Journal of Tropical Biology and Conservation 23: 132−149, 2026 *ISSN 1823-3902*
E-ISSN 2550-1909

Research Article

Quantitative Analysis on Food Ethnobotany of Talaandig Indigenous People in Sitio Tandacol, Barangay Lilingayon, Valencia City, Philippines

Ivy C. ADLAON[1*], Fulgent P. CORITICO[1,2], Florfe M. ACMA[1,2], Dave P. BUENAVISTA[3] , Victor B. AMOROSO[1,2]

[1]*Plant Biology Division, Institute of Biology, College of Arts and Sciences, Central Mindanao University, University Town, Maramag, 8714 Bukidnon, Philippines.*
[2]*Center for Biodiversity Research and Extension in Mindanao (CEBREM), Central Mindanao University, University Town, Maramag, 8714 Bukidnon, Philippines.*
[3]*Animal Biology Division, Institute of Biological Sciences, Central Mindanao University, Musuan, Bukidnon, Philippines.*

*Corresponding author email address: s.adlaon.ivy@cmu.edu.ph

Received 16 May 2025| Accepted 21 April 2026| Published 07 July 2026
Associate Editor: Marcela Pimid
DOI: https://doi.org/10.51200/jtbc.v23i.6373

ABSTRACT

Biocultural erosion in the matter of failure to document Indigenous and Local Knowledge on food ethnobotany poses serious threats to food security in marginalized regions such as the Talaandig Indigenous Group in Sitio Tandacol, Barangay Lilingayon, Valencia City, Philippines. To address this, an ethnobotanical survey through semi-structured and walking interview was done to document the botanical diversity of food plants and their uses in Barangay Lilingayon through different collection sites. Quantitative ethnobotanical analysis revealed a total of 91 food plant species in Sitio Tandacol, belonging to 70 genera and 43 botanical families. Result showed a total of 1,296 use-report in all nine Food and Agriculture Organization (FAO) use-categories: five species (5.49%) were documented to be classified as cereals, 28 species (30.77%) were white roots, tubers, and plantains, 12 species (13.18%) were utilized as Vitamin A rich vegetables and tubers, 38 species (41.76%) were dark green leafy vegetables, 33 species (36.26%) were categorized as other vegetables, 15 species (16.48%) were Vitamin A rich fruits, 48 species (52.75%) were other fruits, 25 species (27.47%) were legumes, nuts, seeds, and 43 species (47.25%) were categorized as spices, condiments, and beverages. The most important edible plants in the food system of Talaandig indigenous people are white roots, tubers, and root crops like Ipomoea batatas (UR= 82; UV=1.051). Utilizing indigenous and local knowledge through documentation and evaluation of gastronomically important plants could help in achieving the zero-hunger goal of the United Nations (UN SDG 2).

Keywords: Ethnobotany; indigenous people; Mindanao; food plants; Sustainable Development Goals (SDG).

INTRODUCTION

One of the major concerns that needs to be addressed in the Philippines is the high incidence level of hunger. Survey on hunger incidence show that one of the probable causes of increasing trend in hunger is the rise in food prices (Valera et al., 2022). As a result, poor households cannot afford to have a diverse diet especially highly important vegetables in the market. The importance of the consumption of vegetables and fruits was recognized by the Food and Agriculture Organization. FAO (2020) acknowledged the negative impact of inadequate consumption of these crops such as ischemic heart diseases, and stroke-related deaths.

The Philippines is home to an estimated 10,000 species of vascular plants (Pelser et al., 2011-present) and 110 indigenous groups, making it one of the most important sites for ethnobotanical research in the Asian region. Wild edible plants play a very important role in the life of indigenous groups (Turner et al., 2011). For marginalized groups, they are reliable alternatives when production of cultivated crops fail. Through these resources, food insecurity can be mitigated. However, even with the insistent problem on health, and food security, underutilized vegetables and wild foods remain to be given low priority in research. Wild edible plants have been widely collected in the Philippines (Chua-Barcelo, 2014), yet little is known about their utilization.

Indigenous and local communities hold extensive knowledge of edible plants and their utilization. So far, it has been an underutilized resource in mitigating malnutrition and food insecurity (Buenavista et al., 2022). The resilience of indigenous communities is sustained with the undervalued edible plant species that they cultivate, gather, and use. In fact, studies revealed the importance of wild edible plants in the food system and biocultural heritage of indigenous people (Sujarwo et al., 2014;Moore et al. (2022) Tahir et al. (2023); Oluoch et al. (2023). Even so, the Indigenous and Local Knowledge (ILK) system on food ethnobotany in Mindanao remained understudied.

Sitio Tandacol, Barangay Lilingayon, is home to one of the understudied indigenous groups in Mindanao, the Talaandig indigenous group. The Talaandig indigenous group has a very rich cultural heritage and is known to be deeply connected with nature (Hipolito, 2024). This paper documents the food ethnobotany of the Talaandig Indigenous Group in Sitio Tandacol, Barangay Lilingayon. Additionally, this paper analyzes the ethnobotanical index value of food ethnobotany of the Talaandig indigenous groups and evaluates their utilization.

METHODOLOGY

Entry protocol

An approved letter was obtained from the Barangay captain of Barangay Lilingayon. A Prior Informed Consent (PIC) certificate was also secured from the chieftain of the Talaandig tribe of Barangay Lilingayon. Approval from the Institutional Ethics Review Committee (IERC) of Central Mindanao University was also secured to ensure that the research is ethically and responsibly conducted, safeguarding both the participants and the researcher. Furthermore, a gratuitous permit was obtained from the Department of Environment and Natural Resources, allowing the researcher to collect unidentified food plants in the area.

Study site

The study was conducted in the natural forest of Sitio Tandacol, Barangay Lilingayon, located at N 07 °58'07.5", E 124 ° 55'48.1", with an altitude ranging from 1,312 m a.s.l. to 1900 m a.s.l (Fig. 1). Barangay Lilingayon is one of the 31 Barangays in Valencia City with the largest land area of about 131.42 km2 and with a population of about 7,216 (PhilAtlas, 2020).

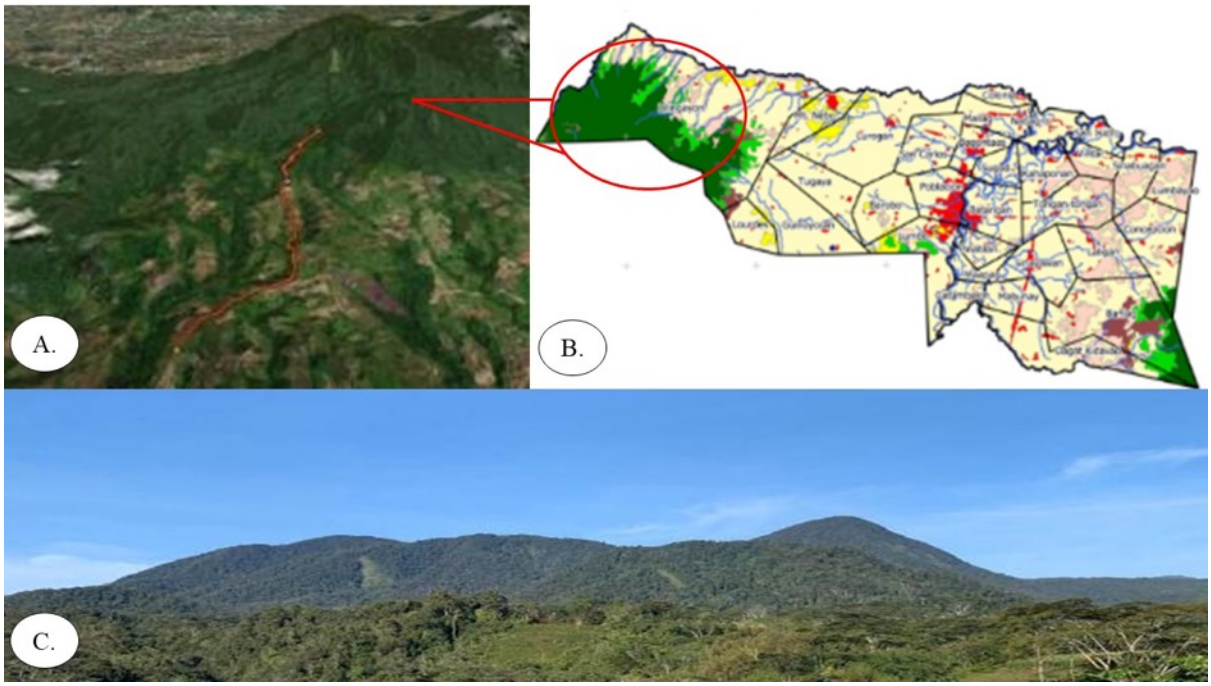

Figure 1: Location of the Study. **A.** Bird's eye view of Sitio Tandacol. **B.** Map of Barangay Lilingayon. **C.** Panoramic view of Sitio Tandacol.

Sampling procedure and ethnobotanical data collection

The data was collected from a total of 246 respondents from Sitio Tandacol, Barangay Lilingayon, Valencia City, Bukidnon. All respondents are of legal age, either pure Talaandig indigenous people or a mixed ethnicity of Bisaya and Talaandig, and permanent residents of the study site. Prior to the interview, a prior informed consent was obtained from the respondents, highlighting their total anonymity. The study followed a purposive sampling approach to objectively gather the data necessary for a thorough and trustworthy analysis of the data and results. A semi-structured interview was conducted with questionnaires utilizing Cebuano dialect since it is the dialect commonly used and/or understood in the area. A walking interview was employed to locate the unfamiliar plants mentioned by the respondents for documentation and taxonomic verification.

The data for the food ethnobotany was recorded in a data sheet following Buenavista (2021). The study acknowledged wild and cultivated food plants found within the ancestral lands of the Talaandig indigenous group. Wild plant species are plants that grow in self-sustaining populations within natural or semi-natural habitats without direct human intervention (Heywood, 1999), while "cultivated" or "domesticated" plant species are species that existthrough human action (Heywood, 1999). All specimens were identified by the authors using monographs and online sources such as Kew's Plants of the World online database (http://www.plantsoftheworldonline.org/) and Co's Digital Flora of the Philippines

(https://www.philippineplants.org/). Unidentified plants were processed using the wet method and verified by other taxonomists in the University Herbarium of Central Mindanao University, Bukidnon, Philippines.

Qualitative analysis

The data for the ethnobotany was organized in a Microsoft Excel spreadsheet for the analysis. Using the checklist of all the reported food plants, descriptive statistics on the botanical diversity were documented. Following the study of Buenavista et al. (2022; 2023), the food plants were classified based on FAO food use-categories adapted from Kennedy et al. (2010). For quantitative ethnobotanical analysis, the Use-Report (UR), Use-Value (UV) index, Number of Uses (NU), and Fidelity Level (FL) were all calculated using the free statistical software R with the R package ethnobotanyR (Whitney, 2020). The Use-Report (UR) calculates the total reported uses of each species in all the use-categories by all respondents (Prance et al., 1987). The Use-Value index developed by (Phillips & Gentry, 1993) determines the relative importance of each species based on the formula: $UV = (\sum Ui)/n$, where Ui is the number of uses (counted based on use-category) mentioned by each respondent, and n is the total number of respondents interviewed. The UV index determines the most widely used food plant species (highest UV) as well as the underutilized species (lowest UV index approaching 0). The UV index, however, cannot determine whether the species is used singly or for multiple purposes. As such, the Number of Uses (NU) per species was likewise determined by calculating the sum of all the use-categories for which a species was cited (Prance et al., 1987). The Fidelity Level (FL) percentage, on the other hand, identifies the central role of each reported food plant species as agreed upon by all the respondents (Quave & Pieroni, 2015). The FL % of each food plant species was expressed as the ratio of the total number of respondents who independently suggested the use of a species for a specific use-category (Ip) and the total number of respondents who mentioned the plant for any use irrespective of the use-category (Iu) (Friedman et al., 1986) calculated as $FL = (Ip/Iu) \times 100$.

RESULTS

Sociodemographic

The indigenous people that inhabit Sitio Tandacol are Talaandig and are members of the Bayawon Lucday Lungayan Pendonay Tandacol (Talaandig) Tribal Association (BLLUPENTTRAS), Inc. These indigenous people are the ones who protect and help preserve the forest within their ancestral domain claim of 4,257.42 ha. This is divided into agricultural area of 1,619.99 ha, grassland of 185.36 ha, primary forest (Kagulangan) of 1,421.93 ha, secondary forest (Lubas kagulangan) of 1,007.80 ha, and only 22.34 ha for residential purpose.

The majority of the 246 respondents are in the 61 and over age bracket (35.0%). The average age of the respondents is 51.66 years old. In terms of gender, 127 respondents are male (51.6%), while 119 are female (48.4%). The result showed that 87.4% of the respondents (215) are married, 10.2% are not married (25), and 2.4% are widowed (6). The number of children among respondents were also documented and it was revealed that 145 of the respondents (58.9%) have several children ranging from 0–5, 98 respondents (39.8%) have children ranging from six to 10 years and three of them (1.2%) have children ranging from 11 to 20. All the respondents are Talaandig indigenous people, however, only 67 (27.2%) are pure Talaandig and 179 respondents (72.8%) are of mixed ethnicity between Bisaya and Talaandig. In this study, mixed ethnicity means that either the biological parents of the respondent are Bisaya or are members of the Talaandig indigenous people. With regards to the household size, most of

the respondents belong to a family consisting of 6 to 10 members (154; 62.6%), about 61 respondents belong to a family of one to five members (24.8%), and 31 of the respondents belong to a family of 11 to 15 members (12.6%). The mean household size of the respondents is 7.27. Results showed that the longest duration of residency among respondents is over 61 years with 55 respondents recorded (22.4%). However, a majority of the respondents are inhabitants of Sitio Tandacol with years ranging from 31 to 40 (57 respondents; 23.2%) and only five respondents (2.0%) have resided in the area for less than 10 years. In the context of their level of educational attainment, most of the respondents (157) attained primary level education (63.8%), while a total of 65 respondents (26.4%) did not attend school or had any proper form of education. Additionally, 22 attended secondary education (8.9%) and only two (0.8%) were able to reach tertiary level. Almost all respondents (210) are farmers (85.4%) and the remaining 36 (14.6%) are government employees, teachers, and vendors. Most of the respondents (132) earned 6,000 php to 10,000 php monthly (53.7%). A total of 97 respondents earned 1,000 to 5,000 (39.4%) every month, 15 respondents earned 11,000 to 15,000 monthly (6.1%), and only two respondents earned more than 20,000 php monthly (Table 1).

Table 1: Demographic and socioeconomic profile of the respondents (n=246).

Variables	Response	Frequency	%
Age (in years)	18–30	27	11.0
	31–40	48	19.5
	41–50	41	16.7
	51–60	44	17.9
	61 and over	86	35.0
Sex	Male	127	51.6
	Female	119	48.4
Marital Status	Married	215	87.4
	Single	25	10.2
	Widow	6	2.4
No. of children	0 to 5	145	58.9
	6 to 10	98	39.8
	11 to 20	3	1.2
Ethnic Group	Talaandig	67	27.2
	Mixed	179	72.8
Household size	1 to 5	61	24.8
	6 to 10	154	62.6
	11 to 15	31	12.6
Duration of residency (in years)	0 to 10	5	2.0
	11 to 20	3	1.2
	21 to 30	43	17.5
	31 to 40	57	23.2
	41 to 50	54	22.0
	51 to 60	29	11.8
	61 to 100	55	22.4
Education	None	65	26.4
	Primary	157	63.8
	Secondary	22	8.9
	Tertiary	2	0.8
Occupation	Farmer	210	85.4
	Others	36	14.6
Monthly Income	1,000 to 5,000	97	39.4
	6,000 to 10,000	132	53.7
	11,000 to 15,000	15	6.1
	20,000 and over	2	0.8

Botanical diversity of food plants

Botanical survey on edible plants revealed a total of 91 species of edible plants belonging to 70 genera and 43 botanical families (Fig. 2).

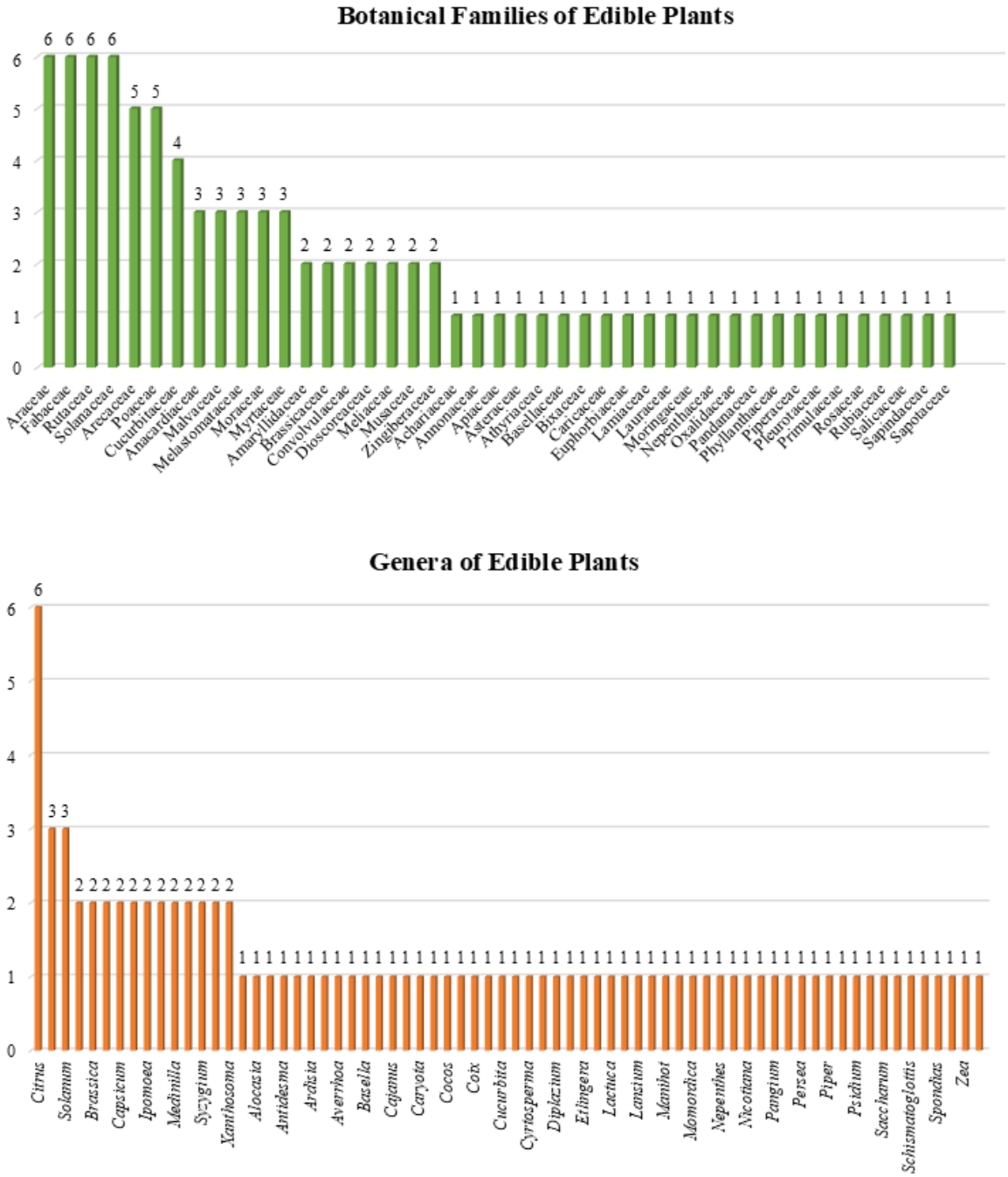

Figure 2: Talaandig indigenous people diversity of food plants.

The botanical family with the highest number of species was the family Araceae with six species, together with Fabaceae (6), Rutaceae (6), and Solanaceae (6). Other botanical families that are well-represented in the Talaandig Indigenous group food system include Arecaceae and Poaceae with five species each, Cucurbitaceae with four species, Anacardiaceae, Malvaceae, Melastomataceae, Moraceae, and Myrtaceae all with three species each, and the families Amaryllidaceae, Brassicaceae, Convolvulaceae, Dioscoreaceae, Meliaceae, Musaceae, and Zingiberacea with two species each. Furthermore, a total of 24 plant families were represented by a single species: Achariaceae, Annonaceae, Apiaceae, Asteriaceae, Athyriaceae, Basellaceae, Bixaceae, Caricaceae, Euphorbiaceae, Lamiaceae, Lauraceae, Moringaceae, Nepenthaceae, Oxalidaceae, Pandanaceae, Phyllanthaceae, Piperaceae, Pleurotaceae, Rosaceae, Rubiaceae, Salicaceae, Sapindaceae, and Sapotaceae.

Quantitative ethnobotanical analysis

Quantitative analysis revealed a total of 1,296 use-report in all 9 FAO use-categories: 5 species (5.49%) were documented to be classified as cereals, 28 species (30.77%) were white roots, tubers, and plantains, 12 species (13.18%) were utilized as Vitamin A rich vegetables and tubers, 38 species (41.76%) were dark green leafy vegetables, 33 species (36.26%) were categorized as other vegetables, 15 species (16.48%) were Vitamin A rich fruits, 48 species (52.75%) were other fruits, 25 species (27.47%) were legumes, nuts, seeds, and 43 species (47.25%) were categorized as spices, condiments, and beverages (Fig. 3).

The edible plants with the highest use-reports (UR) and use-values (UV) were *Ipomoea batatas* (UR= 82; UV=1.051), *Manihot esculenta* (UR= 79; UV= 1.013), *Musa* sp. (UR= 75; UV= 0.962), *Calamus rotang* (UR= 50; UV= 0.641), *Artocarpus heterophyllus* (UR= 47; UV= 0.603), *Colocasia esculenta* (UR= 37; UV= 0.474), *Cucurbita maxima* (UR= 35; UV= 0.449), *Momordica charantia* (UR= 34; UV= 0.436), and *Zea mays* (UR= 32; UV= 0.41). Species with the least UR (1) and UV (0.013) include *Allium ampeloprasum, Spondias mombin, Arachis hypogaea, Leucaena leucocephala* and *Syzygium* sp.

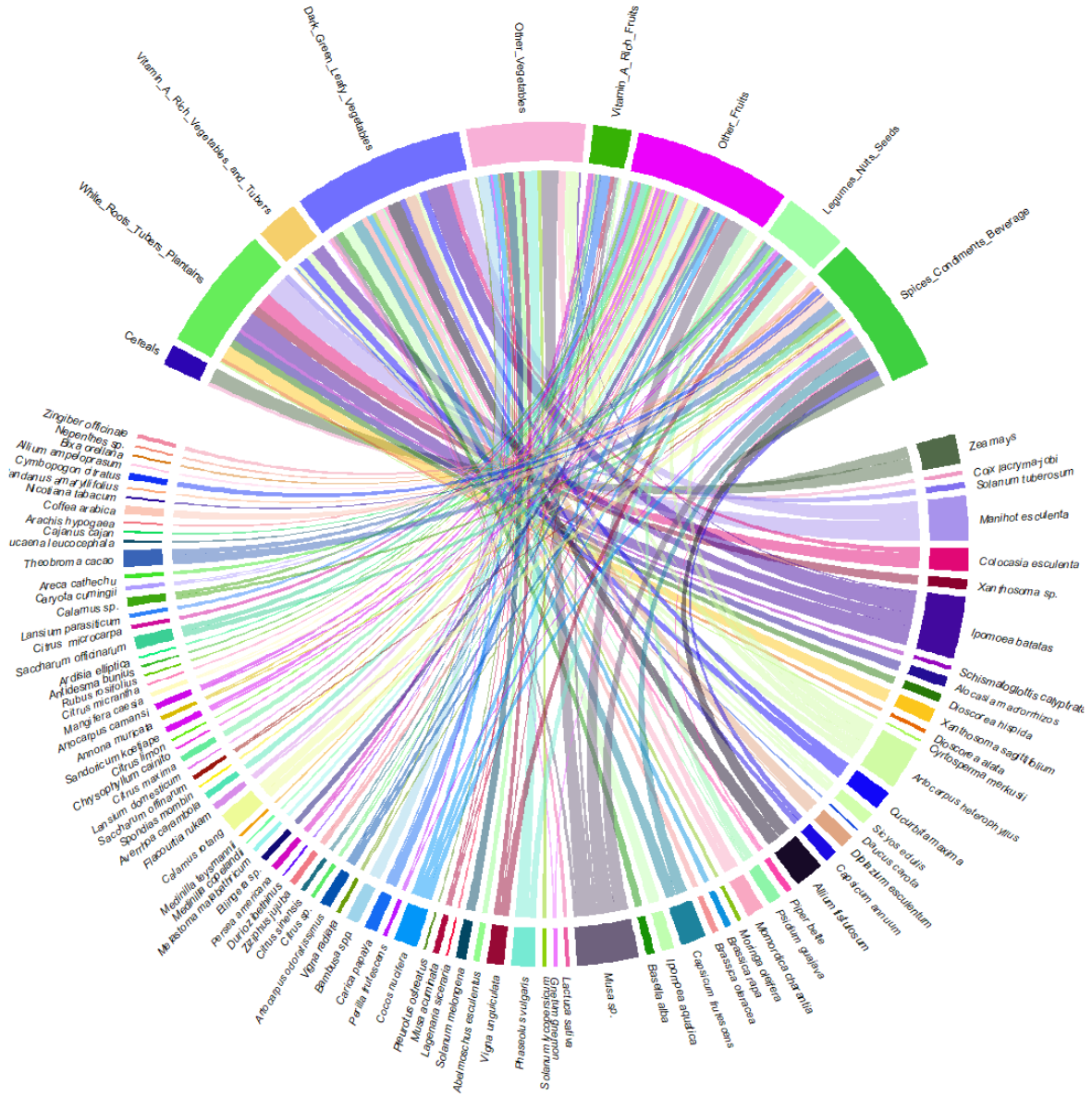

Figure 3: Chord diagram showing the distribution of 1,296 use-reports (UR) for the 91 species of food plants (bottom half) utilized by the Talaandig indigenous group (use-categories in the top half).

Table 2: Food plants locally consumed by the Talaandig Indigenous Group of Sitio Tandacol, Barangay Lilingayon.

Family	Scientific name	Local Name	Plant Source	Life form	Edible parts	Use Report (UR)	Use Value (UV)	Number of Use	FL%**
Achariaceae	*Pangium edule*	Pangi	W	tree	fruits	2	0.026	1	OF: 100.00
Amaryllidaceae	*Allium ampeloprasum*	Bunjing	C	herb	leaves, bulbs	1	0.013	1	S: 100.00
	Allium fistulosum	Sibuyas dahon	C	herb	leaves	25	0.321	2	G: 26.32; S:94.74
Anacardiaceae	*Mangifera caesia*	Belunok	C	tree	fruits	2	0.026	1	VF: 100.00
	Mangifera indica	Manga	C	tree	fruits, shoots	10	0.128	2	VA: 100.00; S: 28.57
	Spondias mombin	Saray	C	tree	fruits	1	0.013	1	OF: 100.00
Annonaceae	*Annona muricata*	Abana	C	tree	fruits	7	0.09	2	OF:100.00; S:40.00
Apiaceae	*Daucus carota*	Carot	C	herb	tuber	7	0.09	1	VA: 100.00
Araceae	*Alocasia macrorrhizos*	Gabi	W	herb	corms	23	0.295	2	W:100.00; G:15.00
	Colocasia esculenta	Labug	W	herb	corms, young leaves	37	0.474	2	W: 92.59; G: 25.93
	Cyrtosperma merkusii	Palaw	W	herb	corms	4	0.051	1	OF: 100.00
	Schismatoglottis calyptrata	Opusow	W	herb	corms, young shoots	3	0.038	2	W: 100.00; G: 50.00
	Xanthosoma sagittifolium	Lutya	W	herb	corms, young shoots	27	0.346	2	W: 90.00; G: 25.00
	Xanthosoma sp.	Lutya/Adupa	W	herb	corms	31	0.397	1	W: 100.00
Arecaceae	*Areca catechu*	Bunga	W	tree	seed	4	0.051	1	OF:100.00
	Calamus rotang	Uway	W	climbers	fruits, pith	50	0.641	2	OV: 66.67; OF: 100.00
	Calamus sp.	Libas/Uway	W	climbers	fruits, pith	10	0.128	2	OV: 50.00; OF: 66.67
	Caryota cumingii	Pugahan	W	tree	fruit flesh	3	0.038	1	L: 100.00
	Cocos nucifera	Lubi	C	tree	fruits, shoots	8	0.103	3	OV: 66.67; OF: 66.67; S: 66.67
Asteraceae	*Lactuca sativa*	Lettuce	C	herb	leaves	8	0.103	1	G: 100.00
Athyriaceae	*Diplazium esculentum*	Pako	W	herb	leaves, shoots	22	0.282	1	G: 100.00
Basellaceae	*Basella alba*	Agbati	C	climbers	leaves, shoots	15	0.192	1	G: 100.00
Bixaceae	*Bixa Orellana*	Aswete	W	shrub	seeds	5	0.064	1	S: 100.00
Brassicaceae	*Brassica oleracea*	Repolyo	C	herb	leaves	10	0.128	1	G: 100.00

	Brassica rapa	Humbok	C	herb	leaves	10	0.128	1	G: 100.00
Caricaceae	*Carica papaya*	Kapayas	C	tree	fruits	10	0.128	2	OV: 22.22; VF: 77.78
Convolvulaceae	*Ipomoea aquatica*	Tinangkong	C	climbers	leaves, shoots	17	0.218	1	G: 100.00
	Ipomoea batatas	Kamote	C	climbers	tubers, leaves, young leaves	82	1.051	3	G: 90.48; OV: 2.38; VA: 100.00
Cucurbitaceae	*Cucurbita maxima*	Kalabasa	C	climbers	fruits, shoots	35	0.449	2	VA: 89.47; G: 84.21
	Lagenaria siceraria	Upo	C	climbers	fruits	6	0.077	1	OV: 100.00
	Momordica charantia	Paliya	C	climbers	fruits, shoots	34	0.436	2	G: 100.00; OV: 100.00
	Sechium edule	Sayote	C	climbers	fruits, shoots	31	0.397	2	G: 82.35; OV: 76.47
Dioscoreaceae	*Dioscorea alata*	Ube	C	climbers	tuber	9	0.115	2	W: 85.71; OV: 14.29
	Dioscorea hispida	Lab-o	W	climbers	tuber	11	0.141	1	W: 100.00
Euphorbiaceae	*Manihot esculenta*	Binggala/Balanghoy	C	shrub	tuber, young leaves	79	1.013	2	W: 91.11; G: 66.67
Fabaceae	*Arachis hypogaea*	Mani	C	herb	seeds	1	0.013	1	L: 100.00
	Cajanus cajan	Kadios	W	shrub	seeds	4	0.051	1	L: 100.00
	Leucaena leucocephala	Ipil-ipil	W	tree	seeds	1	0.013	1	L: 100.00
	Phaseolus vulgaris	Balatong	C	climbers	pods, seeds	23	0.295	1	L: 100.00
	Vigna radiata	Monggos	C	herb	seeds	3	0.038	1	L: 100.00
	Vigna unguiculata	cowpea	C	herb	pods, seeds	19	0.244	1	L: 100.00
Lamiaceae	*Perilla frutescens*	mint	C	herb	leaves	5	0.064	1	S: 100.00
Lauraceae	*Persea americana*	Abokado	C	tree	fruits	9	0.115	1	OF: 100.00
Malvaceae	*Abelmoschus esculentus*	Okra	C	herb	fruits	12	0.154	3	G: 20.00; OV:90.00; OF:10.00
	Durio zibethinus	Durian	C	tree	fruits	5	0.064	1	OF: 100.00
	Theobroma cacao	Cacao	C	tree	fruits, seeds	31	0.397	3	OF: 31.58; L: 31.58; S: 94.74
Melastomataceae	*Medinilla copelandii*	Hagawhao	W	shrub	fruits	7	0.09	1	OF: 100.00
	Medinilla teysmannii	Kalibas	W	shrub	fruits	7	0.09	1	OF: 100.00
	Melastoma malabathricum	Katungaw	W	shrub	fruits	13	0.167	1	OF: 100.00
Meliaceae	*Lansium domesticum*	Lansones	C	tree	fruits	6	0.077	1	OF: 100.00
	Sandoricum koetjape	Santol	C	tree	fruits	6	0.077	1	OF: 100.00
Moraceae	*Artocarpus camansi*	Kamansi	W	tree	fruits, seeds	4	0.051	1	OF:100.00

	Artocarpus heterophyllus	Nangka	C	tree	fruits, seeds	47	0.603	3	OV: 75.00; OF:81.25; L:87.50
	Artocarpus odoratissimus	Marang	C	tree	fruits, seeds	19	0.244	2	OF:90.91; L:72.73
Moringaceae	*Moringa oleifera*	Kamunggay	C	tree	leaves, flowers	8	0.103	1	G: 100.00
Musaceae	*Musa acuminata*	Saging	C	herb	fruits, flowers	20	0.256	3	OV: 30.77; OF: 92.31; S: 23.08
	Musa sp.	Saging	C	herb	fruits, shoots	75	0.962	3	G: 14.71; OV: 61.76; OF: 91.18
Myrtaceae	*Psidium guajava*	Bayabas	C	tree	fruits	9	0.115	3	G: 20.00; OV: 40.00; OF: 60.00
	Syzygium aqueum	Tambis	C	tree	fruits	4	0.051	1	OF: 100.00
	Syzygium sp.	tambis-tambis	C	tree	fruits	1	0.013	1	OF: 100.00
Nepenthaceae	*Nepenthes* sp.	Pitsil-pitsil	W	climbers	water inside the modified leaf	13	0.167	1	S: 100.00
Oxalidaceae	*Averrhoa carambola*	Balimbing	C	tree	fruits	15	0.192	1	OF:100.00
Pandanaceae	*Pandanus amaryllifolius*	Pandan	W	shrub	leaves	7	0.09	1	S: 100.00
Phyllanthaceae	*Antidesma bunius*	Bignay	W	shrub	fruits	6	0.077	1	OF:100.00
Piperaceae	*Piper betle*	Buyo	W	climbers	leaves	5	0.064	2	G: 100.00; S: 25.00
Pleurotaceae	*Pleurotus ostreatus*	Mushroom	C	fungus	body	2	0.026	1	OV: 100.00
Poaceae	*Bambusa* spp.	Ubod	W	shrub	shoots	11	0.141	1	OV: 100.00
	Coix lacryma-jobi	Adlai	W	herb	grains	10	0.128	1	C: 100.00
	Cymbopogon citratus	Tanglad	C	herb	leaves	10	0.128	1	S: 100.00
	Saccharum officinarum	Tubo	C	herb	stems	14	0.179	1	OF: 100.00
	Zea mays	Mais	C	herb	seeds	32	0.41	1	C: 100.00
Primulaceae	*Ardisia elliptica*	Tagpo	W	shrub	fruits	5	0.064	1	OF:100.00
Rosaceae	*Rubus rosifolius*	Sapinit	W	shrub	fruit	15	0.192	1	OF: 100.00
Rubiaceae	*Coffea arabica*	Kape	C	shrub	seeds	17	0.218	1	S: 100.00
Rutaceae	*Citrus macrocarpa*	calamondin	C	shrub	fruits	3	0.038	2	OF: 50.00; S: 50.00
	Citrus limon	lime	C	tree	fruits	3	0.038	1	OF: 100.00
	Citrus maxima	Bu-ungon	C	tree	fruits	11	0.141	1	OF: 100.00
	Citrus micrantha	biasong	C	tree	fruits	9	0.115	2	OF: 87.50; S: 25.00

	Citrus sp.	limonsito	C	tree	fruits	3	0.038	1	OF: 100.00
Salicaceae	*Flacourtia rukam*	Aganas	W	tree	fruits	12	0.154	1	OF: 100.00
Sapindaceae	*Nephelium lappaceum*	Rambutan	C	tree	fruits	6	0.077	1	OF: 100.00
Sapotaceae	*Chrysophyllum cainito*	Kaimito	C	tree	fruits	5	0.064	1	OF: 100.00
Solanaceae	*Capsicum annuum*	Atsal	C	herb	fruits, leaves, shoots	16	0.205	2	G: 70.00; S:90.00
	Capsicum frutescens	Sili	C	shrub	fruits, leaves, shoots	29	0.372	2	G: 78.57; S: 92.86
	Solanum lycopersicum	Kamatis	C	herb	fruits	5	0.064	1	OV: 100.00
	Solanum melongena	Talong	C	herb	fruits	16	0.205	1	OV: 100.00
	Solanum tuberosum	Patatas	C	herb	fruits	13	0.167	2	W: 76.92; OV: 23.08
Zingiberaceae	*Etlingera* sp.	Tukabon	W	herb	inflorescence	15	0.192	1	OF: 100.00
	Zingiber officinale	Luy-a	C	herb	rhizomes	5	0.064	1	S: 100.00

Legend:
*W – Wild; C – Cultivated **C – Cereals; W – White roots, tubers, plantains; VA – Vitamin A rich Vegetables; G – Green leafy vegetables; OV – Other vegetables; VF – Vitamin A rich fruits; OF – Other fruits; L – Legumes, nuts, and seeds; S – Seasonings, condiments, and beverages.

DISCUSSION

Philippines is a very diverse country, not just in terms of its biodiversity but as well as its culture. It is composed of an estimated 17 million Indigenous People (Ips) under 110 ethno-linguistic groups with Mindanao accounting for 61% of the total. Despite support from the government, IPs continue to be among the poorest and most underprivileged communities in the country (Hirai, 2015), suffering unduly with health, human rights, education and exclusion issues. This problem is evident from the result of this study where despite a majority of them being employed, their earnings are still low, showing potential vulnerabilities in terms of economic stability. A majority of them earned about 6,000 to 10,000 pesos from working as farmers. Being that most of the Talaandig Indigenous People of Sitio Tandacol are farmers, it shows how reliant they are on agriculture, their natural resources, and their local knowledge system pertaining to the manner of preparation of these natural resources for consumption.

Implication on the diversity of food plants

In the food system of the Talaandig Indigenous People in Sitio Tandacol, the botanical families Araceae, Fabaceae, Rutaceae, and Solanaceae had the highest number of recorded species. Species belonging to the family Araceae, commonly known as aroids, are widely distributed across the Philippines (Pardales, 1997). As a result, Indigenous communities such as the Talaandig people of Sitio Tandacol have ready access to edible plants from this family. These species typically grow without the need for intensive cultivation, enabling the community to harvest and consume these with minimal maintenance. The high number of species recorded under the family Solanaceae can be attributed to its status as one of the major edible botanical families cultivated by Indigenous communities—not only for household consumption but also for crop production. Moreover, the Fabaceae family is composed of approximately 625 edible species (Antonelli et al., 2020), which is why it is not impossible that it is one of the most species-rich botanical families recorded in Sitio Tandacol. Additionally, given the agricultural orientation of the Talaandig community and their reliance on both cultivated and wild legumes as staple food and protein sources, it is expected that Fabaceae would emerge as one of the most species-rich families recorded in Sitio Tandacol. Furthermore, the family Rutaceae was recorded as one of the most species-rich because species under this botanical family is one of the most extensively produced tree fruit crops in the world (Ollitrault & Navarro, 2012). These fruit crops are cultivated by the Talaandig Indigenous People in Sitio Tandacol for both household consumption and economic purposes.

Indigenous local knowledge on food plants

In the food system of Talaandig indigenous people of Sitio Tandacol, edible plants that are of most importance are white roots, tubers, and plantains such as *Musa* species. Most of the respondents utilized these starch-rich and carbohydrate-source edible plants in the same way with a 100% fidelity level. These plants were recorded as one of the primary staples of the early indigenous people in Bukidnon uplands (Lynch & Clotet, 1967) and so the knowledge on their use was passed down to the present generation. Aside from the above-mentioned edible plants, species like *Calamus rotang* were also widely used within the community with a 100% fidelity level. The pith of the stems of this species is prepared and used as vegetables, while some consume it raw. Additionally, its fruits were consumed by the community and sold at the market every Christmas for 20 pesos per kilo. Some of the families in the community ferment the fruit of this species to be used as vinegar (Fig. 4). In addition, *Artocarpus heterophyllus* or "nangka" was also widely used in the food system of the Talaandig community in Sitio Tandacol. With a fidelity level of 100%, the majority in the community utilized this species as a fruit when ripe while the unripe fruit was consumed as a vegetable (FL= 75%). Most of the

respondents noted that they mix the unripe fruit with coconut milk for a more gastronomically pleasing result. On the other hand, most respondents utilized the seeds of this species the same way as peanuts as they prepare them by drying, then either grill or boil them to cook. Apart from that, corn was recorded to be used mostly over rice as the main cereal crop in the community. One of the reasons for this is the fact that the corn yield is greater than that of rice in dry-soil areas like Sitio Tandacol.

Figure 4: Uses of *Calamus rotang*. **A.** Local harvesting *C. rotang* in the forest. **B.** *C. rotang* utilized as vegetables. **C.** *C. rotang* consumed raw. **D.** *C. rotang* fruit procured for fermentation for vinegar.

Figure 5: Forest food plants of Talaandig Indigenous People in Sitio Tandacol. **A.** *Dioscorea hispida* (lab-o). **B.** *Medinilla copelandii* (Hagaw-hao). **C.** *Medinilla teysmannii* (Kalibas). **D.** *Melastoma malabathricum* (Katungaw). **E.** *Rubus rosifolius* (Sapinit). **F.** *Calamus sp.* fruit.

In the case of the Talaandig Indigenous People of Sitio Tandacol, biocultural adaptation is very important to maintain resilience amidst the limited nutrients they get from the available food resources they have. The lower production of rice in the Bukidnon uplands, and the

mountainous terrains in Sitio Tandacol would explain the highly diverse food system that the Talaandig Indigenous People have. They utilize the goods and services provided by their forest ecosystem in order to survive (Fig. 5).

Additionally, their good practice of having home gardens is one factor to consider in understanding the resilience within the community (Fig. 6). Filipinos are recorded to suffer from micronutrient deficiencies and protein-energy malnutrition. To address this problem, supplemental and/or alternative food source is a must, and with the assessment of the food ethnobotany of the Talaandig Indigenous People in Sitio Tandacol, it contributes in giving leverage in achieving Sustainable Development Goals (SDG) 2 or *"Zero hunger"* that aims to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture. Notably, diversifying food and nutritional sources based on the diversity of traditional plant-based foods could be used as a dietary strategy in addressing the problems of rapidly emerging diet and lifestyle-linked non-communicable chronic diseases (Sarkar et al., 2020).

Figure 6: A–C. Home gardens of Talaandig indigenous people. **D.** Edible plants from farm sold within the community.

CONCLUSIONS

Over the years, Indigenous and Local Knowledge (ILK) on indigenous food plants continues to fade without records. This poses serious threats to food security in marginalized regions such as indigenous communities like the Talaandig of Sitio Tandacol. Quantitative ethnobotanical analysis revealed a total of 91 food plant species in Sitio Tandacol, belonging to 70 genera and 43 botanical families. Results showed a total of 1,296 use-report in all nine FAO use-categories: five species (5.49%) were documented to be classified as cereals, 28 species (30.77%) were white roots, tubers, and plantains, 12 species (13.18%) were utilized as Vitamin A rich vegetables and tubers, 38 species (41.76%) were dark green leafy vegetables, 33 species (36.26%) were categorized as other vegetables, 15 species (16.48%) were Vitamin A rich

fruits, 48 species (52.75%) were other fruits, 25 species (27.47%) were legumes, nuts, seeds, and 43 species (47.25%) were categorized as spices, condiments, and beverages. The edible plants that are most important in the food system of Talaandig indigenous people are white roots, tubers, and plantains like *Ipomoea batatas* (UR= 82; UV=1.051).

Contrary to the common diet of Filipinos, Talaandig food system depends on a plethora of food plant resources in the area such as sweet potato, potato, cassava, taro, corn, banana, and a variety of fruits and other edible plants, both wild and cultivated. With these rich resources, Talaandig indigenous people of Sitio Tandacol rely on farming as their primary source of income. Utilizing indigenous and local knowledge through documentation and evaluation of gastronomically important plants could help in achieving the zero-hunger goal of the SDG 2.

ACKNOWLEDGEMENTS

The first author would like to thank the Department of Science and Technology- Science and Technology Regional Alliance of Universities of National Development (DOST-STRAND) for the scholarship grant. The efforts and hospitality of the Talaandig indigenous community of Sitio Tandacol, and the officials of Barangay Lilingayon, Valencia City, are highly acknowledged and appreciated. Warmest appreciation is also expressed by the first author to Ms. Grisielou Caylan for the photos of *Medinilla* species and Lian for the support of all kinds.

DECLARATIONS

Research permit(s). Gratuitous permit (R10-2024-95) was obtained from the Department of Environment and Natural Resources.

Ethical approval/statement. Prior Informed Consent (PIC) certificate from the tribal chieftain of the Talaandig Indigenous group of Sitio Tandacol was secured.

Generative AI use. I/we declare that generative AI was not used in this study nor in the writing of this article.

REFERENCES

Antonelli A, Fry C, Smith RJ, Simmonds MSJ, Kersey PJ, Pritchard HW, Abbo MS, Acedo C, Adams J, Ainsworth AM, Allkin B, Annecke W, Bachman SP, Bacon K, Bárrios S, Barstow C, Battison A, Bell E, Bensusan K, Zhang BG (2020) State of the World's Plants and Fungi 2020. https://www.kew.org/science/state-of-the-worlds-plants-and-fungi. (Accessed 9 October 2024).

Buenavista DP (2021) Co-production of Knowledge with Indigenous Peoples for United Nations Sustainable Development Goals (SDGs): Higaonon Food Ethnobotany and Discovery of a New Begonia Species in Mindanao, Philippines. PhD Dissertation, Bangor University, United Kingdom. Pp.166.

Buenavista DP (2023) Indigenous knowledge is critical to food security: An ethnobotanical study of food plants utilized by the Matigsalug-Manobo tribe of Bukidnon, Philippines. International Conference of Psychology 3(1): 78–89.

Buenavista DP, Mollee E, McDonald M (2022) Any alternatives to rice? Ethnobotanical insights into the dietary use of edible plants by the Higaonon tribe in Bukidnon Province, the Philippines. Regional Sustainability 3(2): 95–109. https://doi.org/10.1016/j.regsus.2022.04.002.

Chua-Barcelo RT (2014) Ethnobotanical survey of edible wild fruits in Benguet, Cordillera Administrative Region, the Philippines. Asian Pacific Journal of Tropical Biomedicine 4(Suppl. 1): S525–S538.

FAO, IFAD, UNICEF, WFP & WHO (2020) The State of Food Security and Nutrition in the World 2020: Transforming food systems for affordable healthy diets. https://www.fao.org/publications/sofi/2020. (Accessed 9 September 2024).

Friedman J, Yaniv Z, Dafni A, Palewitch D (1986) A preliminary classification of the healing potential of medicinal plants based on a rational analysis of an ethnopharmacological field survey among Bedouins in the Negev Desert, Israel. Journal of Ethnopharmacology 16(2–3): 275–287.

Heywood VH (1999) Use and Potential of Wild Plants in Farm Households. FAO Farm Systems Management Series 15. Food and Agriculture Organization of the United Nations, Rome. 209 pp. http://www.fao.org/3/W8801E/W8801E00.htm.

Hipolito MFG (2024) A systematic literature review of the significance of the School of Living Tradition in the preservation of cultural heritage of Indigenous Peoples. International Journal of Multidisciplinary: Applied Business and Education Research 5(2): 605–614. http://dx.doi.org/10.11594/ijmaber.05.02.21.

Hirai H (2015) Indigenous communities in the Philippines: A situation analysis. Yuchengco Center, De La Salle University, Manila, Philippines. 93pp.

Kennedy G, Ballard T, Dop M (2010) Guidelines for Measuring Household and Individual Dietary Diversity. Food and Agriculture Organization of the United Nations. 53pp. https://www.fao.org/3/i1983e/i1983e.pdf.

Lynch F, Clotet JM (1967) The Bukidnon of North-Central Mindanao in 1889. Philippine Studies 15(3): 464–482.

Moore M, Alpaugh M, Razafindrina K, Trubek AB, Niles MT (2022) Finding food in the hunger season: A mixed methods approach to understanding wild plant foods in relation to food security and dietary diversity in southeastern Madagascar. Frontiers in Sustainable Food Systems 6: 929308. https://doi.org/10.3389/fsufs.2022.929308.

Ollitrault P, Navarro L (2012) Fruit Breeding. Handbook of Plant Breeding 8. Springer, pp. 623–662. https://doi.org/10.1007/978-1-4419-0763-9.

Oluoch WA, Whitney C, Termote C, Moraa MA, Mbau JS, Kipkore W, Dawson IK (2023) Indigenous communities' perceptions reveal threats and management options of wild edible plants in semiarid lands of northwestern Kenya. Journal of Ethnobiology and Ethnomedicine 19: 13. https://doi.org/10.1186/s13002-023-00584-6.

Pardales JR Jr (1997) Ethnobotanical survey of edible aroids in the Philippines I: Farmers' beliefs, experiences and uses. Philippine Journal of Crop Science, 22(1): 1–7. https://doi.org/10.5555/20093019374.

Pelser PB, Barcelona JF, Nickrent DL (2011-present) Co's Digital Flora of the Philippines. https://www.philippineplants.org/ . (Accessed 14 October 2024).

PhilAtlas (2020) Lilingayon, Valencia, Bukidnon profile. PhilAtlas. Retrieved June 15, 2026, from https://www.philatlas.com/mindanao/r10/bukidnon/valencia/lilingayon.html

Phillips O, & Gentry AH (1993) The useful plants of Tambopata, Peru: I. Statistical hypotheses tests with a new quantitative technique. Economic Botany, 47(1), 15–32. https://doi.org/10.1007/BF02862203

Prance GT, Balee W, Boom BM, & Carneiro RL (1987) Quantitative ethnobotany and the case for conservation in Amazonia. Conservation Biology, 1(4), 296–310. https://doi.org/10.1111/j.1523-1739.1987.tb00050.x

Quave CL, Pieroni A (2015) A reservoir of ethnobotanical knowledge informs resilient food security and health strategies in the Balkans. Nature Plants 1: 14021. https://doi.org/10.1038/nplants.2014.21.

Sarkar D, Walker-Swaney J, Shetty K (2020) Food diversity and indigenous food systems to combat diet-linked chronic diseases. Current Developments in Nutrition 4: 3–11 https://doi.org/10.1093/cdn/nzz099.

Sujarwo W, Arinasa IBK, Salomone F, Caneva G, Fattorini S (2014) Cultural erosion of Balinese indigenous knowledge of food and nutraceutical plants. Economic Botany 68(4): 426–437. https://doi.org/10.1007/s12231-014-9288-1.

Tahir M, Abrahim A, Beyene T, Tesso H, Eshetu A, Yadeta G, Sima G (2023) The traditional use of wild edible plants in pastoral and agro-pastoral communities of Mieso District, eastern Ethiopia. Tropical Medicine and Health 51: 10. https://doi.org/10.1186/s41182-023-00505-z.

Turner NJ, Łuczaj ŁJ, Migliorini P, Pieroni A, Dreon AL, Sacchetti LE (2011) Edible and tended wild plants, traditional ecological knowledge and agroecology. Critical Reviews in Plant Sciences 30(1–2): 198–225.

United Nations (2015) Transforming our world: The 2030 Agenda for Sustainable Development. https://sdgs.un.org/2030agenda. (Accessed 16 November 2024).

Valera HG, Mayorga J, Pede VO, Mishra AK (2022) Estimating food demand and the impact of market shocks on food expenditures: The case for the Philippines and missing price data. Q Open, 2(2), Article qoac030. https://doi.org/10.1093/qopen/qoac030.

Whitney CW (2020) EthnobotanyR (version 3.6.3). https://github.com/CWWhitney/ethnobotanyR. (Accessed 9 September 2024).