



Indigenous Medicinal Plants Used by the Agtas of Northern Sierra Madre Mountain: A Basis for Sustainable Development and Educational Intervention

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Abstract— The Agtas are an indigenous group residing in the Northern Sierra Madre Mountain. They have a rich tradition of utilizing various medicinal plants sourced from their natural environment to promote health and treat illnesses. This ethnographic study highlights their unique indigenous knowledge regarding plant use, which has been passed down through generations and is characterized by effective and sustainable healing practices. It details the specific parts of the plants employed, the preparation techniques, and the methods of administration. The researcher, acting as a participant-observer, gathered data through interviews, documentary analysis, observations, and immersion within the community, with the elders serving as primary sources of their indigenous knowledge regarding plants. The findings indicate that the Agtas have consistently engaged in the practice of herbal medicine, relying on their unique traditional knowledge to promote health across generations, and their healing methods have proven to be both effective and sustainable. The Agtas source their herbal remedies from nature, which provides a variety of plants, including herbs, weeds, grasses, shrubs, and trees, some of which have been scientifically recognized for their medicinal properties. They utilize all parts of these plants—roots, stems, bark, leaves, flowers, and sap—in various forms such as poultices, topical applications, inhalants, chewable remedies, washing solutions, and decoctions. Notably, the Agtas do not implement conservation practices, as they find these plants readily available in their environment whenever needed for medicinal purposes.

Index Terms— Agta, Ethno-botany, Ethnographic, Illness, Indigenous Group, Healing, Medicinal Plants, Northern Sierra Madre Mountain, Traditional Plant Knowledge.

1. Introduction

The Sierra Madre is the longest mountain range in the Philippines. Running in the north-south direction from the provinces of Cagayan to the north and Quezon to the south, the mountains form the eastern backbone of Luzon Island, the largest island of the archipelago. Its mountain range system provides the area for growth and development of unique habitats and their associated flora and fauna, e.g., grasslands to mountain forests, which is among the most unique and richest on a per area basis among the park systems in the Philippines.

It is described as long mountain chain providing habitats for the numerous species of plants and animals adapted to various ecological niches (UNESCO 2006).

The northern part of this mountain range is also home of the culture-rich Agta tribe. Being descendants of the Philippine Archipelago's first colonizers who settled on the islands between 35,000 and 60,000 years ago (Bellwood 2005), the Agtas are recognized as indigenous people under the Indigenous Peoples' Rights Act (IPRA 1997). Today, they number around 10,000 individuals, belonging to 16 different language groups (Headland 2010), living throughout the Sierra Madre Mountain Range.

This tribe primarily depends on the mountain's resources where they live, engaging in a diverse range of activities such as fishing, hunting, gathering, trading with nearby farmers, logging, labor, and extensive farming. As an indigenous community, they possess unique traditional knowledge passed down through generations. One significant aspect of this knowledge is the use of medicinal plants for maintaining health.

In recent decades, advancements in disease treatment have led to modern approaches that effectively address health issues and extend life. The medical and pharmaceutical sectors have analyzed nature and, alongside technology, ushered in a new era of medicine. The growth of medical science has its roots in the potential of medicinal plants. Yet, many overlook their healing properties, quickly turning to modern medicines that often utilize plant-derived compounds for evidence-based drugs.

Nature has always been a vital source of herbal remedies for sustaining people's health. Many ethnic communities in remote areas still rely on these potent plants for wellness. Primitive societies have long been intrigued by plants as they form an integral part of daily life. Their connection to nature, which provides all their needs, motivates them to conserve forest resources, contributing to ecological sustainability. In ancient societies, some individuals likely focused more on plants, discovering that seeds grow into plants, cuttings can sprout new growth, and certain plant parts have healing effects and

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economic value. These societies' reliance on their botanical surroundings for survival shows the link between medicinal plants and traditional knowledge. However, as modernization advances rapidly, some primitive societies begin to experience changes due to ecological exploitation.

In line with this, traditional medicine embraces the ways of protecting and restoring health that existed before the arrival of orthodox medicine (WHO, 2001). WHO therefore defines traditional medicine (TM) as diverse health practices, approaches, knowledge and beliefs incorporating plants, animals, and/or mineral-based medicines, spiritual therapies, manual techniques and exercises applied singularly or in combination to maintain well-being, as well as to treat, diagnose or prevent illness (WHO, 2002;2000).

Traditional/Indigenous knowledge includes types of knowledge about traditional subsistence. These kinds of knowledge, crucial for survival, are generally based on accumulations of empirical observation and on interaction with their environment. Traditional/Indigenous knowledge is entering into the mainstream of sustainable development and biodiversity conservation discourse. Article 8 of the Convention of Biological Diversity (Rio, 1992) has contributed to this process by requiring signatories to: "*respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant to the conservation and sustainable use of biological diversity*". as the potential contribution of indigenous knowledge to key items in the global agenda gains widening recognition, an increasing number of scientists and policy makers are calling for the integration of indigenous and science-based knowledge. (Nakashima and Roue, 1999).

Under the Traditional/Indigenous knowledge is the traditional plant knowledge. Traditional plant knowledge is "the body of knowledge, held by members of the community long resident in a particular location, which guides peoples' choices or actions in plant collection, processing and use. It includes names and terminology, methods of collecting and managing plant resources, narratives about plants, and belief systems that define peoples' perspectives about plants" (Turner & Peacock 1996:1).

While management and sustainability on the use of plant resources involved the use of components of biological diversity in a way and at a rate that does not lead to the long term decline of resources. Use of a species was likely to be sustainable if it was compatible with maintaining the ecosystem in which the species was found; does not reduce its future usefulness to humans. But there was no indication that it would get better soon and further added that there was an existing framework that can be adopted by all nations for the conservation of plants (Shingu, 2005).

According to Prott (2000), formal education systems have disrupted the practical everyday life aspects of indigenous knowledge and ways of learning, replacing them with abstract knowledge and academic ways of learning. He contends that today, there is a grave risk that much indigenous knowledge is being lost and along with it, valuable knowledge about ways of living sustainably. This is why it is notable to integrate

indigenous knowledge and perspectives in all curricular areas as an integral part of all learning.

The Philippines, an archipelago, is home to various indigenous peoples and cultural communities, each with distinctive knowledge developed for survival. The Agta people in the Northern Sierra Madre Mountains possess such indigenous knowledge, which is gradually disappearing due to habitat changes, commercialization, and modernization.

This study focuses on identifying and documenting the Agta's traditional knowledge and practices regarding medicinal plants. The aim is to preserve their valuable knowledge by creating a strategic action plan for conserving these potent plant species based on traditional understanding. The study seeks to demonstrate how traditional plant knowledge can be incorporated into Science and Health education, raising awareness of indigenous medicinal practices and contributing to the sustainability of botanical resources. It aspires to encourage respect for local culture, wisdom, and ethics, and to offer methods for teaching and learning locally relevant knowledge and skills.

A. Statement of the Problem

This study focused on the indigenous medicinal plants used by the Agta of Northern Sierra Madre Mountain.

Specifically, it intended to answer the following questions:

- 1) What are the different medicinal plants used by the Agta of Northern Sierra Madre Mountain?
- 2) What are the different traditional plant knowledge practiced by this ethnic group?
- 3) What are the management practices of this ethnic group in maintaining their (medicinal) plant resources and awareness in conservation measures?

B. Conceptual Framework

The participants of this research involved the Agta ethnic group of Sierra Madre Mountain of Northern Luzon. The medicinal plants used in their community practices (traditional/indigenous plant knowledge) served as a basis for inventory and preparation of plant list.

The practice of traditional or indigenous healing has been embraced by people whose geographical positioning makes it extremely difficult for them to receive the needed medical assistance from health professionals.

In some ways the inaccessibility of transportation and communication has propelled the elders in remote communities to learn and master the craft of indigenous healing in order to restore health.

Based on the theory of Wade and Davis, Canadian Ethnobotanists, the criteria of the practice of ethno-botany usually involved two important considerations. First, the compilation of information provides the foundation of any natural science and without the basic inventory of theoretical formulation was not possible. Second, ethno-botany remains in one level what it has always been a science of discovery, their contributions to the welfare of mankind specifically on their socio-economic way of living, which may have led to massive destruction or loss of diversity not only of animals and plants but of human cultures as well as basic plant exploration remains a vital and essential

contribution of the ethno-botanical practices.

This study was conceptualized to further acknowledge the proper use of plants in so many ways which would help in the understanding of the traditional plant knowledge of the Agtas. Output of such could lead to collection and accumulation of important data on traditional/indigenous plant knowledge as a basis for analyzing the sustainability of medicinal plants and significant integration to education.

C. *Significance of the Study*

This study aimed to identify the status of the ethno-botanical resources and traditional plant knowledge of the Agtas of Northern Sierra Madre Mountain that could serve as a basis of recommendation for a long-term project of utilization, management, conservation and sustainability. It aims to answer basic questions on the extent of the use of medicinal plants for their medication or treating illnesses, as well as its implications to the ethnic preservation, growth and development.

Output of this study is of great importance for government organizations like the NCIP (National Commission on Indigenous Peoples), in coming up with programs and projects that will protect and sustain the indigenous knowledge of the Agtas of Northern Sierra Madre Mountain. Local Government Unit (LGU), in making appropriate and timely programs and projects that can help preserve the richness of their culture and native wisdom. Department of Environment and Natural Resources (DENR) in crafting appropriate plans geared towards the proper utilization and conservation of the flora in their area without necessarily offsetting their indigenous plant knowledge. Department of Education (DepEd), and Commission on Higher Education (CHED) in designing more authentic and localize curriculum to integrate the indigenous plant knowledge and culture of different ethnic groups in the Philippines and may consequently guide the teachers to develop activities/strategies to integrate the botanical opulence of the said ethnic group in their respective subjects thereby teaching and inspiring the Indigenous people (IP) and non-IP learners the urge to protect and preserve more our flora. It will also serve basis for the other researchers, Department of Health (DOH) and Department of Science and Technology (DOST) in conducting deep scientific study to probe the medicinal potential of the different plant species used by this ethnic group that could consequently give way to discover new pharmaceutical drugs to maintain wellness.

D. *Scope and Delimitation*

The study was restricted to the indigenous medicinal plants used by the Agta ethnic group of Sierra Madre Mountain of Northern Luzon particularly at De Shupe, Sitio Lagis, and Balyang, Cabisera 10 of Ilagan, Isabela. The traditional plant knowledge and the management practices of this ethnic group are the primary focus. The respondents of this study were the adult Agtas, as these folks have a better grasp of their traditional plant knowledge.

E. *Research Design*

The study used the ethnographic research method. According to Frankel and Wallen (2006), the emphasis of ethnographic

research is on documenting or portraying the everyday experiences of individuals by observing and interviewing them and relevant others. Jocano (1988) as cited by Sevilla *et al.* (1992) further described ethnographic research method as a systematic way of knowing how a people bring order, coherence, and significance to the things they do, believe and think. The ethnographic research method was used to describe, inquire deeper and examine the traditional knowledge on medicinal plants among the Agtas of Northern Sierra Madre Mountain.

F. *Participants of the Study*

The total population of adult Agtas residing in *Balyang*, Barangay Cabisera 10, City of Ilagan, Isabela and in Agta communities in the Sierra Madre Mountain known as *De Shupe* and *Sitio Lagis* are considered in this study. The adults and older Agta folks, both male and female, were the main sources of information relevant to this study.

The Agtas are semi-nomadic people living along the Sierra Madre Mountains. The Agtas in the Northern Sierra Madre move down the lowland on foot or by *bancas* through the Abuan River to exchange and or sometimes to sell whatever products they have like ratan fruit or *uway*, for starchy foods and other goods with nearby farmers or residences and merchants.

G. *Data Gathering Instrument*

Documentary Analysis. An intensive review of documentary materials and readings about the Agta was done to enrich the researcher's knowledge about the participants of the study. Documentary analysis was further used to verify the English and Scientific name of the species of plants that were identified to have medicinal values. The same was also used to identify the medicinal components of the plants.

Informal Interview was utilized to generate the necessary information concerning the name (species) of medicinal plants they used, practices and management. This method was applied in order for the participants not to be distressed or hesitated in answering deep related questions to produce a more complete data, in which the researcher can probe immediately the veracity of the Agta's responses; clarify points of view; and explain multifaceted data which are vital to the study. It was done during the day when they were available. Questions were asked in Ilocano since this dialect is spoken with ease by both the researcher and the respondents. Also, during the interview, an audio recorder was used to record the verbal responses of the respondents to ensure accuracy and authenticity of the information. The interview included varied questions relevant to the study.

Empirical observation, immersion and documentation were further used to supplement and/or verify data gathered by interview methods. The Agtas of *De Shupe*, *Sitio Lagis*, and *Balyang* (Cabisera 10), City of Ilagan, Isabela were the subjects of observation. The researcher became intent participant-observer. The researcher concentrated on the traditional plant knowledge; techniques on the use of specific medicinal plants to treat/cure specific illnesses/diseases and the management

practices. The personal contacts enabled the researcher to elicit the first hand information and genuine observations on how the Agta use their medicinal plants. Also, the different medicinal plant species were documented with the use of a digital camera for the identification of their other names.

To obtain an accurate and real picture of the Agtas' Medicinal plant usages, the researcher stayed in the places of the study at different times.

H. Data Gathering Procedure

Prior to initiating the study, the researcher ensured adherence to the requirements outlined in Administrative Order No.1, series of 2012, which pertains to the Indigenous Knowledge Systems and Practices (IKSP) and Customary Laws (CL) Research and Documentation Guidelines established by the National Commission on Indigenous Peoples (NCIP). The research adviser had previously secured the necessary permit for studying the Traditional Healing Beliefs and Practices of the Agta community. This permit was utilized for the current study, and the tribal leader was informed, subsequently granting consent for the research. To obtain the permit, a conference was held to disclose the details of the research to the Agta community during the Work and Financial Plan conference. The IKSP team, led by a lawyer from the NCIP Provincial Office, facilitated this meeting, where the research's objectives were clearly and objectively communicated to the Agta.

I. Locale of the Study

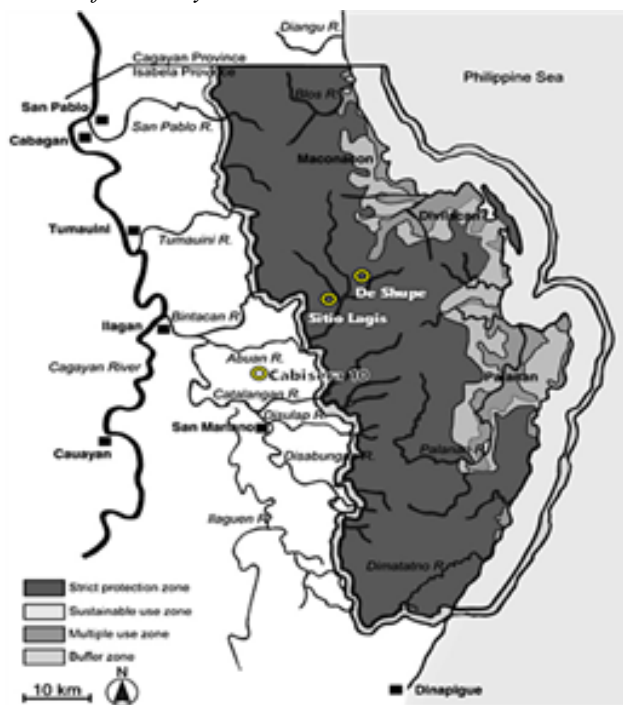


Fig. 1. Map showing the locations of the study (yellow circles) and its vicinity

Data-gathering was done in three places namely: *De shupe*, *Sitio Lagis*, and *Balyang*.

De Shupe and *Sitio Lagis* are two of the precipitous parts of Northern Sierra Madre Mountain where some of the Agtas hunt, plant crops and harvest rattan fruit (*uway*) for their consumption

or to be exchanged for starchy foods and/or to be sold to the lowlanders.

Balyang is a small village put up by the City Government of Ilagan at Lupigue (Cabisera 10), City of Ilagan, Isabela, where the Agta families stay when they are in the lowland. Lupigue (Cabisera 10) is one of the Cabiseras of Hacienda San Antonio, City of Ilagan, Isabela.

2. Related Studies

Literature search revealed that many indigenous communities depend directly on natural ecological systems for their sustenance. In this context, Darrell Addison Posey et al. eds. (1999) and Marites et al. (2016) stressed that biological diversity and natural ecosystems are closely linked to the economy, identity, cultural and spiritual values, as well as the social organization of IPs (Indigenous Peoples). Moreover, many of the landscapes, where IPs live is of extraordinary value, not only for their beauty and the ecosystem services they sustain, but also for their biodiversity. As such, IPs and their land holdings are a vital strategic component in regional and national conservation strategies (cf Posey et al. eds., 1999; and Geronimo, et al. 2016). Based on the study “The Indigenous Knowledge, Beliefs and Practices on Healing of the Agta of Lupigue, Ilagan City, Isabela: Their Contributions towards Sustainability” conducted by Balayan et al. (2016), the Agta community exhibited a genuine sense of pride and ownership of their indigenous knowledge, beliefs and practices, persistently claiming effectiveness of their own natural ways of restoring health. They are aware that since the sources of herbal medicines abound in their habitat, they are spared from availing costly medical services and from buying expensive medicines. Such positive attitude towards indigenous healing greatly contributes to the sustainability of their natural resources. They have learned to nurture nature because they are aware that it provides them not only food and shelter, but also healing and wellness, a very concrete demonstration of a co-existence or interdependence. Furthermore, in recognition and promotion of un-codified folk systems of knowledge on plant utilization, an effective management, conservation and sustainability strategies was recommended. Further studies were suggested to validate the claims specifically the pharmacological efficacy of medicinal plants, to be used by other people, with equal benefits shared with ethnic people, thereby preserving and promoting environmental sustainability and stability of indigenous native cultures (Cabauatan, 2008). On the other hand, the study of Gruyal et al. (2014), *Ethnomedicinal Plants Used by Residents in Northern Surigao del Sur, Philippines* explains that the use of traditional medicine has been practiced in various countries since time immemorial. In the Philippines, knowledge on the use of plants as medicine was inherited from great ancestors through oral tradition. In the present study, a total of 65 plant species were documented as medicinal plants utilized by the Surigaonons. The species were classified into 44 families each treating different kinds of health disorders or ailments. The Family Gramineae (4 species) and Verbenaceae (4 species) were represented as the highest number of species utilized as medicinal plant followed by Labiatea (3 species) and

Malvaceae (3 species). Family Rutaceae, Apocynaceae, Anacardiaceae, Fabaceae, Asteraceae, Euphorbiaceae, Solanaceae, Myrtaceae and Zingiberaceae were represented by two (2) species each, while the rest of the families were all represented by one (1) species. In terms of habit, there are 22 species of herbs (33.9%), 21 species of shrubs (32.3%), 19 species of trees (29.2%), and 3 species of climbers (4.6%). Leaves are commonly used in treating ailments. However, the mode of administration varies from ailment to ailment as in the case of *Lantana camara* and *Stachytarpheta jamaicensis* L., wherein their leaves are boiled and used to clean wounds of the skin, while the leaves of *Annona squamosa*, *Premna odorata* and *Symphytum officinale*, and the young leaves of *Ziziphus jujube* are boiled in water and taken orally to treat of kidney infection, common colds and cough, and diarrhoea, respectively. Results also show that leaves were mostly used to treat cough with different modes of application. The juice of *Conyza cinerea* L. extracted from the leaves is massaged on the chest and back (externally applied) to cure dry cough, while the leaves of *Coleus aromaticus* were preheated to extract the juice and taken orally (internally applied) three times a day to cure the same ailment. Other medicinal plants can be utilized to treat two or more diseases such as *Pandan tsina* which is used to treat cough and induce urination to relieve kidney trouble and *Kyllinga monocephala* (Bosikad) relieves headaches, muscle pain, and fever. In contrast, several species can also be used to treat the same ailments with the same mode of preparation, such as, decoction or boiling with water and taken orally as tea. Examples include *Annona muricata* L., *Artocarpus heterophyllus*, *Chrysophyllum cainito* L. and *Persia Americana* G which all treat diarrhoea and relieve stomach-aches.

The Department of Health, the health sector in the Philippines falls short in meeting several problems due to several reasons inappropriate health delivery system such as, poor hospital facilities, fragmented primary health system, ineffective delivery mechanism for public health program, and misdistribution of health human resources, inadequate health regulatory mechanisms such as gaps in regulatory mandates, lengthy and laborious regulatory systems and processes and inadequate human resources and facilities resulting in poor quality of health care, high cost of privately provided health services and high cost of drugs, poor health care financing such as inadequate funding, inefficient sourcing, and ineffective allocation. To be able to transform the health system into that would ensure the delivery of cost effective services, universal access to essential services and adequate and efficient financing, major reforms must be undertaken. Pursuing the needed improvement, the entire health sector sets a mission of "to ensure accessibility and quality of health care to improve the quality of life of all Filipinos, especially the poor." The DOH as the lead agency on health sets the vision for the nation's health, "Health for All Filipinos." In accordance to the mission of the DOH, the department endorsed a "Traditional Health Program" in which ten (10) herbs have been thoroughly tested and have been clinically proven to have medicinal values. The following is the list of the top ten medicinal plants in the Philippines:

- 1) Akapulko (*Cassia alata*) - also known as "bayabas-bayabasan" and "ringworm bush" in English, this herbal medicine is used to treat ringworms and skin fungal infections. It can also be used as expectorant for bronchitis and dyspnea, mouthwash in stomatitis, alleviation of asthma symptoms, used as diuretic and purgative, for cough & fever, as a laxative to expel intestinal parasites and other stomach problems.
- 2) Ampalaya (*Momordica charantia*) - known as "bitter gourd" or "bitter melon" in English, it most known as a treatment of diabetes (diabetes mellitus), for the non-insulin dependent patients. Other indications are for rheumatism, gout, anti-hypertension, anti-pyretic, disinfectant, anti-diarrhea, enhances immunes system, and remedy for cough.
- 3) Bawang (*Allium sativum*) - popularly known as "garlic", it mainly reduces cholesterol in the blood and hence, helps control blood pressure. It is also good remedy in cough and cold. It relieves sore throat and toothache.
- 4) Bayabas (*Psidium guajava*) - "guava" in English. It is primarily used as an antiseptic, to disinfect wounds. Also, it can be used as a mouth wash to treat tooth decay and gum infection. It also helps in reducing fever and in alleviation of rheumatism.
- 5) Lagundi (*Vitex negundo*) - known in English as the "5-leaved chaste tree". It's main use is for the relief of coughs and asthma. It is also great remedy for cough, colds, fever, flu, and in removal of worms and boils.
- 6) Niyog-niyogan (*Quisqualis indica* L.) - is a vine known as "Chinese honey suckle". It is effective in the elimination of intestinal worms, particularly the *Ascaris* and *Trichina*. Only the dried matured seeds are medicinal - crack and ingest the dried seeds two hours after eating (5 to 7 seeds for children & 8 to 10 seeds for adults). If one dose does not eliminate the worms, wait a week before repeating the dose. It is also well known in relieving fever and toothache.
- 7) Sambong (*Blumea balsamifera*) - English name: *Blumea camphora*. A diuretic that helps in the excretion of urinary stones. It can also be used as an edema. It also treats dysentery, sore throat, remove worms and boils, and as ant-pyretic.
- 8) Tsaang Gubat (*Ehretia microphylla* Lam.) - Prepared like tea, this herbal medicine is effective in treating intestinal motility and also used as a mouth wash since the leaves of this shrub has high fluoride content.
- 9) Ulasimang Bato (*Peperomia pellucida*) - also known as "pansit-pansitan" it is effective in fighting arthritis and gout. The leaves can be eaten fresh (about a cupful) as salad or like tea. For the decoction, boil a cup of clean chopped leaves in 2

cups of water. Boil for 15 to 20 minutes. Strain, let cool and drink a cup after meals (3 times a day). It can also be used as treatment for skin boils, abscesses, pimples, headache, abdominal pains, and kidney problems.

- 10) Yerba Buena (*Clinopodium douglasii*) - commonly known as Peppermint, this vine is used as an analgesic to relieve body aches and pain. It can be taken internally as a decoction or externally by pounding the leaves and applied directly on the afflicted area. It also relieves intestinal gas and indigestion.

The botanical wisdom accumulated by indigenous people has led to the establishment of the traditional systems of medicine including Chinese, Ayurvedic, Middle Eastern, European, African and American. According to American pharmacognosist Norman Farnsworth, 89 plant-derived drugs currently prescribed in the industrial world were discovered by The tropical rainforests are the richest source of medicinal plants. Nazim Mamedov 2012, asserted that illiterate traditional healers have used several ways to know every plant in rainforest around them and use them correctly for medicinal purposes: a) Learning through trial and error. b) Spiritual learning by ritual use of medicinal plants in religious ceremonies, such as “invoking hidden power of the plants” and meditation. c) Observing how apes and other animals utilize those plants. d) Preserving the oral tradition when knowledge about plants is passed by traditional healers from generation to generation. He suggested that investigation of plants used in traditional medicine to determine biological activities is a complicated process that includes several stages: a) obtaining reliable ethnobotanical data on use in the traditional system, b) collecting specimens from the correct genera and species used in the traditional system, c) investigating the activity of crude extracts and active principles, and d) analyzing the chemical structure, synthesis, and structural modification. There are 7 billion people and about 250,000 plants co-existing in this planet. We should never forget that plants lived there for million years before humans, and the main difference between people and plants is that plants can live without people, but people cannot live without plants. People need plants for medicine, in addition to the need of oxygen, food and forage. He also emphasized some important recommendations to consider for every scholar/researcher who study medicinal plants: 1) Each medicinal plant has hundreds of biologically active chemical compounds that work synergistically together. This is a direct result of natural selection process. The plant as a whole, not only identified main ingredient that might possess medicinal value. 2) Each medicinal plant has direct and indirect impact on human body. Direct impact based on pharmacological action of its biologically active compounds. Indirect impact is related to interaction with other plants or drugs taken. 3) Search for medicinal plants to cure epidemic diseases should include the plants from the geographical place, where these diseases were originated and most spread around. The disease may be existing there for thousands of years, and local healers/herbalists might cure, or at least control spread of disease with native medicinal

plants. 4) If one plant from one particular genus has significant medical value, all other plants from the same genus may have the same medical value. The only difference is potency; other plants from the genus may have more or less potency. 5) When there is an investigation of essential oil plants, one should consider that essential oil content depends on the altitude. Essential oil plants from higher altitudes (as alpine grasslands) have higher content of essential oils. 6) Correct identification of medicinal plants by voucher specimen herbarium is very important. Chemotaxonomy and molecular biology are helpful for plant identification. However, identification of chemical compounds and genetic markers alone is not enough, therefore, must be complemented by classical botanical methods and botanical microscopy. 7) Evolutionary approach should be taken into consideration; if several generations in the particular ethnicities continuously used plants from one traditional herbal medicine system (Chinese, African, Indian, Western etc.), and then those plants should remain the first choice for treatment.

In concise, the different literatures explained that traditional medicine provides essential healthcare to the people and long before modern medicines were introduced, herbal medicines has been widely used not only in the Philippines, but in the different parts of the world with their respective medicinal plant knowledge especially within ethnic groups. Today, the use of traditional medicine has expanded and gained regards by the government and tremendously with wide global acceptance. However, it was also cited that there is a great deal of justified concern over the rapid loss of botanical resources especially, medicinal plants. One aspect of this complex problem that was often overlooked was the concomitant extinction or gradual disappearance of indigenous people and their culture.

Different studies about medicinal plants suggested that understanding the relationship among medicinal plants used in traditional medicine systems can help identify plant materials with potential constituents applicable to modern medicine such that these botanicals must be subjected to deep scientific studies by the proper authorities to be able to determine the effective components of these medicinal plants.

In line with this study, identifying and understanding the medicinal plants and the indigenous plant knowledge of the Agtas of the Northern Sierra Madre Mountain can be an avenue to help the natives sustain their botanical opulence thereby contributing to the preservation and sustainability of the different medicinal plants that could also open to new discoveries for plant-based pharmaceutical drugs.

3. Findings

The following are some of the medicinal plants used by the Agtas of Northern Sierra Madre Mountain and their uses:

Sambung



(Tag.: *Sambong*, Eng.: *Blumea camphor*)

The leaves of the shrub are pounded and applied as poultice for wounds.

The roots are boiled and drank the solution to cure colds (*panating*) and stomach ache (*sakit iti rusuk*).

Barani/Kawawing/Garim-Garim (Tag.: *Kandikandilaan*,

Eng.: Aaron's rod/Blue porterweed)

The leaves are crushed and applied as poultice for wound.

The roots are boiled and drank the solution to treat diarrhea (*agtakki*).

Bain-bain (Tag.: *Makahiya*, Eng.: Sensitive plant)

The outer layer of the roots are scraped and used for treating toothache.

The roots are boiled and drank the solution to treat strangury (*sarsarapiit*).

Kugun/Pan-au (Tag.: *Kogon*,

Eng.: Speargrass)

The roots are boiled and drank the solution to cure *sakit iti batu* or kidney stone.

Lidda/Tikal (Tag.: *Talahib*, Eng.: Wild cane)

The stems and leaves are pounded and squeezed the extract to the wound to prevent excessive swelling and hastens healing

Labtang (Tag.: *Abutra/Bayati/Buti*, Eng.: Yellow root)

The stem is cut into pieces, boiled, and drank the solution to cure malaria.

Sagat (Tag.: *Molave/Molauin*, Eng.: Small-flower Chase Tree)

The bark is boiled and drank the solution to cure stomach ache (*sakit iti rusuk*).

Bangbangsit/Sahagubit

(Tag.: *Suob Kabayo*, Eng.: Bush Mint)

The roots are boiled and drank the solution for post-partum recovery.

Tayakat/Dalipauen

(Tag.: *Dita*, Eng.: Milky wood pine)

Either the bark or the roots are boiled and drank the solution to cure stomach ache and malaria.

Atikahang

(Tag.: *Takip-kohol*, Eng.: Pennyworth/Spade leaf/Gotu kola)

The leaves of the plant are pounded and applied as *haplas* or cataplasm to cure *panating* or colds.

The roots are boiled and drank the solution to treat *agsarut* or asthma.

Marakabayu/Attay ni Kabayu

(Tag.: *Bulak-manok*, Eng.: Billy goat weed)

The leaves and flowers are crushed and mixed with *mama* and applied to the abdomen of a child to treat *agbubussug* or flatulence.

Pandakake/busbusilak (Tag.: *Kampupot*, Eng.: Banana bush)

The sap is applied to thorn injuries or *nasalugsugan* to hasten the surfacing of the thorn fragment

Galamay (Tag.: *Galamai-amo*, Eng.: Schefflera/Five Fingers)

The leaves are boiled and drank the solution for post-partum recovery.

Hatuk-hatuk (Tag.: Unknown, Eng.: Peacock spikemoss)

The mature bushy leaves are cut, pounded and used as cataplasm to the abdomen for diarrhea.

Imelda/Mara-NPA (Tag.: *Bikas*, Eng.: Heartleaf Hempvine)

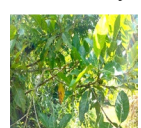
The young and mature leaves are crushed and used as poultice or cataplasm to cure stomach ache, diarrhea and malaria. It is also applied to the wounded body part to hasten the healing.

Suma (Tag.: *Kawa-kawayan*, Eng.: Stiltgrass)

The leaves and/or flowers of this weed are crushed and the extract is squeezed directly to the snake bite or *littig* or boils.

Tahepangpang (Tag.: *Borabor*, Eng.: Scythian lamb)

The roots or rhizomes are boiled and drank the solution to hamper the menstrual flow.

Liwliw/Raya-raya

They upper part of the mature leaves are applied with virgin coconut oil, heated it near fire until become mildly warm and used as cataplasm to treat fever.

The sap is also applied to the skin to treat scabies.

Bilante

The upper part of the mature leaves are applied with virgin coconut oil, heated it near fire until become mildly warm and used as cataplasm to treat *bignat/mapasupliyanan*.

Nagpalad

The roots of the plant are boiled, and drank the solution to treat cough.

Pattikatikad

The leaves are pounded, heated near fire until it becomes mildly warm, and massage it to the whole body to cure colds.

Sapinit

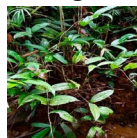
The crumbs of the stem are mixed with the crumbs of *dappig* to be boiled, and drank the solution for post-partum recovery.

Dappig/Tappuding

The crumbs of the periderm of the stem is mixed with the crumbs of *sapinit* to be boiled, and drank the solution for post-partum recovery.

Dilambaka/Dila ni Baka

They upper part of the mature leaves are applied with virgin coconut oil, heated near fire until become mildly warm and used as cataplasm to treat *littig* or boils.

Tulang

The roots are boiled and drank the solution to treat *sakit ti buksit* or abdominal pain.

Bikul

The roots are boiled, and drank the solution whenever they spit out blood after carrying very heavy object.

Matunghib

The periderm of the stem are scraped and used to treat toothache.

Elelus

The stems and leaves are pounded and wrapped in the abdomen to treat bloated stomach or *agbubussug*.

Libagu

The leaves of the shrub are crushed and sniffed to treat dizziness.
The leaves are also boiled and drank the solution to treat asthma.

Kalingag

The bark is chewed like a candy to treat bloated stomach.

Amuhawin

The stem or the roots are boiled and used as a washing solution for the wound.

Aladan/Tihak

They upper part of the mature leaves are heated near fire until become mildly warm and used as cataplasm to treat the onset of malaria.

Dilutan

The mature stem is cut, boiled, and drank the solution to treat diarrhea.

Unknown name

The plant just discovered lately by the agtas.
The root is pounded and used to treat toothache.
The extract of the root can also soften or even dissolve tooth.

The findings showed that the frequent illnesses of the Agtas of Northern Sierra Madre Mountain are gastrointestinal problems and malaria. These illnesses are apparent because most of the time they are in the forested parts of the mountain which make them exposed to different vectors of diseases like mosquitos that could carry plasmodium parasite. Also, when they are in the mountain they just drink in the open flowing rivers which make them susceptible to different gastrointestinal problems.

The Agtas of Northern Sierra Madre Mountain generally used decoctions to cure gastrointestinal problems and malaria. Whenever they boil plant parts for medication, they always base from the color of the water, the amount of remaining water and the aroma before taking it.

Moreover, Agtas of Northern Sierra Madre Mountain believe that all medicinal plants that taste bitter can have the potential to cure malaria.

The Agtas of Northern Sierra Madre Mountain particularly the Agtas at *De shupe*, *Sitio Lagis*, and *Balyang* do not practice conservation measures to preserve the said medicinal plants since the botanicals can just grow copiously in the mountain ranges.

A. Recommendations

- 1) It is essential for reputable institutions like the Department of Science and Technology (DOST) to conduct scientific research and laboratory analyses, such as biochemical evaluations of the medicinal properties of identified plants. This research can help alleviate modern public skepticism regarding the

safety and efficacy of herbal remedies, while also allowing for the discovery of new plant species with potential pharmacological benefits for treating serious diseases.

- 2) Government agencies have the opportunity to weave traditional knowledge of medicinal plants into modern wildlife management initiatives through the active involvement of the Agtas. This traditional knowledge should be complemented with sustainable management practices that enhance their effectiveness in conservation and the stewardship of their medicinal plant resources.
- 3) Schools, particularly those implementing the Indigenous Peoples' Education (IPED) program, along with local barangay officials, should organize outreach initiatives aimed at educating the Agta community on effective management of their plant resources, including the cultivation and propagation of medicinal plants in proximity to their settlements.
- 4) Administrators and educators involved in the Indigenous Peoples' Education (IPED) program should develop teaching strategies and activities within related subjects to promote the sustainability of the Agtas' traditional plant knowledge and resources. Examples include: a. instructing IP learners on the proper uses of various plant parts; b. demonstrating appropriate methods for propagating plants, such as gardening; and c. incorporating fundamental concepts from the Agtas related to herbal medicine use in lessons for non-IP learners regarding common health issues.
- 5) All initiatives and projects launched by Local Government Units, educational institutions, and other governmental organizations should be executed consistently, with adequate monitoring and follow-up until the programs achieve their intended goals.

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