The indigenous uses of plants from Siberut, Mentawai, Indonesia

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Ethnobotany Research & Applications 22:18 (2021)

Research

Abstract

Background: Indigenous knowledge systems, like those traditionally practiced by the Mentawai people from the Mentawai Islands, West Sumatra, Indonesia, are a deep-time laboratory that examines how people manage or failed to find adaptive solutions to changes in their surroundings, including biodiversity loss and changing climate. However, many of these practices, including Mentawai’s traditional knowledge system, arat sabulungan, are eroding. Given that Indigenous knowledge systems are believed to make up at least half of humanity’s intellectual heritage, adequate documentation of traditional ecological knowledge is needed, as too are appropriate systems that support the perpetuation of such knowledge. This paper identifies the indigenous uses of Siberut’s flora and explores how this knowledge may underlie the conservation of Siberut’s unique biodiversity. Mentawai values and attitudes toward their traditional ecological knowledge and reasons why their traditional knowledge is eroding are also examined.

Methods: Primary data was derived from various sources, including: observation of peoples’ day-to-day activities; community surveys (number of participants = 494) and key informant interviews (number of informants = 21); and plant collection and identification. Research participants in the community survey were chosen based on their interest and willingness to partake in the survey. Key informants were chosen based on their reputation within the community on the extent of their plant knowledge.

Results: Ethnobotanical data suggests that the Mentawai have ethnobotanical uses for at least half of all plant species on record. Though 98 percent of respondents felt their traditional knowledge is important for the future of Mentawai, a majority felt there were substantial threats to the continuation of their traditions.

Conclusion: Data gathered during the research period suggests that Mentawai indigenous practices and traditions play a critical role in conserving Siberut’s unique biodiversity.

Key words: Biodiversity; Indigenous peoples; traditional ecological knowledge; Mentawai Islands; Indonesia; tropical conservation; Mentawai people

Manuscript received: 01/06/2021 – Revised manuscript received: 25/08/2021 - Published: 18/09/2021
http://dx.doi.org/10.32859/era.22.18.1-33
Background

Indigenous knowledge systems

Indigenous peoples inhabit some of the most biologically diverse regions globally and add substantially to the world’s cultural, linguistic and intellectual heritage (Davis 2009, Gray 1991, Posey 1999, UNDESA 2009). Accumulated over millennia, traditional ecological knowledge (TEK) spans multiple dimensions and scales, and is verified through repetition, empirical observations and recognition of patterns (Mazzocchi 2006, Nicholas 2018). Moreover, these knowledge systems are often: collectively owned; have co-evolved with ecosystems; integrate benefits across many dimensions, and usually pre-date Western science (Mazzocchi 2006, Tiwari et al. 2017, UNDESA 2009, Wilder et al. 2016). Yet concerns remain in relation to the conservation of Indigenous peoples’ knowledge systems as they continue to be marginalised, expropriated and disparaged; forced to adhere to foreign education, religion and politics (UNDESA 2009). Moreover, those processes that threaten biological diversity and ecosystem health also impact indigenous populations (Sheil et al. 2005), causing detrimental effects to their physical and mental health and wellbeing, and their traditional lands and biomes (Maffi 2002, Minority Rights Groups International 2017, Persoon 2008). Yet, Indigenous peoples, whose values, systems and stewardship regularly interact with, sustain, and often perpetuate or enrich traditional lands and ecosystems, offer significant contributions to global biodiversity conservation efforts (Berkes et al. 2000, Corrigan et al. 2018, Corrigan & Hay 2013, Posey 1999, Sheil & Lawrence 2004, Sobrevila 2008, Standley & Hill 2011, Sujarwo & Caneva 2016, Wilder et al. 2016). Given the current global crisis – namely, ecological degeneration, the possibility of climate collapse and unprecedented biodiversity loss, adequate documentation of TEK is needed, as too are appropriate systems that support the perpetuation of such knowledge.

Mentawai, West Sumatra, Indonesia, is home to a rich, biologically diverse rainforest and unique hunter-gatherer culture. Purportedly, the Mentawai people have occupied these islands for thousands of years, maintaining a strong cultural and spiritual connection with the forest they inhabit (Schefold 1989). In varying degrees, the Mentawai people still practice arat sabulungan, a complex, animistic belief system based on the sacred relationships between themselves and the spirits that reside in all animate and inanimate objects. These practices are based on the overarching priority to live in harmonious balance with nature, and offer the Mentawai people a subsistence lifestyle that can provide all food, resources and medicines from the forests surrounding the uma (traditional clan houses usually built on river tributaries throughout the forest). Tribal elders, or sikerei/ sikebbu’kat, are the primary keepers of this knowledge and work to maintain the health of their community, acting as shaman, educator and healer.

Since 1954, foreign practice and ideology were introduced and enforced throughout Mentawai as part of a “modernisation program” for isolated communities (Colfer & Resosudarmo 2002). Labelled as ‘backward’ and ‘primitive’, the Mentawai people were removed from their ancestral lands and relocated into ‘modern’ resettlement villages, where traditional agriculture, religion, education and artefacts were forbidden. As foreign developments and a cash-based economy have become established within the villages; as more children are being sent to government-run schools; as more villagers become reliant on imported foods rather than forest foods and traditional agricultural provisions; and, as fewer youth are undertaking apprenticeships to become sikerei, the transmission of Mentawai TEK is hindered, and more quickly becoming diluted (Bakker 1999, Kusakabe et al. 2015, van Klooster et al. 2019, Wilder et al. 2016). Despite national policies softening to accommodate traditional beliefs and practices (Boedhiharsono 2017), 99 percent of the Mentawai population live within the resettlement villages, with very limited or no access to their traditional knowledge and practices (Persoon 1998, Persoon 2008). The gap between the younger generation and the TEK held and taught by the sikerei and sikebbu’kat (respected elders) is substantial, and growing rapidly.

Aims of this study

The continued richness of biodiversity, intact ecosystems and perpetuation of Mentawai TEK is assumed to be intrinsic to Mentawai wellbeing, and ultimately fundamental to their communities’ survival. Additionally, it is believed that arat sabulungan – Mentawai TEK – governs and, in many ways, may perpetuate Mentawai’s biodiversity (Berkes et al. 2000, Colfer & Resosudarmo 2002, Reyes-Garcia et al. 2014). Considering the Mentawai community’s values, agenda, and long-term goals, this study examines Mentawai uses of plants and the associated traditions. This study is the first to rank these plants according to their perceived importance by the community, and thus offers a fuller understanding of Mentawai TEK practices, customs and taboos, and local conservation priorities. Collaboration with an Indigenous-led non-profit organisation and their research team was foundational to the research approach as it helped us gain greater depth, accuracy, and relevance of results and ramifications.
Materials and methods

Study area

Maileppet (1° 33' 14" S, 99° 10' 58" E) is a coastal village approximately 5 kilometres north of the main port, Muarasiberut, in Southern Siberut, West Sumatra, Indonesia (Figure 1). Nearby Muntei village (1°34'56" S, 99°11'25" E) is situated west of Maileppet on the Muntei River (see Figure 1). Both village districts predominately speak the Sabirut dialect of the Mentawai language. Surrounding the villages are disturbed secondary forests predominately covered by *Metroxylon sagu* Rottb. (Arecaceae), *Musa* L. (Musaceae), *Durio* Adans. (Malvaceae), *Cocos nucifera* L. (Arecaceae), and other useful or commercial crops (e.g., *Areca catechu* L. (Arecaceae) and *Hevea brasiliensis* (Willd. ex A.Juss.) Müll.Arg (Euphorbiaceae)), with mangrove forests lining the coast, and *Colocasia esculenta* (L.) Schott (Araceae). In addition, *pugette'nan* (traditional taro garden fields) and *mone* (clan-owned growing fields) are scattered throughout the landscape. Maileppet and Muntei village regions are located within Siberut’s development zone, where forestry, agricultural and urban developments may occur, and are not within the Siberut National Park conservation zone (WWF 1980).

The Madobag and Matotonan regions, 1°35'43" S, 99°5'2" E and 1°32'19" S, 99°0'58" E respectively, are situated along the Sarereiket River, a Muntei River tributary, approximately 20-25 kilometres upriver northwest from Muarasiberut (see Figure 1). Both districts share the Rereiket dialect of the Mentawai language. The region is remote and usually only accessible by *pompong* (small dugout canoe with a 2 HP engine) or foot. The surrounding vegetation mixes closed-canopy forests, *pumonean* (food forests), *pugette'nan*, and *sagu* (*Metroxylon sagu*) swamps. The Madobag and Matotonan village regions fall within the Siberut National Park traditional use buffer zone, where all traditional use and activities may take place, and commercial logging is not permitted (WWF 1980).

Data Collection

This project was carried out in collaboration with researchers from Yayasan Pendidikan Budaya Mentawai (YPBM), a grassroots non-profit organisation providing cultural and ecological knowledge learning opportunities for students living in resettlement villages in Mentawai. Through a participatory approach, the study sought to empower YPBM collaborators by facilitating research training activities that might enhance team members’ existing skills so that plant identification and ethnobotanical documentation, and monitoring and evaluation activities may be continued following the completion of this study.
The lead researcher lived with the Mentawai community from January to December 2019, and was mostly based in Muntei village to facilitate daily collaboration with YPBM at their office base. Several field trips to the Madobag and Matotan districts were undertaken during this time. In addition, the lead researcher frequently accompanied sikerei and sikebbu'kat whilst they were collecting or preparing medicines. Researcher involvement in day-to-day household and wider community activities allowed more accurate detection of community needs, wants and attitudes, and enabled the lead researcher to become familiar with Mentawai plant traditions and practices in context (similar to experiences of Nolan & Turner 2011). This involvement also supported the detection of emerging socio-cultural trends (Alexiades 1996). Documentation activities (including photography and videography) focused on capturing the value and relevance of TEK to the Mentawai people, whilst also recording individual plant specimens and uses. Voucher specimens for the plants identified as the most useful to the Mentawai people were collected according to standards outlined in Cunningham (2001) and Martin (1995). Specimens were identified using existing literature and deposited in the herbarium at Universitas Andalas (ANDA) for identification and storage [See Appendix 1 for collection details]. These specimens were still awaiting cataloguing at ANDA at the time of publication.

Semi-structured interviews were carried out on a one-on-one basis by Mentawai collaborators from February to March 2019. A total of 494 participants were surveyed. Research participants were chosen based on their interest and willingness to partake in the survey. Recognising that most Mentawai community members hold some level of botanical knowledge (Nolan & Turner, 2011), and to elucidate differences in opinion and knowledge levels between population groups, no bias was given for age, ethnicity, level of education or occupation for those participating in the community survey. Nearly half of all respondents were 18-40 years of age, nearly one-third were over 41 years of age and 12 percent were aged between 12-17 years of age. Fifty-seven percent of participants were male; 43 percent were female. One-quarter of all respondents had not completed any formal schooling, one third had only completed primary school, 38 percent had completed middle and/or high school, and 5 percent of participants had attended university. Sixty-eight percent of respondents identified their religion as Catholic, 26 percent Islam, and 6 percent Protestant.

As suggested by Mentawai collaborators, the lead researcher did not interview participants in the community survey to prevent participants from becoming shy or distracted due to language barriers. The community survey had two sections: i) a mostly closed-ended questionnaire about individual perceptions of Mentawai TEK, and ii) a ‘freelisting’ activity, where respondents were asked to cite useful ‘ethnospecies’ (plant specimens identified as individual species according to Mentawai informants) within previously defined categories, namely: food, medicine, construction, ceremonial, firewood, tools/handicrafts) (Quinlan 2005). No limit was given to how many plants each respondent could list for each category. From these lists, a freelisting matrix was created to document the relative frequency of citation (RFC), and the average order in which each plant was listed, thus attempting to determine the overall cultural saliency of each ethnospecies, where:

\[
RFC = \frac{\text{number of times an ethnospecies was cited}}{\text{total number of informants}}.
\]

The freelisting matrix also sought to reveal variations between age, gender and regional demographics (Caruso 2015, Quinlan 2005, Vogl et al. 2004). Language variations were identified when possible for each ethnospecies cited. Respondent answers that cited plant parts (e.g. loina’, kayu (Bahasa Indonesia), timber), names of ceremonies (e.g. puliaijat pangurei), or objects (e.g., opa, jaraik), and not plant species were excluded from the analysis.

To clarify results gathered from the community survey, 21 key informant interviews with sikerei and sikebbu’kat were conducted. Key informants were selected based on community consensus of these participants being perceived as being highly knowledgeable and experienced in Mentawai plant knowledge. Interviews were carried out by YPBM team members who were fluent in the Sabirut and Rereiket dialects. Using results from the freelisting activity described above, key informant interview questions focused on refining the uses and descriptions of plant data extracted from the community surveys, and confirming that data gathered from these surveys adequately reflected the perceived usefulness and value of species within Mentawai plant traditions. Open questions focused on elucidating how participants gained their knowledge, whether they had taught or were teaching anyone else, and whether they believed the ways that knowledge is being shared and practiced may be changing, under threat, or eroding.
Data analysis

The cultural significance of each ethnospecies was calculated as specified by Silva et al. (2006) as:

\[ CSI = \sum (i \times e \times c) \times CF. \]

Where \( i = \) ethnospecies management [wild (1) or cultivated (2)]; \( e = \) use preference [not preferred (1) or preferred (2)]; \( c = \) use frequency [rarely (1), sometimes (1.5) frequently (2) used]; \( CF = \) correction factor [number of citations for a given ethnospecies divided by the number of citations for the most-mentioned species].

To measure the proportion of informants who regard an ethnospecies as most important, the Importance Value (IV) formula, adapted by Byg & Balslev (2001) from Phillips & Gentry (1993), was used:

\[ IV = n_{is}/n. \]

Where \( n_{is} = \) the number of informants who consider ethnospecies \( s \) most important; and \( n = \) the total number of informants.

Results

Overview

A total of 452 ethnospecies were recorded during the initial 10-month documentation period (January to October 2019): 339 ethnospecies were spontaneously listed during freelist activities (number of informants = 494) and, 127 ethnospecies cited in key informant interviews (n = 21). When asked to clarify whether any species cited may have two or more varieties, informants were able to cite an additional 166 varieties (e.g., aileleppet includes aileleppet simaingo, aileleppet simabulau, aileleppet kaeru'); including 17 varieties of mago' (Musa spp.), 14 varieties of gette' (Colocasia esculenta), and 13 rattan types. A total of 225 ethnospecies could be identified to genus or family level, from which 83 botanical families were represented. Zingiberaceae (20 ethnospecies), Poaceae (12 ethnospecies) and Araceae (11 ethnospecies) were the most highly represented families (Figure 2). Most plant species are believed to be native to the Mentawai islands.

Frequently cited plants in the community freelist activity

The average number of ethnospecies listed by respondents during the community freelist activities was 21.8 (± 12.76 SD, ± 0.57 SE) (Figure 3). Gender did not play a significant role in determining the number of plants cited by respondents (t-test, p > 0.05). However, there was a correlation between age and the average number of plants cited by respondents (ANOVA single factor test, p < 0.05), with men over 60 years of age able to cite significantly more species (M = 28.1, ± 13.3 SD, ± 0.73 SE) than younger respondents (Figure 4). Of the total number of useful ethnospecies cited, 39 percent could be used medicinally, 30 percent used for construction, 25 percent were used for firewood, 24 percent had ceremonial purposes, 19 percent were edible, and 14 percent used for tool-making. One-third of all ethnospecies were listed in more than one category. Of the 339 ethnospecies cited during the community freelist activities, 95 ethnospecies were mentioned by only one respondent.

A total of 64 ethnospecies were listed as food sources. Sagu (Metroxylon sagu), gette' (Colocasia esculenta) and mago' (Musa spp.) were most frequently mentioned as the most important food sources (Table 1). Fifty-seven ethnospecies cited as food sources were mentioned by fewer than 20 percent of respondents. A total of 134 ethnospecies were cited for medicinal purposes. Aileleppet (Graptophyllum pictum) (L.) Griff. (Acanthaceae), kakainau' (Hedychium coronarium J.Koenig (Zingiberaceae) / H. flavescens Carey ex Roscoe (Zingiberaceae)), talingengeng (Piper betle L. (Piperaceae)), kopuk (Kaempferia galanga L. (Zingiberaceae)), and mumumen (Mussaenda fondonso L. (Rubiacae)) were ranked highly, and were mentioned by more than 20 percent of respondents. Only one respondent mentioned thirty-nine medicinal ethnospecies. Eighty-five ethnospecies were listed as important ceremonial plants, of which only five were listed by more than 20 percent of respondents. Medicinal plants were listed highly for ceremonial purposes, along with important traditional foods such as sagu, gette', toilett, and decorative plants sura' (Codiaeum variegatum) (L.) Rumph. ex A.Juss. (Euphorbiaceae)), bekeu (Hibiscus rosa-sinensis L. (Malvaceae)), katsaila (Arenga pinnata (Wurmb.) Merr. (Arecaceae)). A total of 103 ethnospecies were considered as important building materials. Only one respondent cited twenty-four ethnospecies. Katuka (Shorea pauciflora King (Dipterocarpaceae)), sagu, kakatdut (Alstonia spatulata Blume (Apocynaceae)), mancemi (Hopea dryobalanoides Miq. (Dipterocarpaceae) and manggeak (bamboo types) were...
most frequently cited as important building materials. Respondents from the Sarereiket region also ranked *kaboi* (*Pentace triptera* Mast. (Malvaceae)) highly for building purposes.

A total of 86 ethnospecies were listed as firewood, with three ethnospecies cited by 20 percent of respondents. Some respondents commented that all wood might be used as firewood provided they were dry. The most frequently cited ethnospecies for firewood were *manggeak*, *sagu*, and *sibetu* (Siberut dialect) / *eru’teinung* (Rereiket dialect) (*Melastoma sylvaticum* Blume (Melastomataceae)). For handicraft and tool-making, a total of 46 ethnospecies were cited. Rattan kinds, including *peleka* (*Calamus sp.* L (Arecaceae)), *mandorou* (*Calamus caesius*...
Blume (Arecaceae), and sasa (Calamus sp.), were ranked most highly, along with osap (Gleicheniaceae C.Presl), toiteit, manggeak and sagu.

Figure 3. Distribution of plant knowledge among the Mentawai people living in the Sabirut and Sarereiket regions of Siberut, Mentawai Islands, as indicated by the list length of informants (n = 494) who cited certain plants across all surveyed categories. Total number of plant species mentioned as being useful was 339. Average list length was 21.8 (± 12.76 SD, ± 0.57 SE).

Figure 4. Average number of plants cited during freelisting surveying per age category and gender by the Mentawai people living in the Sabirut and Sarereiket regions of Siberut, Mentawai Islands (n=494). Men over 60 years of age cited more plants than other age and gender categories (mean 28.1, ± 16.14 SD, ± 0.72 SE). Overall, there was no significance difference among list length between genders (ANOVA single factor test, p < 0.05).
Table 1. The top five most frequently cited ethnospecies within each category (food / nutritional, medicinal, ceremonial, building, firewood, and tool-making / handicraft) by the Mentawai people living in the Sabirut and Sarereiket regions of Siberut, Mentawai Islands, Indonesia. Relative frequency of citation (RFC) shows the proportion of the population who cited that ethnospecies within that category, and average rank (Av. rank) is the average list order in which respondents cited that ethnospecies for that category. Sagai (Sab) / Sagu (Sar) (Metroxylon sagu Rottb. (Arecaceae)) was frequency cited as important for all six categories. (Ment –Mentawai language, Sib –Siberut dialect, Sab – Sabirut dialect, Sar –Rereiket dialect, BI – Bahasa Indonesia).

| Family       | Scientific name                                      | Vernacular name/s          | RFC  | Av. rank |
|--------------|------------------------------------------------------|-----------------------------|------|----------|
| **Food / nutritional** |                                                      |                              |      |          |
| Areceae      | Metroxylon sagu Rottb.                                | Sagai (Sab) / Sagu (Sar)    | 0.96 | 1.4      |
| Areceae      | Colocasia esculenta (L.) Schott                      | Gette’ (Ment) / Keladi (Bl) | 0.78 | 2.6      |
| Musaceae     | Musa spp. L.                                        | Bago’ (Sab) / Mago’ (Sar) / Pisang (Bl) | 0.76 | 2.7      |
| Areceae      | Cocos nucifera L.                                  | Toiet (Ment) / Kelapa (Bl)  | 0.47 | 3.9      |
| Malvaceae    | Durio spp. L.                                       | Doriat (Ment) / Durian (Bl) | 0.21 | 5.2      |
| **Medicinal** |                                                      |                              |      |          |
| Acanthaceae  | Graptophyllum pictum (L.) Griff.                     | Aileleppet (Ment)           | 0.44 | 2.7      |
| Zingiberaceae| Hedychium coronarium J.Koenig / Hedychium flavescens Carey ex Roscoe | Kakainau’ (Sab) / Simakainau’ (Sar) | 0.43 | 2.7      |
| Piperaceae   | Piper betle L.                                       | Talingengeng (Ment) / Sirih (Bl) | 0.33 | 2.6      |
| Zingiberaceae| Kaempferia galanga L.                               | Kopuk (Sab) / Sikopuk (Sar) / Kencur (Bl) | 0.32 | 3.4      |
| Rubiaceae    | Musaena frondosa L.                                 | Mumunen (Sib)               | 0.22 | 2.6      |
| **Ceremonial** |                                                      |                              |      |          |
| Euphorbiaceae| Codiaeum variegatum (L.) Rumph. ex A.Juss.           | Sura’ (Ment)                | 0.36 | 1.9      |
| Areceae      | Metroxylon sagu Rottb.                                | Sagai (Sab) / Sagu (Sar)    | 0.24 | 2.2      |
| Acanthaceae  | Graptophyllum pictum (L.) Griff.                     | Aileleppet (Ment)           | 0.24 | 3.2      |
| Areceae      | Colocasia esculenta (L.) Schott                      | Gette’ (Ment) / Keladi (Bl) | 0.22 | 2.5      |
| Zingiberaceae| Hedychium coronarium J.Koenig / Hedychium flavescens Carey ex Roscoe | Kakainau’ (Sab) / Simakainau’ (Sar) | 0.21 | 3.2      |
| **Building** |                                                      |                              |      |          |
| Dipterocarpaceae| Shorea pauciflora King                           | Katuka (Ment)               | 0.50 | 1.7      |
| Areceae      | Metroxylon sagu Rottb.                                | Sagai (Sab) / Sagu (Sar)    | 0.34 | 2.7      |
| Apocynaceae  | Alstonia spathulata Blume                            | Kakadut (Sab) / Gite (Sar) / Pulai (Bl) | 0.29 | 2.8      |
| Dipterocarpaceae| Hopea dryobalanoides Miq.                       | Mancemi (Ment)              | 0.28 | 2.8      |
| Poaceae      | Bamboo types                                        | Manggeak (Ment) / Obbuk (Ment) / Bambu (Bl) | 0.27 | 3.0      |
| **Firewood** |                                                      |                              |      |          |
| Poaceae      | Bamboo types                                        | Manggeak (Ment) / Obbuk (Ment) / Bambu (Bl) | 0.45 | 2.3      |
| Areceae      | Metroxylon sagu Rottb.                                | Sagai (Sab) / Sagu (Sar)    | 0.31 | 2.5      |
| Melastomataceae| Melastoma sylvaticum Schltdl.                     | Sibetu (Sab) / Erue’teinung (Sar) | 0.20 | 2.9      |
| Euphorbiaceae| Macaranga sp. Thouars                                | Katumanggei (Ment)          | 0.18 | 2.6      |
| Rhizophoraceae| Rhizophora apiculata Blume                        | Bakat (Ment) / Bakau (Bl)   | 0.18 | 2.0      |
| **Tool-making / handicrafts** |                                                  |                              |      |          |
| Areceae      | Calamus sp. L.                                       | Pelege (Ment)               | 0.57 | 2.0      |
| Areceae      | Calamus caesius Blume                                | Mandorou’ (Ment)            | 0.40 | 2.7      |
| Areceae      | Calamus sp. L.                                       | Sasa (Ment)                 | 0.36 | 2.6      |
| Gleicheniaceae| Gleicheniaceae C.Presl                               | Osap (Ment)                 | 0.32 | 2.3      |
| Areceae      | Cocos nucifera L.                                    | Toiet (Ment) / Kelapa (Bl)  | 0.19 | 3.3      |
Key informant perspectives of Mentawai medicinal and useful plants
A total of 147 ethnospecies were cited during key informant interviews: 77 medicinal plants, and 70 plants for food, building, tool-making, firewood and ceremonial purposes. Of these, 20 plants had not been previously cited in the community survey. When shown the community freelisting activity results, all key informants agreed that the results and ranking adequately reflected the salient plants used for medicines and other purposes. Key informants made additional comments suggesting that although the plants cited during the community freelisting activity were important, factors such as ease of harvest, relative abundance, and presence in bebet uma (plants growing next to the uma) may contribute to higher rankings of some plants. Other observations suggest that some plants may have received lower rankings since survey activities took place outside flowering, fruiting and/or harvesting seasons.

Significance and importance of medicinal plants and their uses
Using the top-ranking results from the community freelisting activity, coupled with recommendations suggested in key informant interviews, 31 ethnospecies were identified as important medicinal plants for healing both physical and spiritual diseases and illnesses (Figure 5; Table 2). Of these, 35 percent were herbaceous, 19 percent trees, 16 percent shrubs, 16 percent grasses, 6 percent climbers, 3 percent palms, and 3 percent ferns. Zingiberaceae was the most represented plant family (10 species). There were minor differences between the rankings of plants cited during the community freelisting activity and those cited during the key informant interviews. Aileleppet (Graptopphyllum pictum) was ranked most highly in RFC, CSI, and IV (Table 3).

Figure 5: Three of the most frequently cited plants used for medicinal purposes by the Mentawai people living in the Sabirut and Sarereiket regions of Siberut, Mentawai Islands, Indonesia. From left to right: Aileleppet (Graptopphyllum pictum (L.) Griff. (Acanthaceae)), kakainau’ (Sabirut dialect) / simakainau’ (Rereiket dialect) (Hedychium coronarium J.Koenig (Zingiberaceae)), and talingengeng (Piper betle L. (Piperaceae)). All three plants are readily found in bebet uma (plants in the gardens surrounding the uma). Aileleppet and kakainau’ are also considered important for Mentawai ceremonies and rituals.
Table 2. Thirty-one important medicinal plant species and examples of their uses for the Mentawai people living in the Sabirut and Sarereiket regions of Siberut, Mentawai Islands, Indonesia (M – medicine, C – ceremonial, F – food, W – firewood, B – building, T – tool making / handicrafts; Ment –Mentawai language, Sib –Siberut dialect, Sab –Sabirut dialect, Sar –Sarereiket dialect, BI – Bahasa Indonesia; Ba – bark, Fl – flower, Fr – fruit, L – leaf, P – pith, Rh – rhizome, R – roots, S – shoots, St – stem, Ti – timber, Tu – tuber / corm).

| Community freelisting rank | Category | Family | Scientific name | Vernacular name(s) | Plant habit | Part used | Reported uses |
|----------------------------|----------|--------|-----------------|--------------------|-------------|-----------|---------------|
| 1                          | M C      | Acanthaceae | *Graptophyllum pictum* (L.) Griff. | Alleleppet (Ment) | Shrub       | L         | Medicine used for fevers, swelling, headaches and sore back. Can be grated and used topically, or drunk as a tea. Also has significant ceremonial importance, and usually features in all ceremonies. Often planted at the front of a new *uma*. *Maileppet* means ‘cooled’, indicating its use for treating heat conditions. |
| 2                          | M C      | Zingiberaceae | *Hedychium coronarium* J.Koenig / *Hedychium flavescens* Carey ex Roscoe | Kakainau’ (Sab) / Simakainau’ (Sar) | Herbaceous  | Fl, Fr, L, R, S | Used in many *sikerei* medicines, particularly in *kisei* preparations (a type of spiritual illness or disease manifested in the physical body in varying ways). Roots used in *laggek pakop sagu*. Young shoots used to treat ulcers. Rotting fruits can be used to treat vomiting. The flower is often worn by *sikerei* when walking in the forest in case medicine is needed whilst away from the plant source. The leaves are worn as a skirt by *sikerei* during ceremonial rituals. |
| 3                          | M        | Piperaceae | *Piper betle* L. | Talingengeng (Ment) / Sinth (BI) | Climber     | L, R      | Used in many medicines, particularly for *kisei* medicines. Used in *laggek sasaggoi* and *laggek lango* preparations. Used topically to treat machete wounds, or other open skin abrasions. |
| 4                          | M C      | Zingiberaceae | *Kaempferia galanga* L. | Kopuk (Sab) / Sikopuk (Sar) / Kencur (BI) | Herbaceous  | L, Rh     | Used in *laggek lango* and *laggek leitik* preparations. When delirious or possessed, the smell of the leaf is used to "surprise" patients back to consciousness. Rhizome can be used to treat stomach ache and fevers. |
| 5                          | M C      | Rubiaceae | *Mussaenda frondosa* L. | Mumunen (Sib) | Shrub / tree | Ba, Fl, L, R | Used in *laggek siripusou* and *laggek leitik* remedies. A very important plant used for nearly all ceremonies. The leaves are worn to signify a woman is pregnant. Mumunen means *buluk raumun purimanua* (‘leaf that brings blessings for a full and happy life’). |
| 6                          | M C      | Zingiberaceae | *Curcuma longa* L. | Kiniu (Ment) / Kunyit (BI) | Herbaceous  | L, Rh     | Used as a base for many medicines. Used in food preparations. Grated and used topically for treating skin infections, e.g. boils. The root is grated and painted over the body and face by *sikerei* during ceremonies. |
| 7                          | M C      | Asparagaceae | *Cordyline fruticosa* (L.) A.Chev. | Boblo (Ment) | Shrub       | St        | Used in medicinal preparations to treat stomach ache, mixed with a variety of plant stems. Also planted at gravesites. Leaves are important for ceremonies. |
| 8                          | M        | Poaceae | *Eleusine indica* (L.) Gaertn. | Ngiti-ngiti (Sib) / Komensakkoko’ (Sib) | Grass       | L         | Used in *laggek pakop sagu* preparations. |
| 9                          | M F      | Zingiberaceae | *Hornstedtia conica* Ridl. | Kukuet (Ment) | Herbaceous  | Fl, Fr, L, Rh, St | Often used in *masisingin* (sweet smelling) medicines. Used in some snakebite remedies. Leaves are crushed and used whilst bathing to clean the skin. Flowers are used in *laggek lango* preparations. Flowers seeped in hot water and drunk as a tonic. Fruits are eaten for food. |
| Communit y freelisti ng rank | Category | Family          | Scientific name                                    | Vernacular name(s)        | Plant habit | Part used | Reported uses                                                                 |
|-----------------------------|----------|----------------|---------------------------------------------------|---------------------------|-------------|----------|--------------------------------------------------------------------------------|
| 10                          | M F C    | Zingiberaceae  | Zingiber officinale Roscoe                        | Laiga’ (Ment) / Jahe (Bl) | Herbaceous  | Rh       | Used to treat stomach complaints. Also valued in cooking.                       |
| 11                          | M        | Poaceae        | Rottboellia sp. Naezen                            | Boku-boku’ (Ment)         | Grass       | L        | Leaves are used in medicine to treat “inside body heat” (a type of fever).     |
| 12                          | M C      | Malvaceae      | Hibiscus rosa-sinensis L                         | Bekeu (Ment) / Kembang sepatu (Bl) | Shrub       | L, Fl    | Rotting flowers are also used for some medicines. Important ceremonial flower worn in hair, alongside simakainau’ (Hedychi um coronarium / H. flavescens). |
| 13                          | M B C T  | Euphorbiaceae  | Codiaeum variegatum (L.) Rumph. ex A.Juss.       | Sura’ (Ment)              | Shrub / tree | L, St    | Used in laggek sirittet. Used to treat fungal infections and skin ulcers.      |
| 14                          | M C      | Zingiberaceae  | Alpinia galanga (L.) Willd.                      | Oroket (Sab) / Palakkokoai (Sar) | Herbaceous  | Fl, Fr, L, S | Used in many kisei medicines. Used in laggek siri pusou sikatait, laggek pakop suga and laggek lango’ preparations. Can be used for treating headache and stomach ache. Leaves are sometimes held whilst performing ceremonial dances. |
| 15                          | M C      | Marattiaceae   | Angiopteris evecta (G.Forst.) Hoffm.             | Bakkat laggai (Ment)      | Fern        | R, Tu    | Roots are granted and covered over a sacrificial animal to protect its spirit. In this ritual, sikerei ask for the animal’s blessing and ask that its spirit would bring more of its kind to the clan group. If the animal is hunted from the forest, sikerei seek blessing from the spirit of the forest. |
| 16                          | M        | Zingiberaceae  | Etlingera coccinea (Blume) S.Sakai & Nagam.      | Pelekak (Sib)             | Herbaceous  | Fl, L, St | If after being sick for a long time and the body is still weak, the flower is mixed with several other leaves and flowers to help restore the body’s energy. Kinoso (young newly blossomed flower) pelekak used in laggek lango’ preparations. Was also observed being used in treating more complicated illnesses. |
| 17                          | M        | INDENT         | INDENT                                           | Obboi (Sib)              | Grass       | L, R     | Used to treat a sweaty, hot fever. Used in laggek dugui preparations. Can be used for treating stomach aches and coughs. |
| 18                          | M C F    | Zingiberaceae  | Etlingera elatior (Jack) R.M. Sm.                | Tottot mamai (Sab) / Gojo (Sar) | Herbaceous  | Fl, L, S | Tairatt (young flowers) are used in many medicine preparations. Gojo (stems / shoots) are used to treat stomach ache. If a child hasn’t taken its mothers milk for several days and still refuses the breast, the leaves are mixed and drunk to encourage her to return (laggek sika to’to’). Used in laggek lango’ preparations. Totonan (fruits) eaten and tairatti often cooked with vegetables or meat. |
| 19                          | M F W    | Myrtaceae      | Psidium guajava L                                | Jabbui (Ment) / Sabbui (Sar) | Tree        | Fr, L    | Leaf mixed with other leaves and drunk as a tea to treat diarrhoea. Fruit eaten. |
| 20                          | M C      | Piperaceae     | Piper sarmentosum Roxb.                          | Baba (Sib)                | Climber     | L        | Used in laggek lango’ and laggek siripusou preparations. Can be used to treat drained or injured joints. |
| Community freelisting rank | Category | Family | Scientific name | Vernacular name(s) | Plant habit | Part used | Reported uses |
|---------------------------|----------|--------|----------------|-------------------|------------|-----------|---------------|
| 21 | M | Acoraceae | Acorus calamus L. | Butek-butek (Sab) / Sumamra (Sar) | Grass | L | Used in *laggek lango* ˈ sikebukat preparations. Often mixed with a variety of Zingiberaceae species and covered over the forehead and back of neck. |
| 22 | M B C W | Fabaceae | Erythrina subumbrans (Hassk.) Merr. | Mancuat (Sab) / Matcuat (Sar) | Tree | Ba | Used in many *laggek lango* preparations, especially for women after giving birth. Flower worn by newly initiated sikerei. |
| 23 | M C F | Zingiberaceae | Alpinia malaccensis C.Presl | Kojo koddiai (Sib) / Kasisingin (Sab) / Pasisingin (Sar) | Herbaceous | FL, Fr, L, Rh, St | Used in many medicines including *laggek siripusou* preparations. Leaf used to close obbuk (bamboo) whilst cooking. Fruit is eaten. |
| 24 | M C | Zingiberaceae | Curcuma zanthorrhiza Roxb. | Kiniu sailu’ (Ment) / Temulawak (Bl) | Herbaceous | FL, Rh | Used in *laggek pakop sagu* and *laggek siripusou* preparations. Used to heal the spirit of a person. When a sick, the plant is grated and mixed with parts of the gojo (*Etlingera elatior*) plant and taken to the forest to entice the spirit of that person to take on the colour of its flower. |
| 25 | M W | Annonaceae | Cananga odoratum (Lam.) Hook.f. & Thomson | Poak (Sib) | Tree | Ba, L, R, Ti | Used in *laggek lango*, *laggek sibebelak* and *laggek sisasaka* preparations. Can be used as firewood. Used in medicines when giving birth. Can be used to treat sprained or injured joints. |
| 29 | M C | Acanthaceae | Justicia gendarussa Burm.f. | Pakasele (Sab) / Pangasele (Sar) | Shrub | L, R, St | Used in many *kisei* medicines. Used in *laggek lettiki* preparations. Can be used to treat intestinal complaints. |
| 32 | M C T | Arecaceae | Daemonorops angustifolia (Griff.) Mart. | Rui (Sab) / Labi (Sar) | Palm | L, St | Used in *laggek pakop sagu* preparations. Leaves are used to seal the top of the roof of the uma. Part of the palm is used to make gigiqik (a tool used to crush and grate medicinal plants). New growth at the top of the palm can be eaten. |
| 38 | M | Commelinaceae | Amischotolype mollissima (Blume) Hassk. | Lemu-lemu’ (Ment) | Shrub | Ba, L, St | Used in *laggek appu* and *laggek lango* preparations. |
| 45 | M C | Poaceae | Cymbopogon citratus (DC.) Stapf | Siat-siat (Sab) / Jiat-jiat (Sar) / Serai (Bl) | Grass | L, St | Used in many medicinal preparations. Stem used to add flavour to foods. |
| 53 | M | Onagraceae | Ludwigia linifolia Poir. | Lotte-lotte’ (Sab) / Mumru tuktuk (Sar) | Herbaceous | L, R | Used in *laggek simatiet*, *laggek sasaggoi*, *laggek baga siripusou* and *laggek pakop sagu* preparations. Called mumru tuktuk as its flower form resembles tuktuk mumru (prawn whisks). |
| 61 | M | Annonaceae | Goniophalumus sp. (Blume) Hook.f & Thomson | Simuinek (Sar) | Tree | L, St | Used in *laggek pakop sagu*, *laggek lango*, *laggek besit ute* and *laggek sasaggoi* preparations. |
| Family          | Scientific name                        | Vernacular name(s)           | Community RFC | RFC | CSI | IV  |
|-----------------|----------------------------------------|------------------------------|---------------|-----|-----|-----|
| Acanthaceae     | *Graptophyllum pictum* (L.) Griff.     | Aileleppet (Ment)            | 0.44          | 0.67| 4.00| 0.48|
| Zingiberaceae   | *Hedychium coronarium* Koenig / *Hedychiun flavescens* Carey ex Roscoe | Kakainau’ (Sab) / Simakainau’ (Sar) | 0.43          | 0.57| 3.14| 0.10|
| Rubiaceae       | *Mussaenda frondosa* L.                | Mumunen (Sib)                | 0.22          | 0.52| 1.71| 0.05|
| Zingiberaceae   | *Kaempferia galanga* L.                | Kopuk (Sab) / Sikopuk (Sar) / Kencur (BI) | 0.32          | 0.43| 0.64| 0.05|
| Poaceae         | *Eleusine indica* (L.) Gaertn.         | Ngiti-ngitit (Sib) / Komensakkoko’ (Sab) | 0.14          | 0.43| 1.93|     |
| Zingiberaceae   | *Etlingera coccinea* Blume / S. Sakai & Nagam. | Pelekak (Sib) | 0.07          | 0.33| 0.75| 0.05|
| Piperaceae      | *Piper betle* L.                       | Talingengeng (Ment) / Sirih (BI) | 0.33          | 0.29| 0.64| 0.05|
| Asparagaceae    | *Cordyline fruticosa* (L.) A.Chev.    | Boblo (Ment)                 | 0.15          | 0.29| 1.71|     |
| Poaceae         | *Rottboellia sp.* Naezén              | Boku-boku’ (Ment)            | 0.10          | 0.29| 0.64| 0.05|
| Maratiaceae     | *Angiopteris evecta* (G.Forst.) Hoffm. | Bakkat laggai (Ment)         | 0.07          | 0.24| 1.07|     |
| Fabaceae        | *Erythrina subumbrans* Hassk. / Merr. | Mancuat (Sab) / Matcuat (Sar) | 0.03          | 0.24| 1.07|     |
| Commelinaceae   | *Amischotolype mollissima* Blume / Hassk. | Lemu-lemu’ (Ment) | 0.02          | 0.24| 1.07|     |
| Zingiberaceae   | *Curcuma longa* L.                    | Kiniu (Ment) / Kunyit (BI)   | 0.15          | 0.19| 1.14|     |
| Zingiberaceae   | *Alpinia galanga* (L.) Wild.          | Oroket (Sab) / Palakkokoai (Sar) | 0.07          | 0.19| 0.86| 0.05|
| Arecaceae       | *Daemonorops angustifolia* (Griff.) Mart. | Rui (Sab) / Labi (Sar)     | 0.03          | 0.19| 0.43|     |
| Acanthaceae     | *Justicia gendarussa* Burm.f.         | Pakasele (Sab) / Pangasele (Sar) | 0.03          | 0.19| 0.86|     |
| Zingiberaceae   | *Hornstedtia conica* Ridl.            | Kukuet (Ment)                | 0.12          | 0.14| 0.64|     |
| Zingiberaceae   | *Zingiber officinale* Roscoe          | Laiga’ (Ment) / Jahe (BI)    | 0.11          | 0.14| 0.64|     |
| Malvaceae       | *Hibiscus rosa-sinensis* L.           | Bekeu (Ment) / Kembang sepatu (BI) | 0.09          | 0.14| 0.86|     |
| INDENT          | INDENT                                 | Obboi (Sib)                 | 0.06          | 0.14| 0.64|     |
| Piperaceae      | *Piper sarmentosum* Roxb.             | Baba (Sib)                  | 0.05          | 0.14| 0.64|     |
| Zingiberaceae   | *Etlingera elatior* (Jack) R.M. Sm.   | Tottot mamai (Sab) / Gojo (Sar) | 0.04          | 0.14| 0.32|     |
| Poaceae         | *Cymbopogon citratus* (DC.) Stapf     | Siat-siat (Sab) / Siat-siat (Sar) / Sera (BI) | 0.02          | 0.14| 0.64|     |
| Onagraceae      | *Ludwigia linifolia Poir.*            | Lotte-lotte’ (Sab) / Mumru tuktuk (Sar) | 0.01          | 0.14| 0.32|     |
| Annonaceae      | *Goniolobalumus sp.* Blume / Hook. f. & Thomson | Simuinek (Sar) | 0.01          | 0.14| 0.32|     |
| Euphorbiaceae   | *Codaeae variegatum* (L.) Rumph. ex A.Juss. | Sura’ (Ment) | 0.08          | 0.10| 0.57|     |
| Myrtaceae       | *Psidium guajava* L.                  | Jabbi (Ment) / Jambu biji (BI) | 0.05          | 0.10| 0.43|     |
Significance and importance of other useful plants
Using the top-ranking citations from the freelisting activity, along with recommendations provided in key informant interviews, 32 ethnospecies were identified as the most useful plants across five categories (nutritional, ceremonial, building, tool-making and firewood) (Figure 6; Table 4). Of these, 63 percent were trees, 9 percent palms, 9 percent rattan kinds, 9 percent herbaceous, 3 percent grasses, 3 percent ferns and 3 percent shrubs. Acoraceae was the most represented botanical family (six species identified). *Sagai* (*Metroxylon sagu*) ranked highest for RFC, CSI and IV (Table 5). Plants that were considered more valuable for medicinal use and previously cited in Table 2 were excluded from Table 4. Despite *sagai* being listed as the most important food source for the Mentawai, it was observed that most families living in resettlement communities were more likely to eat rice, rather than *sagai* at every meal. Further investigation as to the reasons why this is the case have yet to be examined, but it is assumed that convenience and a lack of access to clan lands and resources has influenced this choice.

Figure 6. Three of the most frequently cited plants considered useful for food, building, firewood, ceremony, and/or tool-making purposes by the Mentawai living in the Sabirut and Sarereiket regions of Siberut, Mentawai Islands. From left to right: *Sagai* (Sabirut dialect) / *Sagu* (Rereiket dialect) (*Metroxylon sagu* Rottb. (Arecaceae)), *manggeak* and *obbuk* (bamboo types), and *gette’* (*Colocasia esculenta* (L.) Schott (Araceae)).
### Table 4. Thirty-two important plant resources and examples of their uses for the Mentawai people living in the Sabirut and Sarereiket regions of Siberut, Mentawai Islands, Indonesia (M – medicine, C – ceremonial, F – food, W – firewood, B – building, T – tool making / handicrafts; Ment – Mentawai language, Sib – Siberut dialect, Sab – Sabirut dialect, Sar – Sarereiket dialect, BI – Bahasa Indonesia; Ba – bark, Fl – flower, Fr – fruit, L – leaf, P – pith, Rh – rhizome, R – roots, S – shoots, St – stem, Ti – timber, Tu – tuber / corm).

| Community freelistin rank | Category | Family | Scientific name | Vernacular name(s) | Plant habit | Part used | Reported uses |
|---------------------------|----------|--------|-----------------|--------------------|------------|----------|---------------|
| 1                         | B C F M T W | Arecaceae | Metroxylon sagu Rottb. | Sagai (Sab) / Sagu (Sar) | Palm | Ba, L, P, R, Sh | Pith is a staple food source for humans, and all domesticated animals. Leaves are used for roofing, cooking sagu, cooking utensils (e.g. bibiip), tappiri (basket for storing processed sagu). Spine of leaf is as duck food, and for making babaklu kerei (sacred sikerei box) and bolobop (large carrying basket). The skin is used dried for firewood (salot), and as a long-lasting torch. Skin is also used for making opa and karajug (carrying baskets). Roots and shoots used in medicines. Skin and leaves used as building materials. Fronds are used to burn off feathers and hair of ceremonial meats. An important plant traded in alat toga negotiations (where possessions of wealth are negotiated as a bride dowry). |
| 2                         | B C F M T W | Poaceae | Bamboo types | Manggeak (Ment) / Obbuk (Ment) / Bambu (BI) | Grass | Sh | Used for obbuk – used like an oven for cooking meats, vegetables, sagu, and to store and carry food and water. Important firewood source. Young shoots are eaten and used in medicine preparations. Used for many building purposes – e.g. small structures / shelter, animal pens, fencing, flooring, tool-making, roofing (kalasau – long pieces used to hold sagu leaves). Used to build goro jobatoinan (aqueduct). Ceremonial significance – e.g. uma juju simagre (home of the spirits). Used to store medicines (uma laggek). Worn by women whilst fishing to store fish (lagasat). Leaves are used as flooring for roiget gou’-gou’ (chicken) basket). |
| 3                         | C F M T | Araceae | Colocasia esculenta (L.) Schott | Gette’ (Ment) / Keladi (BI) | Herbaceou s | L, St, Tu | Staple food source for humans. Tubers, stems and young leaves are eaten. Leaves can be used as a tobacco substitute. Older, yellowing leaves are used in several medicines. Important plant traded in alat toga negotiations. Important ceremonial food. |
| 4                         | B C F M T W | Arecaceae | Cocos nucifera L. | Toitet (Ment) / Kelapa (BI) | Palm | Fr, L | Staple food source for humans and domesticated animals. Young coconut water is drunk and used in |
| Community freelist ranking | Category | Family | Scientific name | Vernacular name(s) | Plant habit | Part used | Reported uses |
|--------------------------|----------|--------|-----------------|-------------------|------------|-----------|---------------|
|                          |          |        |                 |                   |            |           |               |
| 5                        | C F M T  | Musaceae | Musa spp. L.    | Bago’ (Sab) / Mago’ (Sar) / Pisang (Bl) | Herbaceous | Fl, Fr, L | Staple food source for humans, saina’ (pigs) and gou’-gou’. Leaves are traditionally worn as a skirt by women whilst fishing. Flowers used in medicines. Leaves are dried and used as cigarette rolling papers. Leaves used to wrap and protect food. |
| 6                        | B T      | Arecaceae | Calamus sp. L. | Pelege (Ment)    | Rotan      | L, S, St  | Used to make karajug (large woven basket carried on the back), opa (small woven basket carried on the back), orek (basket to store cooked sagu), letcu (bracelet), roiget (gou’-gou’ basket), talatat (storage basket). Leaves used medicinally to treat intestinal worms. Used as rope. Shoots used in laggek pakop sagu. |
| 7                        | B M T W  | Dipterocarpaceae | Shorea pauciflora | Katuka (Ment)  | Tree       | Ba, Ti    | Important structural timber. Used to carve abak (dug-out canoe). Bark used in medicinal preparations. Large boles can be sold from IDR 2,000,000. |
| 8                        | B F W    | Malvaceae | Durio spp. Adans. | Doriat (Ment)  | Tree       | Fr, R, Ti | Seasonal food source for humans, and domesticated and wild animals. Large roots are used to carve tegge (machete) handles. Seeds are replanted. Used for construction. Important tree traded in alat toga negotiations. |
| 9                        | B T      | Arecaceae | Calamus caesius | Mandorou’ (Ment) | Rotan      | St        | Used to make karajug, opa, roiget and other small baskets (e.g. tuku). Used to restring skulls and hang to protect the uma. Used as rope for a variety of purposes. |
| 10                       | B T      | Arecaceae | Daemonorops sp. | Sasa (Ment)     | Rotan      | St        | Used to make bola (floor mats), garangat (small axe). Used to tie bibibilit gajuma (drum skins), tingan jajat (cultural paraphernalia hung in the uma). If someone steals something, but denies, the two parties agree to cut a piece of sasa. If the accused person was lying, within a week they would become sick, and die. Can be sold as income. |
| Commun ity freelistin g rank | Category | Family | Scientific name | Vernacular name(s) | Plant habit | Part used | Reported uses |
|-----------------------------|----------|--------|----------------|-------------------|------------|----------|---------------|
| 11                          | C M T    | Gleicheniaceae | Gleicheniaceae C.Presl | Osap (Ment) | Fern | L, St | Used to make letcu, letcu baku (ties for sikerei keepsake box). Leaves used in medicinal preparations, particularly in some laggek kisei variations. Leaves used in healing ceremonies. |
| 12                          | B C T W  | Apocynaceae | Alstonia spatulata Blume | Kakatdut (Sab) / Gite (Sar) / Pulai (BI) | Tree | Ti | Used for carving tools and important cultural artefacts, including jaraik (sacred symbol to prevent harmful influences entering the uma). Cabinetry timber. Used to make floorboards. Previously used to make coffins. |
| 13                          | B T W    | Dipterocarpaceae | Hopea dryobalanoides Miq. | Mancemi (Ment) | Tree | Ti | Important structural timber – used for beams, joists, rafters, floorboards. Used to carve paluga (oar). Used to carve decorative pieces for the uma. |
| 14                          | B T W    | Rhizophoraceae | Rhizophora apiculata Blume | Bakat (Ment) / Bakau (BI) | Tree | Ti | Used for firewood. Important building resource, particularly around the coastal areas where tidal inundation may occur. |
| 15                          | B C M T  | Dipterocarpaceae | Dipterocarpus fusiformis P.S.Ashton | Elagat (Sab) / Kara-kara (Sar) / Kruing (BI) | Tree | Ba, Ti, Resin | Important structural timber – used to create footbridges, floorboards, verandas. Rotting wood is host to an edible worm. Before kerosene became accessible, oil from the wood was used to light lanterns. Large boles can be sold for IDR 2-3,000,000. Used in kisei medicines. |
| 16                          | C T      | Arecaceae | Arenga pinnata (Wurmb) Merr. | Poula (Ment) / Katsaila (Ment) / Anau (BI) / Aren (BI) | Palm | Fl, L, St, Ti | Leaves are arranged in the hair of sikerei during ceremony. At the beginning of a ceremony, a small piece is tied on the ngalou (necklace) of all those present to signify blessing and protection during the ceremony. Leaves are used to carry saina’ and monkeys between locations. Leaves also used to make brooms. Trunk used to make gajuma (drum), sasaala (hammer used to make kabit (loincloth)). The flower collects water, which is drunk. Hairs are used as a strainer in processing sagu. |
| 17                          | B T W    | Myristicaceae | Horsfieldia sp. Blume ex DC. | Ribbu (Ment) | Tree | Ti | Highly valued structural timber. Used for dumundai (structural stumps for uma). Source of firewood. |
| 18                          | B W      | Euphorbiaceae | Macaranga sp. Thouars | Katumanggei (Ment) | Tree | Ti | Timber used for beams in the uma. Used to create overhead storage in the uma. Used for firewood. |
| 19                          | F M W    | Melastomataceae | Melastoma sylvaticum Blume | Sibetu (Sab) / Eru’teinung (Sar) | Tree | L, Ti | Used for firewood. Leaves are used as gou’-gou’ bedding in roiget. Leaves used to treat stomach ache. Fruit is eaten and used in medicinal preparations. Worms found in bole are used as fishing bait. Worms can also be eaten. |
| 20                          | F M      | Convolvulaceae | Ipomoea sp. L. | Gobi’ (Sab) / Siputeteket (Sar) / Ubi jalar (BI) | Herbaceous | Tu | Corn eaten. Leaves can be eaten, although rare. |
| Community freelistin g rank | Category | Family         | Scientific name                  | Vernacular name(s)                  | Plant habit | Part used | Reported uses                                                                                                                                                                                                 |
|-----------------------------|----------|----------------|----------------------------------|-------------------------------------|-------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 21                          | B W      | Malvaceae      | *Pentacle triptera* Mast.        | Kaboi (Sib)                           | Tree        | Ba, Ti    | Important structural timber for building **uma**. Can be used to carve **abak**. Bark used to make **dedebu** (bucket used for processing sagu). Large boles can be sold from IDR 1,800,000. Can be used as firewood. |
| 22                          | B C T W  | Dipterocarpaceae | *Shorea sp.* Roxb. ex C.F.Gaertn. | Karai (Ment)                          | Tree        | Ti        | Structural timber used for walls, doors and floorboards. Wood is used to carve **jaraik** (sacred carving). Used to make **karaibo** (shield). Used to carve **abak** and **paluga**. |
| 23                          | B F W    | Sapindaceae    | *Nephelium lappaceum* L.         | Bairabbit (Sib) / Rambutan (Bl)      | Tree        | Fr, Ti    | Seasonal food source. Source of firewood.                                                                                                                                                                       |
| 24                          | F M      | Euphorbiaceae  | *Manihot sp.* Mill.              | Bairatti (Sab) / Sipukaju (Sar) / Ubi kayu (Bl) | Shrub       | Tu        | Important food source.                                                                                                                                                                                         |
| 25                          | F M W    | Meliaceae      | *Lansium parasiticum* (Osbeck) K.C.Sahni & Bennet | Selak (Sab) / Tat (Sar) / Siamung (Sar) / Duku (Bl) / Langsat (Bl) | Tree        | Fr, R     | Seasonal food source. Used in **laggek leitik** preparations.                                                                                                                                                 |
| 26                          | B W      | Euphorbiaceae  | *Macaranga tanarius* (L.) Müll.Arg. | Pari-pari (Sab) / Ottot (Sar) | Tree        | L, Ti     | Timber used to carve **tegge** and other small knife handles. Used in construction. Leaves are used for wrapping and carrying medicines.                                                                         |
| 39                          | B W      | Myristicaceae  | *Horsfieldia irya* (Gaertn.) Warb. | Roat (Sab) / Doat (Sar) | Tree        | L, Ti     | Used as firewood. Leaves can be seeped in water to add a **masisingin** (sweet) flavour.                                                                                                                      |
| 40                          | B W      | INDENT         | INDENT                           | Mangguwu’ (Ment)                      | Tree        | R, Ti     | Used as firewood. Used as flooring timber for **uma**. Roots are used in medicinal preparations.                                                                                                               |
| 54                          | B T W    | INDENT         | INDENT                           | Bolas (Ment)                           | Tree        | Ti        | Long burning firewood. Timber is used for building and for handicrafts.                                                                                                                                         |
| 56                          | F M W    | Sapindaceae    | *Nephelium cuspidatum* Blume     | Kapa (Sab) / Babaet (Sar)             | Tree        | Fr, L, Ti | Used as firewood. Used to carve **tuddukat**. Leaves and bark used in medicines. Fruit is eaten. Fruit can be used to dye clothes. Used in **laggek lango’** preparations.                                |
| 58                          | W        | Myristicaceae  | *Gymnacranthera sp.* (A.DC.) Warb. | Ngalou pataddekat (Sar)              | Tree        | Ti        | Source of firewood.                                                                                                                                                                                           |
| 67                          | B W      | Apocynaceae    | *Kibatalia arborea* (Blume) G.Don | Toilat (Ment)                          | Tree        | Ti        | Used for firewood. Used for building, particularly for window frames.                                                                                                                                         |
Table 5. Comparison between three ethnobotanical quantitative measures (RFC – Relative frequency of citation, CSI – Cultural significance index, IV – Importance value) ranking the top 32 plant species considered important food, building, tool-making, firewood and ceremonial resources for the Mentawai communities in the Sabirut and Sarereiket regions of Siberut, Mentawai Islands, Indonesia. Plants have been ordered according to RFC during key informant interviews. (Ment – Mentawai language, Sib –Siberut dialect, Sab –Sabirut dialect, Sar –Rereiket dialect, BI – Bahasa Indonesia).

| Family         | Scientific name                  | Vernacular name(s) | Community | Key informant |
|----------------|----------------------------------|--------------------|-----------|---------------|
|                |                                  |                    | RFC      | RFC | CSI | IV  |
| Arecales       | Metroxylon sagu Rottb.           | Sagai (Sab) / Sagu (Sar) | 0.34     | 0.90 | 8.00 | 0.95 |
| Arecales       | Colocasia esculenta (L.) Schott  | Gette’ (Ment) / Keladi (BI) | 0.17     | 0.71 | 6.32 | 0.10 |
| Arecales       | Calamus sp. L.                   | Pelege (Ment)      | 0.10     | 0.57 | 1.89 | 0.33 |
| Dipterocarpaces| Shorea pauciflora King           | Katuka (Ment)      | 0.09     | 0.57 | 1.89 | 0.52 |
| Myristicacées  | Horsfieldia sp. Blume ex DC.     | Ribbu (Ment)       | 0.04     | 0.52 | 1.16 | 0.29 |
| Poaceae        | Various                          | Manggeak (Ment) / Obbuk (Ment) / Bambu (BI) | 0.18     | 0.43 | 3.79 | 0.29 |
| Arecales       | Arenga pinnata (Wurmb) Merr.     | Poula (Ment) / Katsaila (Ment) / Anau (BI) / Aren (BI) | 0.04     | 0.33 | 1.47 | 0.19 |
| Arecales       | Calamus caesius Blume            | Mandorou’ (Ment)   | 0.07     | 0.29 | 0.95 | 0.24 |
| Dipterocarpaces| Hopea dryobalanoides Miq.        | Mancemi (Ment)     | 0.05     | 0.29 | 0.63 | 0.05 |
| Arecales       | Cocos nucifera L.                | Toitet (Ment) / Kelapa (BI) | 0.15     | 0.24 | 1.68 | 0.05 |
| INDENT         | INDENT                           | Bolasi (Ment)      | 0.02     | 0.24 | 0.79 | 0.19 |
| Musaceae       | Musa spp. L.                     | Bago’ (Sab) / Mago’ (Sar) / Pisang (BI) | 0.13     | 0.19 | 0.84 |       |
| Apocynaceae    | Ribatia arborea (Blume) G.Don    | Toilat (Ment)      | 0.01     | 0.19 | 0.63 | 0.10 |
| Arecales       | Daemonorops sp. Blume            | Sasa (Ment)        | 0.06     | 0.14 | 0.47 | 0.05 |
| Gleicheniaceae | Gleicheniaceae C.Presl           | Osap (Ment)        | 0.05     | 0.14 | 0.47 | 0.05 |
| Apocynaceae    | Alstonia spatulata Blume         | Kakatdut (Sab) / Gite (Sar) / Pulai (BI) | 0.05     | 0.14 | 0.32 | 0.05 |
| Melastomataceae| Melastoma sylvaticum Blume       | Sibetu (Sab) / Eru’teinung (Sar) | 0.03     | 0.14 | 0.11 |       |
| Stemonuraceae  | Stemonurus malaccensis (Mast.) Sleumer | Manggugu’ (Ment) | 0.03     | 0.14 | 0.47 | 0.10 |
| Sapindaceae    | Nephelium cuspidatum Blume       | Kapa (Sab) / Babaet (Sar) | 0.01     | 0.14 | 0.95 | 0.05 |
| Myristicacées  | Gymnacranthera (A.DC.) Warb.     | Ngalou pataddekat (Sar) | 0.01     | 0.14 | 0.47 | 0.05 |
| Dipterocarpaces| Dipterocarpus fusiformis P.S.Ashton | Elagat (Sab) / Kara-kara (Sar) / Kruing (BI) | 0.04     | 0.10 | 0.11 |       |
| Malvaceae      | Pentace triptera Mast.           | Kaboi (Sib)        | 0.03     | 0.10 | 0.21 | 0.05 |
| Dipterocarpaces| Shorea sp. Roxb. ex C.F.Gaertn.  | Karai (Ment)       | 0.03     | 0.10 | 0.21 | 0.05 |
| Myristicacées  | Horsfieldia iarya (Gaertn.) Warb. | Roat (Sab) / Doat (Sar) | 0.03     | 0.10 | 0.21 | 0.05 |
| Malvaceae      | Durio spp. Adans.                | Doriat (Ment)      | 0.07     | 0.05 | 0.16 |       |
| Rhizophoraceae | Rhizophora apiculata Blume       | Bakat (Ment) / Bakau (BI) | 0.05     | 0.05 | 0.11 |       |
| Euphorbiaceae  | Macaranga sp. Thouars            | Katumanggei (Ment) | 0.04     | 0.05 | 0.11 |       |
| Family          | Scientific name | Vernacular name(s)          | Community RFC | RFC | CSI | IV |
|-----------------|-----------------|----------------------------|---------------|-----|-----|----|
| Euphorbiaceae   | Macaranga tanarius (L.) Müll.Arg. | Pari-pari (Sab) / Ottot (Sar) | 0.03          | 0.05| 0.08|    |
| Euphorbiaceae   | Manihot sp. Mill. | Baratti (Sab) / Sipukaju (Sar) / Ubi kayu (BI) | 0.03          | 0.00| 0.21|    |
| Convolvulaceae  | Ipomoea sp. L.  | Gobi (Sab) / Siputeteket (Sar) / Ubi jalar (BI) | 0.03          | Not cited | 0.21 |    |
| Sapindaceae     | Nephelium lappaceum L. | Bairabbit (Sib) / Rambutan (BI) | 0.03          | Not cited | 0.21 | 0.05 |
| Meliaceae       | Lansium parasiticum (Osbeck) K.C.Sahni & Bennet | Selak (Sab) / Tiat (Sar) / Siamung (Sar) / Duku (BI) / Langsat (BI) | 0.03          | Not cited | 0.11 |    |

**Community perceptions of Mentawai traditional ecological knowledge**

Community surveying sought to reveal Mentawai attitudes towards their TEK and whether the community held any concerns about 'why plant knowledge may be eroding or lost' (Figure 7). Nearly all survey respondents agreed that Mentawai plant knowledge is important for the future of Mentawai, particularly as food and medicine resources (98 percent; 95% confidence interval (CI) 97%-99%). One respondent stated:

*Our plant knowledge is very important. Our plants have many benefits, especially in treating sickness. In our traditions, we understand that our plants are the source of our life. We cannot navigate our way in the world without them.*

Mentawai woman, Muntei, February 2019.

When asked what would happen if this knowledge is lost, many believed life would become difficult (38 percent; 95% CI 34%-43%) or become poor (18 percent; 95% CI 15%-21%). Conversely, 19 percent of respondents believed nothing would happen if plant knowledge were lost (95% CI 16%-22%).

![Figure 7](image)

*Figure 7. A sample of community perceptions for why Mentawai traditional ecological knowledge might be eroding in the Sabirut and Sarereiket regions of Siberut, Mentawai Islands, Indonesia (n = 494). Most respondents felt the time spent between sikiebbu’kat (respected elders) and youth is becoming rare due to changes in family social patterns, and because many children now attend formal schools, where little time is spent teaching students about Mentawai’s important plants and ecosystem functions.*

Half of all respondents felt people were too busy working other jobs to practice Mentawai TEK (95% CI 44%-53%), and over half felt that people were more interested in ‘modernising’ (95% CI 56%-64%). Two-thirds of respondents
believed TEK is eroding because contact between youth and sikebbu'kat is decreasing (95% CI 63%-71%). Half of all respondents felt that children and youth do not seem interested in learning about Mentawai plants (95% CI 41%-50%), nor spend enough time in the forest (95% CI 53%-62%). Additionally, 73 percent of respondents felt too little time was spent in school learning about traditional plant uses (95% CI 70%-77%). Eighty percent of respondents believed the loss of Mentawai TEK may become exasperated due to the immigration of young people from Mentawai to other parts of Indonesia or abroad (95% CI 47%-56%).

Half of all respondents believed Siberut’s forests still contain important plants that can be utilised on a day-to-day basis (95% CI 45%-53%). Seventy-four percent of respondents believed the forest would never become ‘empty’, because Mentawai plant knowledge and the principles and practices of arat sabulungan ensure the forest is protected, cared for, and important species are replanted (95% CI 70%-78%). However, a third of respondents identified a correlation between the loss of Mentawai knowledge and the depletion of forest resources (95% CI 32%-41%). The community perceived that the greatest threats to Siberut’s forest resources were deforestation caused by large-scale developments, and lack of protective measures or support from the government. A large portion felt that the forest had already been damaged due to extensive development, including unsuitable logging operations or land conversion (43 percent; 95% CI 39%-47%). The majority did not believe that religion discouraged traditional practices (88 percent; 95% CI 86%-91%).

Transmission of Mentawai traditional ecological knowledge

Two-thirds of respondents felt they knew enough about Mentawai plant knowledge (95% CI 62%-70%). This was reflected in the perception that respondents felt they had learnt enough primarily through daily activities from a young age (22 percent; 95% CI 18%-25%), or had been encouraged by other community members to learn about Mentawai plants (16 percent; 95% CI 13%-20%) (Figure 8). However, of those unsure or felt they did not know enough about Mentawai TEK, most felt it was because they had never been taught (30 percent; 95% CI 26%-33%).

Respondents generally perceived that all community members were responsible for teaching and sharing Mentawai plant knowledge. However, many respondents recognised the responsibility of the sikerei in safeguarding traditional plant knowledge (23 percent; 95% CI 20%-27%). Half of all respondents believed that the knowledge had not been forgotten by sikerei or sikebbu'kat (95% CI 47%-56%). There were mixed responses as to whether
ways of teaching traditional plant use had changed, and whether sikerei and sikebbu’kat spent enough time in the forest practicing traditional knowledge.

Ninety percent of key informants reported having taught, or passed on, their plant knowledge (95% CI 78%-100%), explaining that Mentawai ecological knowledge is usually taught ‘hands-on’ as the opportunity or need is presented. Many respondents added they had only taught others if they had been directly asked by those interested in learning. Nearly all respondents raised concerns about the lack of knowledge or interest by the younger generation, with several lamenting that ‘young people are ignorant of the benefits of Mentawai’s plants’. One respondent worried that if they were not asked to teach Mentawai TEK, then

"...our knowledge will become extinct. Our people will no longer remember who we are, or how to survive."

Mentawai man, Puro, April 2019.

Despite concerns raised by sikebbu’kat and sikerei about threats to the transmission of Mentawai TEK, nearly all respondents from the community survey agreed that Mentawai plant knowledge remains essential for their future, stating:

“The life of the Mentawai cannot be separated from the forest and its plants. Mentawai plants are the breath of everything.”

Sikebbu’kat, Muntei, February 2019.

Despite the results suggesting young (12-25 years of age) respondents felt they knew enough about Mentawai plants and TEK (see Figure 8), comments made by key informants, coupled with observations made during the study period, suggest otherwise. For children and youth living in resettlement communities, it was observed that considerably less time is spent in the forest where plant knowledge is shared amongst peers and siblings. While children living in uma communities spend most of the day exploring the forest or carrying out home duties utilizing forest resources surrounding the uma. In this way, it was observed that children from a young age understand Mentawai’s forests’ ecological and cultural functions. These interactions were rarely observed in resettlement communities, which may be attributed to new socio-economic conditions driving the loss of traditional knowledge – similar to those drivers discussed in Reyes-Garcia et al. (2013).

Other observations made during the study period infer that fewer young people are on the path to becoming sikerei. This observation may be cause for concern, given the extensive knowledge held by the sikerei and the integral role they play in maintaining the health and wellbeing of the Mentawai people. It was also observed in the study period that there can be significant variation between each sikerei and their knowledge and practice of medicinal plants, each having their own unique methods. Though the community collectively knows many plants and their uses, the variation between sikerei and knowledge holders was seen to be an important component of Siberut’s cultural and biological diversity.

Observations on the use of medicinal plants in the community
Observations during the research period established an emerging trend: that is, that resettled communities are more likely to choose pharmaceutical medicines, only returning to traditional medicines and healing systems as a last resort. This is supported by the suggestion in the community survey that over half of respondents felt that people were more interested in modernizing than practicing TEK (see Figure 7). Discussions with Dr S. Tahmasebian from the Madobag government health centre (Puskesmas) revealed similar concerns: community members no longer utilise traditional plant medicines, and instead choose to visit a Puskesmas expecting a quick fix. She stated:

“There are so many herbs and leaves in the forest that can keep the Mentawai people healthy, but they aren’t using them. They don’t ask the sikerei to help, but come to [the Puskesmas] expecting pharmaceutical medicines. It’s not sustainable, nor is it healthy. When they were younger, they didn’t suffer from many of the illnesses and diseases they experience today. Now their children are often sick, when they shouldn’t be.”

S. Tahmasebian, Muarasiberut, May 2019.

Changes in healthcare preference may be underlined by changing values and forms of wealth: traditionally, clan groups would have access to pigs, chickens, fruits, and other important tradable items to exchange for sikerei medicines, healing ceremonies and other associated traditions. However, it was observed during the study period that those now living within resettlement communities generally have limited access to these traditional forms of wealth, instead now relying on the national currency. Though this has benefits in being able to access pharmaceutical medicines, the cost comparison is vast. For example, during the study period it was found that a course of antibiotics at the local pharmacy, without needing to see the doctor, may cost between IDR 8,000 –
Comparatively, when factoring payment for services, travel costs, purchase of sacrificial animals, and provision of other gifts, foods, etc., for rituals, sikerei medicines and the associated ceremonial rituals can cost upwards of IDR 400,000 (approximately USD 28) depending on the severity of illness and required treatments. Though it was observed that community members are becoming less likely to utilise traditional healing systems, many respondents from the community survey still emphasized the importance of Mentawai's plants for treating disease, stating:

"Not all pharmacy drugs are able to heal our people. Disease cannot always be treated by medical treatment or pharmaceuticals."
Mentawai woman, Muntei, February 2019.

"Without Mentawai plant medicines and rituals, disease cannot be cured. Without the Mentawai forest, we wouldn’t have our health."
Mentawai man, Maileppet, March 2019.

Contrastingly, those respondents living in uma communities were more likely to utilise traditional medicines to treat illness or disease. Many were disinterested in using pharmaceutical medicines, and were unlikely to utilise these services unless compelled as a final option. However, it was perceived that these preferences are partly due to limited access to the national currency, and the relative isolation of uma communities from allopathic healthcare options. For example, where there was an option to receive fast-acting medicines to treat headaches, sore joints or diarrhea from visiting tourists, uma clan members would often welcome medicines given by foreigners.

Observations of Mentawai ecological practices and interactions
During the observation period, it was perceived that many Mentawai traditional farming practices align with key principles of regenerative agriculture or permaculture (Rodale Institute 2015). For example, Gou’-gou’ (chickens) and ducks run freely between crops, cattle are grazed as a small herd and rotated regularly, pugette’an are established between sagu trees, and mago’, toitet, bairabbit and pinang are scattered between crops or plantations (Figure 9). Additionally, it was noticed that the Mentawai do not practice slash and burn agriculture – growing fields are cut, and plant matter is left to rot for several years before returning to utilise the land for crops, resulting in aerated soil high in organic matter. However, some fields near Muntei village had been burnt during the observation period before replanting gette’. When asked why this might be the case, one Mentawai man explained that when larger trees are cut down in mone their stumps are usually burned prior to replanting the field. It was speculated that fields that were burnt may have been owned by immigrants to Mentawai.

Figure 9. Pugette’an (traditional taro field) intercropped with a subsidised crop of pinang (Areca catechu L. (Arecales)). In the foreground are coppiced ngrip / irip (Barringtonia racemosa (L.) Spreng. (Lecythidaceae)) used to fence the field, and behind, a small plantation of rubber trees (Hevea brasiliensis (Willd. ex A.Juss.) Müll.Arg. (Euphorbiaceae)). Muntei village, Sabinut region, Siberut, Mentawai Islands, Indonesia, June 2019.
It was also noted during the observation period that fields are often fenced using coppiced ngirip / irip (Barringtonia racemosa (L.) Spreng. (Lecythidaceae)), a practice that has been shown to enhance biodiversity across agricultural landscapes (León & Harvey 2006). Fertiliser, herbicides and pesticides are usually not used, though, observations of farmers spraying poison to control ferns and grasses along garden paths in resettlement communities were made during the research period. It was also observed where customary land tenure is no longer observed, deforestation, sediment run-off and pollution are more apparent (though this requires further study to validate these initial observations).

Authors notes on collaboration with Indigenous researchers
Collaboration with Mentawai researchers was central to the implementation of the research activities and analysis, and is the first of its kind to emerge from Mentawai. Inclusive and transparent approaches aimed to ensure the study’s objectives and methods procured accurate and meaningful outcomes, and were suitable within local contexts. When participants were informed that data gathered during the research period would be returned to the community for their own use, and to develop knowledge-sharing resources for their children, it was observed that participants were more motivated to offer in-depth and accurate responses. Engaging a team of Mentawai researchers also gave a better insight into cultural expectations and procedures, resulting in what was believed to be a more culturally appropriate approach, thus stimulating greater support and interest from sikerei, sikebu’kat, local government and community members. Furthermore, as native speakers of the Sabirut and Rereiket dialects, it is believed that the inclusion of Mentawai peoples as researchers, not just informants, greatly reduced the probability of error in listening or spelling words and meanings in the Mentawai language. Additional perceived benefits from the project include: collaborators increased sense of ownership over and empowerment in preserving Mentawai TEK; collaborator and community increased awareness of Siberut’s unique biosphere; and, increased awareness of international conservation agenda and protocol. Supporting the study’s approach, one collaborating researcher commented:

I knew our forest was important, but I didn’t realise just how many important plants – particularly medicines – were in such a small part of the forest. If our people living in the villages knew this, we wouldn’t give our land away so freely. We must remember our ancestors’ knowledge. We need to keep investigating. We must share our findings with our community.

Y. Mendrofa, YPBM Chairman and collaborating researcher, Matotonan, May 2019

Discussion
The use of medicinal plants and the impact on Siberut’s biodiversity
Since tropical climates provide ideal conditions for the spread of diseases (State of the Tropics 2019) and that the Mentawai diet may be considered “calorie deficient” (Conway 1998), traditional plant medicine plays a critical role in supporting the health of the Mentawai. Access to traditional healthcare systems remains vital for both resettled and forest uma communities due to their perceived efficacy and cultural significance. If Mentawai traditional medicinal plants are no longer used or perceived as important, less value may be attributed to the forest resource, and less attention will be directed toward preserving Siberut’s biome (Hamilton & Hamilton 2006). Furthermore, as the number of youth actively pursuing the path of the sikerei declines, the diversity of Mentawai plant knowledge may also diminish. Since culture and biodiversity are “inextricably linked” (Posey 1999), changes in values, social structures, and patterns of use of Mentawai’s medicinal plants may impact Siberut’s biodiversity.

Mentawai ecological practices and interactions supporting Siberut’s biodiversity
Mentawai’s indigenous agricultural practices are small-scale, diverse, culturally relevant, flexible and adaptable – characteristics essential for resilient, viable food systems (Lin et al. 2011, World Resources Institute 2019). Pumonean are highly diverse, and are important genetic resources for conserving Siberut’s tree diversity (Indra et al. 2017). Moreover, pumonean traditional practices have significant cultural importance, providing crops integral to Mentawai’s food culture. Gardens surrounding the uma are composed of frequently used medicinal, ceremonial, fuel and food plants based on the needs or preferences of the uma clan group. These gardens and pumonean vary in size, but are generally of high floristic diversity, require very little labour input, and contribute to the supply of important nutritional, cultural and economic plant species (Kumar & Nair 2004). By inter-cropping a range of commercial and subsistent species, Siberut’s pumonean and uma gardens provide vital food, medicine, timber and other resources for the Mentawai community – particularly for resettled communities who have limited access to more remote forest resources (Kumar & Nair 2004, Mutua et al. 2014).
Given the considerable impact of industrial agriculture on biodiversity (Laurance et al. 2014, Lin et al. 2011), practices like those traditionally applied by the Mentawai people contribute substantially to supporting Siberut’s biodiversity (Kumar & Nair 2004). Suppose traditional agricultural ecosystems are damaged, or traditional practices discontinued. In that case, there is a possibility that native or endemic plant species may become extinct, thereby causing a decline in the wellbeing of the Mentawai and their biome (WWF 1980). Mentawai traditional practices have the potential to safeguard local food security, maintain long-term sustainability, and regenerate human-degraded ecosystems (Garrity 2004, Kumar & Nair 2004, McNeely & Schroth 2006, Retnowati 2003). Furthermore, by not practicing slash and burn agricultural methods, a lack of fire across Siberut’s landscapes ensures the soil is never exposed, thus preventing significant erosion, run-off and stream sedimentation – an important practice given Siberut’s fragile soils originate from hardened mud sediments, and that riparian zones are subject to extreme erosion (Suhandi et al. 2002; WWF 1980).

The biological and cultural importance of sagu
Previous reforms enforced throughout Siberut and greater Mentawai sought to replace sagu swamps with rice cultivation programs (Pradipta 2019), and the Mentawai people were coerced to replace sagu with ‘modern’ products and foods (Persoon 2001). Not only did this replacement ignore the cultural significance of sagu and displace a crucial food, building and medicinal resource (Pradipta 2019), but branded a nutritious food source as primitive and only for the poor – diminishing its status in consumers’ eyes. The discouragement of sagu also failed to acknowledge the ecological efficiency of the palm for staple food production (WWF 1980; Pradipta 2019). WWF (1980) highlighted several immense ecological benefits of sagu: the palm is easily regenerated, requires no pesticide input, and provides food sources and habitat corridors for multiple species (Figure 10). Given observations of changes in rice season and harvest yields due to climate-related effects (Li et al. 2017), existing ecosystems already achieving efficient staple food production like Siberut’s sagu swamps and pumonean are vital in ensuring food security for a growing population, and have considerable value toward current biodiversity conservation efforts (World Resources Institute 2019). Considering the interconnectedness of culture and biodiversity (Posey 1999, Pretty et al. 2009), those plants most valuable to a community, and the cultural traditions that ensue, are fundamental for biodiversity conservation and ecosystem regeneration.

Conclusions
Understanding the relationships between people and their biomes, and the values given to natural resources by communities are foundational to the equitable conservation of biodiversity (Hanazaki et al. 2013, Pretty et al. 2009, Sheil et al. 2005). While Mentawai’s indigenous knowledge systems are globally recognised as integral to the conservation of Siberut’s unique biodiversity (IPBES 2019), few studies have sought to evaluate the Mentawai community’s preferences and priorities (similar to issues discussed in Sheil et al. (2005)). Given the correlation between biodiversity loss and the declining health and wellbeing of forest-based peoples (Colfer 2008, Sheil et al. 2005), recognizing and responding to local values and priorities for conservation and regeneration may have a two-fold benefit. Though representing a relatively small portion of Siberut’s flora, those 63 plants that have been identified as most significant to the Sabirut and Sarereiket communities give a better perception of which plants are vital for Mentawai livelihoods, and provides a baseline from which biodiversity conservation and knowledge sharing can be guided. Perhaps more significantly, all species encountered during the study period had some use...
to the Mentawai people, demonstrating a strong relationship between Siberut’s biodiversity and Mentawai TEK. Thus, the study indicates that Mentawai TEK is a rich source for understanding Siberut’s ecology. Failure to consider Mentawai TEK in conservation and resource management could drive Siberut’s unique biodiversity and culture into extinction. The global ecological crisis is too urgent to ignore the contributions of Mentawai TEK and local researcher input in advancing the understanding of Indonesia’s ecosystems and species.

**Declarations**

**List of abbreviations:**

- ANDA: Herbarium of Universitas Andalas
- Ba: Bark
- BI: Bahasa Indonesia (Indonesian language)
- CBD: 2014 Conference of the Parties for the Convention on Biological Diversity
- CI: Confidence Interval
- CSI: Cultural significance index
- FAO: Food and Agriculture Organization of the United Nations
- Fl: Flower
- Fr: Fruit
- INDENT: Plant scientific name not yet identified
- IPBES: Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
- IV: Importance value formula
- IVI: Importance value index
- L: Leaf
- M: Mean
- Ment: Mentawai language (believed to be shared vernacular in all dialects)
- P: Pith
- RFC: Relative frequency of citation
- R: Roots
- Rh: Rhizome
- S: Shoots
- Sab: Sabirut dialect
- Sar: Rereiket dialect
- Sib: Siberut dialect
- SD: Standard Deviation
- SE: Standard Error
- St: Stem
- TEK: Traditional ecological knowledge
- Ti: Timber
- Tu: Tuber / corm
- UNDESA: United Nations Department of Economic and Social Affairs
- UNDRIP: United Nations Declaration on the Rights of Indigenous Peoples 2008
- UNESCO: United Nations Educational, Scientific and Cultural Organization
- UNHCR: United Nations High Commissioner for Refugees
- WWF: World Wildlife Fund
- YPBM: Yayasan Pendidikan Budaya Mentawai

**Ethics approval and consent to participate:** Ethical clearance for research activities associated with this paper were approved by Institut Pertanian Bogor (IPB) Komisi Etik Penelitian yang Melibatkan Subyek Manusia, approval number: 164/IT3.KEMPMSM-IPB/SK/2019, and Southern Cross University Human Research Ethics Committee, approval number: ECN-19-055. During 2016-2018, before developing the initial research proposal, informal discussions were held with staff members of YPBM, sikebbu’kat and sikerei to ask if there was a need for the proposed research, and whether they would be willing to assist in research activities. Together, these discussions highlighted the need for ethnobotanical documentation, provided the first stage of gaining consent, and directed the initial scope of the study. Before commencing the study in January 2019, procedures to inform governments and community members of the research project were followed according to both Indonesian regulation and Mentawai custom. The research outline, outcomes and community survey examples were shared with the Camat (District Leader) of Southern Siberut, requesting authorisation to carry out the proposed activities within the village districts of the Southern Siberut region. Formal written permission to undertake the study was obtained from the...
Camat, who then provided a letter of notice for the Kepala Desa (Village Leader) of each village prior to research activities commencing. Before participating in any research activities, participants read (or were read to in their preferred language) and signed an informed consent document, which outlined the research objectives, risks, benefits, and confidentiality agreements. All participants were informed they had the right to decline participation at any time throughout the research activities, and were under no obligation to reveal any knowledge they did not want to share, or felt was secret.

**Consent for publication:** Before participating in any research activities, participants read (or were read to by a trusted witness) and signed an informed consent document, which outlined the research objectives, risks, benefits, confidentiality agreements and consent for publication. All participants were informed they had the right to decline participation at any time throughout the research activities, and were under no obligation to reveal any knowledge they did not want to share, or considered private knowledge. Consent forms have been stored at the Yayasan Pendidikan Budaya Mentawai office, JL Muntei, Desa Muntei, Siberut Selatan.

**Availability of data and materials:** The data has not been deposited in a public repository, but has been made available to the Mentawai community through Yayasan Pendidikan Budaya Mentawai.

**Competing interests:** The authors have no conflict of interest, financial or otherwise.

**Funding:** The fieldwork activities associated with this project were funded by the National Geographic Society Early Career Research Grant (EC-53693R-19), and supported by the Australian Government Department of Foreign Affairs and Trading through the New Colombo Plan Scholarship program. These agencies were not involved in any aspect of the research preparation, data collection, nor preparation of this publication.

**Authors’ contributions:** SML conceptualised the initial fieldwork plan and was the primary author of the manuscript, with suggestions for improvements from JDN and DL. SML and SS were involved in methodology design and implementation, and conducted the data analysis. FS was involved in fieldwork and improving the accuracy of Mentawai plant names and variations between dialects. RH offered clarification of observed socioeconomic changes. Nurainas identified plant samples at ANDA. IZS and APPH provided support in-country.

**Acknowledgements**

The authors are sincerely grateful to the simattaoi of both the Sabirut and Sarereiket regions, who not only participated in and supported this project but welcomed us as a part of their families and community. We would especially like to thank collaborating researchers at Yayasan Pendidikan Budaya Mentawai - Yan Mendrofa, Santi Sagari, Bastianus Ade, Filemon Sagulu, Martison Siritoitet, Raimundus Saruruk, Chindi Raflesia, Manuel Sarimau, Silvia Eka Putri, August Tonggjat – your initiative to document and protect your cultural heritage and ecological knowledge is crucial to protecting our planet, masura’ bagatta. We are indebted to Sikerei Aman Masit Dere, Aman Manja and Aman Sasali. Furthermore, the depth of your knowledge of Siberut’s forests is awe-inspiring, masura’ bagatta.

The first author would like to express thanks to Professor Douglas Sheil for reviewing an early copy of SML’s thesis submission; and to Professor Reimar Schefold for his extensive feedback on this manuscript. The first author also wishes to express deep gratitude to Rob Henry for his endless help in translating key findings and coordinating our field trips throughout Siberut. Your unwavering commitment to a more equitable future for the Mentawai people is truly admirable.

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### Appendix 1

#### Table 6. Supplementary data set – Collection numbers and details of botanical samples taken during the research period.

| Scientific name | Vernacular name(s) | Collection location (nearest village) | Collector | Collection number | Collection date | Herbarium location |
|-----------------|--------------------|---------------------------------------|-----------|-------------------|----------------|-------------------|
| INDENT          | Obboi (BSib)       | N/A                                   | N/A       | N/A               |               | N/A               |
| *Dipterocarpus fusiformis* P.S.Ashton | Elagat (BSab) / Kara-kara (BSil, BSar) / Kruing (BI) | Buttui, Southern Siberut | S Lee | SLBU001 | 4/8/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Angiopteris evecta* (G.Forst.) Hoffm. | Bakkat laggai (BM) / Sibakkat laggai (BM) | Buttui, Southern Siberut | S Lee | SLBU002 | 4/8/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Kibatalia arborea* (Blume) G.Don | Tollat (BM) | Buttui, Southern Siberut | S Lee | SLBU003, SLBU004 | 4/8/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Horstfieldia sp.* Blume ex DC. | Ribbu (BM) | Buttui, Southern Siberut | S Lee | SLBU005 | 4/8/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Justicia gendarussa* Burm.f. | Pangasele (BSar, BSil) / Pakasele (BSab) | Buttui, Southern Siberut | S Lee | SLBU006 | 5/8/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Cananga odoratum* (Lam.) Hook.f. & Thomson | Poak (BSbs) | Buttui, Southern Siberut | S Lee | SLBU007 | 6/8/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Amishcotolype mollissima* (Blume) Hassk. | Lemu-lemu (BM) | Buttui, Southern Siberut | S Lee | SLBU008 | 6/8/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Gleicheniaceae C.Presl* | Osap (BM) | Buttui, Southern Siberut | S Lee | SLBU020 | 10/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Piper sarmentosum* Roxb. | Baba (BSbs) | Buttui, Southern Siberut | S Lee | SLBU021 | 10/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Piper betle* L. | Talingeng (BM) / Sirih (BI) | Muntei, Southern Siberut | S Lee | SLBU022 | 10/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Daemonorops angustifolia* (Griff.) Mart. | Labi (BSar) / Rui (BSab) | Buttui, Southern Siberut | S Lee | SLBU023 | 10/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Etingera elatior* (Jack) R.M. Sm. | Gojo (the whole stem) (BM) / Totoan (BM) / Taijati (BM) | Buttui, Southern Siberut | S Lee | SLBU026 | 10/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Hornstedtia conica* Ridl. | Kukuet (BM) | Muntei, Southern Siberut | S Lee | SLBU027 | 10/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Alpinia malaccensis* C.Presl | Pasisingin (BSil, BSar) / Kassisingin (BSab) / Kojo koddia (BSab) | Buttui, Southern Siberut | S Lee | SLBU029 | 10/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Astrozia spathulata* Blume | Kakatudut (BSbs) / Gite (BSil, BSar) / Pulai (BI) | Matotonan, Southern Siberut | S Lee | SLMA002 | 23/8/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Horstfieldia iya* (Gaertn.) Warb. | Roat (BSab) / Doat (BSar) | Matotonan, Southern Siberut | S Lee | SLMA008 | 23/8/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| INDENT          | Bolasi (BM)        | Muntei, Southern Siberut | S Lee | SLMU001 | 9/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| INDENT          | Mangguguk (BM)     | Muntei, Southern Siberut | S Lee | SLMU002 | 9/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Macaranga sp.* Thouars | Katumanggei (BM) | Muntei, Southern Siberut | S Lee | SLMU003 | 9/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Nephelium cuspidatum* Blume | Babaet (BSar) / Kapa (BSab) | Muntei, Southern Siberut | S Lee | SLMU006 | 10/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Shorea sp.* Roxb. ex C.F.Gaertn. | Karai (BM) | Muntei, Southern Siberut | S Lee | SLMU007 | 10/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| Scientific Name | Local Name | Location | Accession Code | Date | Institution |
|----------------|------------|----------|----------------|------|-------------|
| *Erythrina subumbrans* (Hassk.) Merr. | Manicut (BM) / Batucut (BM) | Muntei, Southern Siberut | S Lee | 10/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Ludwigia linifolia* Poir. | Mumru tukuk (BSar) / Lotttek-lotttek (BSab) | Muntei, Southern Siberut | S Lee | 11/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Lansium parasiticum* (Osbeck) K.C.Sahni & Bennet | Selaq (BSab) / Taat (BSar, BSili) / Siamnun (BSar, BSili) | Muntei, Southern Siberut | S Lee | 11/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Durio spp.* Adans. | Doriat (BM) / Dorian (BSili) | Muntei, Southern Siberut | S Lee | 11/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Hibiscus rosa-sinensis* L. | Bekeu (BM) / Kembang sepatu (Bl) | Muntei, Southern Siberut | S Lee | 11/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Nephelium lappaceum* L. | Gaibabik (BSar, BSili) / Rambutan (Bl) | Muntei, Southern Siberut | S Lee | 11/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Graptothyllum pictum* (L.) Griff. | Alleleppt (BM) | Muntei, Southern Siberut | S Lee | 11/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Cymbopogon citratus* (DC.) Stapf | Siat-siat (BSar) / Jiat-jiat (BSar) / Serai (Bl) | Muntei, Southern Siberut | S Lee | 11/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Rottboelia sp.* Naezén | Boku-boku (BM) | Muntei, Southern Siberut | S Lee | 11/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Barringtonia racemosa* (L.) Spreng. | Ngrip (BSar) / Inip (BSili) | Muntei, Southern Siberut | S Lee | 11/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Bamboo types* | Manggeak (BM) / Bambu (Bl) | Muntei, Southern Siberut | S Lee | 11/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Curcuma longa* L. | Kiniu (BM) / Kunyit (BI) | Muntei, Southern Siberut | S Lee | 11/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Acorus calamus* L. | Sumamra (BSar, BSili) / Butek-butek (BSili) | Muntei, Southern Siberut | S Lee | 11/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Psidium guajava* L. | Jabbu (BM) / Sabibui (BSar) / Jambu biji (BU) | Muntei, Southern Siberut | S Lee | 11/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Alpinia galangal* (L.) Willd. | Oroket (BSar) / Palakkokoki (BSar) | Muntei, Southern Siberut | S Lee | 11/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Kaempferia galanga* L. | Kopuk (BSar) / Sikopuk (BSar) / Kencur (Bl) | Muntei, Southern Siberut | S Lee | 11/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Cordyline fruticosa* (L.) A.Chev. | Boblo (BM) | Muntei, Southern Siberut | S Lee | 11/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Codiaeum variegatum* (L.) Rumph. ex A.Juss. | Surak (BM) | Muntei, Southern Siberut | S Lee | 11/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| * Mussaenda frondosa* L. | Mumunyen (BSar) | Muntei, Southern Siberut | S Lee | 11/10/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Musa spp.* L. | Magok (BSar, BSili) / Bagok (BSar) / Pisang (Bl) | Muntei, Southern Siberut | S Lee | 22/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Manihot sp.* Mill. | Bairatti (BSar) / Sipukaju (BSili, BSar) / Ubi kayu (Bl) | Muntei, Southern Siberut | S Lee | 22/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Iponoeea sp.* L. | Siputeteket (BSili, BSar) / Gongok (BSar) / Ubi jalar (Bl) | Muntei, Southern Siberut | S Lee | 22/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Hedychnium coronarium* J.Koenig / *Hedychnium flavescens* Carey ex Roscoe | Kakainauk (BSar) / Simakainauk (BSar, BSili) | Muntei, Southern Siberut | S Lee | 22/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Melastoma sylvaticum* Blume | Sibeek (BM) / Sibetu (BSar) / Eruk teinunug (BSil, BSar) | Muntei, Southern Siberut | S Lee | 22/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Macaranga tanarius* (L.) Müll.Arg. | Chiot (BM) / Pari-pari (BSar) | Muntei, Southern Siberut | S Lee | 22/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Colocasia esculenta* (L.) Schott | Gettek (BM) / Talas (Bl) / Keladi (Bl) | Muntei, Southern Siberut | S Lee | 22/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Curcuma zanthorrhiza* Roxb. | Kiniu salik (BM) / Temuluwak (Bl) | Muntei, Southern Siberut | S Lee | 22/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Cocos nucifera* L. | Toitet (BM) / Kelapa (Bl) | Muntei, Southern Siberut | S Lee | 22/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Arenga pinnata* (Wurmb.) Merr. | Poula (BM) / Katsaila (BM) | Muntei, Southern Siberut | S Lee | 22/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Rhizophora apiculata* Blume | Bakat (BM) / Bakau (Bl) | Muntei, Southern Siberut | S Lee | 22/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| *Eleusine indica* (L) Gaertn. | Ngiti-ngiti (BSar) / Komensakkokok (BSar) | Muntei, Southern Siberut | S Lee | 22/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| Scientific Name                  | Common Name                  | Collecting Sites          | Collector     | Number   | Date       | Herbarium       |
|---------------------------------|------------------------------|---------------------------|---------------|----------|------------|-----------------|
| Zingiber officinale Roscoe      | Laigak (BM) / Jahe (Bi)      | Muntei, Southern Siberut  | S Lee         | SLMJ048  | 22/11/19   | UNAND Herbarium (ANDA) Padang, Indonesia |
| Calamus caesius Blume           | Mandorau (BM)                | Buttu, Southern Siberut   | S Sagari      | SSBU001  | 4/8/19     | UNAND Herbarium (ANDA) Padang, Indonesia |
| Shorea pauciflora King          | Katuka (BM)                  | Buttu, Southern Siberut   | S Sagari      | SSBU002  | 4/8/19     | UNAND Herbarium (ANDA) Padang, Indonesia |
| Pentace triptera Mast.          | Kaboi (BSib)                 | Buttu, Southern Siberut   | S Sagari      | SSBU003  | 4/8/19     | UNAND Herbarium (ANDA) Padang, Indonesia |
| Hopea dryobalanoides Miq.       | Mancemi (BM)                 | Buttu, Southern Siberut   | S Sagari      | SSBU004  | 4/8/19     | UNAND Herbarium (ANDA) Padang, Indonesia |
| Gymnacranthera sp. (A.DC.) Warb.| Ngalou pataddekat (BSar)     | Buttu, Southern Siberut   | S Sagari      | SSBU005  | 4/8/19     | UNAND Herbarium (ANDA) Padang, Indonesia |
| Goniothalamus sp. (Blume) Hook.f & Thomson | Simuinek (BSar) | Buttu, Southern Siberut | S Sagari | SSBU006 | 4/8/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| Calamus sp. L                   | Pelege (BM)                  | Buttu, Southern Siberut   | S Sagari      | SSBU020; SSBU022 | 13/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| Daemonorops sp. Blume           | Sasa (BM)                    | Buttu, Southern Siberut   | S Sagari      | SSBU021; SSBU023 | 13/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| Etlingera coccinea Blume S.Sakai & Nagam. | Pelekk (BSib) | Buttu, Southern Siberut | S Sagari | SSBU024 | 13/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |
| Metroxylon sagu Rottb.          | Sagu (BSar, BSii) / Sagai (BSab) | Buttu, Southern Siberut | S Sagari | SSBU026 | 13/11/19 | UNAND Herbarium (ANDA) Padang, Indonesia |