

# Knowledge and Usage of Medicinal Plants by Local People in Waigeo Island, Raja Ampat, West Papua, Indonesia

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## ABSTRACT

Papua housed an enormous number of plant species, consisting of about 20,000–25,000 species, which occur in 13 development zones, including Raja Ampat Archipelago. Local people who live in the archipelago are called Maya and Matbat. However, the knowledge and use of local medicinal plants have not been completely explored. Therefore, the research aimed to reveal knowledge about medicinal plants used by local people in Waigeo Island. Open interview and direct observation in two villages with 20 sources had been performed. The study showed that about 46 species were reported as medicinal plants by local people. Some of the species were new addition to the book *Inventaris Tanaman Obat Indonesia*; other species are also used by local people in Moluccas and other areas in Papua and Papua New Guinea. Several species used by Maya people are *Alstonia scholaris*, *Arcangelisia flava*, and *Cryptocarya massoy*. This study also showed that the local people in Waigeo Island, Raja Ampat, and West Papua have still interacted closely with their surrounding environment. The Maya and Langanyan people have sufficient knowledge about the medicinal plant species and their uses.

**KEY WORDS:** Indonesia, Maya people, Medicinal plants, Raja Ampat, West Papua

## INTRODUCTION

Indonesia is known to have a high biological diversity and a great number of ethnic groups. As an agrarian society, life's order of the people is characterized by their close relationship with the surrounding environment. Indonesian people have a set of knowledge in utilizing the natural environment. The knowledge is accumulated from the continuous process of interaction between humans and the environment for a very long time. The knowledge in utilizing plants is different among the ethnical groups and depends on the environment and resources that support them. Local people acknowledge plants mostly as food, medicinal plants, and dyes.

Indonesian biodiversity is very high, and it is known that around 1200 species of plants are traditionally used for medicine to cure diseases. The relationship between the community and the plants in the surrounding area needs to be studied, examined, and described, before the knowledge is lost. Therefore,

exploration on knowledge and plants used by local people is needed, especially for Papua.<sup>[1]</sup>

Papua is one of the easternmost provinces in Indonesia with an area of ±421,981 km<sup>2</sup>.<sup>[2]</sup> Papua has high biological diversity, consisting of 20,000–25,000 species of plants, and there are 13 development zones including the Raja Ampat Islands.<sup>[3]</sup> Raja Ampat archipelago consisted of Waigeo Island, Salawati Island, Misool Island, and Batanta Island, Kofiau Island, the World's Natural and Cultural Heritage (world heritage). Biological diversity of Raja Ampat is very high, with many unique and endemic species. It was recorded that there were 124 genera endemic to New Guinea.<sup>[4]</sup>

Raja Ampat archipelago has a high plant diversity and precious social knowledge within the existing ethnic groups. Local people living in Raja Ampat include Maya and Matbat. Exploration and inventory of traditional medicinal plants are still needed to improve utilization and support for conservation efforts for further management and development.

## MATERIALS AND METHODS

The research was conducted in Warsamdim and

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Lopintol Villages of Waigeo Island, Raja Ampat, Papua, which used the method of ethnobiology research [Figure 1].<sup>[5-7]</sup> Direct participation in people's daily activities is essential to obtain the information on their social life. This approach is important to better understand the management and utilization of plant species diversity, various problems faced by local people in the aspects of extraction activities, and degradation of species diversity, especially medicinal plants. Data collection was done by open-ended interviews and field observations in both villages with 20 informants. Interviews are conducted with the local experts such as the chiefs in the community, medical experts, and other community members who have knowledge on the medicinal plants. The plants used by the local people were recorded and collected for voucher specimens. Furthermore, the specimens were brought back to the Herbarium Bogoriense, Biology Research Center, LIPI, to be processed and identified to find their scientific names.

## RESULTS AND DISCUSSION

Raja Ampat archipelago is situated in 2°25'N-4°25'S and 130°-132°55'E. Geoeconomically and geopolitically, Raja Ampat Regency plays an important role as a territory directly adjacent to the overseas territory, Fani Island, located at the northernmost tips of the Raja Ampat Islands, directly adjacent to the Palau Islands.

The total area of the Raja Ampat Islands is 46,108 km<sup>2</sup>, consists of four major islands, that is, Salawati, Batanta, Misol, and Waigeo islands. Teluk Mayalibit District, with a population of 767 people, consisted of four villages, namely Warsamdim, Lopintol, Kalitoko, and Mumes, located on Waigeo Island.

Ethnobotany studies have been conducted on Waigeo Island, specifically in Warsamdim and Lopintol villages, which are administratively included in the Teluk Mayalibit district, Raja Ampat Regency, West

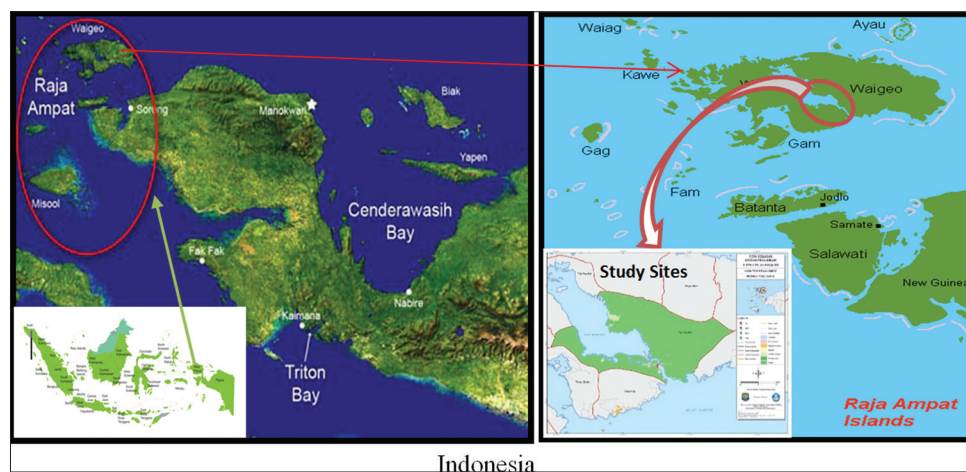
Papua. Both villages are located on the shores of Teluk Mayalibit, not far apart from each other, but the languages are different. Inhabitants of Warsamdim consist of its indigenous Maya tribe (Ambel) and migrants from Biak (Biak tribe). While in Lopintol, the inhabitants are the Langanyan tribe. The Maya (Ambel) and Langanyan are the indigenous tribes from Waigeo and Raja Ampat, while the Biak are immigrants.

In recognizing their plant diversity and its uses, the Maya people in Warsamdim use steps as follows: (1) Recognize the morphological characters such as leaf shapes (*ai kamu*), bark color (*ai kani*), wood, trees (*ai*), fruit (*ai kapiu*), seeds (*imoro*), flowers (*ai suo*), roots (*ai kawako*), rhizomes (*laliu*), tubers (*katili*), and sap (*papoy*); (2) grouping the plants into lianas (*wali*), grasses (*abris*), mushrooms (*yen*), fern (*suander*), and moss (*labut*); (3) name the plant species, and (4) understand its uses.

The Langanyan people in Lopintol use the same steps to recognize the diversity of plants, but they use different languages for the morphological characters such as leaf shape (*alun*), bark color (*gaino*), stem (*wayo*), trees (*gawapo*), fruit (*aulo*), seeds (*ayaho*), roots (*ihato*), and sap (*lit*). Plants are grouped into lianas (*wilek*) and grasses (*ayik* and *anyomo*).

Local languages used in Papua are quite a lot; therefore, local plant names are different between the two villages of Warsamdim and Lopintol, for example, noni fruit (*Morinda citrifolia*) is known as *minikanu* (Ambel/A) and *halanyin* (Langanyan/L). As for papaya (*Carica papaya*), it is known as *tamlaka* (A) and *apiak* (L), and for turmeric (*Curcuma longa*), it is called *darak* (A) and *golfun* (L).

The people of Warsamdim and Lopintol have been closely interacted with their surrounding environment, as they recognized plants in the area and their uses.



**Figure 1:** Study sites in Teluk Mayalibit district, Raja Ampat, West Papua Province, Indonesia

The uses of medicinal plants found in Waigeo Island can be categorized into species that improve body health, beauty, for contraception, aphrodisiac, and masticatory. The medicinal plants used in the villages are not <46 species, belonging to 43 genera and 29 plant families, with the families Euphorbiaceae, Lamiaceae, Leguminosae, Poaceae, and Zingiberaceae contributed of 3–5 species [Table 1]. The species can be either from cultivated species or wild species found in the forest.

Interestingly, it is found that five plant species used by people in Waigeo are the same as those used by people in Wasur (Merauke Regency and Papua), namely *C. papaya*, *Jatropha curcas*, *Leea indica*, *Terminalia catappa*, and *Zingiber officinale*. Four of them are used for the same purposes except *Z. officinale*.<sup>[8]</sup> Compared with the species used by people in Moti Island (North Maluku), three species, *J. curcas*, *L. indica*, and *T. catappa* are also used in Moti but have different uses, while *Sesbania grandiflora* used in both islands and has the same uses to reduce mucous.<sup>[9]</sup> 17 species used in Waigeo are reported as the same medicinal plant species commonly used in PNG.<sup>[10]</sup>

Health facilities in Teluk Mayalibit district are the Auxiliary Community Health Centers (*Puskemas Pembantu*), located in the center of subdistrict in Warsamdim. Teluk Mayalibit district, like many other areas in Papua, has for long suffered from malaria, reaching 17.57% of the whole Raja Ampat district community. Malaria is in the first rank of illness, in addition to upper respiratory infection (Infeksi Saluran Pernafasan Atas, ISPA), skin disease, diarrhea, conjunctivitis, T.B. lung, ear disease, scabies, and frambosia.<sup>[3]</sup>

Local people have the knowledge to use plants to cope with body aches, which they have gotten from generation to generation for a long period of time. The Warsamdim and Lopintol people use medicinal plants to cure about 29 symptoms of the disease. Plants that are used to cure the community diseases such as fever and malaria are *minikanu* (*M. citrifolia*), *tamlaka* (*C. papaya*), *inkambines* (*Arcangelisia flava*), and *lukum* (*Lansium domesticum*), whereas in Papua New Guinea, the local people coped with malaria using *M. citrifolia*, *Mussaenda ferruginea*, *Pongamia pinnata*, *Premna integrifolia*, and *Stephania* sp.<sup>[11]</sup>

Other symptom of illness often suffered by the local people is stomachache and coughs. The plants used by the local for stomachache are *minikanu* (*M. citrifolia*), *geyawas* (*Psidium guajava*), *matnik* (*Syzygium* sp.), and *kastroni* (*Euphorbia pulcherrima*). Plants used for cough are *krisailok* (*Terminalia kaernbachii*), *Kokorop* (*Derris elliptica*), and *Po'* (*A. flava*). In addition, *kanilalaw* bark (*Cryptocarya massoy*) can

be used for body ache and to encourage vicious dogs. This species is native in New Guinea, used by local people in FakFak, Kaimana, and Nabire, and also known in Maluku. The species is usually used for inflammation and used as insect and fungi deterrents and also has antibacterial activity in medium to strong level with smaller doses.<sup>[12-14]</sup> In Warsamdim and Lopintol, *kanilalaw* can be obtained from forest, far from the villages.

The diversity of mangrove species in Raja Ampat Regency (Waigeo, Batanta, and Salawati Islands) consisted of 109 species from 83 genera and 52 families, including *T. catappa*.<sup>[15,16]</sup> The bark of *T. catappa* is used by local for toothache and postpartum. The leaves are used for wounds and burns, as well as in Samoa for coughs, diuretics, and dysentery in Papua.<sup>[17]</sup> The bark extracts from four species of *Terminalia*, that is, *T. catappa*, *T. citrina*, *T. bellirica*, and *T. macadamia* have anti-inflammatory and antioxidant activities.<sup>[18]</sup> However, according to Ling *et al.*,<sup>[17]</sup> *rabonbon* (*Barringtonia asiatica*) was used also to treat fungal infections, burns, and wounds. The species *Guettarda speciosa* is used for postpartum.

Local people generally use plants in a simple way, for example, by peeling off the bark or by eating raw; the leaves were crushed or boiled. The people in Waigeo Island also recognize itchy-rash plants for traditional medicine such as the Mandacan and Aifat communities in Manokwari, Papua.<sup>[19]</sup>

The local people are also familiar with plant that contains aphrodisiac substance, including *kabaji* or white-flowered wood (*Scaevola taccada*). This plant grows on the seafront on a rocky beach. This species is also used as a medicinal plant in the Micronesia Islands, located close to Papua New Guinea.<sup>[20]</sup>

*S. taccada* was included in 100 species commonly used in PNG.<sup>[10]</sup> The same species is used to treat coughs in PNG. Other species of *Scaevola* is also used as medicine by local people in other Southeast Asian regions.<sup>[21]</sup> In Southeast Maluku, the people at Tanimbar-Kei use the species of *Scaevola* cf. *taccada* for sore eye, rheumatism, and digestive problems, whereas for aphrodisiac or tonic, they use *L. indica* there.<sup>[22]</sup>

The *minikanu* (*M. citrifolia*) was used as body freshener for men and women, while in Waigeo, the species was used for stomachache and malaria.<sup>[23]</sup> The species of medicinal plants in Waigeo Island, including *Alstonia scholaris*, *A. flava*, and *C. massoy* is categorized as rare plants.<sup>[24]</sup> In addition, several species have not been listed in the book Inventaris Tanaman Obat Indonesia, such as *Bauhinia lingua*, *Cypholophus* sp., *Premna obtusifolia*, *Merremia peltata*, *Pimelodendron amboinicum*, *Guettarda speciosa*, *Smilax leucophylla*,

Table 1: Medicinal plant species used by people in Waigeo Island, Raja Ampat

Local name	Langanyan	Biak/Common	Family	Scientific Name	Parts	Uses
Maya/Ambel						
Darian Yaren	Salese'	Sirsak Kayususu	Acanthaceae Annonaceae Apocynaceae Araliaceae	<i>Graptophyllum pictum</i> <i>Annona muricata</i> <i>Alstonia scholaris</i> <i>Schefflera</i> sp.	Leaves Leaves Bark Bark Leaves	Sprain Swelling Body ache Cough Body ache
Tamlaka	Bulay Apiak	Kapaya Bintangurputih Ketapang	Asparagaceae Caricaceae Clusiaceae Combretaceae Combretaceae	<i>Dracaena angustifolia</i> <i>Carica papaya</i> <i>Calophyllum inophyllum</i> <i>Terminalia catappa</i> <i>Terminalia kaernbachii</i>	Leaves, root Leaves shoots Bark Stem Stem	Malaria Blurry eyes Toothache, pospartum Blood coughs Postpartum
Kris ailok	Talisusu	Uramikpoer	Convolvulaceae Crassulaceae	<i>Merremia peltata</i> <i>Kalanchoe pinnata</i>	Leaves, stem Leaves	Wounds Stomach ache
Kokanomatalok	Kastroni Balacaik Foimem KayuBunga		Euphorbiaceae Euphorbiaceae Euphorbiaceae Goodeniaceae	<i>Euphorbia pulcherrima</i> <i>Jatropha curcas</i> <i>Pimelodendron amboinicum</i> <i>Scaevola taccada</i>	Leaves, stem Leaves Bark, sap Root	Fever Constipation, ulcers Aphrodisiac Sore eyes
Kabajj Ai soronggok	Daun Olo'	Mayana (U)	Lamiaceae Lamiaceae Lamiaceae Lauraceae Lecythidaceae Legume Legume	<i>Plectranthus scutellarioides</i> <i>Pogostemon cablin</i> <i>Premna serratifolia</i> <i>Cryptocarya massoy</i> <i>Barringtonia asiatica</i> <i>Bauhinia lingua</i> <i>Bauhinia</i> sp.	Leaves Leaves Leaves Fruit juice Stem Stem	Face Powder Wound (bleeding) Body ache, Vicious dogs Blurry eyes Body ache Shampoo
Kamilalaw Rabonbon	Palou		Legume Legume Legume Malvaceae	<i>Derris elliptica</i> <i>Erythrina variegata</i> <i>Sesbania grandiflora</i> <i>Heritiera littoralis</i>	Root, Bark Bark Leaves Bark	Cough Contraception White Blood Cough
Po' Kalanyeo Geyawas	Lukum Inkambines Katanye	Langsat Katanyeo	Meliaceae Menispermaceae Moraceae Myrtaceae Myrtaceae	<i>Lansium domesticum</i> <i>Arcangelisia flava</i> <i>Antiaris toxicaria</i> <i>Psidium guajava</i> <i>Syzygium</i> sp.	Bark Stem Bark Leaves shoots Bark	Malaria, Body ache Cough, malaria, body ache Masticatory Stomachache Stomachache
Abris Amon	Matmik Inpeleh  Nyana' Babu'	Katuk Sirih	Myrtaceae Phyllanthaceae Piperaceae Piperaceae Poaceae Poaceae	<i>Syzygium</i> sp. <i>Sauropus androgynus</i> <i>Piper betle</i> <i>Piper burmanum</i> <i>Cymbopogon nardus</i> <i>Paspalum conjugatum</i> <i>Polytoca</i> sp.	Bark Leaf Leaves Leaves Rhizomes Leaves, stem Leaves, stem Bark	Appetite Breastmilk Body ache Body ache Body ache Wounds Hair dye Postpartum
Mimikanu	Wamoro Halanyin Alummatal Ilmayal	Andarek, mengkudu	Poaceae Rubiaceae Rubiaceae Smilacaceae Urticaceae	<i>Guettarda speciosa</i> <i>Morinda citrifolia</i> <i>Smilax leucophylla</i> <i>Cypholophus</i> sp. <i>Laportea ducumana</i>	Leaves, root Leaves, root Leaf Stem Leaves	Malaria, headache, stomachache, back pain Body ache, Hemorrhoids Ulcers Body ache

(Contd...)

Table 1: (Continued)

Local name	Langanyan	Biak/Common	Family	Scientific Name	Parts	Uses
Maya/Ambel	Rokum	Lengkuas Kunyit Jahe	Vitaceae Zingiberaceae Zingiberaceae	<i>Leea indica</i> <i>Alpinia galanga</i> <i>Curcuma longa</i>	Young Leaves Rhizomes Rhizomes	Stomach ache Ringworm Ringworm
Darak	Golfun Lali AwakGumuk		Zingiberaceae	<i>Zingiber officinale</i> Unidentified	Rhizomes Bark	Body ache Chest pain
Aisinir				Unidentified	Bark	Itchy, wounds

and *S. taccada*.<sup>[25-31]</sup> The leaves of *Cypholophus* sp. are used with oil for massages to fix broken bones in Fiji.<sup>[32]</sup>

Chewing betel leaves or masticatory culture has been recognized by local people in Waigeo, from children to adults. They chew betel leaves (*Piper betle*) and betel nuts (*Areca catechu*) with lime betel and sometimes used betel nuts substitutes. In addition to the leaves, old and large betel twigs are also used for chewing. This habit is also found in other communities in Papua such as in Wasur National Park and its surroundings, Merauke.<sup>[33]</sup> In Waigeo, betel nuts can be substituted by the bark of *kalanyeo/katanye* (*Antiaris toxicaria*) and other areca nuts such as the fruit of *Areca macrocalyx*.

## CONCLUSION

This study showed that the local people in Waigeo Island, Raja Ampat, West Papua, have still interacted closely with their surrounding environment. The Maya and Langanyan people have sufficient knowledge about the medicinal plant species and their uses. There are 46 species of medicinal plants, included in 43 genera and 29 families that are used to treat about 29 symptoms of illness. Some rare species used as medicinal plants on Waigeo Island include *A. scholaris*, *A. flava*, and *C. massoy*. The uses of medicinal plants found in Waigeo Island can be categorized into species that improve body health and beauty, for contraception, aphrodisiac, and masticatory. Research on chemical contents of medicinal plant species obtained from this study will need to be carried out in the future for further understand the uses.

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