

Potential Famine Food Resources: A Systematic Review of Wild and Cultivated Edible Plants in the Philippines

Elgie A. Jimenez^{1,*}, Mark Anthony J. Torres^{1,2}, Cesar G. Demayo^{1,3}, Orven E. Llantos⁴

¹Department of Biological Sciences, College of Science and Mathematics,
Mindanao State University-Iligan Institute of Technology, Philippines

²School of Interdisciplinary Studies/Institute of Peace and Development in Mindanao,
Mindanao State University-Iligan Institute of Technology, Philippines

³Center of Integrative Health, Premier Research Institute of Science and Mathematics,
Mindanao State University-Iligan Institute of Technology, Philippines

⁴Department of Computer Science, College of Computer Studies,
Mindanao State University-Iligan Institute of Technology, Philippines

Received May 2, 2024; Revised June 27, 2024; Accepted July 21, 2024

Cite This Paper in the Following Citation Styles

(a): [1] Elgie A. Jimenez, Mark Anthony J. Torres, Cesar G. Demayo, Orven E. Llantos, "Potential Famine Food Resources: A Systematic Review of Wild and Cultivated Edible Plants in the Philippines," *Universal Journal of Agricultural Research*, Vol. 12, No. 4, pp. 583 - 605, 2024. DOI: 10.13189/ujar.2024.120404.

(b): Elgie A. Jimenez, Mark Anthony J. Torres, Cesar G. Demayo, Orven E. Llantos (2024). *Potential Famine Food Resources: A Systematic Review of Wild and Cultivated Edible Plants in the Philippines*. *Universal Journal of Agricultural Research*, 12(4), 583 - 605. DOI: 10.13189/ujar.2024.120404.

Copyright©2024 by authors, all rights reserved. Authors agree that this article remains permanently open access under the terms of the Creative Commons Attribution License 4.0 International License

Abstract The study investigates the use of wild and cultivated edible food plants in the Philippines as potential sources of food during times of famine. Given the challenges faced by the Philippines, such as malnutrition, poverty, and food insecurity worsened by climate change and natural disasters, it is crucial to explore the potential of alternative local food plant materials as a way of dealing with malnutrition and supporting emergency aid. The study employed a systematic review approach following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. We implemented a search strategy in the Google Scholar database using specific search terms to identify literature that is highly relevant to potential famine food plants in the Philippines. Data selection, extraction, and mapping processes were rigorously conducted to ensure transparency and thoroughness when reporting the findings. The study identified a total of four thousand six hundred seventy-seven (n=4,677) search results. However, by following the eligibility criteria, all irrelevant articles and duplicated studies were excluded, and the remaining thirteen (n=13) articles discussing wild and cultivated edible plants were reviewed. There are two hundred fifty (n=250) species of these edible plants being recorded of which belong to seventy-nine (n=79) families. It has been revealed that the

fruits and leaves are the most consumed plant parts implying their culinary use. These potential famine food plants transcend geographical boundaries as they are widely distributed to 11 provinces in the Philippines. These local edible plants prove essential in mitigating the impact of food scarcity and enhancing food security in the Philippines, emphasizing the need for further research and utilization of these resources.

Keywords Indigenous, Wild Edible Plants, Food Security, Malnutrition, Climate Change, Famine

1. Introduction

Climate change is the primary environmental threat of this century. Climate change has the potential to cause catastrophic effects on the environment, economy, and infrastructure. A grave shift in the worldwide climate will have repercussions on agriculture, thereby affecting the world's food supply [1]. Unpredictably high and low rainfall patterns and more fluctuations in temperature spikes will, in turn, lower agricultural yields, with implications at both global and local scales. There are

theories regarding reduced water availability, extreme geophysical occurrences, land degradation, rising sea levels, salinization, and latitudinal and altitudinal alterations in ecological and agro-economic zones. Tropical developing countries will be especially susceptible [2,3]. Hence, food security in developing tropical countries will be vulnerable unless steps are taken to reduce the consequences of climate change and/or locate other alternative sources of food.

Plants have consistently provided humanity with a wide range of nourishing foods throughout history and play a crucial role in alleviating hunger and starvation. In times of famine, whether caused by natural or human-induced circumstances, particularly such as harsh weather conditions, environmental catastrophes, war, corrupt governments, annual hunger seasons, and radical agricultural policies, communities facing extreme food scarcity often depend significantly on wild food plants as emergency food sources for survival. This situation has led to the emergence of the notion of famine plants [4,5].

Indigenous wild food plants can play an essential role in reducing poverty, ensuring food security, increasing agricultural diversification, generating income, and alleviating malnutrition [6]. In numerous global regions, certain wild-food plants are considered crucial famine foods, and some are intentionally cultivated in agricultural fields so that they can be utilized when food is scarce [5,7]. Individuals rely on these wild plants to acquire micronutrients, enhance dietary diversity, supplement income, and mitigate the repercussions of crop failures. During times of famine, several wild plant species have demonstrated the ability to serve as rescue crops in harsh environmental conditions. These times also frequently reveal new, edible plant species [8].

In the Philippines, malnutrition, poverty, and food insecurity persist as pressing concerns [9]. A report by the Philippine Statistics Authority (PSA) revealed that the proportion of poor Filipino families whose per capita is insufficient to cover their basic needs for food and non-food items was estimated to be 22.4 percent or 25.24 million Filipinos in the first semester of 2023 [10]. This is induced by the fact that the Philippines is highly vulnerable to climate change impacts due to its geographical location. It is a country frequently struck by natural calamities, such as extreme typhoons and drought, and long wet and dry seasons, which result in ruined crops and seasonal and sometimes severe food shortages [11]. With this regard, during food security crises caused by natural or social calamities, these underutilized indigenous food plants could play a crucial role in mitigating the effects of food scarcity and starvation. They could help to supplement emergency relief, which often takes in the form of carbohydrates, with protein and micronutrients for added benefit [8].

A crucial component of each group's cultural legacy is knowing which famine food plants are available, where they are and when, and how to use and prepare them.

However, the significance of this knowledge and its documentation have not received much attention up to this point. It is crucial to record this before it is irretrievably lost since traditional knowledge has been observed to be rapidly diminishing as a result of various reasons, including the migration of indigenous people from rural to urban regions, industrialization, rapid destruction of natural ecosystems, and changes in lifestyle [12].

As a means to address challenges such as malnutrition, poverty, and food insecurity exacerbated by climate change and natural disasters, and given the importance of food security and the impact of climate change on agricultural production as well as the decline in traditional knowledge, there is a need to identify alternative sources of food, particularly during times of famine. To fill this gap, the study aims to use the PRISMA method to systematically review, identify, and document the potential famine food plants that are reportedly available in different regions in the Philippines. The PRISMA method stands for Preferred Reporting Items for Systematic Reviews and Meta-Analyses. PRISMA is widely used in healthcare, social sciences, and other fields where systematic reviews and meta-analyses are conducted to summarize and analyze existing research findings [13]. This study will adapt PRISMA principles to ensure the systematic review process and reporting of findings related to famine foods occurrences follow rigorous and transparent methods to avoid bias. Additionally, the study endeavors to generate a geospatial distribution map of the reported famine food plants in the Philippines. Through these objectives, the study aims to contribute valuable insights into the role of famine food plants in addressing food security challenges in the Philippines.

2. Materials and Methods

2.1. Data Selection

As per the guidelines set forth by Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), this systematic review was carried out (fig 1.). PRISMA is a widely used framework designed to guide and improve the reporting of systematic reviews and meta-analyses in healthcare and other fields. It provides a structured checklist and flow diagram to ensure transparency and thoroughness in reporting these types of research studies [14]. The geographical occurrences of possible famine food plants in the Philippine islands were obtained from published articles in an appropriate online database. It was explored using search terms in the Google Scholar database. The terms that were used in the search engine mentioned above were: ("famine food plants" OR "wild edible plants," OR "indigenous plants" OR "emergency food plants") AND (Philippines). This search term strategy was adapted from Alamgir et al. [15]. The author's last search was done on January 05, 2024.

The study utilized Zotero Software, an automated tool to collect, compile, and organize all search results year by year. Zotero is a free, open-source research tool that facilitates the collection, arrangement, and analysis of research as well as its dissemination via a number of

channels [16]. The researchers independently reviewed titles and abstracts. All irrelevant articles and duplicated studies were excluded, with recordkeeping of the reasons for exclusion. Full-text articles were assessed for eligibility (Table 1).

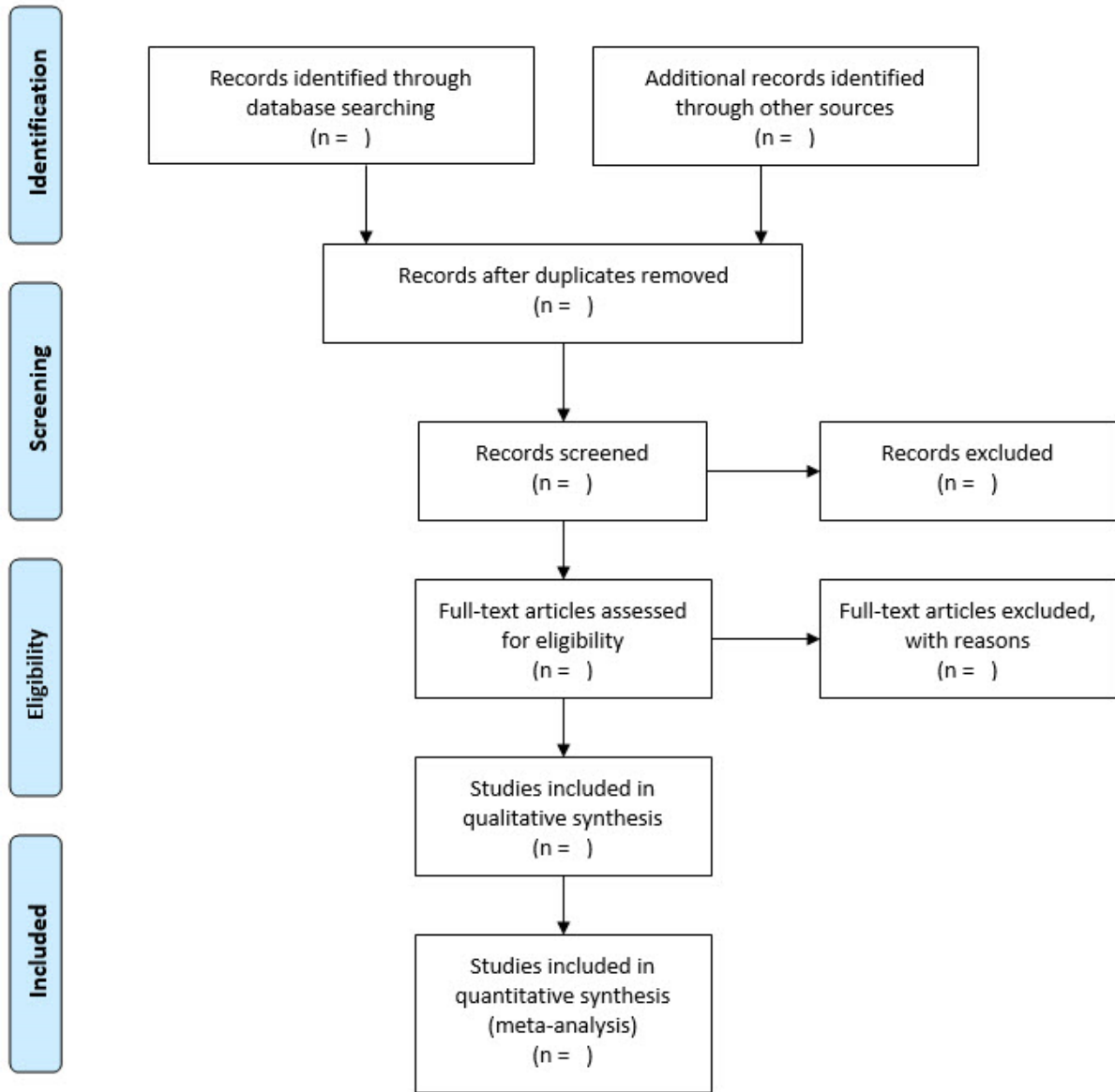


Figure 1. PRISMA flow diagram [14]

Table 1. Eligibility Criteria

Criterion	Inclusion	Exclusion	Justification
Publication Type	Peer-Reviewed Articles, Research Articles	Systematic Reviews, Literature reviews, Magazines, Research Notes, Comments, Book Chapters, Discussion Papers, Reports, Conference Abstract or proposals, posters, pre-prints, letters to the editors	Maintains high-quality research data
Language	English	Other than English	More accessible to gather information and communicate results
Time Frame	Up-to 2023	None	Allows comprehensive and broader coverage
Publication Status	Published in an academic journal or scholarly publication.	Unpublished	Ensures rigor and credibility in the findings presented
Access Type	Open Access and Open Archive	Inaccessible Online or Purchase Access	Free access to up-to-date information
Geographic Focus	Philippines	Other than Philippines	Limiting the study to a specific geographical area allows for more manageable data collection, analysis, and in-depth exploration
Relevant Content	The primary study subject is famine food plants, indigenous wild edible plants, alternative food plants, medicinal food plants, and indigenous vegetables; species name should be stated, location included, family name, local names or common names	Other than famine food plants, plants with medicinal purposes only	Aids in the documentation of the potential famine food plants as an alternative source of food during times of food shortages

2.2. Data Extraction

Available data associated with the occurrence of potential famine food plants that meet the eligibility criteria were downloaded and recorded, including the authors' names, year of publication, title, date accessed, journal type, plant species, common name, local name, edible plant part, and location.

Scientific names with unknown specific epithet were also incorporated but not counted as a unique species to avoid bias. Overall datasets were extracted in Google Sheets and utilized for analysis. The total number of families, genera, and species were also recorded.

2.3. Data Mapping

The study utilized Quantum GIS (QGIS) version 3.34, an open-source Geographic Information System (GIS) software used for viewing, editing, and analyzing geospatial data. It allows users to create maps, perform spatial analysis, and visualize geographical information [17]. The administrative boundary shapefile of the Philippines was obtained from National Mapping and Resource Information Authority abbreviated as NAMRIA, an agency for mapping and geographical data analysis that is a part of the Philippine government and falls under the

Department of Environment and Natural Resources [18]. The distribution map was structured to the provincial level since most of the available data specify the location at the provincial level. This process aimed to generate geospatial map displaying the distribution of the reported famine food plants per province as the study's outcome.

3. Results and Discussions

The current study reviewed 13 papers in total. The study's selection outcome has been summarized in Figure 2. Using the specific search terms, the literature search engine particularly the Google Scholar database resulted in four thousand six hundred seventy-seven ($n=4677$), but only four thousand two hundred twenty-seven ($n=4227$) were collected by the automated tool Zotero. This is most likely due to the fact that the database counts and contains citations to publications that are unavailable online but which have been referenced in other academic works. About one hundred three ($n=103$) were found to be duplicated which brought the number of screened records to four thousand one hundred twenty-four ($n=4124$). By analyzing the title and abstract of each retrieved manuscript, the researchers found out that many of them did not satisfy the adopted inclusion criteria. As a result of careful

screening analysis, about four thousand thirty-one (n=4,031) papers were excluded and the remaining number (n=93) were subject for retrieval but seventeen (n=17) papers were not retrieved due to inaccessibility and purchasing access of the documents. The remaining seventy-six (n=76) full-text articles were assessed for eligibility. Forty (n=40) articles have no information about indigenous food plants, one study (n=1) was not able to provide the scientific names of the edible plants reported, and twenty (n=21) articles about medicinal plants with

medicinal purposes only were excluded. It is essential to understand the potential risks of medicinal plants before incorporating them as an alternative source of food. They can be a double-edged sword that might be used as a treatment-specific dosage and as lethal poisonous substances that can cause death when administered in high amounts [19]. This thorough screening process led to the final selection of 13 articles that discussed edible local plants in the Philippines and their relevance to food security and famine mitigation which meets the inclusion criteria.

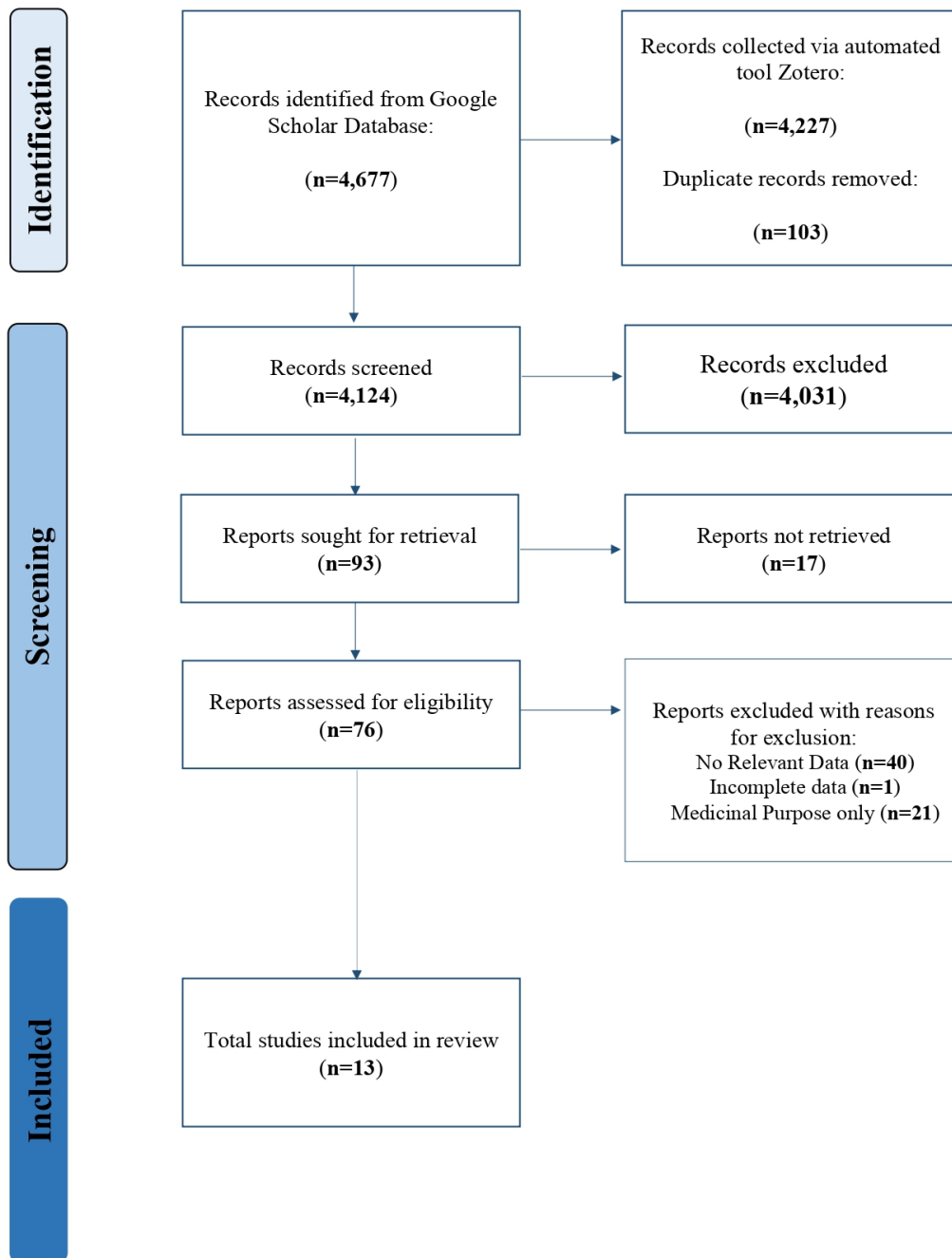


Figure 2. Flow chart of the study's selection outcome

Table 2. List of families of the documented wild and cultivated edible plants with a corresponding number of species and genera

Family Name	No. of Species	No. of Genera	Family Name	No. of Species	No. of Genera
Actinidiaceae	2	1	Lamiaceae	3	2
Aizoaceae	2	2	Lauraceae	1	1
Amaranthaceae	4	2	Lecythidaceae	1	1
Amaryllidaceae	2	2	Leguminosae	6	5
Anacardiaceae	3	2	Lythraceae	1	1
Annonaceae	2	2	Malvaceae	6	5
Apocynaceae	2	3	Marantaceae	2	2
Araceae	7	7	Melastomataceae	1	2
Araliaceae	1	1	Meliaceae	2	2
Arecaceae	17	12	Menispermaceae	1	1
Aspidiaceae	1	1	Molluginaceae	1	1
Asteraceae	5	5	Moraceae	15	5
Athyriaceae	2	2	Moringaceae	1	1
Bambusaceae	0	1	Muntingiaceae	1	1
Basellaceae	1	1	Musaceae	5	1
Begoniaceae	1	1	Myrsinaceae	1	1
Bixaceae	1	1	Myrtaceae	7	3
Blechnaceae	1	1	Nyctaginaceae	1	1
Boraginaceae	2	2	Ophioglossaceae	1	1
Brassicaceae	3	3	Oxalidaceae	1	1
Bromeliaceae	1	1	Pandanaceae	2	1
Cannabaceae	2	2	Passifloraceae	3	1
Caricaceae	1	1	Phyllanthaceae	6	4
Clusiaceae	5	1	Poaceae	10	11
Combretaceae	1	1	Polyporaceae	1	1
Convolvulaceae	2	1	Portulacae	2	2
Cucurbitaceae	10	9	Rhamnaceae	1	1
Cyperaceae	1	1	Rosaceae	3	2
Dilleniaceae	2	1	Rubiaceae	2	1
Dioscoreaceae	6	1	Rutaceae	4	1
Ebenaceae	3	1	Salicaceae	1	1
Elaeagnaceae	2	1	Sapindaceae	4	4
Ericaceae	2	1	Sapotaceae	2	2
Euphorbiaceae	5	5	Saururaceae	1	1
Fabaceae	9	9	Solanaceae	15	5
Flacourtiaceae	3	3	Talinaceae	1	1
Gnetaceae	1	1	Urticaceae	3	3
Hydrocharitaceae	1	1	Verbenaceae	1	1
Ipomoea	1	1	Vitaceae	2	2
			Zingerberaceae	11	10
Total			79	250	187

The researchers meticulously extracted, compiled, and presented the data including the family name, plant species, common name, local name, edible plant parts used, and location from the selected thirteen articles included in the study. The information gathered serves to provide a detailed overview of the edible plants identified in the study and their characteristics. The summarized data are shown in Table 3. To provide insights into the diversity of plant families and genera associated with edible plants in the Philippines, researchers counted the documented plant families, the number of species within each family, and also determined the number of genera represented. These data were compiled and organized in Table 2. The result shows that there are seventy-nine families (79) included, ranging from those with a single species to others with several more.

Families with a high degree of diversity, such as the Arecaceae, Solanaceae, and Moraceae stand out with their respective 17 and 15 species. The table also highlights average diversity within some families, such as Zingerberaceae (with 11 species), Cucurbitaceae (with 10 species), Poaceae (with 10 species), and Fabaceae (with 9 species) while the rest shows rarity. The table indicates two hundred fifty (250) plant species from different families in total. The data show the diversity and richness of wild and cultivated edible food plant species across different groups. On the other hand, there are one hundred eighty-seven (187) distinct plant genera. These genera span various botanical families and represent a wide range of plant species, indicating the richness of botanical diversity within the dataset.

Table 3. Wild and Cultivated Edible Plants in the Philippines

FAMILY	SPECIES NAME	LOCAL/COMMON NAME	EDIBLE PART	LOCATION
Actinidiaceae	<i>Saurauia sp.</i>	Soybo (Igt)	Fruit	Benguet Province, Philippines
	<i>Saurauia elegans</i>	Uyok (Igt, Knk)	Fruit	Benguet Province, Philippines
	<i>Saurauia sparsifolia</i>	Sapuwan (Igt)/Degway (Knk)	Fruit	Benguet Province, Philippines
Aizoaceae	<i>Sesuvium portulacastrum</i>	Dampali/Taraumpalit	Leaves	Bataan Province, Philippines
	<i>Glinus spergula</i> (L.) Steud.	Slender carpetweed	Leaves, Stem	Northwestern Cagayan, Philippines
Amaranthaceae	<i>Amaranthus spinosus</i>	Kalunay		Abra Province, Philippines
	<i>Alternanthera sessilis</i> (L.)	Lupo-lupo	Young Leaves	Aklan, Philippines
	<i>Amaranthus spinosus</i>	Kulitis	Young Leaves	Aklan, Philippines
	<i>Amaranthus cruentus</i>	Kadyapa	Young Leaves, kadyapa	Aklan, Philippines
	<i>Amaranthus viridis</i> L.		Leaf and Shoot	Bukidnon Province, Philippines
	<i>Amaranthus viridis</i> Linn.	Kalunai (Ilk), Kolutis (Tag)	Young shoots	Isabela Province, Philippines
	<i>Amaranthus viridis</i> L.	Green amarath	Leaves, Stem	Northwestern Cagayan, Philippines
	<i>Amaranthus spinosus</i> L.	Spiny amaranth	Leaves, Stem	Northwestern Cagayan, Philippines
Amaryllidaceae	<i>Allium cepa</i> L.		Leaf	Bukidnon Province, Philippines
	<i>Allium tuberosum</i> Rottler ex Spreng.		Leaf	Bukidnon Province, the Philippines
Anacardiaceae	<i>Spondias pinnata</i>	Libas	leaves and stem	Agusan del Sur, Southern Philippines
	<i>Mangifera altissima</i> Blanco	Pahunan	Fruits	Bataan Province, Philippines
	<i>Mangifera indica</i> L.		Fruit	Bukidnon Province, the Philippines
	<i>Mangifera indica</i>	Mangga/Mango		Cebu Province, Philippines
	<i>Spondias pinnata</i> L.	Heavy Fruit		Northern Isabela, Cagayan Valley, Philippines

Table 3 continued

Annonaceae	<i>Uvaria rufa</i> Blume	Allagat		Abra Province, Philippines
	<i>Annona muricata</i> L.		Fruit	Bukidnon Province, Philippines
	<i>Uvaria</i> sp.		Fruit	Camiguin Island, Philippines
	<i>Annona muricata</i> L.	Hilbas/Mugwort		Cebu Province, Philippines
	<i>Uvaria rufa</i> (Blume)	Dupo na Ayong, Susong Kalabaw		Northern Isabela, Cagayan Valley, Philippines
	<i>Uvaria rufa</i> (Dunal) Blume	Carabao's teats	Fruit	Northwestern Cagayan, Philippines
Apocynaceae	<i>Alstonia scholaris</i> (L.) R.Br.	Dalipawan (Ilk.)	Fruit	Camiguin Island, Philippines
	<i>Telosma odoratissima</i> Cav	Ampupuyang		Northern Isabela, Cagayan Valley, Philippines
	<i>Willughbeia</i> sp.	Tabo	Fruit	Southern Palawan, Philippines
Araceae	<i>Cyrtosperma chamissonis</i>	Giant corms		Abra Province, Philippines
	<i>Calla maxima</i> Blanco	Biga		Abra Province, Philippines
	<i>Colocasia esculenta</i> (L.) Schott	Abaeong	Young Leaves, young petioles and runners	Aklan, Philippines
	<i>Colocasia esculenta</i> (L.) Schott	Gabi	Leaves, root	Benguet Province, Philippines
	<i>Alocasia macrorrhizos</i> (L.) G.Don.	Galyang	Corm, leaves	Benguet Province, Philippines
	<i>Colocasia esculenta</i> (L.) Schott	Pising	Corm, leaves	Benguet Province, Philippines
	<i>Xanthosoma sagittifolium</i> (L.) Schott		Corm	Bukidnon Province, Philippines
	<i>Colocasia esculenta</i> (L.) Schott		Corm and young leaf	Bukidnon Province, Philippines
	<i>Schismatoglottis calyptrata</i> (Roxb.) Zoll. & Moritzi		Young leaf	Bukidnon Province, Philippines
	<i>Amorphophallus campanulatus</i> Blume	Tiggi a magmanto (Ilk) Apong-pong (Tag)	Stalk	Isabela Province, Philippines
	<i>Colocasia esculenta</i> Linn	Daludal (Ilk)	Young roots	Isabela Province, Philippines
	<i>Amorphophallus campanulatus</i> (Roxb) Bl. Ex. Decne	Bagang, dalahira		Northern Isabela, Cagayan Valley, Philippines
	<i>Colocasia esculenta</i> L.	Taro	Leaves, Stem, Corm	Northwestern Cagayan, Philippines
Araliaceae	<i>Schefflera odorata</i> Blanco	Lima-lima	Roots	Bataan Province, Philippines
Areaceae	<i>Areca catechu</i> Linn	Boa		Abra Province, Philippines
	<i>Corypha rumpii</i> Perr	Buri		Abra Province, Philippines
	<i>Caryota mitis</i> Lour.	Pugahan		Agusan del Sur, Southern Philippines
	<i>Nypa fruticans</i>	Nipa	Nipa core	Aklan, Philippines
	<i>Callamus manillensis</i>	Litoko (Ilk)	Fruit	Benguet Province, Philippines
	<i>Cocos nucifera</i> L.		Fruit	Bukidnon Province, Philippines
	<i>Calamus</i> sp.		fruit and pith	Bukidnon Province, Philippines
	<i>Calamus</i> sp.	Alanyog (Ilk.)	Fruit	Camiguin Island, Philippines

Table 3 continued

	<i>Pinanga insignis</i> Becc.	Rasidan (Ilk.)	Fruit	Camiguin Island, Philippines
	<i>Heterospathe sibuyanensis</i>	Bil-is/Sagisi palm		Cebu Province, Philippines
	<i>Cocos nucifera</i>	Lubi/Coconut		Cebu Province, Philippines
	<i>Saribus merrillii</i> (Becc.)	Anahaw	Fruit, Ubod	Northwestern Cagayan, Philippines
	<i>Areca catechu</i> L.	Betelnut	Fruit	Northwestern Cagayan, Philippines
	<i>Nypa fruticans</i> var. <i>neameana</i> F.M.Bailey	Nipa palm	Flower stalk, fruit (meat)	Northwestern Cagayan, Philippines
	<i>Adonidia merilli</i> (Becc.) Becc.	Bunga	Fruit	Bataan Province, Philippines
	<i>Daemonorps mollis</i>	Ditaan	Shoots and fruits	Bataan Province, Philippines
	<i>Calamus ornatus</i>	Limuran	Shoots	Bataan Province, Philippines
	<i>Calamus microcarpa</i> Becc.	Mala-uban	Shoots	Bataan Province, Philippines
	<i>Calamus maximus</i>	Palasan	Shoots	Bataan Province, Philippines
	<i>Caryota rumphiana</i> Ledd. Ex Martius	Takipan	Shoots	Bataan Province, Philippines
	<i>Adonidia merrillii</i> B. B.	Bunga/Manila palm		Cebu Province, Philippines
	<i>Calamus ornatus</i> Blume	Snake fruit	Fruit, Ubod	Northwestern Cagayan, Philippines
Aspidiaceae	<i>Athyrium esculentum</i>	Pakong ula	Young shoots	Bataan Province, Philippines
Asteraceae	<i>Ageratum conyzoides</i> Linn	Bulak Manok	Leaves	Bataan Province, Philippines
	<i>Taraxacum officinale</i> F.H.Wigg.	Gagatang (Weeds)	Leaves	Benguet Province, Philippines
	<i>Bidens pilosa</i> L.		Young leaf and shoot	Bukidnon Province, Philippines
	<i>Blumea balsamifera</i> L.	Gabon/Blumea camphor		Cebu Province, Philippines
	<i>Gynuria aelliptica</i> Yae & Hayata			Northern Isabela, Cagayan Valley, Philippines
Athyriaceae	<i>Diplazium esculentum</i> Retz.	Pako		Abra Province, Philippines
	<i>Athyrium esculentum</i>	Fern	Leaves	Agusan del Sur, Southern Philippines
	<i>Diplazium esculentum</i>	Pako-Pako	Young Leaves, Rhizomes	Aklan, Philippines
	<i>Diplazium esculentum</i> (Retz.) Sw.		Leaf and Shoot	Bukidnon Province, Philippines
	<i>Diplazium esculentum</i>	Pako (Tag, Ilk.)	Young shoots	Isabela Province, Philippines
	<i>Diplazium esculentum</i> (Retz.) Sw.	Fiddlehead fern	Fiddle heads	Northwestern Cagayan, Philippines
	<i>Diplazium esculentum</i> (Retz.) Sw.	Pako	Leaves, Stem	Benguet Province, Philippines
Bambusaceae	<i>Bambusa</i> sp.		Shoot	Bukidnon Province, Philippines
Basellaceae	<i>Basella alba</i> Linn	Alugbati		Abra Province, Philippines
	<i>Basella alba</i> L.		Leaf and Shoot	Bukidnon Province, Philippines
Begoniaceae	<i>Begonia nigritarum</i> Steud.	Pingol-bato	Leaves	Bataan Province, Philippines
Bixaceae	<i>Bixa orellana</i> L.	Shuetes/Lipstick Tree		Cebu Province, Philippines
Blechnaceae	<i>Stenochlaena palustris</i> (Burm.f.) Bedd.	Climbing fern	Leaves	Northwestern Cagayan, Philippines

Table 3 continued

Boraginaceae	<i>Cordia dichotoma</i> Forst. f.	Anonang	Fruit	Bataan Province, Philippines	
	<i>Ehretia microphylla</i> Lam.	Phillippine wild tea	Fruit, Leaves	Northwestern Cagayan, Philippines	
Brassicaceae	<i>Rorippa indica</i> (L.) Hiern.	Kendoy/Kendey	Leaves	Benguet Province, Philippines	
	<i>Nasturtium officinale</i> R. Br.		Leaf	Bukidnon Province, Philippines	
	<i>Brassica rapa</i> L.		Leaf and Shoot	Bukidnon Province, Philippines	
Bromeliaceae	<i>Ananas comosus</i> (L.) Merr.		Leaf	Bukidnon Province, Philippines	
Cannabaceae	<i>Trema Orientalis</i> (Linn) Blume	Anabiong		Abra Province, Philippines	
	<i>Celtis philippensis</i> Blanco	Uratan (Ilk.)	Fruit	Camiguin Island, Philippines	
Caricaceae	<i>Carica papaya</i> L.		Fruit	Bukidnon Province, Philippines	
	<i>Carica papaya</i> L.	Papaya	Fruit	Benguet Province, Philippines	
Clusiaceae	<i>Garcinia binucao</i> (Blanco) Choisy	Binucao	Leaves	Bataan Province, Philippines	
	<i>Garcinia binucao</i>	Balokok (Igt)	Fruit	Benguet Province, Philippines	
	<i>Rheedea edulis</i> or <i>Garcinia intermedia</i>	Chinese Santol (Tag)/Lemon drop mangosteen (Eng)	Fruit	Benguet Province, Philippines	
	<i>Garcinia vidalii</i>	Bilis/Belis (Igt)	Fruit	Benguet Province, Philippines	
	<i>Garcinia vidalii</i> Merr.	Bilis		Benguet Province, Philippines	
	<i>Garcinia mangostana</i> L.		Fruit	Bukidnon Province, Philippines	
	<i>Garcinia morella</i> G. D.	Batwan/Batuan		Cebu Province, Philippines	
Combretaceae	<i>Terminalia catappa</i> L.	Talisay (ManyLgs.)	Fruit	Camiguin Island, Philippines	
	<i>Terminalia catappa</i> L.	Indian almond	Seed	Northwestern Cagayan, Philippines	
Convolvulaceae	<i>Ipomoea batatas</i> (L.) Lam.	Camote	Root	Benguet Province, Philippines	
	<i>Ipomoea batatas</i> (L.) Lam.		Leaf, shoot, and tuber	Bukidnon Province, Philippines	
	<i>Ipomea aquatica</i> Forssk.	Chinese water spinach	Leaves, Stem	Northwestern Cagayan, Philippines	
Cucurbitaceae	<i>Benincasa hispida</i>	Hagukhok		Aklan, Philippines	
	<i>Momordica charantia</i> L.	Palya	Young Leaves, Fruits	Aklan, Philippines	
	<i>Sechium edule</i> Sw.	Sayote	Fruit	Benguet Province, Philippines	
	<i>Cucurbita pepo</i> L.	Zucchini	Flower	Benguet Province, Philippines	
	<i>Sicyos edulis</i> Jacq.		Leaf, shoot, and fruit	Bukidnon Province, Philippines	
	<i>Cucurbita maxima</i> Duchesne		Shoot and Fruit	Bukidnon Province, Philippines	
	<i>Momordica charantia</i> L.		Shoot and Fruit	Bukidnon Province, Philippines	
	<i>Lagenaria siceraria</i> (Molina) Standl.		Fruit	Bukidnon Province, Philippines	
	<i>Cucumis melo</i> L.		Fruit	Bukidnon Province, Philippines	
	<i>Momordica charantia</i> L.	Bitter gourd	Leaves, Fruits	Northwestern Cagayan, Philippines	
	<i>Benincasa hispida</i> (Thunb.) Cogn.	White gourd melon	Fruit	Northwestern Cagayan, Philippines	
	<i>Momordica chinensis</i> Spreng.	Ampalayang ligaw (Tag)	Whole Fruit	Isabela Province, Philippines	
	<i>Melothria pendula</i> L.	Creeping cucumber	Fruit	Northwestern Cagayan, Philippines	
	Cyperaceae	<i>Eleocharis dulcis</i> L.	Water chestnut	Corm	Northwestern Cagayan, Philippines

Table 3 continued

Dilleniaceae	<i>Dillenia indica</i> Blanco	Katmon		Agusan del Sur, Southern Philippines
	<i>Dillenia philippinensis</i>	Palali (Igt)	Fruit	Benguet Province, Philippines
	<i>Dillenia philippinensis</i> Rolfe var. <i>philippinensis</i>	Palale (Ilk.)	Fruit	Camiguin Island, Philippines
	<i>Dillenia philippinensis</i> Rolfe	Katmon	Fruit, Flower	Northwestern Cagayan, Philippines
Dioscoreaceae	<i>Dioscorea alata</i>	Kamangeg		Abra Province, Philippines
	<i>Dioscorea esculenta</i> Burkill	Tugi		Abra Province, Philippines
	<i>Dioscorea hispida</i> Dennst	Wild yam		Abra Province, Philippines
	<i>Dioscorea divaricata</i> Blco.	Buloy	Matured roots	Bataan Province, Philippines
	<i>Dioscorea hispida</i>	Kalot	Matured roots	Bataan Province, Philippines
	<i>Dioscorea esculenta</i> (Lour) Burkill	Tugi	Roots	Bataan Province, Philippines
	<i>Dioscorea alata</i>	Ube	Matured roots	Bataan Province, Philippines
	<i>Dioscorea hispida</i> Dennst.		Tuber	Bukidnon Province, Philippines
	<i>Dioscorea alata</i> L.		Tuber	Bukidnon Province, Philippines
	<i>Dioscorea pentaphylla</i> L.		Tuber	Bukidnon Province, Philippines
	<i>Dioscorea divaricata</i>	Balyakag/ "wild yam/Chinese yam"		Cebu Province, Philippines
	<i>Dioscorea</i> spp.	Kubong/Wild edible yam		Cebu Province, Philippines
	<i>Dioscorea pentaphylla</i>			Southern Palawan, Philippines
	<i>Dioscorea</i> sp.			Southern Palawan, Philippines
	<i>Dioscorea hispida</i>			Southern Palawan, Philippines
Ebenaceae	<i>Diospyros philippensis</i>	Kamagong	Fruit	Bataan Province, Philippines
	<i>Diospyros lanceifolia</i> Roxb.	Balinagta (Ilk.)	Fruit	Camiguin Island, Philippines
	<i>Diospyros discolor</i> Willd.	Velvet apple	Fruit	Northwestern Cagayan, Philippines
Elaeagnaceae	<i>Elaeagnus triflora</i>	Bennaken/Banaken (Bon); Kopapey (Igt)	Fruit	Benguet Province, Philippines
	<i>Elaeagnus commutate</i> L.	Silverberry	Fruit	Northwestern Cagayan, Philippines
Ericaceae	<i>Vaccinium barandanum</i>	Lusong (Igt)	Fruit	Benguet Province, Philippines
	<i>Vaccinium myrtooides</i>	Ayosep/Ayusip (Igt); Alumani(Bon); Gotmo (Knk)	Fruit	Benguet Province, Philippines
	<i>Vaccinium myrtooides</i> Miq.	Ayusep	Fruit	Benguet Province, Philippines
Euphorbiaceae	<i>Manihot esculenta</i>	Cassava	Root	Agusan del Sur, Southern Philippines
	<i>Atidesma bunius</i>	Bignay	Fruit	Bataan Province, Philippines
	<i>Phyllanthus rhanoides</i> ; Retz	Matang-ulang	Fruit	Bataan Province, Philippines
	<i>Manihot esculenta</i> Crantz.	Cassava	Tuber	Benguet Province, Philippines
	<i>Manihot esculenta</i> Crantz		Tuber	Bukidnon Province, Philippines
	<i>Cicca acida</i> (Linn.) Merr	Karamay (Ilk.), Iba (Tag)	Fruit	Isabela Province, Philippines
	<i>Euphorbia nerifolia</i> L.	Indian spurge tree	Leaves	Northwestern Cagayan, Philippines

Table 3 continued

Fabaceae	<i>Mucuna sp.</i>	Sabawil		Abra Province, Philippines
	<i>Phaseolus vulgaris</i> L.	Climbing Beans	Fruit	Benguet Province, Philippines
	<i>Phaseolus vulgaris</i> L.		Pod and seed	Bukidnon Province, Philippines
	<i>Pisum sativum</i> L.		Pod and seed	Bukidnon Province, Philippines
	<i>Arachis hypogaea</i> L.		Seed	Bukidnon Province, Philippines
	<i>Vigna unguiculata</i> (L.) Walp.		Pod and seed	Bukidnon Province, Philippines
	<i>Phaseolus lunatus</i> L.		Pod and seed	Bukidnon Province, Philippines
	<i>Psophocarpus tetragonolobus</i> (L.) DC.		Pod and seed	Bukidnon Province, Philippines
	<i>Castanopsis evansii</i> Elmer		Seed	Bukidnon Province, Philippines
	<i>Sesbania grandiflora</i> Linn	Katurai (Tag), Katudai (Ilk)	Flowers	Isabela Province, Philippines
	<i>Gliricidia sepium</i> (Jacq.) Kunth	Madre de cacao	Flower	Northwestern Cagayan, Philippines
Flacourtiaceae	<i>Flacourtia rukam</i> Zollinger & Moritz	Bitongol	Fruit	Bataan Province, Philippines
	<i>Muntigia carabola</i>	Datiles	Fruit	Bataan Province, Philippines
	<i>Flacourtia rukam</i>	Kalominga/Kalumina (Igt); Native Cherry (Eng)	Fruit	Benguet Province, Philippines
	<i>Medinilla pendula</i>	Agubangbang/Balanban/Ballangbang/Gubangbang (Igt)	Fruit	Benguet Province, Philippines
Gnetaceae	<i>Gnetum gnemon</i> Linn	Lumbay(Bago)	Young Leaves	Aklan, Philippines
	<i>Gnetum sp.</i>	Bago	Young leaves and fruits	Southern Palawan, Philippines
Hydrocharitaceae	<i>Otelia alismoides</i> Linn	Kalabua		Abra Province, Philippines
Ipomoea	<i>Ipomoea batatas</i> L.	Kamote/ Sweet potato		Cebu Province, Philippines
	<i>Ipomoea batatas</i> L.	Kamote/ Sweet potato		Cebu Province, Philippines
Lamiaceae	<i>Coleus scutellarioides</i> (L.) Benth.	Tamura (Ilk.)	Fruit	Camiguin Island, Philippines
	<i>Coleus blumei</i> B.	Mayana/Coleus		Cebu Province, Philippines
	<i>Plectranthus amboinicus</i> L.	Kalabo/Oregano		Cebu Province, Philippines
Lauraceae	<i>Persea americana</i> Mill.		Fruit	Bukidnon Province, Philippines
	<i>Persea americana</i> M.	Abukado/Avocado		Cebu Province, Philippines
Lecythidaceae	<i>Barringtonia asiatica</i> L.	Mango pine	Leaves, Stem	Northwestern Cagayan, Philippines
Leguminosae	<i>Phaseolus lunatus</i> Linn	Palpadi (Ilk.) Patani (Ilk,Tag)	Seeds	Isabela Province, Philippines
	<i>Cajanus cajan</i> (Linn.) Mill	Kardis (Ilk)	Seeds	Isabela Province, Philippines
	<i>Phaseolus vulgaris</i>	Tudo (Ilk)	Seeds	Isabela Province, Philippines
	<i>Psophocarpus tetragonolobus</i>	Wing Bean(Eng), Sigarilyas (Tag)	Whole Fruit	Isabela Province, Philippines
	<i>Pachyrrhizus erosus</i> Linn	Singkamas		Abra Province, Philippines
	<i>Antidesma bunius</i> (L.) Spreng.	Barakbak (Ilk.)	Fruit	Camiguin Island, Philippines
Lythraceae	<i>Sonneratia alba</i> Sm.	Mangrove apple	Fruit, Leaves	Northwestern Cagayan, Philippines

Table 3 continued

Malvaceae	<i>Thespesia sublobata</i> Blanco	Bulak-bulakan		Abra Province, Philippines
	<i>Theobroma cacao</i> Linn	Kakaw		Abra Province, Philippines
	<i>Durio zibethinus</i> L.		Fruit	Bukidnon Province, Philippines
	<i>Abelmoschus esculentus</i> (L.) Moench		Fruit	Bukidnon Province, Philippines
	<i>Corchorus capsularis</i> L.		Leaf and Shoot	Bukidnon Province, Philippines
	<i>Theobroma cacao</i> L.		Fruit	Bukidnon Province, Philippines
	<i>Theobroma cacao</i> L.	Cacao		Cebu Province, Philippines
	<i>Theobroma cacao</i> L.	Cacao/cacao		Cebu Province, Philippines
	<i>Corchorus olitorius</i> L.	Nalta jute	Leaves, Stem	Northwestern Cagayan, Philippines
	<i>Durio sp.</i>	Wild durian	Fruit	Southern Palawan, Philippines
Marantaceae	<i>Donax canifformis</i> (G.Forst.) K.Schum.	Banban (ManyLgs.)	Fruit	Camiguin Island, Philippines
	<i>Maranta arundinacea</i> L.	Arrowroot	Rhizome	Northwestern Cagayan, Philippines
Melastomataceae	<i>Melastoma malabathricum</i>	Baksi/Dagaday/Tagad-ay (Igt)	Fruit	Benguet Province, Philippines
	<i>Medinilla sp.</i>	Binnok	Leaves, Fruit	Benguet Province, Philippines
Meliaceae	<i>Dysoxylum parasiticum</i> (Osbeck) Kosterm.		Fruit	Bukidnon Province, Philippines
	<i>Sandoricum koetjape</i> (Burm.f.) Merr.		Fruit	Bukidnon Province, Philippines
	<i>Sandoricum koetjape</i> B. M.	Santol/Lolly fruit		Cebu Province, Philippines
Menispermaceae	<i>Tinosphora rumphii</i> B.	Panyawan/Heavenly elixir		Cebu Province, Philippines
Molluginaceae	<i>Mollugo oppositifolia</i> Linn	Papait		Abra Province, Philippines
Moraceae	<i>Artocarpus altilis</i> Forberg	Bread Fruit		Abra Province, Philippines
	<i>Artocarpus treculianus</i>	Tugop		Agusan del Sur, Southern Philippines
	<i>Ficus minahassae</i> (Teijsm. & Vriese) Miq.	Ayunit	Fruit	Bataan Province, Philippines
	<i>Artocarpus blancoi</i>	Antipolo	Young fruits	Bataan Province, Philippines
	<i>Alleanthus luzonicus</i> var. glaber (Warb.) Merr	Babayan	Leaves, young fruits	Bataan Province, Philippines
	<i>Broussonetia luzonica</i> (Blanco) F. Vill	Himbabao	Leaves and flowers	Bataan Province, Philippines
	<i>Ficus nota</i> (Blanco) Merr.	Tibig	Fruits and leaves	Bataan Province, Philippines
	<i>Ficus sp.</i>	Aplas/Appas/Opdas (Igt)	Fruit	Benguet Province, Philippines
	<i>Ficus minahassae</i>	Alomit (Igt)	Fruit	Benguet Province, Philippines
	<i>Morus alba</i>	Moras (Tag)	Fruit	Benguet Province, Philippines
	<i>Artocarpus heterophyllus</i> Lam.		Fruit	Bukidnon Province, Philippines
	<i>Artocarpus odoratissimus</i> Blanco		Fruit	Bukidnon Province, Philippines
	<i>Ficus virens</i>	Malakopa/White fig		Cebu Province, Philippines

Table 3 continued

	<i>Artocarpus heterophyllus</i> L.	Nangka/Jackfruit		Cebu Province, Philippines
	<i>Ficus selatica</i> R. ex H.	Dakit/Rubber fig		Cebu Province, Philippines
	<i>Artocarpus camansi</i> Blanco	Pakak (Ilk), Kamansi (Tag), Bulai-patani (Tag)	Immature pulp of fruit	Isabela Province, Philippines
	<i>Brussonetia luzonica</i> L.	Birch flower	Leaves, Flower spikes	Northwestern Cagayan, Philippines
	<i>Artocarpus altilis</i> (Parkinson)	Breadfruit	Fruit	Northwestern Cagayan, Philippines
	<i>Morus alba</i> L.	Mulberry	Fruit	Northwestern Cagayan, Philippines
	<i>Ficus ulmifolia</i> Lam.	Scouring leaf	Fruit	Northwestern Cagayan, Philippines
	<i>Artocarpus blancoi</i> (Elmer) Merr.	Tipolo	Fruit	Northwestern Cagayan, Philippines
	<i>Artocarpus</i> sp.	kamansi and badak	Young leaves and fruits	Southern Palawan, Philippines
Moringaceae	<i>Moringa oleifera</i> Lam.		Leaf	Bukidnon Province, Philippines
Muntingiaceae	<i>Muntingia calabura</i>	Sarisa (Ilk)	Fruit	Benguet Province, Philippines
	<i>Muntingia calabura</i> L.	Mansanitas/Aratiles, Cherry tree		Cebu Province, Philippines
	<i>Muntingia calabura</i> L.	Mansanitas/Cherry tree		Cebu Province, Philippines
	<i>Muntingia calabura</i> L.	Malayan cherry	Fruit	Northwestern Cagayan, Philippines
Musaceae	<i>Musa sapientum</i>	Banana	Blossom	Agusan del Sur, Southern Philippines
	<i>Musa rosacea</i>	Bayating/Amoting (Igt)	Fruit	Benguet Province, Philippines
	<i>Musa × paradisiaca</i> L.	Saba	Fruit	Benguet Province, Philippines
	<i>Musa</i> sp.		Fruit	Bukidnon Province, Philippines
	<i>Musa acuminata</i> subsp. <i>errans</i> B. R. V. V.	Pakol/Botoan Banana		Cebu Province, Philippines
	<i>Musa balbisiana</i> Colla	Cavendish banana	Fruit	Northwestern Cagayan, Philippines
Myrsinaceae	<i>Embelia philippinensis</i>	Bisolak/Bisudak (Igt)	Fruit	Benguet Province, Philippines
Myrtaceae	<i>Psidium guajava</i>	Wild Guava (Eng)/Bayabas (Tag/Ilk)	Fruit	Benguet Province, Philippines
	<i>Psidium guajava</i> L.	Bayabas	Shoots, Fruit	Benguet Province, Philippines
	<i>Psidium guajava</i> L.		Fruit	Bukidnon Province, Philippines
	<i>Syzygium samarangense</i> (Blume) Merr. and L.M. Perry		Fruit	Bukidnon Province, Philippines
	<i>Syzygium aqueum</i> (Burm.f.) Alston		Fruit	Bukidnon Province, Philippines
	<i>Rhodomyrtus tomentosa</i> (Aiton) Hassk var. <i>tomentosa</i>	Tungawtungaw (Ilk.)	Fruit	Camiguin Island, Philippines
	<i>Syzygium fenicis</i> (C.B.Rob) Merr.	Barakbak (Ilk.)	Fruit	Camiguin Island, Philippines
	<i>Syzygium subtundifolium</i> (C.B.Rob.) Merr.	Tampuy (Ilk.)	Fruit	Camiguin Island, Philippines
	<i>Psidium guajava</i> L.	Bayabas/Guava		Cebu Province, Philippines
	<i>Psidium guajava</i> L.	Bayabas/Guava		Cebu Province, Philippines
	<i>Syzygium lineatum</i> (DC.) Merr. & L.M. Perry	Malibado (Ilk.)	Fruit	Isabela Province, Philippines
	<i>Psidium guajava</i> L.	Guava	Fruit	Northwestern Cagayan, Philippines

Table 3 continued

Nyctaginaceae	<i>Boerhaavia diffusa</i> Linn	Tabtabukol		Abra Province, Philippines
Ophioglossaceae	<i>Helminthotachys zeylanica</i>	Tukod-langit	Young leaves	Bataan Province, Philippines
Oxalidaceae	<i>Averrhoa blimbi</i> L.	Iba/Bilimbi		Cebu Province, Philippines
Pandanaceae	<i>Pandanus amaryllifolius</i> Roxb.	Pandan	Fruit	Agusan del Sur, Southern Philippines
	<i>Pandanus amaryllifolius</i> Roxb.	Pandan	Leaves	Agusan del Sur, Southern Philippines
	<i>Pandanus amaryllifolius</i> Roxb. ex Lindl.	Pandan (Eng.)	Fruit	Camiguin Island, Philippines
	<i>Pandanus luzonensis</i> Merr.	Pandan	Leaves	Northwestern Cagayan, Philippines
Passifloraceae	<i>Passiflora edulis</i>	Masaplora/Masaflora (Ibl)	Fruit	Benguet Province, Philippines
	<i>Passiflora foetida</i> L.	Bush passion fruit	Fruit	Northwestern Cagayan, Philippines
	<i>Passiflora foetida</i> L.	Los baños	Fruit	Northwestern Cagayan, Philippines
	<i>Passiflora diaden</i> Vell.	Passion fruit	Pulp, Seed	Northwestern Cagayan, Philippines
Phyllanthaceae	<i>Antidesma bunius</i> Linn	Bugnay		Abra Province, Philippines
	<i>Securrinega flexouosa</i>	Anislag		Agusan del Sur, Southern Philippines
	<i>Phyllanthus acidus</i>	Kabihid		Agusan del Sur, Southern Philippines
	<i>Antidesma bunius</i>	Bugnay/Bignay (ManyLgs)	Fruit	Benguet Province, Philippines
	<i>Antidesma montanum</i> or <i>Antidesma angustifolium</i>	Balekesan (Igt)	Fruit	Benguet Province, Philippines
	<i>Breynia androgyna</i> (L.) Chakrab. & N.P.Balacr.		Leaf	Bukidnon Province, Philippines
	<i>Antidesma gasembilla</i> L.	Agusi, Arosip		Northern Isabela, Cagayan Valley, Philippines
	<i>Antidesma bunius</i> L.	Wild cherry	Fruit	Northwestern Cagayan, Philippines
	Poaceae	<i>Eleusine indica</i> L. G.	Bila-bila/Wire grass	
<i>Cymbopogon citrates</i> (DC.) Stapf.		Tanglad	Leaves	Bataan Province, Philippines
<i>Zea mays</i> L.		Corn	Kernel	Benguet Province, Philippines
<i>Miscanthus sinensis</i> Anders.		Suyok(Rono), bellang	Shoots	Benguet Province, Philippines
<i>Oryza sativa</i> L.			Seed	Bukidnon Province, Philippines
<i>Cymbopogon citratus</i> (DC.) Stapf			Leaf	Bukidnon Province, Philippines
<i>Coix lacryma-jobi</i> L.			Seed	Bukidnon Province, Philippines
<i>Saccharum officinarum</i> L.			Stem	Bukidnon Province, Philippines
<i>Zea mays</i> L.			Seed	Bukidnon Province, Philippines
<i>Macaranga tanarius</i> (L.) Müll.Arg.		Samak (Ilk.)	Fruit	Camiguin Island, Philippines
<i>Echinochloa stagnina</i>		Balili/Hippo Grass		Cebu Province, Philippines
<i>Bambusa spinosa</i> Roxb.		Thorny bamboo	Shoot	Northwestern Cagayan, Philippines
<i>Oryza sp.</i>		Ballatinaw		Abra Province, Philippines

Table 3 continued

Polyporaceae	<i>Schizophyllum commune</i>	Kudit (Ilk)	Whole plant	Isabela Province, Philippines
Portulacaceae	<i>Talinum triangulare</i> L.	Waterleaf	Leaves, Stem	Northwestern Cagayan, Philippines
	<i>Portulaca oleracea</i> Linn	Ngalog		Abra Province, Philippines
Rhamnaceae	<i>Ziziphus jujuva</i>	Mansanitas		Agusan del Sur, Southern Philippines
Rosaceae	<i>Photinia serratifolia</i>	Sugsuggat (Igt)	Fruit	Benguet Province, Philippines
	<i>Rubus ellipticus</i>	Batnak/Butnak (Igt); Bunut (Bon)	Fruit	Benguet Province, Philippines
	<i>Rubus fraxinifolius</i>	Pinit (Ilk); Doting/Luting/Buyot (Igt); Sapinit (Tag)	Fruit	Benguet Province, Philippines
	<i>Rubus sp.</i>	Pinet, Pinit	Berries, Fruit	Benguet Province, Philippines
Rubiaceae	<i>Coffea arabica</i>	Coffee		Abra Province, Philippines
	<i>Coffea arabica</i> L.	Kape	Bean	Benguet Province, Philippines
	<i>Coffea canephora</i> Pierre ex A.Froehner		Seed	Bukidnon Province, Philippines
	<i>Coffea arabica</i> L.	Kape/Arabian coffee		Cebu Province, Philippines
Rutaceae	<i>Citrus maxima</i> (Burm.) Merr.	Pomelo	Fruit	Benguet Province, Philippines
	<i>Citrus maxima</i> (Burm.) Merr.		Fruit	Bukidnon Province, Philippines
	<i>Citrus x aurantiifolia</i> (Christm.) Swingle		Fruit	Bukidnon Province, Philippines
	<i>Citrus x aurantium</i> L.		Fruit	Bukidnon Province, Philippines
	<i>Citrus x microcarpa</i> Bunge		Fruit	Bukidnon Province, Philippines
	<i>Citrus aurantium</i> L.	Sitrus; kandiss; dalandan or sankist/ Sour Orange		Cebu Province, Philippines
Salicaceae	<i>Pangium edule</i> Reinw.		Fruit	Bukidnon Province, Philippines
Sapindaceae	<i>Euphoria didyma</i> Blanco	Alupag	Fruit	Bataan Province, Philippines
	<i>Nephelium lappaceum</i> L.		Fruit	Bukidnon Province, Philippines
	<i>Pometia pinnata</i> J.R.Forst. & G.Forst.	Sida-i (Ilk, Ibg, Ivt.)	Fruit	Camiguin Island, Philippines
	<i>Lepisanthes fruticosa</i> (Roxb.) Leenh.	Dirig (Ibg, Ilk)	Fruit	Camiguin Island, Philippines
	<i>Lepisanthes fruticosa</i> L.	Chammaliang	Fruit	Northwestern Cagayan, Philippines
	<i>Nephelium spp.</i>	Wild rambutan	Fruit	Southern Palawan, Philippines
Sapotaceae	<i>Chrysophyllum cainito</i> L.		Fruit	Bukidnon Province, Philippines
	<i>Chrysophyllum cainito</i> L.	Caimito/Star apple		Cebu Province, Philippines
	<i>Chrysophyllum cainito</i> L.	Caimito/Star apple		Cebu Province, Philippines
	<i>Pouteria campechiana</i> (Kunth) Baehni	Canistel	Fruit	Northwestern Cagayan, Philippines
Saururaceae	<i>Saurauia elegans</i> Fern.-Vill.	Ul-ek. Utok	Fruit	Benguet Province, Philippines

Table 3 continued

Solanaceae	<i>Capsicum frutescens</i>		Fruit	Agusan del Sur, Southern Philippines
	<i>Solanum nigrum</i> Linn.	Lubi-lubi	Ripe Fruits	Bataan Province, Philippines
	<i>Capsicum frutescens</i> Linn.	Siling-labuyo	Fruits and leaves	Bataan Province, Philippines
	<i>Solanum betacea</i>	Dulce/Tamarillo (Sp)	Fruit	Benguet Province, Philippines
	<i>Physalis peruviana</i>	Gobbayas/Gumbais (Igt) Cape gooseberry (Eng)	Fruit	Benguet Province, Philippines
	<i>Solanum pimpinellifolium</i>	Marble Tomato (Eng)	Fruit	Benguet Province, Philippines
	<i>Solanum nigrum</i> L.	Ami(weeds)	Leaves	Benguet Province, Philippines
	<i>Capsicum frutescens</i> L.	Sili (Labuyo)	Fruit	Benguet Province, Philippines
	<i>Solanum americanum</i> Mill.		Leaf and Shoot	Bukidnon Province, Philippines
	<i>Solanum melongena</i> L.		Fruit	Bukidnon Province, Philippines
	<i>Solanum aethiopicum</i> L.		Fruit	Bukidnon Province, Philippines
	<i>Capsicum annum</i> L.		Fruit, leaf, and shoot	Bukidnon Province, Philippines
	<i>Solanum lycopersicum</i> L.		Fruit	Bukidnon Province, Philippines
	<i>Solanum tuberosum</i> L.		Tuber	Bukidnon Province, Philippines
	<i>Capsicum annum</i>	Sweet bell pepper	Fruit	Cebu Province, Philippines
	<i>Capsicum annum</i>	Perfection group pepper	Fruit	Cebu Province, Philippines
	<i>Capsicum annum</i>	Finger chili pepper	Fruit	Cebu Province, Philippines
	<i>Capsicum frutescens</i>	Sili Kulikot	Fruit	Cebu Province, Philippines
	<i>Capsicum frutescens</i>		Fruit	Cebu Province, Philippines
	<i>Solanum habrochaites</i>	Kamatis (Ihas)/ Wild Tomato		Cebu Province, Philippines
	<i>Capsicum frutescens</i> L.	Sili Kuliko/Tabasco pepper		Cebu Province, Philippines
	<i>Lycopersicon pimpinellifolium</i>	Botbotines (Ilk) Kamatis (Tag)	Whole Fruit	Isabela Province, Philippines
	<i>Capsicum annum</i> L.	Cayenne pepper	Fruit	Northwestern Cagayan, Philippines
	<i>Nicandra indica</i> Roem. & Schult.	Pantug-pantugan	Fruit	Northwestern Cagayan, Philippines
	<i>Solanum undatum</i> Lam.	Wild eggplant	Fruit	Northwestern Cagayan, Philippines
Talinaceae	<i>Talinum fruticosum</i> (L.)	Las pinakas	Young Leaves	Aklan, Philippines
Urticaceae	<i>Gonostegia hirta</i>	Aluloy	Fruits	Bataan Province, Philippines
	<i>Debregeasia longifolia</i>	Ngamoy/Ngamey (Ifg); Namey (Knk)	Fruit	Benguet Province, Philippines
	<i>Leucosyke benguetensis</i>	Lapsek/Lapsik (Igt)	Fruit	Benguet Province, Philippines
Verbenaceae	<i>Vitex parviflora</i> J.	Tugas/Small-flower Chaste Tree		Cebu Province, Philippines
Vitaceae	<i>Tetrastigma</i> sp.	Ngalatngat (Igt); Ngaratngat (Neg)	Fruit	Benguet Province, Philippines
	<i>Cayratia trifolia</i> L.	Langi-ngi/Three-Leaf Cayratia		Cebu Province, Philippines
	<i>Tetrastigma harmandii</i> Planch.	Ayo	Leaves, stem	Northwestern Cagayan, Philippines

Table 3 continued

Zingerberaceae	<i>Curcuma domestica</i>	Luyang dilaw	Roots	Bataan Province, Philippines
	<i>Languas pyramidata</i> Blume	Lankanas		Abra Province, Philippines
	<i>Alpinia vanoverberghii</i>	Akbab (Knk/Bon)	Fruit	Benguet Province, Philippines
	<i>Amomum lepicarpum</i>	Gadang (Igt)	Fruit	Benguet Province, Philippines
	<i>Leptosolena haenkei</i>	Poli (Igt); Panawil (Knk)	Fruit	Benguet Province, Philippines
	<i>Languas haenkei</i> (C.Presl) Merr.	Gaddang	Fruit	Benguet Province, Philippines
	<i>Zingiber officinale</i> Roscoe	Laya	Rhizome	Benguet Province, Philippines
	<i>Amomum muricarpum</i> Elm.		Fruit	Bukidnon Province, Philippines
	<i>Etilingera elatior</i> (Jack) R.M.Sm.		Inflorescence	Bukidnon Province, Philippines
	<i>Hornstedtia conoidea</i> Ridl		Fruit	Bukidnon Province, Philippines
	<i>Zingiber officinale</i> Roscoe		Rhizome	Bukidnon Province, Philippines
	<i>Curcuma longa</i> L.		Rhizome	Bukidnon Province, Philippines
	<i>Hornstedtia lophophora</i> Ridl.		Fruit	Bukidnon Province, Philippines
	<i>Curcuma longa</i> L.	Duwaw or tuwaw/Turmeric		Cebu Province, Philippines
	<i>Curcuma longa</i> L.	Duwaw or tuwaw/Turmeric		Cebu Province, Philippines

*Local name languages: Eng-English; Tag-Tagalog; Bon-Bontok; Ifg-Ifugao; Igt-Igorot; Ibl-Inibaloi; Ilk-Ilokano; Neg-Negrito; Sp-Spanish; Knk-Kankana-ey; ManyLgs-Many Languages

Edible Plant Part Used

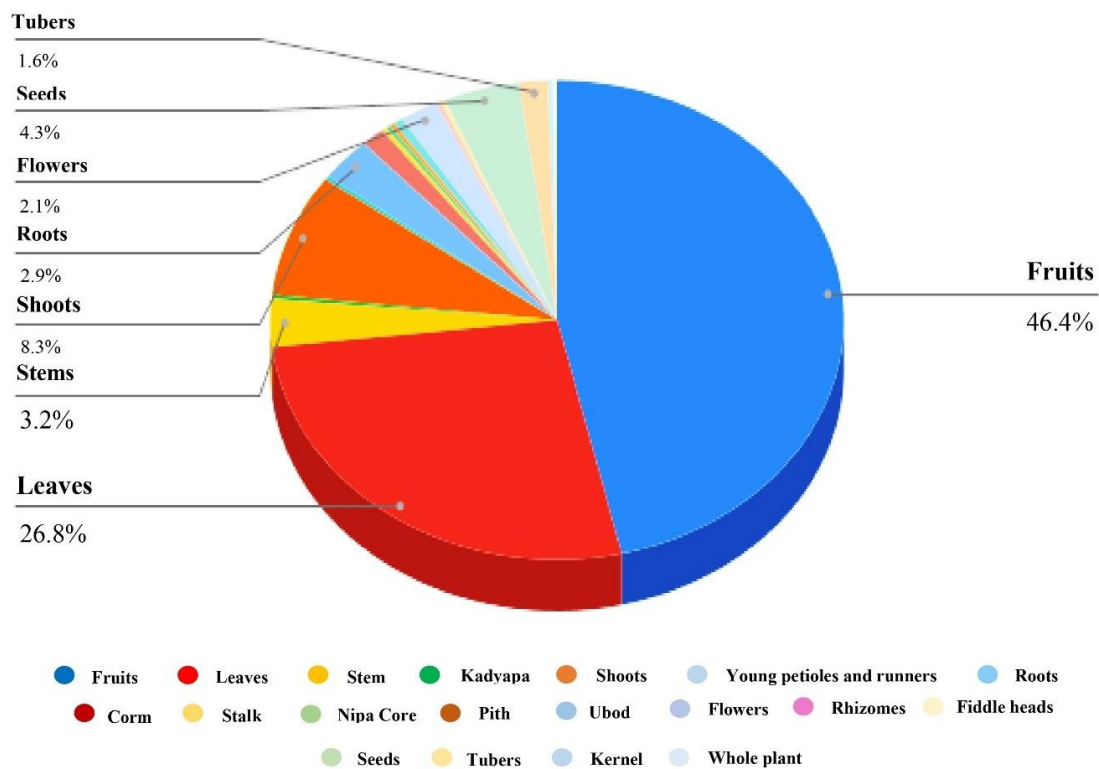


Figure 3. Edible Plant Parts Used

Among the edible plant parts used, as shown in Figure 3, it reveals that the fruit category, including berries, whole fruit, ripe fruits, and immature pulp of fruit, are the most commonly utilized plant parts with 46.4% (n=173) counts. Following the fruits, the leaves show a significant portion of 26.8% (n=100). Shoots with 8.3% (n=31), seeds with 4.3% (n=16), and stems with 3.2% (n=12) exhibit moderate counts, followed by roots with 2.9% (n=11), flowers with 2.1% (n=8) and tubers with 1.6% (n=6), implying their utilization in culinary practices. Additionally, less common plant parts such as corms, young petioles and runners, ‘nipa’ core, stalk, fiddleheads, pith, ‘ubod’, and kernels are also mentioned, albeit with lower frequencies. This distribution highlights the wide variety of plant parts that are consumed, which is indicative of the various dietary customs and

culinary traditions related to local edible plants in the Philippines.

This study reviews thirteen (n=13) articles in total, as shown in Table 4, which collectively highlight the diverse ways in which indigenous plants play a crucial role in ensuring food security and alleviating hunger across different regions in the Philippines. As shown in Figure 4, the generated geospatial distribution map shows that these reported edible plants are widely distributed to 11 provinces namely the Province of Bataan, Cebu, Aklan, Benguet, Bukidnon, Cagayan, Agusan del Sur, Abra, Palawan, Camiguin, and Isabela. These patterns of distribution underscore the fact that potential famine food plants transcend geographical boundaries and could aid food security in various regions of the Philippines.

Table 4. List of included studies

No.	Publication Type	Year of Publication	Author	Title	Date Accessed
1	Research Article	2021	(David, 2021)	School of Living Traditions on Aeta Magbukon indigenous knowledge: promoting indigenous food plants for food security	2024-02-14 10:18:09
2	Journal Article	2020	(Casio et al., 2020)	Phenotypic Characterization and Ethnobotanical Inventory of Chili Pepper (<i>Capsicum spp.</i>) Cultivars in Cebu Island, Philippines	2024-01-22 21:00:21
3	Journal Article	2023	(Israel, 2023)	Rural Household's Utilization of the Indigenous Vegetables	2024-01-22 21:20:55
4	Journal Article	2021	(Bersamin et al., 2021)	Utilization of plant resources among the Kankanaeys in Kibungan, Benguet Province, Philippines	2024-02-05 21:58:40
5	Research Article	2022	(Buenavista et al., 2022)	Are there any alternatives to rice? Ethnobotanical insights into the dietary use of edible plants by the Higaonon tribe in Bukidnon Province, the Philippines	2024-01-22 21:00:23
6	Journal Article	2023	(Cacatian & Tabian, 2023)	Floristic composition and diversity of indigenous wild food resources in northwestern Cagayan, Philippines	2/14/2024 10:18:09
7	Journal Article	2015	(Arquion et al., 2015)	Ethnobotanical study of indigenous plants used by local people of Agusan del Sur, Philippines	2024-02-17 13:49:25
8	Journal Article	2010	(Segismundo et al., 2010)	Indigenous Edible Flora and Fauna in the Province of Abra	2024-02-21 15:02:49
9	Journal Article	2017	(Bernadas Jr & Peralta, 2017)	Indigenous crops and wild plants used as food by the Pala'wan Tribe in Southern Palawan, Philippines	2024-02-16 12:24:13
10	Journal Article	2014	(Chua-Barcelo, 2014)	Ethno-botanical survey of edible wild fruits in Benguet, Cordillera administrative region, the Philippines	2024-02-17 13:49:27
11	Journal Article	2013	(Cabauatan, 2013)	Ethnobiology And Alternative Medicine Of The Ybanag Minority In Northern Isabela, Cagayan Valley, Philippines	2024-02-19 15:42:23
12	Journal Article	2022	(Docot et al., 2022)	A Quantitative Ethnobotanical Study of Plants Used by the Locals in Camiguin Island, Calayan, Cagayan, Philippines	2024-01-22 21:00:37
13	Journal Article	2016	(Ruma, 2016)	Phytochemical Screening Of Selected Indigenous Edible Plants From The Towns Of Isabela, Philippines	2024-02-16 12:24:17

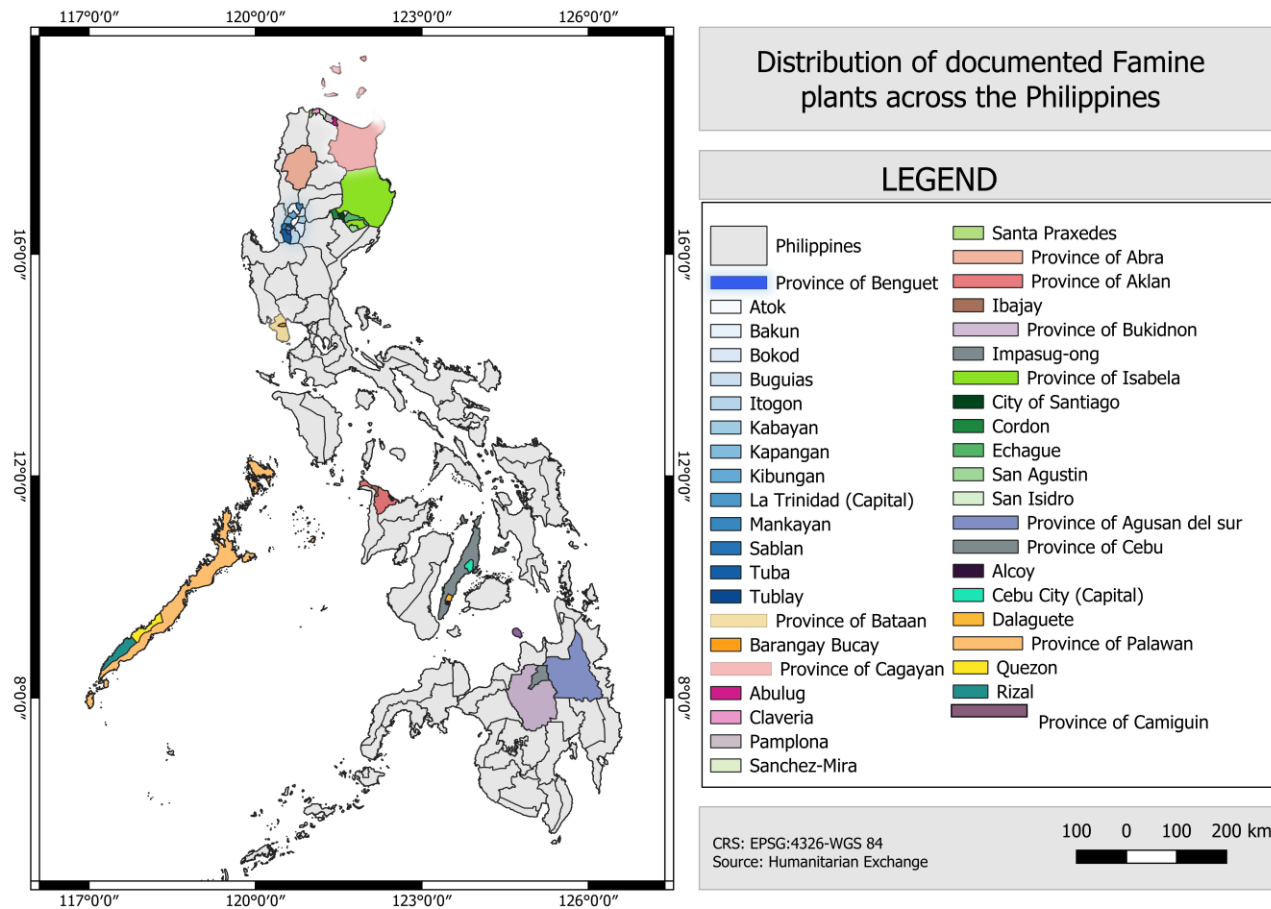


Figure 4. Geographic distribution of famine food plants in the Philippines

According to Durst and Bayasgalanbat [20], the rural community's foundation is its abundance of indigenous food resources, which can be associated with the availability of indigenous plants in the area. Indigenous food plants (IFPs) are edible plants that are native to a particular country or region. They are referred to as "indigenous" since they grow naturally in those locations [21]. In the study conducted by David [22], these native or indigenous food plants demonstrate a vast potential to alleviate hunger and ensure food security globally, which is evident in Abucay, Bataan, Philippines. The study focused on promoting indigenous food plants (IFPs) for food security through a School of Living Traditions (SLT) on the indigenous knowledge (IK) of the Aeta Magbukon. The qualitative ethnographic research method documented 35 species of IFPs and 15 traditional cooking methods taught by Cultural Masters, ensuring the transmission of indigenous skills. The program aimed to address food insecurity among the Aeta Magbukon, especially during the COVID-19 pandemic, by encouraging the consumption of IFPs and involving the younger generation in preserving their cultural heritage.

On Cebu Island, Philippines, Casio et al. [23] conducted an ethnobotanical inventory and phenotypic characterization of chili pepper varieties. Despite chili peppers not being a staple food, the study investigates their

potential to enhance the flavor and nutritional diversity of diets, thus potentially contributing to food security. The study revealed the multiple uses of chili peppers, not only as a food ingredient but also as a source of income for farmers. This knowledge can support sustainable farming practices and promote the cultivation of specific cultivars that have medicinal properties, potentially enhancing food security by providing additional sources of nutrition and income for communities in the region.

In the province of Aklan, Philippines, indigenous vegetables contribute to the food security of their households, especially during the time of the COVID-19 pandemic. The study identified pako-pako (*Diplazium esculentum*) as the most commonly consumed indigenous vegetable in rural households in Ibaday, Aklan. Other frequently consumed IV included abaeong (*Colocasia esculenta* (L.) Schott), lumbay or bago (*Gnetum gnemon* Linn), and lupu-lupo (*Alternanthera sessilis* (L.)). These vegetables were harvested from various habitats and were available year-round, except for palya (*Momordica charantia* L.) which had a specific season. The study also highlighted the multiple uses of IV, including culinary, medicinal, and as animal feed, emphasizing their importance in contributing to food security and nutrition in the local community [24].

In Kibungan, Benguet Province, Philippines, the

indigenous Kankanaey tribe uses plant resources for their basic needs. It was revealed that they have various utilizations of these indigenous plant resources, which can be categorized for food, medicinal, ritualistic purposes, and cultural activities. The 'pinit' (*Rubus fraxinifolius*), 'galyang' (*Alocasia macrorrhizos*), 'amti' (*Solanum nigrum*), 'gatgatang' (*Sonchus arvensis*), 'bayabas' (*Psidium guajava*), 'kamote' (*Ipomea batatas*) and 'pako' (*Diplazium esculentum*) are among the wildly increasing prevalent food resources in their community [25].

Even though the Philippines is acknowledged as an agricultural country, it is the world's biggest importer of rice. Problems with the scarcity of rice remain the same, made worse by natural disasters and downturns in the economy. Nevertheless, the rich agrobiodiversity and wild edible plants are vital resources for the Higaonon tribe in Bukidnon Province, Philippines, assuring resilience and food security. These wild edible plants play an essential role in their community because the province's challenging mountainous terrain makes rice farming difficult. The study identified several alternatives to rice, emphasizing the diverse dietary use of indigenous edible plants. The tribe utilizes a variety of tubers, roots, and grains, such as sweet potatoes, taro, and millet, which serve as staple food sources. These plants are not only nutritionally rich but also culturally significant, reflecting the tribe's deep knowledge and sustainable use of local biodiversity [26].

In northwestern Cagayan, Philippines, the floristic composition and the diversity of indigenous wild food resources were explored. Around forty-eight wild plant species belonging to 42 families, mainly from the groups Moraceae, Solanaceae, Amaranthaceae, and Cucurbitaceae, were collected for food purposes by the rural communities in the study areas. The biggest threats to these plant diversity are agricultural land expansion or development, overexploitation of wildlife, and excessive rainfall [27].

Meanwhile, the study conducted by Arquion et al. [28] focuses on an ethnobotanical investigation of indigenous plants utilized by the local people of Agusan del Sur, Philippines. About 53 wild edible plant species were reportedly used as part of their diet. During famines and other times when rice was scarce, one root crop, *Manihot esculenta* (cassava), was mostly prepared alone and occasionally used as emergency food. Also, in the local communities in Abra, Philippines, there were 25 species of indigenous edible flora incorporated into their diet [29]. Similarly, in Southern Palawan, Philippines, the Pala'wan Tribe utilized indigenous crops, vegetables, fruits, and wild plants to combat hunger in their local community. Sorghum and corn are periodically planted in their field. Additionally, corm and tuber crops have been considered to be ideal substitutes for rice. Essential vegetable items include leafy vegetables, mushrooms, 'ubod' from palm trees, bamboo, and other wild plants. They frequently eat 'tabo', durian, 'mante', and 'badak', among other fruits. The Pala'wan tribe possesses a wealth of information on food sources that are essential for survival [30].

Furthermore, wild edible fruits are widely available and may be consumed around the world during times when food sources are scarce [31,32]. In different municipalities of Benguet, Philippines, a total of 36 fruit species are found. Among these, the *Garcinia binucao* (balokok), belonging to Clusiaceae is the most abundant fruit. The study demonstrates the connections between customary and cultural practices to the acceptance as well as utilization of wild fruits as food [33]. In Northern Isabela, Cagayan Valley, in the Philippines, the Ybanag minority consumed some exotic wild plants or fruits that were commonly available in their environment. It includes *Spondias pinnata* L. (heavy fruit), *Gynuria aelliptica* Yae & Hayata, *Uvaria rufa* (Blume) (Susong kalabaw), *Amorphophallus campanulatus* (Roxb) Bl. Ex. Decne (Bagang), and *Antidesma gasebilla* L. (Agusi) [34].

According to Azam et al. [5], famine food plants as unconventional dietary items which consist of wild edible plants that people consumed during scarcity could also possess therapeutic properties.

In Camiguin Island, Calayan, Cagayan, Philippines, the locals probably use some medicinal plants for food purposes and this was revealed by the study conducted by Docot et al. [35]. The study identified 70 terrestrial plant species used by locals for various purposes. The most commonly used plant part was leaves, with medicinal preparations primarily done through decoctions. Overall, the documentation of ethnobotanical knowledge in Camiguin Island provides valuable insights for future studies and conservation efforts and can contribute to strategies for enhancing food security and resilience in the face of challenges. Similar to this, Ruma's study [36] is probably centered on conducting phytochemical screening of specific indigenous edible plants collected from the towns of Isabela, Philippines. These plants are likely consumed either for their nutritional value or claimed therapeutic properties. The study revealed significant presence of bioactive compounds. The plants were found to contain alkaloids, flavonoids, tannins, and saponins, indicating their potential for medicinal and nutritional uses. High levels of antioxidants were noted, suggesting their efficacy in combating oxidative stress and related diseases. These findings underscore the value of these indigenous plants as sources of natural health-promoting compounds and support their inclusion in dietary and pharmacological applications. Collectively, these studies explore the significant contribution of these wild and cultivated plants to food security and hunger alleviation within various regions of the Philippines.

4. Conclusions and Recommendation

The systematic review conducted in this study identified a significant number of search results, ultimately narrowing down to thirteen literatures that discussed wild and cultivated edible plants in the Philippines. The findings

revealed a total of two hundred fifty species of these edible plants belonging to seventy-nine families, showcasing the rich diversity and potential of famine food resources across eleven provinces in the country. The diverse array of wild and cultivated edible plants underscores their importance as potential alternative source of food in times of famine in the Philippines, with their widespread distribution highlighting their significance in addressing food scarcity and enhancing food security, especially in light of the danger posed by climate change. To harness this potential, further research should explore additional indigenous food plants, focusing on their nutritional value, culinary applications, and cultivation potential. Policies should promote the protection and sustainable utilization of these plants, supporting food security and local resilience. Collaboration between government agencies, researchers, and local communities is essential to document and preserve traditional knowledge. Public awareness campaigns should educate the population about the nutritional benefits and cultural significance of these plants, encouraging their incorporation into diets and local food systems.

Acknowledgements

The authors would like to acknowledge the Center of Integrative Health of the Premier Research Institute of Science and Mathematics (PRISM) of MSU-Iligan Institute of Technology for the support of this study. This study is funded by the Department of Science and Technology through the Accelerated Science and Technology Human Resource Development Program (DOST-ASTHRDP) with Dr. Josette Biyo as its director.

REFERENCES

- [1] FAO, "Climate variability and change: A challenge for sustainable agricultural production," Committee on Agriculture, Sixteenth Session Report, Rome, Italy, Mar. 26-30, 2001.
- [2] FAO, "Impact of climate change on agriculture in Asia and the Pacific: A challenge for sustainable agricultural production," Committee on Agriculture, Twenty-seventh FAO Regional Conference for Asia and the Pacific, Beijing, China, May 17-21, 2004.
- [3] Lobell, D. B., & Field, C. B., "Global scale climate-crop yield relationships and the impacts of recent warming," *Environmental Research Letters*, vol. 2, no. 1, pp. 014002, 2007. DOI: <https://doi.org/10.1088/1748-9326/2/1/014002>.
- [4] Minnis, P. E., "Famine Foods: Plants We Eat to Survive", Tucson: University of Arizona Press, 2021. DOI: <https://doi.org/10.2307/j.ctv1k13b98>.
- [5] Azam, F. M. S., Biswas, A., Mannan, A., Afsana, N. A., Jahan, R., & Rahmatullah, M., "Are famine food plants also ethnomedicinal plants? An ethnomedicinal appraisal of famine food plants of two districts of Bangladesh," *Evidence-Based Complementary and Alternative Medicine*, vol. 2014, no. 1, pp. 1–28, 2014. DOI: <https://doi.org/10.1155/2014/741712>.
- [6] Ashagre, M., Asfaw, Z., Kelbessa, E., "Ethnobotanical study of wild edible plants in Burji District, Segan Area Zone of Southern Nations, Nationalities and Peoples Region (SNNPR), Ethiopia," *Journal of Ethnobiology and Ethnomedicine*, vol. 12, no. 32, pp. 1-10, 2016. DOI: <https://doi.org/10.1186/s13002-016-0103-1>.
- [7] Guinand, Y., & Lemessa, D., "Wild Food Plants in Southern Ethiopia: Reflections on the Role of 'Famine Foods' at a Time of Drought," UN-EUE, Addis Ababa, 2000.
- [8] Hughes, J., "Just Famine Foods? What Contributions Can Underutilized Plants Make To Food Security?" *Acta Horticulturae*, vol. 806, pp. 39–48, 2009. DOI: <https://doi.org/10.17660/actahortic.2009.806.2>.
- [9] Angeles-Agdeppa, I., "Food and nutrition security and poverty alleviation in the Philippines," *Asia Pacific Journal of Clinical Nutrition*, vol. 11, no. S13, pp. S335–S340, 2002. DOI: https://doi.org/10.1046/j.1440-6047.11.s13.1_11_s1.x
- [10] Philippine Statistics Authority, "Poverty Statistics," <https://psa.gov.ph/statistics/poverty> (accessed Jan. 1, 2024)
- [11] Rovillos, R., Cayabyab-Orticio, N., & Orticio, G. C., "Indigenous peoples and food security: Advocating a livelihood framework," in *Promoting Indigenous Knowledge for Food Security: A Sourcebook*, A. L. Tamayo & M. Demetillo, Eds., Quezon City: EED Philippine Partners' Task Force for Indigenous Peoples' Rights, 2009, pp. 6–19.
- [12] Teklehaymanot, T., & Giday, M., "Ethnobotanical study of medicinal plants used by people in Zegie Peninsula, Northwestern Ethiopia," *Journal of Ethnobiology and Ethnomedicine*, vol. 3, no. 12, pp. 1-11, 2007. DOI: <https://doi.org/10.1186/1746-4269-3-12>.
- [13] Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C. D., Gøtzsche, P. C., Ioannidis, J. P. A., Clarke, M., Devereaux, P., Kleijnen, J., & Moher, D., "The PRISMA Statement for Reporting Systematic Reviews and Meta-Analyses of Studies that Evaluate Health Care Interventions: Explanation and Elaboration," *PLOS Medicine*, vol. 6, no. 7, pp. e1000100, 2009. DOI: <https://doi.org/10.1371/journal.pmed.1000100>.
- [14] Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G., "Preferred reporting items for Systematic Reviews and Meta-Analyses: the PRISMA statement," *PLOS Medicine*, vol. 6, no. 7, pp. e1000097, 2009. DOI: <https://doi.org/10.1371/journal.pmed.1000097>.
- [15] Alamgir, A., Mousa, O., & Shah, Z., "Artificial Intelligence in Predicting Cardiac Arrest: Scoping Review," *JMIR Medical Informatics*, vol. 9, no. 12, pp. e30798, 2021. DOI: <https://doi.org/10.2196/30798>.
- [16] Behera, M., & Meher, D., "Zotero: An Overview of Open Source Citation Management Tool for Researchers," *Journal Name*, vol. 35, pp. 74–82, 2022.
- [17] QGIS Development Team. "QGIS Geographic Information System. Open Source Geospatial Foundation Project", <https://qgis.org> (accessed April 01, 2022).

- [18] NAMRIA "The Central Mapping Agency of the Government of the Philippines", gov.ph., <https://www.namria.gov.ph/> (accessed April 11, 2024).
- [19] Alotaibi, S. S., Alshoaibi, D., Alamari, H., Albogami, S., Khan, E., Al-Shanbari, A. H., Darwish, H., Alshantqi, B., Alghamdi, H. M., & Almalki, W. M., "Potential significance of medicinal plants in forensic analysis: A review," *Saudi Journal of Biological Sciences*, 28, no. 7, 3929–3935, 2021. DOI: <https://doi.org/10.1016/j.sjbs.2021.03.071>.
- [20] Durst, P., & Bayasgalanbat, N. (Eds.), "Promotion of Underutilized indigenous food resources for food security and nutrition in Asia and the Pacific," Bangkok, Thailand: Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific, 2014, pp. 60–67. <http://www.fao.org/3/a-i3685e.pdf>.
- [21] Shava, S., "The Use of Indigenous Plants as Food by a Rural Community in the Eastern Cape: An Educational Exploration," Master's Thesis, Rhodes University, South Africa, 2000.
- [22] David, N. D., "School of Living Traditions on Aeta Magbukon indigenous knowledge: Promoting indigenous food plants for food security," *Humanities, Arts and Social Sciences Studies (Former Name Silpakorn University Journal Of Social Sciences, Humanities, And Arts)*, pp. 518–534, 2021.
- [23] Casio, C. R., Amistad, V. R., Rosales, E. R., Campos, B. P., Castañares, S. J. L., Dugaduga, K. D. B., Estella, J. G., Polo, C. M. L., Villacorta, K., Garces, J. J. C., & Picardal, J. P., "Phenotypic Characterization and Ethnobotanical Inventory of Chili Pepper (*Capsicum* spp.) Cultivars in Cebu Island, Philippines," *Liceo Journal of Higher Education Research*, vol. 16, no. 1, 2020. DOI: <https://doi.org/10.7828/ljher.v16i1.1372>.
- [24] Israel, P., "Rural Household's Utilization of the Indigenous Vegetables," *International Journal of Arts, Sciences and Education*, vol. 4, no. 4, Article 4, 2023.
- [25] Bersamin, A. T., Tayaben, J. L., Balangcod, K. D., Balangcod, A. K. D., Cendana, A. C., Dom-Ogen, E. T., Licnahan, L. O. C., Siadto, B., Wong, F. M., & Balangcod, T. D., "Utilization of plant resources among the Kankanaeys in Kibungan, Benguet Province, Philippines," *Biodiversitas Journal of Biological Diversity*, vol. 22, no. 1, 2021. DOI: <https://doi.org/10.13057/biodiv/d220144>.
- [26] Buenavista, D. P., Mollee, E. M., & McDonald, M., "Any alternatives to rice? Ethnobotanical insights into the dietary use of edible plants by the Higaonon tribe in Bukidnon Province, the Philippines," *Regional Sustainability*, vol. 3, no. 2, pp. 95–109, 2022.
- [27] Cacatian, S. B., & Tabian, J. L. T., "Floristic composition and diversity of indigenous wild food resources in northwestern Cagayan, Philippines," *Biodiversitas Journal of Biological Diversity*, vol. 24, no. 4, 2023. <https://www.smujo.id/biodiv/article/view/13711>.
- [28] Arquion, R. D., C. C. Galanida, B. Villamor, and H. T. Aguilar. "Ethnobotanical Study of Indigenous Plants Used by Local People of Agusan Del Sur, Philippines". *Asia Pacific Higher Education Research Journal (APHERJ)*, vol. 2, no. 2, Nov. 2015, <https://po.pnuresearchportal.org/ejournal/index.php/apherj/article/view/102>.
- [29] Segismundo, A. B., Navarro, R. B., & Abaya, J. "Indigenous Edible Flora and Fauna in the Province of Abra". *The Vector: International Journal of Emerging Science, Technology and Management (IJESTM)*, vol. 19, no. 1, 2010. <https://vector.unp.edu.ph/index.php/1/article/view/231>.
- [30] Bernadas Jr, C. N., & Peralta, M. D., "Indigenous crops and wild plants used as food by the Pala'wan Tribe in Southern Palawan, Philippines," *Journal of Nature Studies*, vol. 16, no. 1, pp. 11–17, 2017.
- [31] Rasingam, L., "Ethnobotanical studies on the wild edible plants of Irula tribe of Pillur valley, Coimbatore district, Tamil Nadu, India," *Asian Pacific Journal of Tropical Biomedicine*, vol. 2, Suppl 3, pp. S1493-S1497, 2012.
- [32] Deshmukh, B., & Waghmode, A., "Role of wild edible fruits as a food resource: traditional knowledge," *International Journal of Pharmacy and Life Sciences*, vol. 2, pp. 919-924, 2011.
- [33] Chua-Barcelo, R. T., "Ethno-botanical survey of edible wild fruits in Benguet, Cordillera administrative region, the Philippines," *Asian Pacific Journal of Tropical Biomedicine*, vol. 4, pp. S525–S538, 2014.
- [34] Cabauatan, J. G., "Ethnobiology and Alternative Medicine of the Ybanag Minority in Northern Isabela, Cagayan Valley, Philippines," *ISU-Cabagan Journal of Research*, vol. 22, no. 1, pp. 1–1, 2013.
- [35] Docot, R. V. A., Sohal, A. S., Cruz, C. G. D., Fontillas, K. A. P., Rodriguez, M. A. G., Trillana, G. E. M., & Dapar, M. L. G., "A Quantitative Ethnobotanical Study of Plants Used by the Locals in Camiguin Island, Calayan, Cagayan, Philippines," *Journal of Tropical Life Science*, vol. 12, no. 1, 2022. DOI: <https://doi.org/10.11594/jtls.12.01.15>.
- [36] Ruma, O. C., "Phytochemical screening of selected indigenous edible plants from the towns of Isabela, Philippines," *Asian J Nat Appl Sci*, vol. 5, pp. 36–45, 2016.