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Traditional Wisdom on Cultivated Edible Plants: Ethnobotany of the Kui Ethnic Group in Sangkha District, Surin Province, Northeastern Thailand

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ABSTRACT

This study explores the ethnobotanical knowledge of cultivated edible plants among the Kui community in Sangkha District, Surin Province, Northeastern Thailand, emphasising their cultural, nutritional, and medicinal roles. A total of 77 species from 44 families were documented, with Fabaceae and Zingiberaceae being the most represented. Introduced species (62.34%) were more common than native species (37.66%), reflecting historical crop dissemination and cultural adoption, while native species continue to play important roles in cultural identity and ecosystem resilience. Herbs and trees were the predominant growth forms, supporting both immediate and long-term subsistence needs. Analyses of use value (UV), fidelity level (FL), and informant consensus factor (F_{ic}) highlighted key species central to local livelihoods and healthcare, including *Citrus hystrix* DC., *Morinda citrifolia* L., *Oryza sativa* L., and *Piper sarmentosum* Roxb., demonstrating multifunctionality in both culinary and medicinal contexts. Leaves, rhizomes, and inflorescences were the most commonly used plant parts, suggesting deliberate selection for nutritional and pharmacological benefits. These cultivated edible plants not only sustain traditional food practices but also support livelihoods, income generation, and intergenerational knowledge transfer. The findings provide a basis for future phytochemical, nutritional, socio-cultural, and agroecological studies aimed at enhancing biodiversity conservation, food security, and sustainable use of ethnobotanical resources.

***Keywords*:** Edible plants, Ethnobotany, Kui ethnic group, Surin Province, Traditional uses

Introduction

Ethnobotany, which examines the interactions between humans and plants, provides important insights into how communities understand, utilise, and manage plant resources.[1] Since Harshberger's pioneering work in the late nineteenth century, the field has evolved into an interdisciplinary discipline linking anthropology, botany, ecology, and cultural studies.[2] It explores the interconnections between traditional knowledge, plant diversity, and cultural practices, emphasising the role of plants in food security, health care, and biodiversity conservation.[3] Cultivated edible plants hold particular significance as they provide daily nutrition while reflecting cultural identity, heritage, and adaptation to local environments.[4] Globally, they form the foundation of subsistence systems, particularly among agrarian and indigenous communities, where traditional ecological knowledge has guided centuries of selection and cultivation.[5-8]

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In Thailand, one of the most culturally and biologically diverse countries in Southeast Asia, the northeastern region (Isan) stands out as a vital area for ethnobotanical research.[9] Characterised by paddy fields, home gardens, and remnant forests, Isan's smallholder farming systems sustain diverse cultivated edible plants that contribute not only to food and nutrition but also to household income, traditional medicine, and cultural continuity.[10]

Within northeastern Thailand, Surin Province is notable for its cultural diversity, with the Kui ethnic group (also referred to as Suai or Kuay) forming a major population. The Kui are an indigenous Mon–Khmer–speaking group distributed across several provinces in the lower northeastern region, including Surin, Sisaket, Buriram, and Ubon Ratchathani. Historically renowned for their elephant-keeping tradition, the Kui are recognised as one of Thailand's most distinctive ethnic communities.[11] Surin Province, in particular, represents the cultural and historical heartland of the Kui people, where traditional knowledge, agricultural systems, and rituals have been best preserved. This province was therefore selected for the present ethnobotanical study to document and analyse the role of cultivated edible plants in Kui households, which continue to form the basis of local diets, culinary traditions, and seasonal activities. Many of these plants are consumed fresh, cooked in traditional recipes, or preserved for future use, while others hold symbolic and ritual importance—illustrating how cultivated plants function as both biological resources and cultural expressions.

Despite their importance, the ethnobotany of cultivated edible plants among the Kui ethnic group remains poorly documented. Previous ethnobotanical studies in Thailand have predominantly focused on wild food plants, medicinal plants, or general surveys of local plants use, often overlooking the specific role of cultivated species in ethnic communities.[12] A few studies have highlighted the diversity of home

gardens and agroecosystems in northeastern Thailand, yet detailed accounts of how specific ethnic groups, such as the Kui, manage and utilise cultivated edible plants are scarce.[13] This lack of documentation risks the erosion of valuable knowledge systems, particularly as younger generations adopt modern agricultural practices, processed foods, and urban-oriented lifestyles that may reduce reliance on traditional cultivated resources.[14]

Sangkha District, located in Surin Province, provides a significant case study for exploring the ethnobotany of cultivated edible plants among the Kui. The district is home to a large Kui population and is characterised by mixed agricultural landscapes where rice cultivation, vegetable gardens, and small-scale orchards coexist.[15] Within these landscapes, local households maintain a wide range of cultivated edible species that reflect both subsistence needs and cultural preferences. Documenting these plant resources is essential not only for understanding Kui food systems but also for preserving traditional knowledge that contributes to cultural identity and resilience in the face of social and ecological change.[16]

This study was conducted to explore the ethnobotanical knowledge of cultivated edible plants among the Kui ethnic group in Sangkha District, Surin Province. Specifically, to document the diversity of cultivated edible plants maintained by Kui households, investigate their uses and cultural significance, and assess the role of these plants in supporting traditional food practices and local livelihoods. By concentrating on cultivated edible species, the research addresses a gap in Thai ethnobotanical studies and emphasises the value of preserving and promoting traditional agricultural knowledge. Additionally, the results are intended to inform broader discussions on food security, sustainable farming, and the conservation of cultural heritage in Thailand and comparable regions.

Materials and Methods

Study area

The study was conducted in Sangkha District, located in the southern part of Surin Province, Northeastern Thailand, within the Khorat Plateau (14°30′–15°30′ N, 103°30′–104°30′ E) (Figure 1). The district experiences a tropical savanna climate with three distinct seasons: hot (March–May), rainy (June–October), and cool (November–February). Annual rainfall ranges from 1,200 to 1,500 mm, and average temperatures vary between 25 and 32 °C, creating favorable conditions for cultivating a variety of edible plants, including rice, vegetables, fruits, and herbs. The landscape consists primarily of rainfed lowland paddy fields, upland plots, orchards, and home gardens, where households integrate both subsistence crops and culturally significant species. The soils are generally sandy loam to loamy sand, with moderate fertility, typical of the Khorat Plateau.[17]

Sangkha District covers an area of approximately 955 km² and has a population of about 10,700 people,[18] belonging to the Kui ethnic group. Most households engage in smallholder farming systems, combining rice cultivation, mixed cropping, and livestock rearing, while maintaining home gardens for vegetables, herbs, and fruit trees. Agricultural activities are mainly rainfed and depend heavily on seasonal rainfall, with rice serving as the primary staple crop. During the dry season, farmers cultivate short-cycle vegetables and perennial fruit species, demonstrating adaptation to local climatic variability.

Local agro-markets serve a vital socio-economic function, offering villagers venues to sell and trade agricultural and forest products. They feature a broad range of items, including fresh vegetables, herbs, and fruits, as well as processed goods such as traditional sweets, fermented fish, and herbal condiments. Vendors usually sell small, varied quantities sourced from their own farms or neighboring areas, highlighting the diversity and resilience of local food systems.[19]

The district is also a cultural center for the Kui people, who maintain strong traditional agricultural knowledge and social practices. Cultivated edible plants are deeply embedded in Kui livelihoods—not only as sources of food and income but also as integral components of traditional medicine, rituals, and seasonal festivals. Knowledge regarding the cultivation, selection, and utilisation of plants is transmitted orally across generations. This close interaction between ecology, subsistence, and cultural heritage makes Sangkha District an ideal setting for examining the ethnobotany of cultivated edible plants and understanding how traditional ecological knowledge contributes to the sustainability and identity of the Kui community.[20]

Plant Collection and Identification

Data collection was conducted over 12 months, from June 2024 to May 2025. The study focused exclusively on cultivated edible plants found in home gardens, agricultural fields, and local markets within Sangkha District. Field surveys were carried out in a total of 24 home gardens, 12 rice fields with mixed vegetable cultivation, and 4 local markets, as well as in residential areas where common cultivated species were observed. These sites were selected to represent a wide range of cultivation systems and household-scale plant management practices within Kui communities. All plant species cited by informants were collected through systematic field excursions and market surveys. Each specimen was photographed in its cultivated habitat, processed into herbarium vouchers, and deposited in the Vascular Plant Herbarium, Mahasarakham University (VMSU), located in Kantharawichai District, Maha Sarakham Province, Thailand, for long-term preservation. Taxonomic identification of the specimens was conducted using standard botanical references, including the Flora of Thailand and other relevant taxonomic literature. Scientific names and family classifications were further verified using the online database Plants of the World Online (POWO).[21]

Ethnobotanical Data Collection

Ethnobotanical fieldwork was carried out from June 2024 to May 2025 in Sangkha District, Surin Province, covering 12 sub-districts predominantly inhabited by the Kui ethnic group. The study employed a qualitative ethnobotanical approach, combining semi-structured interviews, participant observation, and guided field walks with knowledgeable local informants to document traditional wisdom on cultivated edible plants.

An interview form was designed by the research team to ensure comprehensive and systematic data collection. The questionnaire included open-ended and structured questions focusing on the local names of plants, specific uses (food, medicinal, ritual, or other purposes), parts used, methods of preparation or utilisation, and associated cultural beliefs or symbolic meanings. This design allowed flexibility for informants to elaborate on traditional practices and local classifications of cultivated species.

Each documented plant species was classified based on its primary mode of utilisation, following the categorisation framework proposed by Saensouk *et al*.,[4] with minor adjustments to align with the specific objectives of this study. The utilisation categories comprised condiments and flavoring, food, fruit, and medicinal edible plants.

A total of 40 informants (20 men and 20 women, aged 25–65 years) were selected through snowball and purposive sampling techniques,[22,23] with emphasis on traditional healers, elderly villagers, and individuals widely recognised for their plant knowledge. The selection criteria included being a resident of the study area for at least 10 years, having experience in cultivating or utilising local edible plants, being actively involved in household food preparation, traditional healing, or local agricultural activities, and showing willingness to share traditional knowledge about cultivated edible species. Interviews were conducted in Thai or the Kui dialect, depending on the informant's language preference, with assistance from a local guide fluent in both Kui and Thai to ensure accurate translation and mutual understanding during the interviews.

Before data collection, the purpose, methodology, and expected benefits of the study were clearly communicated to all participants. In line with the International Society of Ethnobiology (ISE) Code of Ethics and the Nagoya Protocol on Access and Benefit-Sharing,[24,25] informed consent was obtained from each participant. Participants were informed of their rights, including the voluntary nature of participation, confidentiality, and the ability to withdraw at any point without any negative consequences.

Although the study did not involve personal or sensitive data and therefore did not require formal institutional ethical approval, all research procedures adhered to international ethical guidelines for

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ethnobotanical research, ensuring respect, transparency, and reciprocal engagement with the Kui community.

Data analysis

Use Value (UV)

The Use Value (UV) measures the relative significance of each plant species in the study area and was determined using the following formula:[26]

$$UV = \frac{\sum UV_s}{n_s} \quad (1)$$

Where UV denotes the total use value of a species, UV_s represents the use value cited by each informant for that species, and n_s is the total number of informants providing information on that species. A higher UV reflects greater acknowledgment and significance of the species within the community.

To facilitate interpretation, UV values were grouped into three categories, following previous ethnobotanical studies Saensouk *et al*.,[4] with slight modification to suit the context of this study:

High UV: ≥ 0.600 – species with very frequent use and high cultural importance

Medium UV: 0.400–0.599 – species used regularly but with moderate cultural importance

Low UV: < 0.400 – species known or used by few informants or for limited purposes

This classification allows a more precise comparison of species' relative significance in local traditions and everyday life.

Informant Consensus Factor (F_{ic})

The Informant Consensus Factor (F_{ic}) was calculated to evaluate the level of agreement among informants on the use of plants for particular purposes:[27]

$$F_{ic} = \frac{n_{ur} - n_t}{n_{ur} - 1} \quad (2)$$

In this formula, n_{ur} represents the total number of use reports for a given category, and n_t is the number of species used within that category. F_{ic} values range from 0 to 1, with higher values indicating stronger agreement among informants regarding the use of particular plant species for medicinal purposes.

Fidelity Level (FL)

The Fidelity Level (FL) indicates the proportion of informants who associate a plant species with a specific health condition relative to its general medicinal use. It was calculated as, [28]

$$FL = \frac{I_p}{I_u} \times 100$$

In this context, I_p represents the number of informants citing a plant for a specific ailment, while I_u is the total number of informants who reported any medicinal use of that plant. A higher FL value reflects stronger agreement on the use of the species for a particular health condition.

Results and Discussion

This study documented 77 cultivated edible plant species across 44 families and 69 genera, reflecting the rich ethnobotanical diversity of Sangkha District. The 77 plant species, genera, and families are presented in Table 1 and Figure 2. The families Fabaceae and Zingiberaceae were the most represented, each contributing 7 species (9.09%), followed by Cucurbitaceae with 5 species (6.49%). Six families—Apiaceae, Lamiaceae, Myrtaceae, Poaceae, Rutaceae, and Solanaceae—were moderately represented, each comprising 3 species (3.90%). Six families, namely Amaryllidaceae, Arecaceae, Bignoniaceae, Euphorbiaceae, Menispermaceae, and Moraceae, each contributed 2 species (2.60%). The remaining 28 families were represented by a single species (1.30%) each, indicating a broad taxonomic diversity but with relatively few species per family. This pattern highlights the dominance of a few families in terms of species richness while maintaining high overall family-level diversity in the study area. Figure 2 illustrates representative examples of cultivated edible plants traditionally used by the Kui ethnic group in Sangkha District. The images highlight the predominance of herbaceous and shrub species commonly grown in home gardens and smallholder farms, reflecting both the ecological adaptability and cultural preference for easily cultivated, multipurpose plants.

Table 1: Diversity of plant species used by the Kui Ethnic Group in Sangkha District, Surin Province, including their vernacular name, distribution, habit, used parts, utiliaation, use value (UV), and voucher number.

No.	Family	Scientific name	Vernacular name	Distribution in Thailand	Habit	Used parts	Utilisation	UV	Voucher no.
1.	Acanthaceae	*Thunbergia laurifolia* Lindl.	Rangchuet	Introduced	climber	LF, RT	MP	0.275	TJS0071
2.	Alismataceae	*Limnocharis flava* (L.) Buchenau	Phak Kan Chong	Introduced	herb	IF	FD	0.175	TJS0038
3.	Amaryllidaceae	*Allium cepa* L.	Hom Daeng	Introduced	herb	BU, LF	CF, FD	0.775	TJS0001
4.	Amaryllidaceae	*Allium sativum* L.	Krathiam	Introduced	herb	BU	CF, MP	0.800	TJS0002
5.	Anacardiaceae	*Mangifera indica* L.	Mamuang	Native	tree	FR	FT	0.850	TJS0040
6.	Annonaceae	*Annona squamosa* L.	Noina	Introduced	tree	FR	FT	0.700	TJS0007
7.	Apiaceae	*Anethum graveolens* L.	Phak Chilao	Introduced	herb	LF	FD	0.675	TJS0006
.	Apiaceae	*Centella asiatica* (L.) Urb.	Buabok	Native	herb	LF	FD, MP	0.275	TJS0017
9.	Apiaceae	*Coriandrum sativum* L.	Phakchi	Introduced	herb	LF, RT	CF, FD	0.725	TJS0027
10.	Apocynaceae	*Carissa carandas* L.	Mamuang Hao Manao Ho	Introduced	shrub	FR	FT	0.375	TJS0016

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11.	Araceae	*Colocasia esculenta* (L.) Schott	Bon	Native	herb	LF	FD	0.500	TJS0026
12.	Arecaceae	*Borassus flabellifer* L.	Tan	Introduced	tree	FR	FT	0.275	TJS0013
13.	Arecaceae	*Cocos nucifera* L.	Maphrao	Introduced	tree	FR	FT	0.900	TJS0025
14.	Asphodelaceae	*Aloe vera* (L.) Burm.f.	Wan Hangchorakhe	Introduced	herb	LF	MP	0.225	TJS0003
15.	Basellaceae	*Basella alba* L.	Phak Plung	Native	climber	LF	FD	0.175	TJS0011
16.	Bignoniaceae	*Oroxylum indicum* (L.) Kurz	Phe Ka	Native	tree	IF	FD	0.275	TJS0052
17.	Bignoniaceae	*Tecoma stans* (L.) Juss. ex Kunth	Thong Urai	Introduced	tree	IF, RT	FD, MP	0.175	TJS0070
18.	Bromeliaceae	*Ananas comosus* (L.) Merr.	Sapparot	Introduced	herb	FR	FT	0.475	TJS0005
19.	Cactaceae	*Selenicereus undatus* (Haw.) D.R.Hunt	Kaeo Mangkon Malako	Introduced	climber	FR	FT	0.950	TJS0061
20.	Caricaceae	*Carica papaya* L.	Malako	Introduced	tree	FR	FD, FT	0.700	TJS0015
21.	Commelinaceae	*Tradescantia spathacea* Sw.	Wan Kap Hoi Khraeng	Introduced	herb	IF, LF	MP	0.175	TJS0073
22.	Convolvulaceae	*Ipomoea aquatica* Forssk.	Phakbung	Native	herb	LF	FD	0.575	TJS0035
23.	Cucurbitaceae	*Coccinia grandis* (L.) Voigt	Tamlueng	Native	climber	LF	FD	0.425	TJS0024
24.	Cucurbitaceae	*Cucurbita maxima* Duchesne	Fakthong	Introduced	climber	FR	FD	0.450	TJS0029
25.	Cucurbitaceae	*Lagenaria siceraria* (Molina) Standl.	Nam Tao	Introduced	climber	FR	FD	0.375	TJS0037
26.	Cucurbitaceae	*Luffa aegyptiaca* Mill.	Buap Hom	Introduced	climber	FR	FD	0.400	TJS0039
27.	Cucurbitaceae	*Momordica charantia* L.	Mara Khi Nok	Native	climber	FR, LF	FD, MP	0.350	TJS0044
28.	Euphorbiaceae	*Cnidoscolus aconitifolius* (Mill.) I.M.Johnst.	Phak Chaiya	Introduced	shrub	LF	FD	0.150	TJS0023
29.	Euphorbiaceae	*Manihot esculenta* Crantz	Mansampalang	Introduced	shrub	RT	FD	0.275	TJS0041
30.	Fabaceae	*Clitoria ternatea* L.	Anchan	Introduced	climber	IF	FD, MP	0.325	TJS0022
31.	Fabaceae	*Psophocarpus tetragonolobus* (L.) DC.	Thua Phu	Introduced	climber	FR	FD	0.450	TJS0058
32.	Fabaceae	*Senegalia pennata* (L.) Maslin	Cha Om	Native	tree	LF	FD	0.425	TJS0062
33.	Fabaceae	*Senna siamea* (Lam.) H.S.Irwin & Barneby	Khilek	Native	tree	LF	FD, MP	0.525	TJS0063
34.	Fabaceae	*Sesbania grandiflora* (L.) Poir.	Khae	Introduced	tree	IF	FD	0.475	TJS0064
35.	Fabaceae	*Tamarindus indica* L.	Makham	Introduced	tree	FR	FT	0.850	TJS0069
36.	Fabaceae	*Vigna unguiculata* subsp. *sesquipedalis* (L.) Verdc.	Thuafakyao	Introduced	climber	FR	FD	0.575	TJS0074
37.	Hypericaceae	*Cratoxylum formosum* (Jack) Benth. & Hook.f. ex Dyer	Phak Tio	Native	tree	IF	FD	0.375	TJS0028
38.	Lamiaceae	*Melissa officinalis* L.	Saranae	Introduced	herb	LF	FD	0.525	TJS0043
39.	Lamiaceae	*Ocimum* × *africanum* Lour.	Horapha	Native	herb	LF	FD	0.550	TJS0050
40.	Lamiaceae	*Ocimum tenuiflorum* L.	Kaphrao	Native	herb	LF	FD	0.475	TJS0051

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41.	Lythraceae	*Punica granatum* L.	Thapthim	Introduced	tree	FR	FT	0.325	TJS0059
42.	Meliaceae	*Azadirachta indica* A.Juss.	Phak Sadao	Native	tree	IF, LF	FD, MP	0.275	TJS0010
43.	Menispermaceae	*Cissampelos pareira* L.	Khruea Ma Noi	Native	climber	LF	FD	0.425	TJS0018
44.	Menispermaceae	*Tiliacora triandra* (Colebr.) Diels	Yanang	Native	climber	LF	CF	0.450	TJS0072
45.	Moraceae	*Artocarpus heterophyllus* Lam.	Khanun	Introduced	tree	FR	FT	0.925	TJS0008
46.	Moraceae	*Morus alba* L.	Mon	Introduced	tree	FR	FT	0.350	TJS0047
47.	Moringaceae	*Moringa oleifera* Lam.	Ma Rum	Introduced	tree	FR, IF	FD	0.400	TJS0046
48.	Muntingiaceae	*Muntingia calabura* L.	Ta Khop	Introduced	tree	FR	FT	0.125	TJS0048
49.	Musaceae	*Musa acuminata* Colla	Kluai Hom	Native	herb	FR	FT	0.475	TJS0049
50.	Myrtaceae	*Psidium guajava* L.	Farang	Introduced	tree	FR	FT	0.350	TJS0057
51.	Myrtaceae	*Syzygium aqueum* (Burm.f.) Alston	Chomphu	Introduced	tree	FR	FT	0.325	TJS0067
52.	Myrtaceae	*Syzygium cumini* (L.) Skeels	Wa	Native	tree	FR	FT	0.250	TJS0068
53.	Oleaceae	*Jasminum sambac* (L.) Aiton	Mali	Introduced	shrub	IF, RT	MP	0.275	TJS0036
54.	Oxalidaceae	*Averrhoa carambola* L.	Mafueang	Introduced	tree	FR	FT	0.225	TJS0009
55.	Pandanaceae	*Pandanus amaryllifolius* Roxb. ex Lindl.	Toei Hom	Introduced	herb	LF	CF	0.400	TJS0054
56.	Phyllanthaceae	*Phyllanthus acidus* (L.) Skeels	Mayom	Introduced	tree	FR	FT	0.375	TJS0055
57.	Piperaceae	*Piper sarmentosum* Roxb.	Chaphlu	Native	herb	LF, RT	FD, MP	0.425	TJS0056
58.	Poaceae	*Cymbopogon citratus* (DC.) Stapf	Takhrai	Introduced	herb	LF	FD, MP	0.750	TJS0032
59.	Poaceae	*Oryza sativa* L.	Khao	Introduced	herb	SE	FD	1.000	TJS0053
60.	Poaceae	*Saccharum officinarum* L.	Oi	Introduced	herb	ST	FD	0.350	TJS0060
61.	Rhamnaceae	*Ziziphus mauritiana* Lam.	Phutsa	Native	tree	FR	FT	0.275	TJS0077
62.	Rubiaceae	*Morinda citrifolia* L.	Yo	Native	tree	FR	MP	0.850	TJS0045
63.	Rutaceae	*Citrus* × *aurantiifolia* (Christm.) Swingle	Manao	Introduced	shrub	FR	CF	0.750	TJS0019
64.	Rutaceae	*Citrus hystrix* DC.	Ma Krut	Native	shrub	FR	CF, MP	0.700	TJS0020
65.	Rutaceae	*Citrus maxima* (Burm.) Merr.	Som O	Native	tree	FR	FT	0.400	TJS0021
66.	Sapindaceae	*Dimocarpus longan* Lour.	Lamyai	Native	tree	FR	FT	0.475	TJS0033
67.	Sapotaceae	*Manilkara zapota* (L.) P.Royen	La Mut	Introduced	tree	FR	FT	0.125	TJS0042
68.	Solanaceae	*Capsicum annuum* L.	Phrik	Introduced	shrub	FR	CF	0.700	TJS0014
69.	Solanaceae	*Solanum torvum* Sw.	Makhuea Phuang	Introduced	shrub	FR	FD	0.600	TJS0065
70.	Solanaceae	*Solanum virginianum* L.	Makhuea Pro	Introduced	herb	FR	FD	0.650	TJS0066
71.	Zingiberaceae	*Alpinia galanga* (L.) Willd.	Kha	Native	herb	RZ	CF, FD, MP	0.800	TJS0004
72.	Zingiberaceae	*Boesenbergia rotunda* (L.) Mansf.	Kra Chai	Native	herb	RZ	CF, MP	0.775	TJS0012
73.	Zingiberaceae	*Curcuma comosa* Roxb.	Wan Chak Motluk	Native	herb	RZ	MP	0.600	TJS0030

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74.	Zingiberaceae	*Curcuma longa* L.	Khamin	Introduced	herb	RZ	CF, MP	0.550	TJS0031
75.	Zingiberaceae	*Etlingera elatior* (Jack) R.M.Sm.	Da La	Native	herb	IF, RZ	FD, MP	0.525	TJS0034
76.	Zingiberaceae	*Zingiber montanum* (J.Koenig) Link ex A.Dietr.	Wan Phlai	Native	herb	RZ	MP	0.450	TJS0075
77.	Zingiberaceae	*Zingiber officinale* Roscoe	Khing	Introduced	herb	FR, RT, RZ	CF, MP	0.475	TJS0076

Note: Used parts; BU=bulb, FR=fruit, IF=inflorescence, LF=leaf, RT=root, RZ=rhizome, SE=seed, ST=shoot. Utilization; CF=condiments and flavoring, FD=food, FT=fruits, MP=medicinal edible plants.

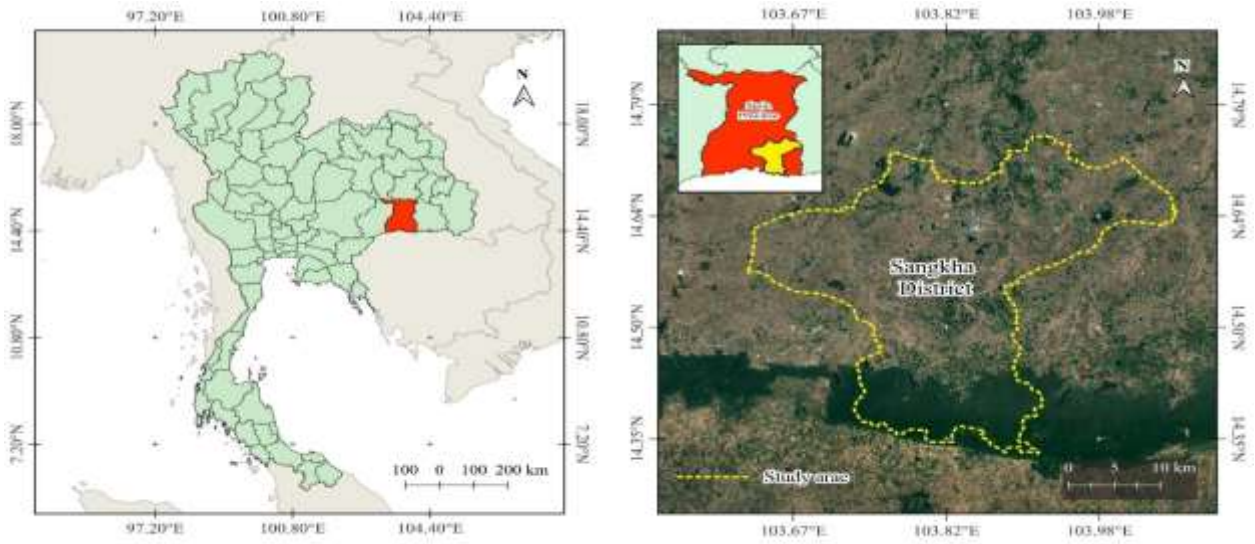

Figure 1: Map showing the study area in Sangkha District, Surin Province, Thailand (map created with "QGIS" program ver. 3.34, geographic system ID: WGS 84, EPSG 4326 designed by Phiphat Sonthongphithak, Diversity of Family Zingiberaceae and Vascular Plant for Its Applications Research Unit, Mahasarakham University).

Figure 2: Examples of cultivated edible plants traditionally used by the Kui Ethnic Group in Sangkha District, Surin Province. (Photograph by Tammanoon Jitpromma, Walai Rukhavej Botanical Research Institute, Mahasarakham University).

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Of the 77 recorded plant species, 48 species (62.34%) were identified as introduced, while 29 species (37.66%) were classified as native to Thailand. This distribution reflects a greater reliance on introduced species within the study area, though native species still contribute substantially to the overall ethnobotanical diversity.

Analysis of plant habits revealed that herbs and trees were equally dominant, each accounting for 28 species (36.36%). Climbers represented 13 species (16.89%), while shrubs contributed 8 species (10.39%). This distribution indicates a balanced representation of life forms, with herbs and trees being the primary growth habits utilised by local communities.

A detailed inventory of plant species and their associated use values (UV) within the study area is provided in Table 1. Species with high use values (≥ 0.600) are considered particularly important due to their prominent roles in cultural traditions, culinary practices, and medicinal applications. Among these, *Oryza sativa* has the highest UV (1.000), reflecting its central role as a staple food. Other species with high UVs include *Selenicereus undatus* (0.950), *Artocarpus heterophyllus* (0.925), *Cocos nucifera* (0.900), *Mangifera indica* (0.850), and *Tamarindus indica* (0.850), highlighting their importance in local diets, traditional medicine, and cultural practices. Additionally, species such as *Allium sativum* (0.800), *Alpinia galanga* (0.800), *A. cepa* (0.775), and *Cymbopogon citratus* (0.750) also show high UVs, indicating widespread utilisation for both medicinal and culinary purposes.

Species falling within the medium-use value range (0.400–0.599) offer moderate benefits to the community. Examples include *Ipomoea aquatica* (0.575), *Curcuma longa* (0.550), *Zingiber officinale* (0.475), and *Coccinia grandis* (0.425), which are utilised for diverse purposes such as culinary use, traditional medicine, and everyday household activities.

Species with low use values (< 0.400) are more specialised or less frequently utilised. This group includes *Thunbergia laurifolia* (0.275), *Azadirachta indica* (0.275), *Jasminum sambac* (0.275), *Ziziphus mauritiana* (0.275), *Aloe vera* (0.225), *Averrhoa carambola* (0.225), and *Muntingia calabura* (0.125). While these plants may have specific or localised applications, their use is not as widespread in the community.

The utilisation of cultivated edible plants was also evaluated in this survey, of which a total of 12 species from 7 families were identified as condiments and flavoring agents (Table 1). Zingiberaceae was the most prominent family, represented by 4 species, underscoring its key role in imparting aroma and taste to local dishes. Both Amaryllidaceae and Rutaceae contributed to 2 species each, while Apiaceae, Menispermaceae, Pandanaceae, and Solanaceae were each represented by a single species. This pattern reflects the community's reliance on a variety of plant families to enhance the flavor and culinary quality of traditional cuisine. Details on the plant parts used and their preparation methods are provided in Table 2.

Among the species used as condiments and flavoring (Figure 3), the rhizome was the most frequently utilised part (33.33%), followed by the fruit (25.00%). The bulb and leaf were used equally (16.67% each), while the root was the least commonly used part (8.33%). Figure 3 clearly illustrates this dominance of underground storage organs, particularly rhizomes, reflecting their importance as key flavoring components in local cooking traditions.

Table 2: Plants are used as condiments and flavoring, and their methods of use.

No.	Scientific name	Used parts	Method of use
1.	*Allium cepa* L.	Bulb	Chopped or sliced as seasoning in soups, curries, stir-fries, and sauces
2.	*Allium sativum* L.	Bulb	Crushed, chopped, or ground as a flavor in soups, stir-fries, curries, and marinades
3.	*Alpinia galanga* (L.) Willd.	Rhizome	Sliced, crushed, or pounded for curries, soups, and spice pastes
4.	*Boesenbergia rotunda* (L.) Mansf.	Rhizome	Crushed or ground to enhance aroma and taste in chili pastes, soups, and curries
5.	*Capsicum annuum* L.	Fruit	Fresh or dried, chopped, or ground to add heat in curries, sauces, and condiments
6.	*Citrus* × *aurantiifolia* (Christm.) Swingle	Fruit	Juice or zest is used to add sour flavor to soups, sauces, and marinades
7.	*Citrus hystrix* DC.	Fruit	Fruit peel or zest is used to flavor curries, soups, and salads
8.	*Coriandrum sativum* L.	Root	Ground or pounded into pastes for curry bases and seasoning sauces
9.	*Curcuma longa* L.	Rhizome	Dried, powdered, or fresh rhizome used in curries, soups, and spice blends
10.	*Pandanus amaryllifolius* Roxb. ex Lindl.	Leaf	Used whole or shredded to impart aroma to desserts, rice, and savory dishes
11.	*Tiliacora triandra* (Colebr.) Diels	Leaf	Crushed or pounded and added to soups and spicy pastes
12.	*Zingiber officinale* Roscoe	Rhizome	Sliced, crushed, or ground to flavor curries, stir-fries, soups, and beverages

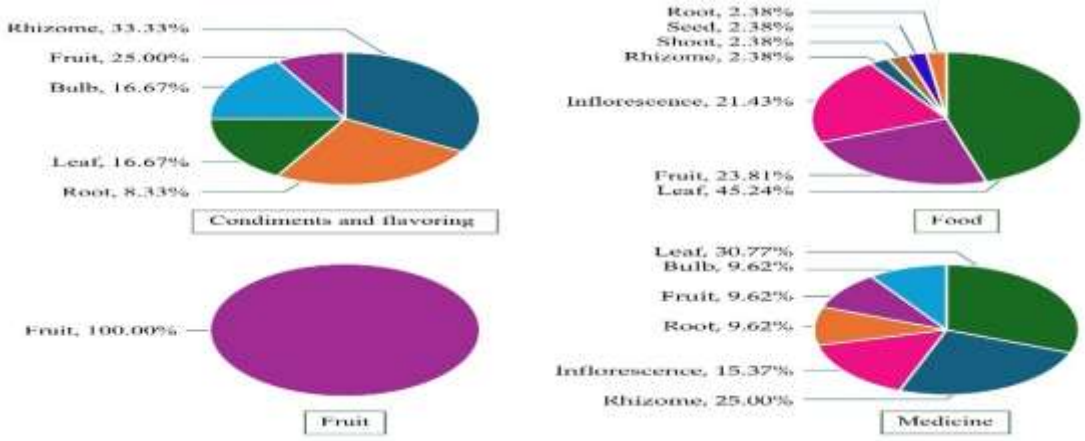

Figure 3: Relative percentage of plant parts utilised in traditional practices across different use categories.

Also, 39 species from 20 families were used as food sources (Table 1). The family Fabaceae was the most represented with 6 species, followed by Cucurbitaceae with 5 species. Apiaceae, Lamiaceae, and Poaceae each contributed 3 species, while Bignoniaceae, Euphorbiaceae, Solanaceae, and Zingiberaceae were represented by 2 species each. The remaining families—Alismataceae, Amaryllidaceae, Araceae, Basellaceae, Caricaceae, Convolvulaceae, Hypericaceae, Meliaceae, Menispermaceae, Moringaceae, and Piperaceae—were each represented by a single species. This distribution demonstrates the community's reliance on a broad range of plant families to meet nutritional needs and support dietary diversity. Details regarding the plant parts employed and their modes of utilisation are provided in Table 3.

Table 3: Plants are used as food, and their uses.

No.	Scientific name	Used parts	Method of use
1.	*Allium cepa* L.	Leaf	Eaten raw as garnish, added fresh to salads, soups, or stir-fries
2.	*Alpinia galanga* (L.) Willd.	Rhizome	Sliced or crushed as a spice in curries, soups, and chili pastes
3.	*Anethum graveolens* L.	Leaf	Fresh leaves are used as seasoning in soups, salads, and fish dishes
4.	*Azadirachta indica* A.Juss.	Inflorescence, Leaf	Young leaves and flowers are eaten fresh or boiled.
5.	*Basella alba* L.	Leaf	Cooked in soups, stir-fried, or used in curries for a thick texture
6.	*Carica papaya* L.	Fruit	Ripe fruit eaten fresh as dessert; unripe fruit shredded for salads (som tam) or cooked in curries
7.	*Centella asiatica* (L.) Urb.	Leaf	Eaten fresh as salad, inside dishes, or blended into herbal drinks
8.	*Cissampelos pareira* L.	Leaf	The juice is extracted, which then solidifies into a jelly-like form and is used in cooking.
9.	*Clitoria ternatea* L.	Inflorescence	Flowers used for coloring rice, drinks, and desserts
10.	*Cnidoscolus aconitifolius* (Mill.) I.M.Johnst.	Leaf	Boiled to remove toxins, eaten as a leafy vegetable in soups or stir-fries
11.	*Coccinia grandis* (L.) Voigt	Leaf	Young leaves cooked in curries, stir-fries, or soups
12.	*Colocasia esculenta* (L.) Schott	Leaf	Cooked in curries and stews after thorough boiling to remove acridity
13.	*Coriandrum sativum* L.	Leaf	Used fresh as garnish in soups, curries, salads, and dipping sauces
14.	*Cratoxylum formosum* (Jack) Benth. & Hook.f. ex Dyer	Inflorescence	Young flowers are eaten fresh with chili paste or in soups
15.	*Cucurbita maxima* Duchesne	Fruit	Cooked as a vegetable in soups, curries, stir-fries, or desserts
16.	*Cymbopogon citratus* (DC.) Stapf	Leaf	Crushed and boiled in soups, curries, and herbal teas for flavor
17.	*Etlingera elatior* (Jack) R.M.Sm.	Inflorescence	Used as a condiment in curries, chili pastes, and salads
18.	*Ipomoea aquatica* Forssk.	Leaf	Stir-fried, boiled, or used in soups as a common leafy vegetable
19.	*Lagenaria siceraria* (Molina) Standl.	Fruit	Cooked in curries, soups, or stir-fried
20.	*Limnocharis flava* (L.) Buchenau	Inflorescence	Young flowers are eaten blanched with chili paste or in soups
21.	*Luffa aegyptiaca* Mill.	Fruit	Cooked in soups and stir-fries as a soft vegetable
22.	*Manihot esculenta* Crantz	Root	Tubers can be boiled, steamed, fried, or made into desserts
23.	*Melissa officinalis* L.	Leaf	Used fresh teas, herbal drinks, and as a seasoning
24.	*Momordica charantia* L.	Leaf, Fruit	Young leaves are boiled in soups; fruits are cooked in curries or stuffed and stir-fried.
25.	*Moringa oleifera* Lam.	Fruit, Inflorescence	Young pods cooked in curries and soups; flowers eaten as a vegetable
26.	*Ocimum* × *africanum* Lour.	Leaf	Eaten fresh with curries, used in soups and stir-fries
27.	*Ocimum tenuiflorum* L.	Leaf	Used fresh as a garnish, or in herbal teas and curries
28.	*Oroxylum indicum* (L.) Kurz	Inflorescence	Flowers eaten fresh, boiled, or roasted as a vegetable
29.	*Oryza sativa* L.	Seed	Cooked as staple food (rice), made into noodles, desserts, or fermented products
30.	*Piper sarmentosum* Roxb.	Leaf	Used fresh for wrapping food, in salads, curries, and soups
31.	*Psophocarpus tetragonolobus* (L.) DC.	Fruit	Young pods are eaten fresh, boiled, stir-fried, or in curries
32.	*Saccharum officinarum* L.	Shoot	Chewed raw for juice or boiled to make sugar and desserts
33.	*Senegalia pennata* (L.) Maslin	Leaf	Young leaves are eaten fresh, in omelets, soups, or curries

34.	*Senna siamea* (Lam.) H.S.Irwin & Barneby	Leaf	Boiled to remove bitterness, then cooked in curries
35.	*Sesbania grandiflora* (L.) Poir.	Inflorescence	Flowers eaten fresh, in soups, omelets, or curries
36.	*Solanum torvum* Sw.	Fruit	Small fruits cooked in curries or stir-fried
37.	*Solanum virginianum* L.	Fruit	Cooked in curries or fried as a side dish
38.	*Tecoma stans* (L.) Juss. ex Kunth	Inflorescence	Flowers are eaten fresh or boiled as a vegetable
39.	*Vigna unguiculata* subsp. *sesquipedalis* (L.) Verdc.	Fruit	Long pods cooked in stir-fries, curries, or soups

Among the species used as food, the leaf was the most utilised part (45.24%), followed by the fruit (23.81%) and inflorescence (21.43%). Other plant parts, including rhizome, root, seed, and shoot, were less frequently used (2.38% each) (Figure 3). The trend visible in Figure 3 shows the predominance of leafy vegetables and edible flowers in the local diet, emphasising their nutritional importance and versatility in daily meals.

The study also revealed that 23 species belonging to 19 families were utilised as fruits (Table 1). The family Myrtaceae was the most represented, with 3 species, followed by Arecaceae and Moraceae, each contributing 2 species. The remaining families—Anacardiaceae, Annonaceae, Apocynaceae, Bromeliaceae, Cactaceae, Caricaceae, Fabaceae, Lythraceae, Muntingiaceae, Musaceae, Oxalidaceae, Phyllanthaceae, Rhamnaceae, Rutaceae, Sapindaceae, and Sapotaceae—were each represented by a single species. This distribution highlights the diversity of plant families providing fruits, which serve as important nutritional and dietary resources for the community. For all species used as fruits (Figure 3), the fruit was the sole part utilised (100%). As illustrated in Figure 3, fruits constitute a distinct and exclusive use category, emphasising their central role as fresh and energy-rich food sources in the local diet.

Furthermore, among the edible plants surveyed, 24 species belonging to 17 families were utilised for medicinal purposes (Table 1). The family Zingiberaceae was the most represented, with 7 species, highlighting its prominent role in traditional health care. Both Amaryllidaceae and Fabaceae contributed 2 species each. The remaining families—Acanthaceae, Apiaceae, Asphodelaceae, Bignoniaceae, Commelinaceae, Cucurbitaceae, Meliaceae, Menispermaceae, Oleaceae, Piperaceae, Poaceae, Rubiaceae, and Rutaceae—were each represented by a single species. This distribution illustrates the community's reliance on a diverse range of plant families for treating various health conditions and maintaining overall well-being. Among the species studied, the leaf was the most frequently used part (30.77%), followed by the rhizome (25.00%) and inflorescence (15.37%). Other plant parts, including bulbs, fruit, and root, were less commonly used (9.62% each) (Figure 3). Figure 3 reveals that medicinal plants are dominated by leafy and rhizomatous species, reflecting their accessibility and multifunctional properties within traditional health practices.

Also, Fidelity Level (FL) was analysed to assess the extent of agreement among informants regarding the medicinal uses of plant species. It measures the percentage of participants who report a specific use for a given species, reflecting both its cultural significance and the perceived effectiveness of that use in local healthcare practices. In this study (Table 4), several species exhibited high FL values, indicating strong agreement among informants on their primary therapeutic uses. *Citrus hystrix* showed a maximum FL of 87.50% for relieving abdominal discomfort and flatulence, reflecting a strong cultural consensus on its gastrointestinal benefits. Similarly, *Morinda citrifolia* demonstrated an FL of 87.50% for carminative purposes, while *Piper sarmentosum* recorded the highest FL of 88.89% for expectorant activity and respiratory tract support. *Etlingera elatior* and *Zingiber montanum* showed FL values of 80.00%, indicating high agreement for their use in gastrointestinal disorders and gynecological care, respectively. Species with moderate FL values (50–75%) included *Thunbergia laurifolia* (66.67% for antidote and 33.33% for gynecological use), *Allium sativum* (66.67% for gastrointestinal use), *Alpinia galanga* (50% each for gastrointestinal and dermatological purposes), *Curcuma comosa* (50%–30% for gastrointestinal and gynecological uses), *Centella asiatica* (62.50% for musculoskeletal and 37.50% for infection management), and *Clitoria ternatea* (50%–16.67% for urinary, gastrointestinal, and infection-related uses). These values suggest a moderate degree of consensus, reflecting either multifunctionality or variation in informant experience with these species.

Lower FL values (<50%) were generally associated with species reported for multiple therapeutic applications, resulting in divided consensus. For example, *Allium cepa* had FLs of 71.43% for gastrointestinal use and 28.57% for treating infections, while *Aloe vera* recorded 57.14% for skin applications and 42.86% for infection management. Likewise, *Tradescantia spathacea* showed FLs of 77.78% for infection control and 22.22% for dermatological use. Such variability highlights the complex traditional knowledge systems and multifunctional roles of these plants in local healthcare practices. Table 4 presents a detailed summary of the plant species, their used parts, preparation methods, therapeutic applications, and associated FL values.

The Informant Consensus Factor (F_{ic}) was also evaluated. The F_{ic} values reflect the level of agreement among informants regarding the use of plant species for specific therapeutic categories. High F_{ic} values (close to 1) indicate strong consensus and suggest that these plants are widely recognised for their efficacy within the community. In this study (Table 5), the Nervous system and Musculoskeletal and joint diseases categories exhibited the highest consensus (F_{ic} = 1.00), although they involved relatively few species. The Gastrointestinal and Toxicology categories also showed high consensus (F_{ic} = 0.80), underscoring their importance in local ethnomedicinal practices. Plants used for Infection, Parasite, and Immune system disorders demonstrated strong agreement among informants (F_{ic} = 0.78), followed by Obstetrics, Gynaecology, and urinary disorders (F_{ic} = 0.74). The Skin category had the lowest consensus (F_{ic} = 0.65), reflecting more diverse opinions among informants regarding species used for dermatological purposes.

This study showed that the families Fabaceae and Zingiberaceae were the most represented, consistent with their widespread importance in tropical and subtropical regions for both nutritional and medicinal purposes.[29] This finding is in agreement with the study of Wannakham et al.,[30] who reported that Fabaceae was the most frequently cited family, followed by Zingiberaceae, among the Thai Phuan ethnic group in Ban Phue District, Udon Thani Province. Such similarities highlight the shared ethnobotanical patterns across ethnic communities in Northeastern Thailand, where these families are culturally valued for their versatile uses as food ingredients, traditional medicines, and ritual plants.

Interestingly, this study revealed a higher proportion of introduced species (62.34%) than native species (37.66%), highlighting the significant role of historical crop diffusion, trade, and cultural integration in shaping the contemporary ethnobotanical landscape. Similar patterns have been reported in other ethnobotanical studies from northeastern Thailand, where introduced crops such as Allium sativum, Annona squamosa, and Zingiber officinale have become deeply embedded in local food systems and cultural traditions.[31] In contrast, native species—though fewer in number—remain integral to traditional diets, rituals, and local ecological knowledge, reflecting long-term adaptation to regional environments. These findings suggest that both introduced and native species are indispensable to the resilience of local food traditions, with introduced plants contributing to dietary diversification and economic value, while native species preserve cultural identity and support ecosystem sustainability.[32,33]

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Table 4: Fidelity Level (FL) of medicinal plants of the Kui Ethnic Group in Sangkha District, Surin Province

No.	Scientific name	I_u	I_p	FL	Used parts	Preparation	Therapeutic uses and health benefits	Therapeutic categories
1.	*Thunbergia laurifolia* Lindl.	4	6	66.67	Root	Decoction	Traditionally used as an antidote for poisons and toxic substances	Toxicology
		2	6	33.33	Leaf	Decoction	Traditionally used to regulate irregular menstruation	Obstetrics, Gynaecology, and urinary disorders
2.	*Allium cepa* L.	5	7	71.43	Bulb	Decoction	Traditionally used to relieve flatulence, reduce bloating, and alleviate abdominal discomfort.	Gastrointestinal
		2	7	28.57	Bulb	Consumed	Traditionally used to relieve the common cold and nasal congestion	Infection, Parasite, and the Immune system.
3.	*Allium sativum* L.	6	9	66.67	Bulb	Consumed	Traditionally used to relieve abdominal colic, bloating, and indigestion	Gastrointestinal
		2	9	22.22	Bulb	Use externally	Traditionally used as a topical treatment for insect, centipede, or scorpion stings.	Toxicology
		1	9	11.11	Bulb	Consumed	Traditionally used to promote postpartum uterine cleansing in women	Obstetrics, Gynaecology, and urinary disorders
4.	*Aloe vera* (L.) Burm.f.	4	7	57.14	Leaf	The plant material is crushed and mixed with alcohol	Applied topically to treat abscesses	Skin
		3	7	42.86	Leaf	Decoction	Used to treat gonorrhea and sexually transmitted infections	Infection, Parasite, and the Immune system
5.	*Alpinia galanga* (L.) Willd.	3	6	50.00	Rhizome	Consumed	Traditionally used for the management of digestive disorders, including indigestion, abdominal distension, and discomfort.	Gastrointestinal
		3	6	50.00	Rhizome	Crushed and mixed with lime juice, then applied topically to the skin	Traditionally used to manage dermatological conditions such as ringworm, itchy skin eruptions, and hives	Skin
6.	*Azadirachta indica* A.Juss.	3	4	75.00	Leaf	Consumed	Traditionally used for the treatment and removal of intestinal worms and parasitic infections.	Infection, Parasite, and the Immune system
		1	4	25.00	Inflorescence	Consumed	Traditionally used to promote the expulsion of gas and relieve abdominal discomfort caused by flatulence.	Gastrointestinal
7.	*Boesenbergia rotunda* (L.) Mansf.	6	9	66.67	Rhizome	Consumed	Traditionally used for the management of dizziness, lightheadedness, or vertigo.	Nervous system
		3	9	33.33	Rhizome	Consumed	Traditionally used to enhance hair strength and overall health, reverse graying, stimulate	Skin

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							hair growth in thinning areas, and prevent hair loss.	
8.	*Centella asiatica* (L.) Urb.	5	8	62.50	Leaf	Squeeze	Traditionally used to relieve internal bruising and inflammation	Musculoskeletal and joint diseases
		3	8	37.50	Leaf	Consumed	Used to reduce fever and relieve headache	Infection, Parasite, and the Immune system
9.	*Citrus hystrix* DC.	7	8	87.50	Fruit	Decoction	Traditionally used to promote the expulsion of gas and relieve abdominal discomfort caused by flatulence.	Gastrointestinal
		1	8	12.50	Fruit	Use externally	Traditionally used to improve hair health, enhance shine, and maintain overall hair strength.	Skin
10.	*Clitoria ternatea* L.	6	12	50.00	Inflorescence	Consumed	Traditionally used to increase urine output and support urinary system health.	Obstetrics, Gynaecology, and urinary disorders
		4	12	33.33	Inflorescence	Consumed	Traditionally used to promote bowel movements and support digestive health by relieving constipation.	Gastrointestinal
		2	12	16.67	Inflorescence	Consumed	Used to reduce fever and relieve headache	Infection, Parasite, and the Immune system
11.	*Curcuma comosa* Roxb.	5	10	50.00	Rhizome	Decoction	Traditionally used for the management of bloating, abdominal fullness, and related digestive disturbances.	Gastrointestinal
		3	10	30.00	Rhizome	Decoction	Traditionally used for the regulation of menstruation, including inducing menstrual bleeding in women with irregular cycles.	Obstetrics, Gynaecology, and urinary disorders
		2	10	20.00	Rhizome	Decoction	Traditionally used for the management of digestive discomfort, including bloating, fullness, and indigestion.	Gastrointestinal
12.	*Curcuma longa* L.	6	8	75.00	Rhizome	Dried in sunlight, powdered, mixed with honey, and prepared as pills	Traditionally employed to alleviate bloating, flatulence, abdominal pain, and indigestion	Gastrointestinal
		2	8	25.00	Rhizome	Dried in sunlight, powdered, mixed with honey, and prepared as pills	Traditionally used to treat dyspepsia, particularly symptoms of bloating, nausea, and abdominal discomfort	Gastrointestinal
13.	*Cymbopogon citratus* (DC.) Stapf	7	9	77.78	Leaf	Decoction	Traditionally used to reduce fever	Infection, Parasite, and the Immune system

		2	9	22.22	Leaf	Decoction	Traditionally employed to relieve abdominal discomfort, particularly bloating and flatulence, and to promote healthy digestion.	Gastrointestinal
14.	*Etlingera elatior* (Jack) R.M.Sm.	8	10	80.00	Inflorescence	Decoction	Traditionally used for the management of digestive disorders, including flatulence, abdominal distension, and diarrhea.	Gastrointestinal
		2	10	20.00	Rhizome	Crushed and mixed with alcohol, the extract is applied to the skin	Traditionally used to relieve urticaria and related allergic skin reactions	Skin
15.	*Jasminum sambac* (L.) Aiton	5	8	62.50	Inflorescence	Decoction	Traditionally used to reduce fever	Infection, Parasite, and the Immune system
		3	8	37.50	Root	Decoction	Traditionally used as an emmenagogue to stimulate or regulate menstrual flow in women with irregular cycles.	Obstetrics, Gynaecology, and urinary disorders
16.	*Momordica charantia* L.	4	6	66.67	Leaf	Decoction	Traditionally used to relieve gastric disorders and alleviate symptoms associated with gastritis.	Gastrointestinal
		2	6	33.33	Leaf	Decoction	Traditionally used as an anthelmintic to expel intestinal parasites	Infection, Parasite, and the Immune system
17.	*Morinda citrifolia* L.	7	8	87.50	Fruit	Consumed	Traditionally used as a carminative to relieve flatulence and promote the expulsion of intestinal gas.	Gastrointestinal
		1	8	12.50	Fruit	Consumed	Traditionally used as an emmenagogue to regulate menstruation and expel retained menses.	Obstetrics, Gynaecology, and urinary disorders
18.	*Piper sarmentosum* Roxb.	8	9	88.89	Leaf	Consumed	Traditionally used as an expectorant to expel phlegm and clear the respiratory tract.	Infection, Parasite, and the Immune system
		1	9	11.11	Root	Decoction	Traditionally used to relieve abdominal bloating and distension, and to expel intestinal gas.	Gastrointestinal
19.	*Senna siamea* (Lam.) H.S.Irwin & Barneby	6	9	66.67	Leaf	Decoction	Traditionally used as a laxative to relieve constipation	Gastrointestinal
		3	9	33.33	Leaf	Boiled and used as a bath	Traditionally used to treat skin diseases and to eliminate fungal infections.	Skin
20.	*Tecoma stans* (L.) Juss. ex Kunth	5	8	62.50	Inflorescence	Decoction	Traditionally used to reduce fever	Infection, Parasite, and the Immune system
		3	8	37.50	Root	Decoction	Traditionally used as a diuretic, to enhance vitality, and to treat urinary tract disorders.	Obstetrics, Gynaecology,

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								and urinary disorders
21.	*Tiliacora triandra* (Colebr.) Diels	5	7	71.43	Leaf	Decoction	Traditionally used to relieve constipation and reduce abdominal burning or discomfort.	Gastrointestinal
		2	7	28.57	Leaf	Decoction	Traditionally used as an expectorant to expel phlegm and clear the respiratory tract.	Infection, Parasite, and the Immune system
22.	*Tradescantia spathacea* Sw.	7	9	77.78	Inflorescence	Decoction	Traditionally used to relieve cold symptoms and cough	Infection, Parasite, and the Immune system
		2	9	22.22	Leaf	Use externally	Traditionally used to treat skin diseases and relieve itching	Skin
23.	*Zingiber montanum* (J.Koenig) Link ex A.Dietr.	8	10	80.00	Rhizome	Decoction	Traditionally used to eliminate impure blood and regulate menstruation in women.	Obstetrics, Gynaecology, and urinary disorders
		2	10	20.00	Rhizome	Decoction	Traditionally used to relieve bloating, abdominal pain, constipation, vomiting, and toothache.	Gastrointestinal
24.	*Zingiber officinale* Roscoe	7	14	50.00	Rhizome	Consumed	Traditionally employed as a restorative tonic to stimulate digestion and promote overall bodily balance.	Gastrointestinal
		5	14	35.71	Fruit	Decoction	Traditionally employed to soothe throat dryness and alleviate a sore throat.	Infection, Parasite, and the Immune System
		2	14	14.29	Root	Decoction	Traditionally employed to expel phlegm and promote respiratory clearance	Infection, Parasite, and the Immune System

Table 5: Informant Consensus Factor (F_{ic})

Therapeutic categories	Number of use reports (n_{ur})	Number of species (n_t)	F_{ic}
Nervous system	6	1	1.00
Musculoskeletal and joint diseases	5	1	1.00
Toxicology	6	2	0.80
Gastrointestinal	86	18	0.80
Infection, Parasite, and the Immune System	56	13	0.78
Obstetrics, Gynaecology, and urinary disorders	24	7	0.74
Skin	18	7	0.65

Note: F_{ic}= Informant Consensus Factor.

The balanced distribution of growth habits, with herbs and trees equally dominant, indicates a dual strategy for subsistence: annual herbs for short-term food and medicinal needs and perennial trees for long-term nutrition, medicine, and cultural purposes. This pattern suggests that local communities actively manage both ecological and cultural dimensions of plant diversity, an aspect rarely quantified in previous studies of cultivated edible plants.[34] Use value (UV) analysis highlights species that are central to local livelihoods and cultural practices. In this study, Oryza sativa exhibited the highest UV, confirming its well-established role as a dietary staple, consistent with findings from Saensouk et al.[4] in Yasothon Province and Phatlamphu et al.[35] in Kalasin Province, where rice has been consistently reported as the cornerstone of local food systems.

Fruit-bearing trees such as Artocarpus heterophyllus, Mangifera indica, and Tamarindus indica also showed high UVs, reflecting their multifunctional roles in nutrition, medicine, and cultural rituals, in agreement with ethnobotanical studies from Kalasin, Nakhon Phanom, and Yasothon Provinces.[4,35-37] Species with high UVs like Allium sativum, Alpinia galanga, and Cymbopogon citratus demonstrate an overlap between culinary and medicinal uses, exemplifying the "food-medicine continuum," a concept increasingly recognised in ethnopharmacological research in the region.[38-40] Medium and low UV

species likely reflect localised or seasonal knowledge, highlighting gaps in community utilisation that could inform conservation priorities.[41]

Condiments and flavoring species were dominated by Zingiberaceae, illustrating reliance on aromatic rhizomes to enhance traditional dishes. The preference for underground storage organs and fruits aligns with both flavor intensity and year-round availability, suggesting a strategic selection for high-impact culinary components.[42] For general food purposes, leaves, fruits, and inflorescences were most frequently used, reflecting their nutritional value, versatility, and ease of harvest.[43] Fruits were exclusively utilised as edible components, emphasising their role as micronutrient-rich dietary supplements.[44]

Medicinally, members of the Zingiberaceae family again dominated, reaffirming their well-documented pharmacological significance, particularly in the treatment of gastrointestinal and inflammatory disorders. This pattern aligns with previous ethnobotanical studies conducted in northeastern Thailand, such as those in Mae Hong Son and Nakhon Phanom Province, where species like Alpinia galanga, Curcuma longa, and Zingiber officinale were among the most frequently cited medicinal plants.[45,46] Leaves, rhizomes, and flowers were the most commonly utilised plant parts, consistent with their known richness in bioactive secondary metabolites, including essential oils and phenolic compounds.[47] The observed diversity in plant parts and preparation methods reflects a sophisticated understanding of species-specific efficacy, suggesting that Kui traditional knowledge integrates empirical experience with intergenerational wisdom.[48]

High fidelity-level (FL) values recorded for particular species indicate strong agreement among informants regarding their therapeutic efficacy, thereby identifying them as promising candidates for pharmacological validation.[49-51] In northeastern Thailand, species such as Citrus hystrix and Piper sarmentosum have been widely cited in ethnobotanical surveys of wild herbs and spices, particularly for digestive and infection-related conditions.[52] Although precise FL values for Morinda citrifolia in this region are less well documented, its broad traditional use suggests further study is warranted. Reports across the region show that multifunctional species often achieve only moderate FL values, reflecting the adaptation of local knowledge systems. In contrast, plants with many divergent uses (multipurpose) tend to show lower FL, illustrating the contextual variation in community health practices.[53] F_{ic} analyses further support this interpretation: high consensus in Nervous system and Musculoskeletal disorders categories points to culturally entrenched treatments, whereas lower consensus in dermatological uses suggests individualised or context-dependent applications.[54]

This study makes several novel contributions to the field of ethnobotany. First, the quantified prevalence of introduced versus native cultivated edible species sheds light on cultural and ecological dynamics that are rarely addressed in similar studies, highlighting how historical trade and cultivation practices shape local plant use. Secondly, by integrating use value (UV), fidelity level (FL), and informant consensus factor (F_{ic}) analyses across culinary, medicinal, and multipurpose plant categories, the study provides a more holistic understanding of plant importance, moving beyond single-use assessments. Thirdly, the observed patterns of plant part utilisation reflect strategic selection for nutritional and pharmacological efficacy, suggesting that local communities possess implicit biochemical knowledge of plant utility. Importantly, these cultivated edible plants play a key role in sustaining traditional food culture and supporting local livelihoods, serving not only as dietary staples and flavoring agents but also as sources of income, cultural identity, and intergenerational knowledge transmission. Based on the findings of this study, several avenues for future research are recommended. First, phytochemical and pharmacological investigations of species with high fidelity level (FL) and use value (UV) should be conducted to validate their bioactivity and explore potential therapeutic applications. Second, nutritional profiling of commonly consumed leaves, fruits, and rhizomes would provide insights into their contributions to local diets and micronutrient intake. Third, longitudinal studies examining seasonal availability and consumption patterns could clarify how ecological and climatic factors influence ethnobotanical practices. Fourth, socio-cultural research focusing on knowledge transmission, including gendered differences in plant use, is essential for preserving intangible cultural heritage. Finally, agroecological studies investigating interactions between native and introduced species would support the development of optimised cultivation strategies, promoting both biodiversity conservation and local food security.

Conclusion

This study documented a rich diversity of 77 cultivated edible plant species across 44 families in Sangkha District, highlighting the intricate relationships between local communities and their plant resources. The dominance of Fabaceae and Zingiberaceae, alongside the balanced representation of herbs, trees, shrubs, and climbers, reflects both cultural preferences and ecological suitability in plant selection. The higher proportion of introduced species underscores the influence of historical crop diffusion and trade, while native species continue to maintain cultural identity and contribute to ecosystem resilience. Use value, fidelity level, and informant consensus factor analyses revealed species of central importance to local livelihoods, diets, and healthcare. Most of the plants studied demonstrate the intertwined roles of nutrition, medicine, and cultural practices, with strong community consensus on their therapeutic efficacy, medicinal and biochemical properties, guiding strategic use for culinary and medicinal purposes. The findings from this study revealed that cultivated edible plants serve as pillars of traditional food culture and local livelihoods, offering novel insights into the holistic evaluation of plant importance by combining cultural, nutritional, and medicinal dimensions.

Conflict of Interest

The authors declare no conflict of interest.

Authors' Declaration

The authors hereby declare that the work presented in this article is original and that any liability for claims relating to the content of this article will be borne by them.

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