	1	0.1
31	Ixonanthaceae	1	1.2	1	0.8	1	0.1
32	Lecythidaceae	1	1.2	1	0.8	1	0.1
33	Loganiaceae	1	1.2	1	0.8	1	0.1
34	Magnoliaceae	1	1.2	1	0.8	1	0.1
35	Passifloraceae	1	1.2	1	0.8	1	0.1
36	Sapindaceae	1	1.2	1	0.8	1	0.1
37	Tiliaceae	1	1.2	1	0.8	1	0.1

Appendix 8: List of dominant families in Kubah National Park forest

No	Family	Genus		Species		Individual	
		No.	%	No.	%	No.	%
1	Dipterocarpaceae	6	5.66	33	15.64	165	24.19
2	Myrtaceae	1	0.94	14	6.64	91	13.34
3	Burseraceae	3	2.83	6	2.84	39	5.72
4	Lauraceae	6	5.66	13	6.16	31	4.55
5	Sapotaceae	3	2.83	8	3.79	28	4.11
6	Myristicaceae	4	3.77	8	3.79	27	3.96
7	Annonaceae	5	4.72	12	5.69	26	3.81
8	Fabaceae	8	7.55	9	4.27	25	3.67
9	Polygalaceae	1	0.94	8	3.79	20	2.93
10	Fagaceae	2	1.89	4	1.90	19	2.79
11	Phyllanthaceae	3	2.83	4	1.90	16	2.35
12	Cardiopteridaceae	3	2.83	3	1.42	14	2.05
13	Euphorbiaceae	7	6.60	7	3.32	14	2.05
14	Anacardiaceae	4	3.77	8	3.79	13	1.91
15	Clusiaceae	2	1.89	5	2.37	13	1.91
16	Elaeocarpaceae	1	0.94	3	1.42	13	1.91
17	Moraceae	2	1.89	5	2.37	11	1.61
18	Anisophylleaceae	1	0.94	1	0.47	10	1.47
19	Malvaceae	5	4.72	7	3.32	9	1.32
20	Sapindaceae	2	1.89	5	2.37	9	1.32
21	Ebenaceae	1	0.94	5	2.37	7	1.03
22	Proteaceae	1	0.94	1	0.47	7	1.03
23	Rubiaceae	5	4.72	5	2.37	7	1.03
24	Thymelaeaceae	1	0.94	3	1.42	7	1.03
25	Melastomataceae	1	0.94	1	0.47	6	0.88
26	Calophyllaceae	2	1.89	2	0.95	5	0.73
27	Cannabaceae	1	0.94	2	0.95	5	0.73
28	Ixonanthaceae	2	1.89	2	0.95	5	0.73
29	Lecythidaceae	1	0.94	1	0.47	5	0.73
30	Olacaceae	2	1.89	3	1.42	5	0.73
31	Cornaceae	1	0.94	1	0.47	4	0.59
32	Lamiaceae	2	1.89	2	0.95	3	0.44
33	Rosaceae	1	0.94	1	0.47	3	0.44
34	Achariaceae	1	0.94	2	0.95	2	0.29
35	Celastraceae	1	0.94	2	0.95	2	0.29
36	Dilleniaceae	1	0.94	2	0.95	2	0.29
37	Hypericaceae	1	0.94	1	0.47	2	0.29
38	Meliaceae	2	1.89	2	0.95	2	0.29
39	Symplocaceae	1	0.94	1	0.47	2	0.29
40	Apocynaceae	1	0.94	1	0.47	1	0.15
41	Callophyllaceae	2	1.89	2	0.95	1	0.15
42	Chrysobalanaceae	1	0.94	1	0.47	1	0.15
43	Combretaceae	1	0.94	1	0.47	1	0.15
44	Crypteroniaceae	1	0.94	1	0.47	1	0.15
45	Loganiaceae	1	0.94	1	0.47	1	0.15
46	Picrodendraceae	1	0.94	1	0.47	1	0.15
47	Sterculiaceae	1	0.94	1	0.47	1	0.15

Appendix 9: List of large tree species (≥ 60 cm DBH) with respect to DBH and
AGB of logged-over forests

Bukit Durang			
Species	Family	DBH (cm)	AGB (Mg/ha)
<i>Glochidion obscurum</i>	Phyllanthaceae	104.00	13.55
<i>Shorea beccariana</i>	Dipterocarpaceae	85.00	7.16
<i>Hopea kerangasensis</i>	Dipterocarpaceae	75.00	6.12
<i>Gluta wallichii</i>	Anacardiaceae	74.70	5.74
<i>Shorea macrophylla</i>	Dipterocarpaceae	72.30	4.43
<i>Santiria megaphylla</i>	Dipterocarpaceae	70.20	5.23
<i>Lithocarpus dasystachya</i>	Burseraceae	69.90	5.60
<i>Dyera costulata</i>	Fagaceae	68.80	5.40
<i>Palaquium obovatum</i>	Apocynaceae	66.80	3.21
<i>Artocarpus anisophyllus</i>	Sapotaceae	65.60	4.41
<i>Shorea mecistopteryx</i>	Moraceae	64.80	5.32
<i>Shorea leprosula</i>	Dipterocarpaceae	64.40	4.25
<i>Shorea parvifolia</i>	Dipterocarpaceae	62.60	3.97
<i>Elateriospermum tapos</i>	Euphorbiaceae	62.30	6.19
<i>Sindora beccariana</i>	Fabaceae	61.10	3.89
Saremas 1 Div 5			
Species	Family	DBH (cm)	AGB (Mg/ha)
<i>Shorea macroptera</i>	Dipterocarpaceae	85.90	9.69
<i>Ternstroemia citrina</i>	Petanphylacaceae	71.00	6.71
<i>Dipterocarpus sublamellatus</i>	Dipterocarpaceae	70.80	7.46
<i>Dacryodes rostrata</i>	Burseraceae	70.40	5.76
<i>Aquilaria macrocarpa</i>	Thymelaeceae	69.50	3.34
<i>Sindora beccariana</i>	Fabaceae	66.30	5.46
<i>Ternstroemia citrina</i>	Petanphylacaceae	65.70	5.57

Appendix 10: List of large tree species (≥ 60 cm DBH) with respect to DBH
and AGB primary forests

Lambir Hills National Park			
Species	Family	DBH (cm)	AGB (Mg/ha)
<i>Shorea uliginosa</i>	Dipterocarpaceae	105.00	13.29
<i>Shorea parvifolia</i>	Dipterocarpaceae	98.00	11.37
<i>Elateriospermum tapos</i>	Euphorbiaceae	97.10	17.57
<i>Shorea macroptera</i>	Dipterocarpaceae	85.00	8.20
<i>Anisoptera grossivenia</i>	Dipterocarpaceae	83.00	8.68
<i>Dryobalanops aromatica</i>	Dipterocarpaceae	82.90	10.12
<i>Dryobalanops aromatica</i>	Dipterocarpaceae	80.20	9.36
<i>Shorea pinanga</i>	Dipterocarpaceae	80.10	7.14
<i>Fagraea fragrans</i>	Loganiaceae	77.90	9.35
<i>Dryobalanops aromatica</i>	Dipterocarpaceae	74.20	7.80
<i>Hopea ferruginea</i>	Dipterocarpaceae	70.00	5.57
<i>Shorea scabrida</i>	Dipterocarpaceae	68.00	4.18
<i>Shorea pinanga</i>	Dipterocarpaceae	68.00	4.84
<i>Dryobalanops aromatica</i>	Dipterocarpaceae	65.00	5.68
<i>Dryobalanops lanceolata</i>	Dipterocarpaceae	65.00	5.05
<i>Shorea macrophylla</i>	Dipterocarpaceae	65.00	4.35
<i>Dryobalanops aromatica</i>	Dipterocarpaceae	62.60	5.19
<i>Palaquium leiocarpum</i>	Sapotaceae	62.30	5.11
<i>Shorea pinanga</i>	Dipterocarpaceae	61.00	3.73
<i>Dipterocarpus globosus</i>	Anacardiaceae	60.00	4.69
Kubah National Park			
Species	Family	DBH (cm)	AGB (Mg/ha)
<i>Shorea havilandii</i>	Dipterocarpaceae	69.20	8.29
<i>Palaquium stenophyllum</i>	Sapotaceae	66.10	5.66
<i>Anisoptera grossivenia</i>	Dipterocarpaceae	62.70	4.46