



Institute of Biodiversity and Environmental Conservation

Utilization Pattern and Value of Medicinal and Food Plants Use in the Bidayuh Communities in Bau, Kuching, and Serian Districts of Sarawak

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Utilization Pattern and Value of Medicinal and Food Plants Use in the
Bidayuh Communities in Bau, Kuching, and Serian Districts of Sarawak

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DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Malaysia Sarawak. Except where due acknowledgements have been made, the work is that of the author alone. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.



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ABSTRACT

Bidayuh communities are recognized for their skills in the usage of wild plants for food and traditional medicine. The research was conducted from April 2019 until the end of 2021. The research is done to (1) to gather the pattern of use of medicinal and food plants among Bidayuh communities in Siburan district (Serian Division), Padawan sub-district, and Bau district (in Kuching Division), (2) compare and describe the use practices such as plant parts used and methods of preparation of plants documented, and (3) estimate the annual value of the use of the food and traditional medicinal plants in the communities. Household surveys were conducted on 226 households based on stratified random sampling. Key informant in-depth interviews and group meetings were used to gather further information. A total of 43 medicinal plant species used to treat 25 ailments have been recorded from all districts. Five primary ailments are fever (11 plant species), wound (10 plant species), post-partum care (eight plant species), hypertension (seven plant species), and diseases of the skin (seven plant species). For the food plants, 74 species were recorded from the three districts. The plants are mostly consumed directly as *ulam* or ripe fruit (36 plant species), cooked as vegetables (28 plant species), and others are made as *tuak* or condiment (10 plant species).

Keywords: Wild plant; medicine; food; annual value; Bidayuh communities

Corak Penggunaan dan Nilai Tumbuhan Ubat dan Makanan dalam Komuniti Bidayuh di Daerah Bau, Kuching dan Serian Sarawak

ABSTRAK

Komuniti Bidayuh terkenal dengan kemahiran mereka dalam penggunaan tumbuhan liar sebagai makanan dan ubat tradisional. Kajian ini telah dilaksanakan pada April 2019 sehingga pada penghujung tahun 2021. Objektif kajian adalah untuk (1) mengumpul corak penggunaan tumbuhan ubat dan makanan yang digunakan oleh komuniti Bidayuh yang terdapat di daerah Siburan (Bahagian Serian), daerah kecil Padawan dan daerah Bau (Bahagian Kuching), (2) membuat bandingan dan huraian cara penggunaan tumbuhan seperti bahagian tumbuhan yang digunakan dan pendokumentasian cara penyediaan tumbuhan, dan (3) menganggar nilai tahunan penggunaan tumbuhan makanan dan ubat dalam kalangan komuniti. Tinjauan isi rumah telah dijalankan ke atas 226 isi rumah berdasarkan persampelan rawak berstrata. Temu bual mendalam secara individual dan kumpulan digunakan untuk mengumpul maklumat lanjut. Sebanyak 43 spesies tumbuhan ubatan yang digunakan untuk merawat 25 penyakit telah direkodkan dari semua daerah. Lima penyakit utama ialah demam (11 spesies tumbuhan), luka (10 spesies tumbuhan), penjagaan selepas bersalin (lapan spesies tumbuhan), hipertensi (tujuh spesies tumbuhan), dan penyakit kulit (tujuh spesies tumbuhan). Bagi tumbuhan makanan, 74 spesies direkodkan dari ketiga-tiga daerah. Tumbuhan tersebut kebanyakannya dimakan secara langsung sebagai ulam atau buah yang telah matang (36 spesies tumbuhan), dimasak sebagai sayur-sayuran (31 spesies tumbuhan), dan yang lain dibuat sebagai tuak atau perasa (10 spesies tumbuhan).

Kata kunci: *Tumbuhan liar; ubat; makanan; nilai tahunan; komuniti Bidayuh*

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LIST OF ABBREVIATIONS

FAO	Food and Agriculture Organization
NTFP	Non- timber Forest Product
TK	Traditional Knowledge
SPSS	Statistical Program for Social Science
TM	Traditional Medicine
TEK	Traditional Ecological Knowledge
WIPO	World Intellectual Property Organization
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

1.1 Brief Background

The field of ethnobotany focuses on the study of medicinal and food plants used by local communities worldwide. This chapter provides an overview of recent trends related to these plants, focusing on global, Malaysia and Sarawak (study sites), including the Padawan sub-district, Siburan district, and Bau district. In Malaysia, indigenous people have a long-standing tradition of using plants for food, medicine, construction, fuel, and ceremonial purposes. In Sarawak, particularly in the selected study sites (Padawan sub-district, Siburan district, and Bau district), the Bidayuh community has a profound connection to plants. Numerous studies have extensively documented the traditional uses of plants for medicine, food, and ceremonies in the daily lives of the community. These plants are typically gathered from nearby community forests or cultivated near their homes.

1.2 Study Background

The term "Ethnobotany" was first introduced in the late eighteenth century by a botany professor who studied plants' used by primitive and aboriginal people. Later, the modern-day ethnobotanical study started, which led to various definitions of ethnobotany by multiple researchers. Yet, in short, ethnobotany is the study of the relationship between plants and people. The people described in ethnobotany are indigenous people who follow traditional, nonindustrial routines in the area they occupied for generations (Balick et al., 2002). Traditional knowledge is the evidence of the well-aged traditions and practices of the indigenous community, which include understanding, knowledge, and experiences of the community. Often, this knowledge is passed down orally through generations and rarely put

in any standard form of documentation. The World Health Organization (WHO) estimated about 60% of the world's population relies on traditional medicine (TM) for their primary healthcare essentials (Gyasi et al., 2011). WHO defines TM often includes medication remedies such as herbal medicines (plants), animal parts, and minerals (WHO, 2005). People worldwide have been associated with healing plants since ancient, particularly the indigenous people in developing countries. They have been consuming and using herbal medicine (plants) not just for health but in their culture, practices, and daily livelihood. Traditional medicine is a valuable ancient knowledge of the people who have survived and evolved over the millennia, such as Ayurveda medicine and Traditional Chinese Medicine. These practices are still used and accepted to date, commonly known as alternative medicine or complementary medicine.

People have depended on wild-growing plants in their nourishment since prehistoric and continue to rely on these plants for nutritional consumption till today (Grivetti & Ogle, 2000; Turner et al., 2011; Khan et al., 2017). Wild harvested plant foods consist of underground parts; shoots and leafy greens; fleshy fruits; grains, nuts, and seed; and mushrooms, lichens, algae, and other species. These species involve specific traditional knowledge of the locals concerning collecting, preparation, cooking, and other forms of processing (Turner et al., 2011). Other than offer nourishment, these harvested wild plants provide cash income for the local people and have vital importance in safeguarding global food security (Uprety et al., 2012). Consuming wild edible is part of the food habits of people in countless families and communities around the world and closely associated with practically all features of their socio-cultural, spiritual life and health. Furthermore, wild food plants have a vital role in meeting the nutritional necessity of the indigenous population in remote parts of the country Khan et al. (2017).

Sarawak is located on one of the largest islands in Asia-Pacific county known as Borneo, one of the 13 Biodiversity Hotspots of the world (Jong et al., 2013). The massive tropical rainforest of Sarawak has contributed to the rich biodiversity of Malaysia's tropical rainforest. There are five types of natural forests that occur in Sarawak: Hill Mixed Dipterocarp Forest, Peat Swamp Forest, and Mangrove Forest, which are three prime forest types. Subsequently, by a slightly small extent, the Kerangas and Montane Forests. Aside from being lavish and having extensive biodiversity, Sarawak is also ethnically and culturally diverse. Rainforest plays a vital role in the Indigenous community's livelihood, such as a source of nourishment, lodging, covers, utensils, and religious and healing purposes (Jong et al., 2013). In Sarawak, the various studies on traditional medicinal plants used by the indigenous community are still ongoing. Based on Runi and Lee's (2001) study, the Sarawak Forest Department has been collecting information on the use of medicinal plants by the various communities in the state. Studies show that Bidayuh is the third largest community after Orang Ulu and Iban, and it uses medicinal plants.

Aside from providing medicinal plants to the communities, the Sarawak rainforest has been a significant source of the indigenous community's diet. Studies by (Shaffiq et al., 2013) stated that the locals collect, hunt and consume wild fruits, mushrooms, wild vegetables, and animals as a food source. In addition to the food the rainforest supplies, the communities also cultivate wild fruits and vegetables in their orchards and home gardens. According to (Anupunt et al., 2003), more than 55% of the Asian fruit species were collected from forests and other non-cultivated areas.

The Bidayuh communities that settle in Kuching and Serian division, predominately in the Padawan sub-district, Bau district, and Siburan district, respectively, had been using

forest products for decades. Several studies focus on the utilization of non-timber forest products, specifically plants used in traditional medicine and as food by the Bidayuh community. A recent study by Naming (2015) of the Bidayuh Tebia of Kampung Kiding in Padawan sub-district documented a total of 35 species of medicinal plants from 25 families. Some of these species were medicinal plants for external use (27 species), internal use (6 species), for the healing of disease caused by "black magic" or spirits, and one species for preventing hair fall and itchy scalp. These medicinal plants were collected from the agroforestry site, old rubber farms, and secondary forest. In addition to ongoing documentation on the valuable plants used by the Singai Bidayuh in Bau, so far, there are 52 identified and recorded wild plant species used for medicinal purposes and nourishment (Ripen & Noweg, 2017).

Over the years, the demand for medicinal and aromatic plants increases as the markets expand and new end-usage was established. Since approximately 80 percent population of the developing countries still depend on traditional medicines for their main well-being essentials, WHO estimated about US\$ 60 billion of international trade in medicinal plants in the year 2010 and will be reaching up to US\$ 5 trillion by the year 2050. Meanwhile, in Asia only, the demand for the herbal market had nearly doubled during the late 1990s due to expansion in the population (Nirmal et al., 2013). Over 56 000 tons of medicinal plants were used annually by some 48 million consumers, with the consumers obtaining their plant materials from local healers, traders and collecting the plants themselves. It shows about 49 000 tons (87 percent) are wild plants, and the rest 7 000 tons (13 percent) being cultivated (Hishe et al., 2016).

Meanwhile, the trade value of wild food plants was not as established compared to medicinal plants since no comprehensive global estimation of the economic value of wild food plants was recorded. Many studies were done in many parts of the world that specifically focus on particular communities or regions. Based on one of the studies done in European countries, the provisional calculations estimated that the market value of wild plants in the European countries is summed up to at least 1.66 billion Euros or approximately US\$ 1.89 billion (Schunko & Vogl, 2018).

1.3 Problem Statement

Bidayuh communities are familiar with the traditional uses of medicinal and food plants. However, this understanding was only passed down through generations through conventional methods or oral tradition. The use of medicinal and food plants tends to be confined to the elderly members of the community and traditional herbal medicine experts. However, there is a developing trend; an even younger and more affluent population is beginning to appreciate wild food plants and herbal medicine. Observation in the Bidayuh community indicates that traditional medicinal plants are now quite common. In contrast, food plants are only seen in the small community market due to changes in people's preferences and dietary habits and the time required to collect wild plants. The use of these plants tends to differ according to the livelihood of the Bidayuh community.

Between the Bidayuh alone, the diverse Bidayuh group has a different culture. The Bidayuh from Serian originated from the Upper Kapuas River of the Kalimantan. Meanwhile, the Bidayuh in Padawan mainly migrated from Gunung Sengkong, and the Bidayuh in Bau migrated from Kabupaten Bengkayang in Indonesia. A search for more details on the practices of food and medicinal plants, such as plant parts used and methods

of preparation for medicine or culinary purposes, between the Bidayuh group needs more documentation. Past studies have only focused on one or a particular Bidayuh community. It shows that the documentation of the traditional knowledge of these medicinal and food plants is far from complete. In the meantime, the valuation of food and traditional medicinal plants used by the Bidayuh community will help create incentives within the Bidayuh community to protect and conserve their nearby forest community. Hence, this study is preserving their ancestor's traditional knowledge and safeguarding their valuable natural resources.

1.4 Objectives

In general, the study's objective is to expand on the previous documentation and assess the pattern of use and value of traditional medicinal and food plants. It also aims to document the valuable traditional knowledge in the Bidayuh communities in Siburan district (Serian Division), Padawan sub-district, and Bau district (Kuching Division). The specific objectives of the study are as follows:

- i. To gather the pattern of use of medicinal and food plants among Bidayuh communities in Siburan district (Serian Division), Padawan sub-district, and Bau district (in Kuching Division),
- ii. To compare and describe the use practices such as plant parts used and methods of preparation of plants documented, and
- iii. To estimate the annual value of the use of the food and traditional medicinal plants in the communities.

1.5 Study Justification

Currently, traditional knowledge of plants among the natives is under threat due to the modernization and globalization of the native livelihood alone. Awareness among the newer generations is deteriorating over time. Thus, it becomes a pressure in need of conservation predominantly on behalf of the native's community resources. Documenting the utilizations and selection of plant species commonly used in traditional medicine and diet by the Bidayuh community will help create awareness of the significance of community resources and the safeguarding of their ancestor knowledge in the uses of the plants. It helps to initiate conservation within a practice by involving the local herbal practitioners and the surrounding communities, which will help to provide and share information on the importance of medicinal and food plant conservation within the community.

Consequently, the study will help protect traditional knowledge and provide environmental services to the community and its surroundings. Meanwhile, it is crucial to ponder on the three concepts, such as values, goals, and decision-making for management and planning of resource use. Positive values within the community will help create better goals for managing sustainable community resources for future cohorts by thorough observation and consideration that lead to community and environmental benefits.

1.6 Study Limitation

The study focuses on only a few selected Bidayuh communities in the Kuching and Serian regions. The results obtained are limited to these specific groups and cannot represent the entire Bidayuh community. The information collected through interviews and observations on medicinal and food plants is inadequate due to time constraints.

CHAPTER 2

LITERATURE REVIEW

2.1 General Introduction

This chapter will focus on the various aspects of the ethnobotanical study of medicinal and food plants from past findings.

2.2 Community Forestry and Ethnobotany

People have depended on plants since the earliest civilization ever recorded. Humanity has relied on the unique qualities of plants in numerous parts of their life up to this point for aesthetic purposes: as a source of nutrients, for their medicinal properties, for lodging, and more. They had cultivated practices, rituals, and culture for generations in their local environment. Often, these groups of people are known as the indigenous community or indigenous people.

As cited by Charnley and Poe (2007), FAO stated that forests shelter 30 per cent of the earth's land region, totalling about four billion hectares. In the brief five-year interlude between 2000 and 2005, experts estimate an average net loss of about 7.3 million hectares per annum of forest occurred. Almost (79.5 per cent) 5.8 million hectares of the damage were the primary forest due to forest conversion to the agriculture industry. Estimated about 400 – 500 million people live in and around the world's forest, and people in the rural and urban areas have depend on forest resources. People living in communities within and around the forests use products from the forest to nourish, fuel, remedy, and buildings such as constructing houses or huts and even sustain their income (Charnley & Poe, 2007).

Meanwhile, Belcher et al. (2005) study shows forests offer livelihoods and food for about 300 million people in the form of non-timber products (NTFP). NTFP and food security have a significant relationship with rural *communities*. There are several ethnobotanical findings and records around the world. For example, studies done by (Grivetti & Ogle, 2000) show that more than 7000 species of wild plants, were used as food by people.

2.3 Types of Plant Resources Used by the Local Communities

Traditional ecological knowledge (TEK) is one of the vital elements in the management of nature, closely linked to the protection of ecosystems and species. The natives establish this TEK through adaptive practices with natural resources. Common examples of plant resources are plants such as medicine, nourishment, fodder, fuelwood, and other general uses such as construction and shelter. According to Hanazaki et al. (2013), more studies focused of medicinal plants than other plant resources. The primary factor influencing ethnobotanical knowledge on medicinal plants is age. Older people tend to have higher medicinal plant knowledge than the younger generation, as they lack interest concerning these resources and related practices. Also, due to the type of health facilities predominating among the youth, accessibility for modern medicine, and change in lifestyle and the environment regarding the availability of plant resources.

Meanwhile, for food plants, there seems to be a lack of evidence of knowledge oddities between different age groups; the knowledge of these types of plant resources is inclined to be more consistently distributed within the population. People commonly have extensive contact with and depend on food plants since they are juvenile, and people usually experiment with food plants more frequently than with medicinal plants (Hanazaki et al., 2013). Fodder trees play an essential role in Africa, mainly among the dairy farmers who

have fed tree foliage to their livestock since ancient. Many of the fodder trees are also multi-purpose. The locals used them as firewood and soil erosion control (Franzel et al., 2014). In Southeast Asia, Bharucha and Pretty (2010) stated, that fodder is not often collected for livestock, yet they allowed the herd to forage freely. In many developing countries, fuelwood is one of the necessities used by the indigenous community, especially in rural areas. Firewood is often collected from forests daily; it is generally as fallen branches, litter, and deadwood (De Beer & McDermott, 1996)

2.4 Local Communities Use of Plant Resources

People use plant resources for remedies, the supply of foods and spices, the construction of buildings, and other general uses. Native in Eastern Tanzania has been using tree species in the tropical woodlands for charcoal, firewood, medicine, and poles for the principal applications. Results from the survey show wooden sticks are used in about 98% of the houses and storage constructions; wild foods were valuable, especially during the drought periods, and high-quality timber trees have been decreased due to the pit-sawing industry. The utilization of plant resources by the natives is expected in developing countries. Experts worldwide were doing extensive research and recordings on the uses of forest products by the indigenous communities. In Asia, over 90 species of edible wild plants were recorded from 4 villages in the Mekong Delta and Central Highlands of Vietnam. These plants are used as foods, medicines, and livestock feeds (Ogle et al., 2003). In Nepal, 62 wild food plants are recorded in nine villages in the Dolakha district. Most of the documented plants are consumed by the locals as snacks and a supplementary preceding to the yield of primary foods (Shrestha & Dhillion, 2006). In a study by Saha and Sundriyal (2012), a total of 343 non-timber forest products recorded used by the tribes that settled in the Eastern Himalayan region of India, is comprised of medicinal (163 species), edible fruits (75