



## ETHNOBOTANICAL INVENTORY OF TRADITIONAL PLANT OF THE SUBANEN TRIBAL COMMUNITIES IN ZAMBOANGA SIBUGAY, MINDANAO

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### ABSTRACT

The study aimed to document ethnobotanical and phytocultural importance of traditional plants by the *Subanen* tribal communities in the province of Zamboanga Sibugay, Mindanao. The study utilized descriptive research design to gathered information from general interviews and focus group discussions designed to learn more about how participants use a few different plants utilized for food and medicine. More so, cultural practices and beliefs related to utilization of traditional plants by the *Subanen* tribal communities. The results showed that there was a total of 26 traditional plant species having medicinal values which they use to treat various range of diseases and seven (7) plant species utilized both as food and medicine. There were 33 species of plants documented are under 24 families and are mostly represented by herbs. Three plant species each were under Family Asteraceae and Malvaceae, respectively. Consequently, the phytochemical screening of the ethanolic extracts of cobra vine seeds revealed the presence of flavonoids, alkaloids, polyphenols and tannins. Since phytochemicals are nonnutritive substances in plants that possess health protective benefits, it can be inferred that cobra vine seeds possess medicinal and nutraceutical potential. Likewise, cobra vine can be investigated to create an evidence base that will facilitate their inclusion in medical practice and as food supplement and additives in the food industry.

**Keywords:** *ethnobotanical inventory, subanen tribal communities, traditional plant*

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## INTRODUCTION

From ancient time various plant species have been used by human being as a source of food, shelter, medicine, fiber, gum, resin, oil, etc. Several wild plants are used as food by tribes and other local communities living in that particular region. It has been observed that the traditional knowledge on indigenous plants is declining day by day (Mishra et al., 2012).

Natural resources are of great importance to rural communities since they provide many useful materials for their daily life. One of these important resources is the indigenous plants which provide food, and wood for fuel and building materials.

The Philippines is endowed with diverse flora and fauna. It is home to many endemic species as well as indigenous tribes with assorted cultural practices. These various indigenous tribes are dependent on their environment. The forests and mountains serve as a life-support system because these provide basic needs such as food, clothing, shelter, medicine, and other ecological services. With the intimate dependence of indigenous communities on natural resources, traditional knowledge on the use of these resources has evolved through time and has become knitted into their cultural practices.

Indigenous tribes in the Philippines exhibit a wealth of traditional knowledge on the use of their natural resources, yet documents and published materials on ethnobotanical studies are scarce. Few earlier publications were focused on more popular ethnic tribes.

The remarkable work of Reed (1904) on the Negritos of Zambales described the origin, distribution, diasporas, culture and traditions, including descriptions of the industrial life of the group like hunting, fishing, agriculture, manufacture, and trade. Social life of the Negrito such as marriage, polygamy, divorce, burial, morals, slavery, music, dances, games, and clothing were also presented. In 1952, Fox demonstrated the useful plants and material culture of the same tribe. In another study, Rocero (1982) documented the ethnobotanical knowledge of the Itawes, a minority group of Cagayan Valley. Interestingly, the Itawes' use of plant resources was classified according to food, beverage, building and construction materials, furniture and other household equipment, medicinal plants, and other purposes.

In the Cordillera region, the only available document on how the eastern Ifugaos use their plant resources was a study by Beyer and Merrill between 1905 and 1965 which was summarized by Conklin (1967). For the Kalanguya, a sub-tribe of the Ifugao tribe, the only known records are those by Rice (1984) and Natalio (1987) who presented an

assessment of the development project introduced to the Kalanguya or Ikalahan in Nueva Vizcaya. Among the numerous tribes in the Cordillera region, the Kalanguya of Tinoc, who live in the western part of Ifugao province, exhibits a cultural heritage that is unique and rich. They live a very interesting way of life yet this indigenous group is hardly known because of the scarcity of published materials about their cultural practices and ethnobotanical knowledge. The only available document of this sub-tribe is an unpublished thesis which described the traditional practices of this group and their implication on education (Gaspili 1987).

According to Aquino (2010), the Philippines has been blessed with plants but, more often than not, these have been neglected or remain underutilized. For a long time, little did we know that the parts of these plants have own unique characteristics and uses that can be processed into different forms usable to man. Many of these plants have medicinal properties and are now being exploited for their cosmetic and aesthetic values, for aromatherapy, or even their use as spices, food supplements and functional food. In particular, Region 9 is one of the regions with an abundance of these plants and is where the practice of herbal medicine and the use of medicinal plants are extensive. These botanicals have thrived in the region (Zamboanga del Norte, Zamboanga del Sur, and Zamboanga Sibugay) and are easily available.

It is to this end that this study was conducted among tribal communities in the province of Zamboanga Sibugay, Mindanao to serve as a living document of the use of plant resources, particularly for food and medicinal purposes, of the *Subanen* tribe. This study on the uses of plant resources as food and medicine by the tribal communities if left undocumented can be irretrievably lost. Consequently, this serves as a record of this vanishing yet important indigenous knowledge.

## Research Objectives

The main purpose of this study was to document ethnobotanical inventory and phytocultural importance of traditional plants by the *Subanen* tribal communities in the province of Zamboanga Sibugay, Mindanao.

Specifically, this study aimed to:

1. document the existing traditional plant resources of food and medicine of the *Subanen* tribal communities in Zamboanga Sibugay, Mindanao;
2. document the following information on the identified plants:
  - 2.1 Botanical characteristics/description;
  - 2.2 Ethnobotany and related information on the plants' utilization,
  - 2.3 Perceptions of the plants' socio-economic importance, and

- 2.4 Possible threats to the species and conservation initiatives;
3. determine whether the utilization of plants is tied with the cultural practices and beliefs of the *Subanen* tribal communities; and
5. present the phytochemical composition of one distinctive traditional plant identified.

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## METHODOLOGY

### Research Design

The study utilized descriptive research design. Descriptive research describes data and characteristics about the population or phenomenon being studied. Descriptive research answers the questions who, what, where, when and how. It is a scientific method which involves observing and describing the behavior of a subject without influencing it in any way. The common data collection methods for descriptive research are surveys, interviews, observations and portfolios (Calderon and Gonzales, 1993).

Information were obtained from general interviews and focus group discussions designed to learn more about how participants use a number of different plants utilized for food and medicine.

### Population and Sampling

Three tribal communities of the *Subanen* were selected out of the five indigenous groups in the province of Zamboanga Sibugay, Mindanao, namely: Lapuyan tribe, Kalibugan tribe and Binakalan Tribe. The *Subanen* tribe was selected because the group spent a great deal of time in gathering food for their livelihood than other tribes. The *Subanen* also had the largest population of tribal members in Zamboanga Sibugay based on the records of the Philippine National Commission on Indigenous Peoples.

Ten local elders from three *Subanen* tribal communities were the major sources of information in this study. In all, a total of 15 respondents comprising of five local elders from each of the three *Subanen* tribes were interviewed and three traditional healers. The focus group discussions were composed of five elders who participated in the interviews and were conducted on a scheduled visit to the area.

The selection criterion that was used for informants will be the reliability and depth of knowledge each one of them had. In general, the best informants were older men and women who were alive at times when their culture was subjected to fewer inputs from contemporary society.

## Research Instrument

A structured interview schedule was developed to gather the respondents' socio-demographic profile and their knowledge and perceptions of IFPs. These included: (a) traditional plant resources used and/ or known; (b) socioeconomic importance and prospects; (c) reasons for usage/non-usage; (d) ethnobotany (how the plant is used in a particular area, i.e. food, medicinal, feed, ritual, industrial, etc.); and (f) conservation efforts on the target plants.

During the interviews, questions were translated to the local dialect and answers translated back to the English language for documentation.

## Data Collection

Informed consent and the permission to conduct the study was secured from the local government units (LGUs) in Zamboanga Sibugay Province. Thereafter, permission was secured from the head of tribe of the three *Subanen* tribal communities. Once permission is granted, the researcher scheduled field interviews and focus group discussions (FGDs) with the local elders to gather the necessary data. Plant materials for propagation and taxonomic identification were also collected and observed for botanical description.

The main objective of this study was achieved through scheduled interviews and focus group discussions and was augmented by direct observations. Face-to-face interviews were accomplished using the local dialect because most of the participants only speak this dialect. During the interviews, questions were translated to the local dialect and answers translated back to the English language for documentation. The information that was gathered through face-to-face interviews will be confirmed by field observations and focus group discussions. The group discussions were composed of five respondents and were conducted on visitations to the area.

Along the way to the tribal villages, the researcher collected plant samples and presented to the community for ethnobotanical data. At other times, field visits to the forests or "walk into the woods," a method introduced by Cunningham (2001), were undertaken together with the informants to facilitate identification and demonstrate which plants are used for food purposes. These plants were photographed and were indexed in vouchers.

## **Voucher Specimen Collection and Management**

Available plants were collected from their natural habitat. Passport descriptors and other important notes (i.e., collection number, collector(s), collection site, material collected) were accomplished for each accession. For this study, plant specimens were collected along with necessary information with the help of local elders from the tribal communities. Collected samples were processed and authentically identified consulting the pertinent literatures, and specialists.

Specimens were collected from the natural population and prepared for taxonomic identification. In this study, the common species between and among the three tribes were enumerated. Local names were given followed by the tribal name in parenthesis in abbreviated form. Specimens were identified, photographed and indexed in vouchers. Botanical descriptions of the identified plants were recorded from specimens in situ.

## **Phytochemical Screening of Cobra vine (*Ipomoea cf. setosa*) Seeds**

The ethanolic extracts of cobra vine (*Ipomoea cf. setosa*) seeds were subjected to phytochemical analysis at the UST Research Center for Natural and Applied Sciences (Appendix 4). The phytochemical screening of the seed extracts of cobra vine were determined by standard procedures using the following tests: Bate-Smith and Metcalf method, Munier and Macheboeuf modification test, Ferric chloride test, and Gelatin test.

## **Data Analysis**

A written narrative of interviews and FGDs with the key informants was presented. Key phrases from the interviews and FGDs were written on index cards.

The data collected were analyzed and presented using descriptive statistics. Descriptive statistics such as frequency distribution, percentage, mean and standard deviation were used to answer the objectives of study.

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## **RESULTS AND DISCUSSION**

This section discusses and analyzes the data obtained from interviews, FGDs and field observations. This documented the existing traditional plant resources of food and medicine of the selected Subanen tribal communities; the different information on the plants identified such as: botanical characteristics/description, ethnobotany and related information on the plants' utilization, perceptions of the plants' socio-economic

importance, possible threats to the species and conservation initiatives; and the cultural practices and beliefs tied with the utilization of the identified plants.

### Existing Traditional Plant Resources of Food and Medicine of the *Subanen* tribal Communities in Zamboanga Sibugay, Mindanao

As shown in Table 1, Subanens from the three tribal communities of Zamboanga Sibugay, Mindanao utilized 33 varieties of plants as food and medicine.

Table 1. List of traditional plant resources utilized as food and medicine by the *Subanen* tribal Communities in Zamboanga Sibugay, Mindanao

FAMILY	LOCAL NAME	COMMON NAME	SCIENTIFIC NAME	USE
Acanthaceae	Kuyanap	Dahon-pula (Filipino); Metal leaf, red ivy (Eng.)	<i>Hemigraphis colorata</i> (Bl.) Hallier	Medicine
Acanthaceae	Mandalusa	Limang-sugat, kapanitulot (Filipino); Shooting star (Eng.)	<i>Justicia gendarussa</i> Blanco	Medicine
Amaryllidaceae	Abod	Tambal (Filipino); Cardwell lily (Eng.)	<i>Eurycles amboinensis</i> (L.) Lindl. ex Loudon	Medicine
Apiaceae	Gotu Kola	Yahong-yahong (Filipino); Marsh pennywort (Eng.)	<i>Hydrocotyle vulgaris</i> Linn.	Medicine
Asteraceae	Maluko	Hagonoy (Filipino); Jack in the bus, devil weed, Siam weed (Eng.)	<i>Chromolaena odorata</i> (L)	Medicine
Asteraceae	Pisaw-pisaw	Tagulinaw (Filipino); Lilac tasselflower (Engl.)	<i>Emilia sonchifolia</i> (Linn.)	Medicine
Asteraceae	Tulay-tulay	Dadayem (Filipino); Beggar ticks (Eng.)	<i>Bidens pilosa</i> Linn.	Medicine
Convolvulaceae	Cobra	Cobra vine (Eng)	<i>Ipomoea cf. setosa</i>	Medicine
Crassulaceae	Hanlilika	Katakataka (Filipino); Cathedral bells (Eng.)	<i>Kalanchoe pinnata</i> (Lam.) Pers.	Medicine
Cyperaceae	Busikad	Anuang (Filipino); Whitehead Spike Sedge (Eng.)	<i>Cyperus kyllingia</i> f. <i>humilis</i> (Boeckeler)	Medicine
Dracaenaceae	Espada-espada	Espada (Filipino); Spear plant (Eng.)	<i>Sansevieria spp.</i>	Medicine
Euphorbiaceae	Balanhoy	Kamoteng kahoy (Filipino); Cassava, tapioca plant (Eng.)	<i>Manihot esculenta</i> Crantz	Medicine

Euphorbiaceae	Tuba-tuba	Tubang bakod (Filipino); Purging nut tree (English)	<i>Jatropha curcas</i> Linn	Medicine
Fabaceae	Asunting	Akapulko (Filipino); Ringworm bush or shrub (Engl.)	<i>Cassia alata</i> Linn.	Medicine
Flagelleriaceae	Uag / Uai	Baling-uai (Filipino); Whip vine (Eng.)	<i>Flagellaria indica</i> Linn.	Food and medicine
Gnetaceae	Bago	Bago (Filipino)	<i>Gnetum gnemon</i> Linn.	Food and medicine
Lamiaceae	Sangig	Balanoy (Filipino); Sweet basil (English),	<i>Ocimum basilicum</i> L.	Medicine
Lamiaceae	Wachichao	Balbaspusa (Filipino); Cat's whiskers (Eng.)	<i>Orthosiphon aristatus</i> (Blume) Miq.	Food and Medicine
Leguminosae	Mani-mani	Tayam (Filipino); False ground nut, Asian ticktrefoil, (English); Mani-manian (Tagalog)	<i>Desmodium heterocarpon</i> (L.) DC.	Medicine
Liliaceae	Ganda	Kutsay (Filipino); Chinese chives (English)	<i>Allium tuberosum</i>	Medicine
Malvaceae	Likway	Lagikway (Filipino); Sunset muskmallow (Eng.)	<i>Abelmoschus manihot</i> L. Medikus	Food and medicine
Malvaceae	Eskubang-mayawis	Uaualisan (Filipino); Wireweed (English)	<i>Sida acuta</i> Burm. f.	Medicine
Malvaceae	Ahimit / Labog	Labuag (Filipino); Sapinit (Tag.); Wild sour (Eng.)	<i>Fucaria suratensis</i> Kostel	Food and medicine
Menispermaceae	Panyawan	Makabuhay (Filipino); Heavenly elixir (Eng.)	<i>Tinospora rumphii</i> Boerl. is a synonym of <i>Tinospora crispa</i> (L.) Hook. f. & Thomson	Medicine
Moraceae	Lagnob	Hauili (Filipino); Labnog (P. Bis.); Hauili fig tree (Eng.)	<i>Ficus septica</i> Blanco <i>Ficus septica</i> Burm.f.	Medicine
Moraceae	Kamongsi	Kamansi (Filipino); Breadnut (Eng.)	<i>Artocarpus camansi</i> Blanco	Food and medicine
Piperaceae	Sinaw-sinaw	Pansit-pansitan (Filipino); Ulasiman-bato (Tag.); Sinaw-sinaw (Bis.); Shiny bush (Eng.)	<i>Peperomia pellucida</i> (L.) Kunth	Medicine
Poaceae	Bila-bila	Paragis (Filipino); wire grass, crow'sfoot, goosegrass (Eng.)	<i>Eleusine indica</i>	Medicine

Poaceae	Galot	Talahib (Filipino); Wild sugarcane (Eng.)	<i>Saccharum spontaneum</i>	Food and medicine
Smilacaceae	Banag	Banag (Filipino, Bis.); Sarsaparilla vine (Eng.)	<i>Smilax bracteata</i> Presl.	Medicine
Tiliaceae	Dalupang	Kulutkulutan (Filipino); Chinese burr (Eng.)	<i>Triumfetta bartramia</i> Linn.	Medicine
Urticaceae	Alagasi	Alagasi (Filipino); Tooth scrubber (Eng.)	<i>Leucosyke capitellata</i> Wedd.	Medicine
Zingiberaceae	Dulaw	Dilaw, luyang-dilaw (Tag.); Turmeric, long tumeric (Eng.);	<i>Curcuma longa</i> Linn.	Medicine

A total of 26 plant species were used as medicine and a total of seven (7) plant species were used both as food and medicine by the Subanen tribal communities. These plant species correspond to twenty-four (24) different families such as: Acanthaceae, Amaryllidaceae, Apiaceae, Asteraceae, Convolvulaceae, Crassulaceae, Cyperaceae, Dracaenaceae, Euphorbiaceae, Fabaceae, Flagelleriaceae, Gnetaceae, Lamiaceae, Leguminosae, Liliaceae, Malvaceae, Menispermaceae, Moraceae, Piperaceae, Poaceae, Smilacaceae, Tiliaceae, Urticaceae, and Zingiberaceae.

Some of the plant species identified although they are well known throughout the Philippines, they are not well recognized to treat different ailments such as: *Kalanchoe pinnata*, *Manihot esculenta* Crantz, *Tinospora rumphii* Boerl., *Eleusine indica*, *Saccharum spontaneum*. These plants are generally available from forest, fields and roadsides.

Many related research were conducted regarding the effectiveness of the said families. Some of the species under these families were proven to contain various chemical compounds and metabolites that are known to have medicinal properties. Asteraceae family for instance, is one of the largest and most diverse of all plant families. They are also considered edible and safely medicinal, but they often contain very active ingredients along with their exceptional supplies of nutrients. Many Asteraceae contain active alkaloids that are medicinal (Rahman, 2013).

### **Relevant Information Related to the Identified Plant Resources of Food and Medicine of the *Subanen* tribal Communities in Zamboanga Sibugay, Mindanao**

Table 11 summarizes the botanical characteristics, ethnobotany and related information on the plants utilization both as food and medicine by the three *Subanen* tribal Communities in Zamboanga Sibugay, Mindanao. Seven (7) plant species were used both as food and medicine by the *Subanen* tribal communities, namely: *Flagellaria indica* L.,

*Gnetum gnemon* L., *Orthosiphon aristatus* (Blume) Miq., *Abelmoschus manihot* L. Medikus, *Fucaria suratensis* Kostel, *Artocarpus camansi* Blanco, and *Saccharum spontaneum*.

Table 2 Continued.

FAMILY	LOCAL NAME	COMMON NAME	SCIENTIFIC NAME	AS FOOD		AS MEDICINE			
				Plant part(s) used	Method of Food preparation	Medicinal Function	Plant part(s) used	Method of Preparation	Direction for use
Malvaceae	Ahimit Labog	Labuag (Filipino); Sapinit (Tag.); Wild sour (Eng.)	<i>Fucaria suratensis</i> Kostel	Leaves	Leaves served as souring agent and placed on top of pinangat na isda	emollient in enemas	Roots and leaves	Decoction of roots and leaves	Drink for decoction as needed
Moraceae	Kamongsi	Kamansi (Filipino); Breadnut (Eng.)	<i>Artocarpus camansi</i> Blanco	Leaves and fruit	Ripe fruit is eaten raw with sweet and flavorful taste Young fruits are boiled and eaten as a vegetable.	laxative	Fruit	Ripe fruit is eaten as laxative.	Eat fruit as needed
Poaceae	Galot	Talahib (Filipino); wild sugarcane (Eng.)	<i>Saccharum spontaneum</i>	Stem	Stems are used as beverage base	kidney condition	Leaves	Decoction: Boil a handful of leaves in 2 glasses of water to produce 1 glass decoction.	Drink 1 glass every morning.

Table 2 Continued.

FAMILY	LOCAL NAME	COMMON NAME	SCIENTIFIC NAME	AS FOOD		AS MEDICINE			Direction for use
				Plant part(s) used	Method of Food preparation	Medicinal Function	Plant part(s) used	Method of Preparation	
Malvaceae	Ahimit Labog	Labuag (Filipino); Sapinit (Tag.); Wild sour (Eng.)	<i>Fucaria suratensis</i> Kostel	Leaves	Leaves served as souring agent and placed on top of pinangat na isda	emollient in enemas	Roots and leaves	Decoction of roots and leaves	Drink decoction as needed
Moraceae	Kamongsi	Kamansi (Filipino); Breadnut (Eng.)	<i>Artocarpus camansi</i> Blanco	Leaves and fruit	Ripe fruit is eaten raw with sweet and flavorful taste Young fruits are boiled and eaten as a vegetable.	laxative	Fruit	Ripe fruit is eaten as laxative.	Eat fruit as needed
Poaceae	Galot	Talahib (Filipino); wild sugarcane (Eng.)	<i>Saccharum spontaneum</i>	Stem	Stems are used as beverage base	kidney condition	Leaves	Decoction: Boil a handful of leaves in 2 glasses of water to produce 1 glass decoction.	Drink 1 glass every morning.

The table above shows that majority of the 11 plant species utilized both as food and medicine by the *Subanen* tribal communities commonly used the leaves of the plants as food and medicine. Only the young leafy shoots and stems of *Flagellaria indica* L. and the stems of *Saccharum spontaneum* were utilized by the *Subanens* as food. Likewise, the leaves and fruit of *Artocarpus camansi* Blanco were used by the *Subanens* as food.

It can also be gleaned from the data that the plant species utilized both as food and medicine came from six (6) different families with only two plant species (*Fucaria suratensis* Kostel, and *Abelmoschus manihot* L. Medikus) belonging from the same family Malvaceae. Moreover, decoction was the most common form of medicinal preparation for the six plant species identified. Overall, the results showed that the leaves of the plant species play the role of fresh vegetables in the traditional *Subanen* diet. It also suggests that there are relatively few plant species utilized by *Subanens* both as food and medicine.

Table 3 summarizes the botanical characteristics, ethnobotany and related information on the plants utilized as medicine by the three *Subanen* tribal Communities in Zamboanga Sibugay, Mindanao.

The three *Subanen* tribal communities in Zamboanga Sibugay used 26 different plants and plant part/s in treating illnesses. Five (5) plants were used for treating wounds, namely: *Chromolaena odorata* (L); *Sansevieria spp.*; *Curcuma longa* L.; *Ipomoea nil* for gunshot wounds; and *Jatropha curcas* L. for wounds caused by sharp object. Three (3) plants were used to treat fever /flu, (*Cyperus kyllingia* f. *humilis* (Boeckeler); *Allium tuberosum*; and *Ficus septica* Blanco), another three (3) plants were used for treating stomachache (*Justicia gendarussa* Blanco; *Desmodium heterocarpon* (L.) DC. for pregnant women; *Sida acuta* Burm. f.), while *Eurycles amboinensis* (L.) Lindl. ex Loudon and *Triumfetta bartramia* L. were used to treat boil / furuncle, while two plants were used to treat kidney trouble or condition (*Hydrocotyle vulgaris* Linn. And *Peperomia pellucida* L.).

The cobra vine (*Ipomoea cf. setosa*) is used by the *Subanens* to treat poisoning, snakebites, and gunshot wounds. The stems of *Tinospora rumphii* Boerl., locally known as *panyawan* by the *Subanens* is used for treating eczema.

The most common preparations used by the *Subanen* tribal communities were decoction and poultice. Decoction was usually taken orally and poultice was applied directly to the affected parts. Meanwhile, in order to treat cough, the stems of *Leucosyke capitellata* Wedd., are eaten directly or its trunk was made into decoction.

Table 3. Botanical characteristics and ethnobotany of the plants utilized as medicine by the three Subanen tribal Communities in Zamboanga Sibugay, Mindanao

FAMILY	LOCAL NAME	SCIENTIFIC NAME	MEDICINAL FUNCTION	PLANT PART(S) USED	METHOD OF PREPARATION	DIRECTION FOR USE
Acanthaceae	Kuyanap	<i>Hemigraphis colorata</i> (Bl.) Hallier	inflammation	leaves	Poultice: Crush the leaves	Apply the poultice directly on the affected area (s) as needed
Acanthaceae	Mandalusa	<i>Justicia gendarussa</i> Blanco	stomachache bloating,	Leaves /	Poultice: Crash or pound the leaves	Apply the poultice directly on the stomach
			fracture, sprain	Leaves	Poultice: Pound the leaves and	Apply the poultice on the affected area(s).
			cold	Leaves	Rub crushed leaves on the chest	Rub on the chest 3 times a day
Amaryllidaceae	Abod	<i>Erycyles amboinensis</i> (L.) Lindl. ex Loudon	boil poisoning	Leaves	Heat leaves for boil; Decoction of root bulb	Apply the heated leaves on the affected area(s). Drink the decoction and let patient vomit.
Apiaceae	Gotu Kola	<i>Hydrocotyle vulgaris</i> Linn.	kidney condition	leaves	Decoction: Boil a handful of leaves in 5 glasses of water to produce 2 glasses of decoction. Decoction of whole plant	Adult: 1 glass 3 times a day  Drink decoction daily until cough is healed
Asteraceae	Maluko	<i>Chromolaena odorata</i> (L)	wound	leaves	Crush the leaves and apply directly as poultice on the affected area.	Apply as needed

Table 3 Continued.

FAMILY	LOCAL NAME	SCIENTIFIC NAME	MEDICINAL FUNCTION	PLANT PART(S) USED	METHOD OF PREPARATION	DIRECTION FOR USE
Asteraceae	Pisaw-pisaw	<i>Emilia sonchifolia</i> (Linn.)	colds	whole plant	Decoction of whole plant	Drink or infuse decoction
Asteraceae	Tulay-tulay	<i>Bidens pilosa</i> Linn.	over fatigue	roots	Decoction of roots	Drink the decoction as needed.
Convolvulaceae	Cobra	<i>Ipomoea cf. setosa</i>	poisoning, snakebites, gunshot wounds	Seeds and vines	Seed poultice for poisoning and snakebites Vines as express juice	Apply poultice on the affected area. Apply juice on the affected area.
Crassulaceae	Hanlilika	<i>Kalanchoe pinnata</i> (Lam.) Pers.	toothache	leaves	Decoction of leaves	Drink daily until healed
Cyperaceae	Busikad	<i>Cyperus kyllingia f. humilis</i> (Boeckeler)	fever / flu	whole plant	Decoction of whole plant	Infuse decoction
Dracaenaceae	Espada-espada	<i>Sansevieria spp.</i>	wound	leaves	Poultice: Cut the leaves into pieces and pound. Apply as poultice on the affected area.	Apply as needed.
Euphorbiaceae	Balanghoy	<i>Manihot esculenta</i> Crantz	furuncle /boil	Rhizome	Scrape the rhizome and apply directly on the affected part.	Apply as needed.
Euphorbiaceae	Tuba-tuba	<i>Jatropha curcas</i> Linn	for wound caused by sharp object such as bolo(large cutting tool)	bark	Poultice: expose the bark to fire	Apply directly the grilled bark on the affected part. Secure the bark by tying it with clean cloth.

Tiliaceae	Dalupang	<i>Triumfetta bartramia</i> Linn.	boil/ furuncle	flowers	Poultice: Crush/pound the flowers and apply directly on the affected area	Apply on the affected area(s)
Urticaceae	Alagasi	<i>Leucosyke capitellata</i> Wedd.	cough	Bark and stems	Stems eaten directly and decoction of trunk	Eat small amounts of stem for cough Drink the decoction
Zingiberaceae	Dulaw	<i>Curcuma longa</i> Linn.	wound, ulcer	rhizomes	Poultice: Crush/pound the rhizomes and rub on the affected area.	Apply on the affected area(s)
Smilacaceae	Banag	<i>Smilax bracteata</i> Presl.	relief and muscle pains, over fatigue	Roots, bark	Decoction of roots or bark	Drink the decoction three (3) times a day.
					Crush the stem pieces and boil in 3-5 glasses of water.	any time of the day until the abdomen decreases in size.

### **Other related information on the plants utilized as food and medicine.**

Twenty-one of the traditional plant resources utilized as food and medicine by the three Subanen tribal Communities were herbs, six (6) were shrubs, three (3) were vines and only one each was classified as grass [*Cyperus kyllingia* f. *humilis* (Boeckeler)], subshrub [*Chromolaena odorata* (L)], and tree (*Artocarpus camansi* Blanco). The collection sites of these identified plant species were highly varied because many of these plants can be found anywhere since they grow on ordinary soil.

In terms of gathering period, 27 of the plant species were available all year round suggesting that majority of the plants were available to the Subanens any time. Two plant species, ganda (*Allium tuberosum*) and cobra (*Ipomoea* cf. *setosa*) were gathered quarterly, and another two, bago (*Gnetum gnemon* Linn.) and ahimit / labog (*Fucaria suratensis* Kostel) were harvested between June and July. *Eurycles amboinensis* (L.) Lindl. ex Loudon, locally known as abod was gathered between January and May. While balanghoy (*Manihot esculenta* Crantz) was gathered 8 to 12 months after planting.

Out of the 33 plants identified, 19 were gathered by the Subanens through handpicking, nine (9) plants were harvested by uprooting and two plants were gathered with the use of bolo. The galot plant (*Saccharum spontaneum*) was harvested with the use of sickle while bago (*Gnetum gnemon* Linn.) was gathered with the use of sickle or bolo.

The results indicate that herbs were the primary sources of food and medicine by the three selected Subanen tribal communities. It was also revealed that these plants were highly abundant and can be gathered anytime. The Subanens normally employ handpicking when gathering the plant resources in the fields.

Table 4. Other related information on the plants utilized as food and medicine by the three Subanen tribal Communities in Zamboanga Sibugay, Mindanao

LOCAL NAME	SCIENTIFIC NAME	GROWTH HABIT	COLLECTION SITE(S)	GATHERING PERIOD	MODE OF GATHERING
Kuyanap	<i>Hemigraphis colorata</i> (Bl.) Hallier	herb	forest overstories, roadsides, yard ornaments	Any time	handpicking
Mandalusa	<i>Justicia gendarussa</i> Blanco	shrub	thickets, grove	Any time	use of bolo
Abod	<i>Euryclis amboinensis</i> (L.) Lindl. ex Loudon	herb	along the sides of streams and thickets	From Jan -may	handpicking
Gotu Kola	<i>Hydrocotyle vulgaris</i> Linn.	herb	swamps, marshes	Anytime	handpicking
Maluko	<i>Chromolaena odorata</i> (L)	subshrub	farm, riverbank	All year round	handpicking
Pisaw-pisaw	<i>Emilia sonchifolia</i> (Linn.)	herb	open places, wastelands, open grassy or waste areas, dry stony areas, roadsides	Any month	handpicking
Tulay-tulay	<i>Bidens pilosa</i> Linn.	herb	grassland, heathland, forest clearings, wetlands, plantations, streamlines, roadsides	Any month	handpicking
Cobra	<i>Ipomoea cf. setosa</i>	vine	thickets on mountain slopes, waysides, fields and hedges	Quarterly	handpicking
Hanllilka	<i>Kalanchoe pinnata</i> (Lam.) Pers.	vine	anywhere (ordinary soil)	Anytime	handpicking

Table 4 Continued.

LOCAL NAME	SCIENTIFIC NAME	GROWTH HABIT	COLLECTION SITE(S)	GATHERING PERIOD	MODE OF GATHERING
Busikad	<i>Cyperus kyllingia</i> f. <i>humilis</i> (Boeckeler)	grass	lawn, roadsides especially in wet areas	All year round	handpicking
Espada-espada	<i>Sansevieria</i> spp.	herb	tropical and sub-tropical areas	All year round	handpicking
Balanghoy	<i>Manihot esculenta</i> Crantz	herb	poor soil with a little water	8 – 12 months after planting	handpicking
Tuba-tuba	<i>Jatropha curcas</i> Linn	herb	anywhere (ordinary soil, sandy, gravelly or rocky soil)	All year round	handpicking
Asunting	<i>Cassia alata</i> Linn.	herb	thickets on mountain slopes, waysides, fields	All year round	handpicking
Uag / Uai	<i>Flagellaria indica</i> Linn.	herb	tropical and sub-tropical areas	All year round	use of bolo
Bago	<i>Gnetum gnemon</i> Linn.	herb	mountain	June -July	cutting by sickle or bolo
Sangig	<i>Ocimum basilicum</i> L.	herb	anywhere (ordinary soil)	All year round	handpicking
Wachichao	<i>Orthosiphon aristatus</i> (Blume) Miq.	herb	tropical and sub-tropical areas	All year round	uprooting
Mani-mani	<i>Desmodium heterocarpon</i> (L.) DC.	herb	tropical and sub-tropical areas	All year round	uprooting

LOCAL NAME	SCIENTIFIC NAME	GROWTH HABIT	COLLECTION SITE(S)	GATHERING PERIOD	MODE OF GATHERING
Likway Eskubang- mayawis	<i>Abelmoschus manihot</i> L. Medikus <i>Sida acuta</i> Burm. f.	shrub shrub	anywhere (ordinary soil) anywhere (ordinary soil)	All year round All year round	handpicking handpicking
Ahimit / Labog	<i>Fucaria suratensis</i> Kostel	shrub	loam soil	June to July	handpicking
Panyawan	<i>Tinospora rumphii</i> Boerl. is a synonym of <i>Tinospora crispa</i> (L.) Hook. f. & Thomson	Climbing vine	tropical areas	All year round	handpicking
Lagnob	<i>Ficus septica</i> Blanco <i>Ficus septica</i> Burm.f.	shrub	anywhere (ordinary soil)	All year round	handpicking
Kamongsi	<i>Artocarpus camansi</i> Blanco	tree	tropical and sub-tropical areas	All year round	use of bolo
Sinaw-sinaw	<i>Peperomia pellucida</i> (L.) Kunth	herb	anywhere (ordinary soil)	All year round	uprooting
Bila-bila	<i>Eleusine indica</i>	herb	anywhere (ordinary soil)	All year round	uprooting
Galot	<i>Saccharum spontaneum</i>	herb	anywhere (ordinary soil)	All year round	use of sickle
Banag	<i>Smilax bracteata</i> Presl.	herb	anywhere (ordinary soil)	All year round	uprooting
Dalupang	<i>Triumfetta bartramia</i> Linn.	shrub	anywhere (ordinary soil)	All year round	uprooting
Alagasi	<i>Leucosyke capitellata</i> Wedd.	herb	anywhere (ordinary soil)	All year round	uprooting
Dulaw	<i>Curcuma longa</i> Linn.	herb	anywhere (ordinary soil)	All year round	uprooting

**Perception of the plants' socio-economic importance.** The 15 participants in the FGDs were asked about the socio-economic importance of plants to their families and tribal community. Their responses are summarized in Table 15.

Table 15. Perceptions of the plants' socio-economic importance

<b>IMPORTANCE/USE</b>	<b>MEAN</b>	<b>DESCRIPTIVE INTERPRETATION</b>
1. source of additional income for the family / provide employment to household members	3.93	Agree
2. provide food and nourishment	4.87	Strongly Agree
3. used in local healing practices or medicinal use	4.00	Agree
4. has ornamental/aesthetic values	2.80	Somewhat Agree
5. Used as animal feedstuff	3.13	Somewhat Agree
6. Has cultural significance	3.80	Agree
7. Used in rituals	2.53	Disagree
<b>Overall Mean</b>	<b>3.69</b>	<b>Important</b>

Legend:

<u>Mean Score</u>	<u>Descriptive Interpretation</u>	<u>Overall</u>
4.20-5.00	5- Strongly Agree	Very Important
3.40-4.19	4 – Agree	Important
2.60-3.39	3 – Somewhat Agree	Somewhat Important
1.80-2.59	2 – Disagree	Less Important
1.00-1.79	1 – Strongly Agree	Not Important at all

The table above shows that participants strongly agreed that the traditional plants provide food and nourishment to their families and the tribal community. They agreed that the plants provide additional income or employment for the family. Although participants reported that the income earned from growing, gathering, or collecting plants from the wild was minimal, it supplemented their income. They also agreed that some of the plants identified were used in local healing and practices and have cultural significance.

Furthermore, participants only somewhat agreed that the plants were used as animal feedstuff and have ornamental/aesthetic values. On the other hand, participants generally disagreed that the plants identified were used in rituals.

As a whole, the traditional plant resources identified are generally regarded as “important” by the Subanen tribal communities in Zamboanga Sibugay, Mindanao. Some of the most important contributions of these traditional plants to the families and

communities of the Subanens include the provision of food and nourishment, utilized in local healing or have medicinal uses and provide additional income and employment for the family.

**Possible threats to the plant species.** During FGDs, participants confirmed that generally, the identified plants are still abundant and available in the wilds or forests of Zamboanga Sibugay. However, they are now in a much reduced quantity than several years ago. The major reasons cited for the decline in the population of these traditional plants were: loss and/or destruction of the plants due to armed conflict (f=15); burning of plants due to kaingin activities (f=9); collection sites /areas were eroded because of natural calamities such as typhoons and flash floods (f=8); and overexploitation due to over-collection (f=4).

**Conservation initiatives.** As revealed during FGDS, participants believed that there is a need to conserve the traditional plant resources since they are sources of food and livelihood of their communities. Most of them employ in situ conservation of some of the plants identified which include: storing or reserving seed stock for next cropping/planting; planting yearly or continuously propagating selected plants in their fields like balanghoy; and domestication of some plant species.

### **Cultural Practices and Beliefs of the *Subanen* Tribal Communities that are tied with the Utilization of Plants**

One cultural belief practiced by the Subanen was connected to bamboo stalks. Several bamboo stalks were placed around the home of a Subanen to drive away bad spirits. Also, burning of calamondin (*Citrofortunella microcarpa*) leaves on the backyard of a Subanen was performed before 6 PM in order to drive away evil spirits.

### **Phytochemical Analysis of Cobra Vine (*Ipomoea cf. setosa*) Seeds**

The presence of phytochemicals found in the seed extracts of cobra vine was determined by standard procedures at the UST Research Center for Natural and Applied Sciences (refer to the laboratory results shown in Appendix 4). Table 16 shows the results of phytochemical analysis.

Table 16. Qualitative phytochemical screening of ethanolic extracts of cobra vine (*Ipomoea cf. setosa*) seeds

PHYTOCHEMICAL	SCREENING TEST	
Flavonoids	Bate-Smith and Metcalf method	+
Alkaloids	Munier and Macheboeuf modification test	+
Polyphenols	Ferric chloride test	+
Tannins	Gelatin test	+

+ Present in the seed extracts

As shown in the qualitative phytochemical screening, the ethanolic extracts of cobra vine seeds were positive for flavonoids, alkaloids, polyphenols and tannins. Using Bate-Smith and Metcalf method, change to reddish color was observed on the sample indicating the presence of flavonoids. According to Cote (2013) phytochemicals are nonnutritive substances in plants that possess health protective benefits. The main phytochemicals in plants are called Flavonoids, and they have extensive biological properties that promote human health and reduce the risk of disease. They extend the activity of vitamin C, act as antioxidants and protect LDL cholesterol from oxidation to unsafe cholesterol oxides. They also contain anti-inflammatory and antitumor properties. Most of these flavonoids are found in the color pigmented part of the plant; therefore, different colored plants will provide protection in different ways.

The Munier and Macheboeuf modification test was applied to determine the presence of alkaloids. The formation of white precipitate was observed in the sample extracts of cobra vine seeds which indicated the presence of alkaloids. Alkaloids are secondary metabolites originally defined as pharmacologically active compounds, primarily composed of nitrogen (Ziegler & Facchini, 2008). They are synthesized from one of the few common amino acids: lysine, tyrosine and tryptophan. More than 12,000 alkaloids, including more than 150 families, have been identified in plants; and around 20% of the 'species of flowering plants' contain alkaloids. The biological properties of various alkaloids have led to their use as pharmaceuticals, narcotics, stimulants and poisons (Richard, Temsamani, Cantos-Villar & Monti, 2013).

The Ferric chloride test was used to determine the presence of polyphenols. The test showed a change to dark colored solution after adding  $FeCl_3$  solution suggesting that the sample extracts of cobra vine seeds was positive for phenols. Polyphenols are chemicals found in plants that are believed to have important health benefits, according to the American Cancer Society. Many of the health benefits associated with polyphenols may be related to their role as antioxidants. Antioxidants are known for their ability to combat cell damage. Some evidence exists that polyphenols help prevent health dangers such as cancer, high blood pressure, heart disease and diabetes (Rose, 2017).

Finally, the Gelatin test revealed that the sample extracts of cobra vine seeds was positive for tannins. The formation of jelly-like precipitate after adding Gelatin-salt reagent indicates the presence of tannins. Tannins are astringent-tasting polyphenols found in plants that can bind and precipitate proteins. They interact with one or more protein molecules forming large cross-linked complexes that are insoluble in water. This property makes food tannins undesirable since they will make part of the dietetic protein indigestible (Izawa, Amino, Kohmura, Ueda & Kuroda, 2010).

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## Conclusions

The Subanen tribal communities of Lapuyan, Kalibugan and Binakalan have been practicing and using traditional knowledge because they believe that plants provide food and nourishment and heal in a very effective way without spending any single centavo. They also regarded that plants, like humans, have spirits that must be respected and valued. This belief urges the Subanens to utilize plants even more in a useful and less destructing way, which can be attributed to practicality and political instability they are facing due to pervasiveness of armed conflict. Furthermore, because the Subanens generally have limited access to modern health care services, most of them have no option but to rely on the use of traditional medicine.

The informants were able to report a total of 26 traditional plant species having medicinal values which they use to treat various range of diseases and seven (7) plant species utilized both as food and medicine. This total of 33 plant species.

The 33 species of plants documented are under 24 families and are mostly represented by herbs. Three plant species each were under Family Asteraceae and Malvaceae, respectively.

Leaves are the most frequently utilized plant part of the Subanens for food and medicine. These plants are generally available from forest, fields and roadsides. The most common techniques used in the preparation of medicines by the Subanens are through decoction and poultice. In decoction, plant parts are boiled with water and the crude extract is used, while in poultice plant materials are mashed or crushed with warm water or natural oils to make a paste. Decoction is usually taken orally. The paste from the poultice is commonly applied directly to the affected parts.

Majority of the plant species documented are available all year round suggesting the abundance of the plants in the wilds. Handpicking is the most common method of gathering the plant resources in the fields.

Subanens in Zamboanga Sibugay considered the plant resources as important to their families and community. The most important contributions of these plants include

the provision of food and nourishment, utilized in local healing or have medicinal uses and provide additional income and employment for the family.

The loss and destruction of the plants due to armed conflict in Zamboanga Sibugay is the major threat to the existence of the plant species as disclosed by the informants. Burning of plants due to kaingin activities and the collection sites /areas were eroded because of natural calamities such as typhoons and flash floods were also identified as threats to the existence of the traditional plants.

Despite the traditional way of life of the Subanens, they still engage in some activities to conserve the traditional plant resources. These conservation activities include: storing or reserving seed stock for next cropping/planting; planting yearly or continuously propagating selected plants in their fields; and domestication of some plant species.

Finally, the phytochemical screening of the ethanolic extracts of cobra vine seeds revealed the presence of flavonoids, alkaloids, polyphenols and tannins. Since phytochemicals are nonnutritive substances in plants that possess health protective benefits, it can be inferred that cobra vine seeds possess medicinal and nutraceutical potential. Likewise, cobra vine can be investigated to create an evidence base that will facilitate their inclusion in medical practice and as food supplement and additives in the food industry.

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## Compliance with Ethical Standards

This research study followed ethical guidelines. The respondents' participation was voluntary. They were to opt to dismiss themselves from the study at any point in time they felt uncomfortable. Their participation was protected from harm: physical, social, psychological, and all other forms of harm were kept to an absolute minimum. The dignity and well-being of informants who responded were always protected. The research data remained confidential throughout the study, and the respondents' rights were protected, ensuring scientific or academic integrity. Furthermore, to ensure that this research study is free of plagiarism or research misconduct, proper result communication must be practiced. The author declares no conflicts of interest about the publication of this paper.

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