DOCUMENTING ETHNOBOTANICAL KNOWLEDGE OF RURAL COMMUNITY FOR SUSTAINABLE BENEFITS

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ABSTRACT

A study was conducted to identify and document all plants with economic and cultural significance to the nine Singai Bidayuh communities (villages) around the foothills of Mount Singai. Key informant surveys were carried out in each of the villages prior to field documentation and collection of specimens for identification. The information on use and methods of preparations and applications were obtained from active practitioners or traditional "medicine men" and "medicine women" through interviews and application observations for medicinal plants. For each of the plant species identified, specific use, parts of the plant used, method of preparation and applications, and general precautionary notes were included. A total of 52 species of useful plants were documented for medicine and the remaining were for food, preservatives, and spiritual healing. A use and valuation survey on these plant species also revealed that the total value of traditional medicinal plant use for the Singai Bidayuh community based on the current rate of household participation of 10% is at RM15,443.90 per year. The results have provided a baseline on the economic value of the forest resources and contributed towards a better management of the area as a community heritage.

Keywords: Forest resources; traditional medicine; Bidayuh communities; medicinal plants; traditional knowledge; valuation of medicinal plants; economic value

INTRODUCTION

For generations, knowledge and use of plants in healing were passed down through the oral tradition. Traditional livelihood which centered on forest foraging and subsistence farming had kept native communities attached to the skills and knowledge of this gift of nature. Prior to the Malaysian Independence, there were hardly any serious efforts to document the use of wild plants, especially for food and medicinal purposes among the native communities. As

such, it was only during the last two decades or so that there was growing interest in the use of plants in scientific research and for the search of chemical constituents for use in modern medicine. For the Bidayuh community, medicinal plants are used as a direct therapeutic agent because it is cheap and easy to get compared to modern medicine that is often expensive.

Today, even though there is a wide use of modern scientific medicines, traditional practitioners and their traditional methods of healing are not entirely forgotten by the modern society. Utilization of ethnobotanical resources is recognized to have a number of benefits, which among others, includes the realization of direct and indirect use value. The direct use values include provision of resources for wood products, non-wood products, recreational use and amenities (Bishop, 1998). A few studies on assessment of value for ethnobotanical resources were made for the local communities surrounding the limestone forests in Bau district in 2004 and Maludam National Park in Betong Division, Sarawak in 2004 (Noweg, 2004; Noweg, Shebli & Schrevel, 2004). In both studies, the annual value of ethnobotanical resources consumed was estimated to be approximately RM 60 and RM 50 per household respectively. A similar assessment made for communities around peat swamp forest areas in Roban sub-district of Betong Division, Sarawak indicated that the annual value of household use of ethnobotanical resources was as high as RM180 (Noweg & Songan, 2009). Nareh (2008) in her study among the Krokong Bidayuh communities reported that the average annual household use of wild plants for medicinal purpose was around RM250 while the value of wild plants for food was lower, at about RM50.

This paper presents the results of an ongoing documentation on the useful plants among the Bidayuh community in the Singai Bau district of Sarawak. The importance of ethno botanical resources to the native communities of Sarawak is one of the driving forces behind the current trend of community based resource management. This need to conserve community owned forests for the Singai people of Bau district has called for a complete documentation of the available resources to allow for the formulation of a more strategic and integrated management plan. This study is meant to support the development of the proposed plan to conserve the remaining forested lands in the area.

The study documented the traditional uses of plant resources in the Bidayuh communities in Singai, Bau District (Sarawak, Malaysia) and estimated the economic contribution these resources provide to the welfare of the community. The specific objectives include the following:

1. to conduct a documentation of Traditional Knowledge on important plants of the Bidayuh Community in Singai, Bau District (Kampung Apar, Kampung Atas, Kampung Barieng, Bobak, Kampung Bogag, Kampung Sudoh, Kampung Sagah, Kampung Daun and Kampung Tanjung),

2. to study the pattern of medicinal plant uses in and among the communities,
3. to estimate the value associated with the use of these plant resources, and
4. to assess the perceptions towards management of the resources in the community forest.

METHODOLOGY

The study was carried out on the Singai Bidayuh community in Bau district of Sarawak (Malaysia). This area is situated about 40km from Kuching city. The research covered nine villages in Singai area where the villagers are decendents of a group of old villagers. These villages are located half way up the Singai mountain. As such, these villages are close-knit communities and share the same common cultural identity. The Singai Bidayuh community in this area is still practicing the use of traditional medicine, of which wild plants are of paramount importance.

Documentation, Plant Collection and Specimen Identification

The local community leaders were approached to identify informants who were knowledgeable on what the community considered important medicinal plants. These informants comprised of individuals knowledgeable in the identification, preparation and applications of traditional medicinal plants. They were also incorporated in the study as field guides. Plant collections were carried out with the same informants to allow consistency and to avoid conflicting species identifications and unreliable information. In the study, field parameters recorded include the details of location, habitat and all related information concerning the use of the plant. The specimens of each species were taken and brought to Sarawak Herbarium (SAR) for identification.

Household Survey and Instrument

To assess the pattern of use for medicinal plants and plant products, a household survey was conducted. The target village communities were sited in different clustered locations in the study area. Nine villages were selected based on their higher population size and proximity to Mount Singai. The effective population size for this study consisted of fulltime resident households, totaling 720 households. It was further assumed that the population homogeneity (with similar background and experiences) was 90 percent. At 95% confidence level and with a margin of error at 5 percent, the sample size was determined, as follows:

Initial sample estimate, n:

$$n = \frac{Z^2 \times p(1-p)}{c^2}$$

$$= \frac{(\pm 1.96)^2 \times (0.9)(1-0.9)}{(0.05)^2}$$

$$= 138$$

where,
Z = Z value (±1.96 for 95 percent confidence level)
p = percentage of estimated population homogeneity
c = margin of error

Using the above formula, n was found to be 138.

The final sample size, n_1, was:

$$n_1 = \frac{N \times n}{N + n}$$

$$= \frac{720 \times 138}{720 + 138}$$

$$= 115$$

The 115 households were then proportionately allocated between the sample villages based on their respective effective population size. Each village sample was selected randomly from the list of households provided by their respective Village Development and Security Council (JKKK). This household list included only the households who were permanent residents of that village.

A set of semi-structured questionnaire survey was developed and used for assessing the use of traditional medicinal plants in the 115 households. The questionnaire consisted of the following parts:

a. Basic socio demographic information
b. Pattern of use of traditional medicinal plants, and
c. Common chronic diseases in the surveyed households (their prevalence and types).

The instrument was tested for its reliability and validity based on Cronbach's Alpha value (Cavana, Delahaye & Sekaran, 2001). The reliability test was conducted on 114 items in the survey instrument that uses nominal scales. The result yielded a Cronbach's Alpha value of 0.749, which indicated that the instrument had "Moderate Strength" in capturing the intended information.

DATA ANALYSIS

Valuation of Medicinal Plant Use

The use of medicinal herbs collected from the forest resources by local communities is an example of both non-marketed and marketed direct use. There were three approaches used in the valuation of medicinal plant used by the community. For readily available marketed products, direct market value was used. For non-marketed products, valuation was based on replacement value or replacement cost and opportunity cost.

- Direct market valuation

Market visits were made to all local markets in Bau district during weekends. Interviews were conducted with people selling plants and herbal products to record prices of the plants and herbal products that were sold.

- Replacement Value

The replacement cost approach was used for valuation of plant used for medications, which did not have readily market values. In this approach, the cost for specific treatment of sickness was replaced by the value of a similar treatment received from a private clinic.

- Opportunity Cost

The opportunity cost approach was used for valuation of medicinal plant that neither have the readily available "market value" nor had a similar treatment from modern medical sources (clinics and hospitals), The opportunity cost was calculated by including the cost of collecting the plant materials, the cost of traditional preparation into final usable products and costs in administering the treatments.

RESULT AND DISCUSSION

There were 52 species of useful plants documented for the Singai Bidayuh community. These plants were recorded for their types of uses, their natural habitats, method of preparation and treatment, as shown in Appendix 1.

Plant Uses

The first objective of the study was to document the specific uses of the plants identified. From the study, a total of 44 species were found to be used for medicine, four for spiritual and cultural belief usage and the rest for food, shampoo and soap, preservatives, and building materials (Table 1).

Table 1: Specific Use of Wild Plants Identified by the Community

Uses	Percentage of Use (%)
Medicinal use	84.7
Spiritual & superstitious belief	7.7
Food	1.9
Shampoo/Soap	1.9
Preservatives	1.9
Building material	1.9

From the study, it was found that there were two different ways in treating the ailments. These were internal method, for internal ailments, and external method for external ailments. The internal ailments included high blood pressure (hypertension), diarrhea, fever, food poisoning and gastric pain. The external ailments included skin injury, headache, swollen parts (muscle injury), scabies and skin diseases. The ailments that were categorized as both internal and external included chicken-pox, stomachache and fever (high body temperature).

Most Popular Families

In relation to the second objective of this paper, looking at the plants identified as useful by the community, it was observed that a total of 35 families of plants were involved. The most prominent families that were identified were the Arecaceae, Fabaceae and Poaceae (19%), Asteraceae, Moraceae and Zingiberaceae (14%) species (Figure 1).

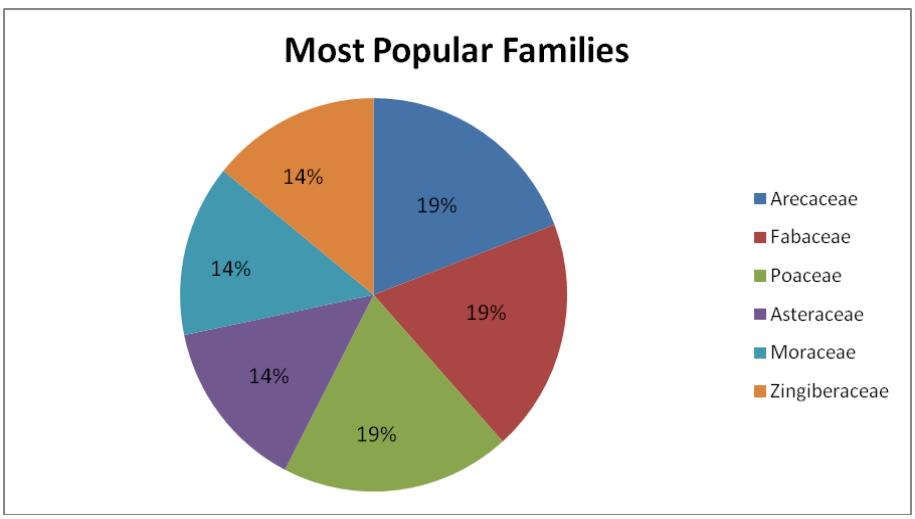

Figure 1: Six Most Dominant (Common) Families Identified

Value of Annual Usage of the Ethnobotanical Resources by Community

The annual value on usage of the plant resources used by the Singai community was calculated based on the values derived from the actual usage of treatments received from traditional medicine as reported by the households surveyed in each of the nine villages in the study area. The average annual value and total annual value for surveyed households, by village are as shown in Table 2.

Table 2: Average Annual Value and Total Annual Value of Traditional Medicinal Plants Used by the Village

Name of Villages	No. of Respondents	Total Annual Value of Traditional Medicine (RM)	Average Annual value of Traditional Medicine (RM)
Apar	12	3665	305.4
Atas	12	2995	249.5
Barieng	10	2205	220.5
Bobak	14	3850	275.0
Daun	10	3085	308.5
Segong	12	1655	137.9
Senibung	12	1905	158.7
Sudoh	13	3950	303.8
Tanjung	20	2860	143.0

The third objective of the study was to estimate the total annual use value for the whole Singai community. Based on the derived average annual value per household in the respective villages (Table 2) the estimated community value was calculated and is as shown in Table 3.

Table 3: Total Annual Use of Traditional Medicinal Plants, by the Village and Assumed Level of Participation

Name of Villages	No. of Resident Households	Value of use for assumed participation level (RM)			
		2.5%	5%	10%	20%
Apar	50	381.70	763.50	1,527.10	3,054.20
Atas	50	311.90	623.90	1,247.90	2,495.00
Barieng	20	110.30	220.50	4,41.00	882.00
Bobak	41	281.90	563.80	1,127.50	2,255.00
Daun	109	840.70	1681.30	3,362.60	6,725.30
Segong	100	344.80	689.50	1379.00	2,758.00
Senibung	119	472.10	944.20	1,888.50	3,777.10
Sudoh	100	759.60	1,519.00	3,038.00	6,076.00
Tanjung	131	468.30	936.60	1,873.30	3,746.60
Total	720	3971.30	7942.30	15,443.90	31,769.20

Actual annual use varied from year to year. To demonstrate how the total use value fluctuated with changing use intensity, a sensitivity analysis was included. The approach taken was to estimate based on different assumption on the percentage of villagers who were actively using traditional medicinal plants. There were four levels of percentage of household participation assumed: 2.5%, 5%, 10% and 20%. This assumption was made as the actual percentage of villagers participating or actively using traditional medicinal plants annually were not constant and appeared to be quite volatile changing with time as influenced by changing social environment and economic developments that took place in the area.

Example of calculation for value of use for assumed participation level, by Singai community:
Assumed participation level × No of resident household × Average Annual Value of Traditional Medicine

$$= \frac{2.5}{100} \times 50 \times 305.42$$

$$= 381.78$$

Based on the above calculation, the value of traditional medicinal plants used varied quite significantly with the different levels of participation. With a 2.5% of the whole Singai community's involvement or participation, the estimated value stood at RM3,971.30. For the 5% participation or involvement level, the total value was RM7,942.30. For the assumed participation level of 10% and 20%, the estimated values were RM15,443.90 and RM31,769.20 respectively. A use and valuation survey on these plant species also revealed that the total value of traditional medicinal plant use for the Singai Bidayuh community based on the current rate of household participation of 10% stood at RM15, 443.90 per year.

Willingness to Pay (WTP) for Singai Community Forest Conservation

To achieve the fourth objective of this study, the respondents were asked whether they were willing to pay to support the conservation and protection of Singai Community Forest by assuming that a special trust fund to support the conservation and protection of Singai community forest was to be established. The proposition also envisaged that the local communities in Singai area are encouraged to participate in the proposed conservation programme.

Estimation of Respondent's Willingness to Pay (WTP)

After explaining the purpose of establishing the conservation trust fund, 77.4% of respondents agreed to participate. Their maximum WTP ranged from RM1 to RM20 with a weighted average of RM10.50 per year (Table 4).

Table 4: Estimation of Respondent's Willingness to Pay (n=81)

Willing To Pay (WTP)	No of Household	Percentage (%)
Yes	89	77.4
No	26	22.6

The Maximum Amount Respondents Willingness to Pay

The result showed that the majority of the households (77.4%) were willing to contribute to support the conservation programme and only 22.6% were not willing to pay as they did not believe that paying such a sum would result in improved forest conservation. Some of them felt that only people who directly benefitted from the existence of Singai forest should pay for the conservation effort and thus contribute to the fund.

Extrapolating the result of the estimation to the whole population (720 households) indicated that some 558 (77.4%) households were willing to pay annually. Assuming the mean annual contribution was RM10.50 per household, the total fund collectable and made available from the community would be about RM5,859 annually. If, on the other hand, the higher range of suggested WTP amount was assumed, the total annual amount that could be potentially contributed by the local communities should surpass RM10, 000.

Community support, as demonstrated by their willingness to pay, is a good indication of how they value the community forest and its resources. This value may be attributed to direct utilization or consumption of the resources or indirectly through enjoyment of the various other environmental services received. Their willingness to pay more for the conservation effort indicates their awareness and inclination to protect and conserve the forest and its natural resources. The awareness and willingness to pay also bear implications on how the resource will be managed. Among others, the formulated management plan will include both conservation and development agendas. Valuable information on the existing use and its monetary value will also allow managers to develop better pricing mechanism and policy.

CONCLUSION

There are 52 wild plant species identified as useful plants among the Singai Bidayuh community in the study area. The most common use was for medicinal use and food, such as, wild vegetables and fruits. For the medicinal use, the most predominant type of use was for external applications rather than internal. The community was found to use a single plant or a concoction of different plants as medication in a single disease. It was also found that one species of plant can be

used in the treatment of several different diseases.

The use and valuation survey revealed that the total annual value of traditional medicinal plant use for the Singai Bidayuh community based on the current rate of household participation of 10% was RM15, 443.9. The results of the valuation can provide policy makers with some indication of the importance of unpriced plant resources in monetary terms. The resultant value would be much higher if the valuation was extended to include benefits from other environmental services such as community water supply, wildlife and recreation use and benefits from use of other forest resources.

In terms of community perception on ethnobotanical resources in the area, the majority of the informants felt that there is an urgent need for a more planned management and control of use. In view of the increasing pressure from other land uses, the existing community forests need to be properly surveyed and gazetted (officially recorded and documented) and recognized as protected community reserve.

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APPENDIX

Useful Plants of Singai, Bau (Sarawak)

Local Name	Family	Genus	Species	Uses	Preparation
Baai	Arecaceae	*Areca*	*Catechu*	Treat stomach ache and headache	The nut is chewed with *Piper betle*. Poultice is applied on the affected part and massaged for 10-15 minutes
Banuok	Euphorbia ceae	*Manihot*	*Escuelanta*	Relief stomach ache	Wet leaves are warmed over open fire and later placed on the stomach for 1-2 minutes.
Bliming trinyu	Oxalidaceae	*Averrhoa*	*Carambola*	Food	Fruit are cooked with fish as aouring agent (replacing asam jawa)
Boid	Piperaceae	*Piper*	*Betle*	1) For headache, stomachache and backache 2) To remove excess air	1) Leaves are chewed with *Areca catechu* and applied to the affected part and massaged for 10-15 minutes. 2) Leaves are boiled and used for bath when bathing solution is still warm.
Borak	Musaceae	*Musa*	*Sapientum*	For mouth ulcer of the baby	Tip of the unripe fruit is sliced to extract the exudate. Exudate is applied onto the breast nipple area from where the baby sucks milk from the mother.
Botey	Caricaceae	*Carica*	*Papaya*	To reduce high blood pressure	Young shoots and leaves are boiled with water and solution is drunk while still warm.
Boyuh	Moraceae	*Artocarpus*	*elasticus*	Food	Ripen fruit taken raw
Buan	Dilleniaceae	*Dillenia*	*Suffruticosa*	1) To stop the internal bleeding caused by the internal injury. 2) For constructing a	1) Young shoot pounded and applied on the affected body area. Treatment is repeated as required. 2) Take a straight stem of about 4-6 inch.

				ladder to an altar in the farm or near the long house during Gawai festival. They believe that their Gods climb the altar on this ladder to guard the farm or the long house	Notches are made at regular intervals (as steps). The "ladder" is placed in slanting position to the alter platform.
Lokan / Popan	Moraceae	*Ficus*	*Grossularioides*	For injury	Young shoots are chewed. Poultice is wrapped in cloth bag and applied on the affected part of the body.
Buru	Poaceae	*Gigantochloa*	*sp.*	1) To facilitate easy delivery process 2)To "wake" the baby up from unconscious state 3) Used by Bidayuh during religious occasions, for constructing altars for their gods	1) Bamboo stick is used to gesture a movement onto the mother's womb (belly) while chanting spiritual prayers, until the baby is born. 2) Step on the stem while chanting "Burie" 7 times until the stem cracked and the new born started to cry 3) Cut stem to about 2 feet long. Split into thin sized then weave. This is for flooring of the altar. For the poles, this species must also be used. For roofs and walls, the leaves are used.
Butan grin	Arecaceae	*Cocos*	*Nucifera*	1) To treat the skin head of infant that peels off. 2) To reduce the high temperature and to clean the kidney.	1) Peel off the endosperm of the fruit and put onto the infant head, wrap the head with a clean cloth. It is believed to treat the skin head that peels off in one week. 2) Drink the coconut water.
Butan sia	Arecaceae	*Cocos*	*Nucifera*	1) For chicken-pox, food poison and reduce high temperature 2) To reduce hair fall 3) To reduce jaundice in babies	1The coconut milk is drunk 2) The paste of "santan" or grounded of coconut meat is boiled with water to extract the oil. The oil is applied to the hair. 3) The baby is bathed in coconut milk.
Do'oh	Fabaceae	*Koompasia*	*Excels*	1)Food 2) Building material	1) Peel off the skin and seeds are fried 2) Stem: for construction wood
Duh rubak	Asteraceae	*Elephantopus*	*Scaber*	To reduce body temperature	Leaves are boiled and water drunk while either warm or when completely cooled.
Gami	Ulmaceae	*Trema*	*Orientalis*	For treating	10-20g of leaves with

				chicken pox	branch and fruit are pounded and added with a few drop of the water. The solution is applied on the chicken pox area twice a day and until it is cured.
Girogot	Schizaea ceae	*Lygodium*	*Circinnatum*	For break bone	5 grams of the whole plant is pounded with 2cm length of ginger roots (about 10 grams). Poultice is put on the affected part and wrapped with a cloth. The application is repeated until it is cured.
Gomier	Rubiaceae	*Uncaria*	*Gambir*	For headache, stomachache and backache	Leaves are cooked in the bamboo. Leaves chewed with *Areca catechu* and *Piper betle.* The solution is applied on the affected part together with a 10-15 minutes massage.
Jamu batuh	Myrtaceae	*Psidium*	*Guajava*	1) For diarrhoea 2) For treating scald	1) Leaves are boiled and the solution water is drunk warm. 2) Young shoots and leaves are chewed and applied on the affected part.
Jamu Piin	Myrtaceae	*Syzygium*	*Paucipunctatum*	To treat skin diseases	Leaves are pounded into a wet poultice and applied on the affected part.
Jiet	Oleandra ceae	*Nephrolepis*	*Biserrata*	For bleeding in the stool or faeces	Whole leaves are pounded to extract wet and juicy paste. This paste is mixed with a little water and honey and is drunk.
Jingah	Fabaceae	*Pithecellobium*	*Jiringa*	To reduce high blood pressure and diabetes	Fresh fruit is taken raw as salad with “sambal”.
Kabang	Dipterocarpaceae	*Shorea*	*Macrophylla*	1). For treatment of mouth ulcer and chicken pox 2). Oil used as vegetable oil	1) Fruit is cooked to extract the oil which is used as ointment on affected parts. 2) Oil is used for cooking.
Kari boos	Fabaceae	*Mimos*	*Pudica*	For treating swollen	Leaves are pounded with ginger. Put onto the affected part and wrap it with cloth.
Kari pati	Acoraceae	*Acorus*	*Calamus L.*	1) For diarrhoea, regulating urination 2) Stomachache (flatulence)	1) Whole plant is boiled in water. The solution water is drunk while warm 2) Warm a whole branch over the fire until the leaves turn to yellowish green. Warm leaves are wrapped around the stomach area.
Lada	Piperaceae	*Piper*	*Nigrum*	For mother after delivery	Pepper grain is pounded and used for massaging the stomach area (belly) of the mother.

Lalang	Poaceae	*Imperata*	*Cylindrical*	To reduce high temperature and cure fever	Rhizome or root is pounded to extract the juice. The juice is drunk twice a day.
Langir	Polygala ceae	*Xanthophy llum*	*Spitatum*	To remove dandruff	The foamy flesh from the fruit wall is collected. This foamy-jelly fruit endocarp is used as shampoo.
Likuas	Zingibera ceae	*Alpinia*	*galanga L (Willd)*	1) Fungus treatment 2) To reduce body temperature	1) Mature rhizome are pounded and mixed with 3 drops of benzene. The pounded or grounded mix is wrapped in cloth and squeezed to release the watery extract to be applied on the affected part. 2) About 10 leaves are boiled in water and the resultant solution is used to bathe. The practise is repeated until the body temperature is reduced.
Limo mosio	Rutaceae	*Citrus*	*Nobilis*	For cough	Leaves are boiled with water added with about 1 tea spoon of sugar to make it mildly sweet. The "tea" water is drunk 2-3 times a day.
Ngili wat	Lamiaceae	*Vitex*	*Pubescens*	For sore eyes	The young leaves of the plant are pounded to squeeze the juice out. This resultant juice is dropped into the eyes.
Mi'et	Zingibera ceae	*Curcuma*	*Domestica*	1) To treat bloated skins on the body caused by food allergy 2) For mother after delivery 3) For inner muscle injury on hands and legs	1) Matured rhizome are pounded and applied on the affected part 2) Rhizomes are pounded with *Zingiber officinale* rhizome and poultice applied on the leg, hand, stomach and at the back of mother after delivery 3) Rhizome is pounded and applied on the affected part
Mikudu	Rubiaceae	*Morinda*	*citrifolia*	To relief gastric and reduce high blood	Fruit are cooked to extract the juice from the fruit. The juice are drunk.
Mupuot	Asteraceae	*Vernonia*	*arborea*	For curing cuts and sores	Leaves are pounded to extract the juice. The juice is applied on the cuts or sored area.
Naka Blana	Annonaceae	*Annona*	*muricata L.*	For treating swellings and skin diseases.	Young shoots are pounded and poultice is applied on the affected part.
Pigaga	Apiaceae	*Centella*	*asiatica*	1) To reduce high blood 2) For stomach ache	For all purposes, the young leaves are taken raw as part of leafy salad mix or on its own with sambal dressing.

				3) For mother after delivery	
Pinyin gat	Agavaceae	*Cordyline*	*Fruticosa*	1) For blood vomiting, blood clotting and tuberculosis 2) Spiritual use. To drive away evil spirits & spiritual	1) Leaves are boiled with water and the solution is drunk when warm. 2) The leaves of the plant are taken and placed at the side of the house. In extreme cases such as the presence of paranormal being in the house, the leaves are placed under the pillow during sleep.
Poyang	Flacourtia ceae	*Pangium*	*Edule*	To preserve pickled fish or meat	Mixed the young leaves in the fermented pickled meat or fish.
Pudun tana	Acantha ceae	*Androgra phis*	*Paniculata*	To reduce high blood pressure or hypertension	Whole plant is boiled and drunk when warm.
Saang	Solanaceae	*Capsicum*	*frutescens*	For treating scald	Leaves are chewed and put on the affected area.
Siroyan	Blechnaceae	*Blechnum*	*orientale L*	For treating boils	Fresh part of young shoots are pounded and applied onto the boil. The boil is wrapped with a clean cloth. The process is repeated for 2-3 days or until the pus from the boils is released.
Sisuoh	Asteraceae	*Blumea*	*Balsamifera*	1) To cure fever in infants 2) For mother after delivery	1 & 2) Dried leaves or fresh leaves are boiled with water and used for bathing.
Situ ruok	Clusiaceae	*Garcinia*	*Forbesii*	For bleary eye	Dried bark are boiled with water and drank every morning and evening for one month.
Sorai Wangi	Poaceae	*Cymbopogon*	*Nardus*	To reduce body temperature and reduce the smell of the body	Stems are pounded together with garlic and mixture boiled. That resultant water or solution is used to bathe, while still warm.
Sorin ieng	Lycopodia ceae	*Lycopodium*	*Cernuum*	For injury	Fresh leaves are pounded and a half tea spoon of arak is added to produce a paste. The paste is applied on the affected part and wrapped with a cloth. This is practised till injury is cured.
Suruok	Fabaceae	*Cassia*	*alata L*	For treating skin deseases.	Saps from the young shoots are applied on the affected part.
Tibakau oyuo	Campanula ceae	*Laurentia*	*Longiflora*	For scabies	2-3g of leaves are pounded with a few drops of water to make poultice. The paste is applied on the affected part and wrapped with a clean cloth. The process is repeated till cured.

Tobuh riung	Poaceae	*Saccharuum*	*Officinarum*	For mouth ulcer of the baby and food poisoning	The sugar cane internode is squeezed or pressed to release the cane juice. The juice is drunk.
Tomu	Zingibera ceae	*Curcuma*	*Xanthorrhiza*	For mother after delivery	A paste of mixed rhizomes of *Curcuma* and Z*ingiber officinale* is used to massage the mother's body.
Tongun dia	Myrsina ceae	*Labisia*	*Pumila*	For mother after delivery	Whole plant is boiled and resultant water solution is drunk when warm. It is believed that the treatment would help to contract the uterine and vagina muscles after delivery.
Tongun sagu	Arecaceae	*Metroxylon*	*Sagus*	To stop the baby that always cries	The wet baby napkin is placed on leaves of the sago arranged nicely on the floor. After prayer rituals, the napkin is used to wipe the face and body of the baby. The process is performed only by qualified traditional medicine men or women. Chanting of prayers to ancestral gods accompanies the medicine men.
Popan	Moraceae	*Ficus*	*sp.*	For bleeding in the stool or faeces	3-6 young shoots are boiled with 1 cup of water. The resultant solution is drunk 3 times a day.