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Economic value assessment of edible plants in Muang District, Kalasin Province, Thailand

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[2]Diversity of Family Zingiberaceae and Vascular Plant for Its Applications Research Unit, Department of Biology, Faculty of Science, Mahasarakham University. Kantarawichai District, Maha Sarakham 44150, Thailand
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Abstract. *Phatlamphu N, Saensouk S, Saensouk P, Junsongduang A, Setyawan AD. 2023. Economic value assessment of edible plants in Muang District, Kalasin Province, Thailand. Biodiversitas 24: 3960-3967.* Edible plants have been traded as economic plants for food consumption, and their supply can be used at the industry level. However, modern agriculture might be disrupting a local plant value that the indigenous people use as their food in daily life. Therefore, this study aimed to assess the economic value of edible plants in Muang District, Kalasin Province, based on their market value and trading volume in a year. Data were collected through a pricing survey in the municipal and local markets from March 2019 to February 2021. The value was applied using the formula of the economic Value of Edible Plants (EVEP) that focus on the local scale of economy to explore the relationships between edible plant traders and consumers in the study area. There were 78 edible plant species that belonged to 67 genera and 41 families. The highest value is *Oryza sativa* L. (rice) which gains income averaging 684,000 THB annually/trader, followed by *Coriandrum sativum* L. (coriander) and *Alpinia galanga* (L.) Willd. (galangal) with averaging values of 216,000 and 187,200 THB annually/trader, respectively. When we identified the edible plants into two groups based on their sources, including the economic plants and the local plants, they were found 40 species of economic plants (51%) and 38 species of local plants (49%). In addition, we found that 43 species of edible plants were traded throughout the year (12 months), including 14 species of local plants (32.6%) and 29 species of economic plants (67.4%). That shows the risk trend of local plant consumption loss is due to the growth of economic plants.

Keywords: Economic plants, economic value, edible plants, Kalasin Province, Thailand

INTRODUCTION

Plants are one of the most important kingdoms of organisms. They are the main energy sources for other life and themselves, and people can make income from some important plant species economically (Saensouk et al. 2016; Phatlamphu et al. 2021; Saisor et al. 2021). Human was using wild plants as foods and drugs since before the pre-history era until modern cultivation knowledge made people produces more foods, and the plant extracted that be used in the pharmaceutical industry (Zhang et al. 2016; Pholhiamhan et al. 2018; Moksia et al. 2019; Hosseini et al. 2021(. Some plant species can be produced as cash crops with many varieties, increasing productivity to secure their supply into the economic systems and make more income for the farmers. This fact was proved by much evidence about the plants that are the main component of global food security and human well-being worldwide (Heywood 2011; Bhatia et al. 2018; Kew Science 2022). Therefore, several species of plants have high value at both the local level and the economic systems (Pholhiamhan et al. 2018; Junsongduang et al. 2020; Phatlamphu et al. 2021).

Thailand is a population of plant species diversity country due to several distinct geographic regions and weather conditions. This country was located in Southeast Asia in the tropical zone. Thailand was found very suitable for plant growth and distribution, especially in the Korat Plateau (14-19°N, 101-106°E), located in a part of the country's northeastern region (Isan region). This region is the largest and most populous region in Thailand (25,000 km^2), the largest cultivation area, also with the highest number of people active in agricultural activity, and it is also the location of many industrial factories that use agricultural products as an important raw material resource to run their business (Choenkwan et al. 2014; Panyadee et al. 2019; Mullalija et al. 2021).

Kalasin is a province located in the central of the northeast of Thailand (Central Isan region). People in Kalasin Province are growing several cash crop varieties (rice, sugarcane, cassava, and maize). They can separate their land into the mixed-crop and change their land use to grow different crop species each year. On the other hand, many people in Kalasin Province still use the local edible plant as food and drugs daily. It can be sought in a wild or other natural place. Moreover, many people could trade the local herbs and other wild vegetables in the market around their hometown (Phatlamphu et al. 2021). Muang District is economically centric in Kalasin Province, which has many

medium-large agricultural industries. This district has the highest number of people who work in cultivation, not only the farmer who grows the plant on their land, but many could rent land to increase their cash crop yield. Moreover, natural products are traded in the local market by people authorized to access the legally protected forest in Kalasin Province (edible wild plants, mushrooms, and some species of edible animals) (Choenkwan et al. 2014).

Thus, the economic value evaluation of food plants is conducted in Muang District, Kalasin Province, to look into the worth and demand of edible plants with an emphasis on the local and economic scales. Then this information is applied to sustain the human well-being of people in Thailand and the country in the Southeast Asia region and aims to point out the disadvantages of encroaching forest areas to find forest products, which may disturb the creatures in that area, both plants and wildlife. In addition, this study can be used to develop natural-agricultural products and add their value to be a famous product and make higher value with the commercial strategy.

MATERIALS AND METHODS

Study area

Kalasin Province is located in northeastern Thailand with the center position of this region (16°25'56.5"N 103°30'28.3" E) (Figure 1). The total area is 6,936 square kilometers. Muang District has an area of around 691,524 square kilometers. The area consists of valleys and plains with an altitude of around 140-250 meters above sea level. The average rainfall is 265 millimeters. Most of the land is covered by a hill and swamp landscape. The climate in Kalasin Province is normally classified as a Tropical Savanah (Bhatia et al. 2018; Phatlamphu et al. 2021). The weather is hot in the summer (March-May) and quite cold in the winter (November-February). There are mixed population patterns between urban and rural, with 146,194 inhabitants in 17 sub-districts. Most people in Kalasin Province live in semi-urban and rural areas engaged in agriculture and work as establishment employees (Kalasin Provincial Office SIPD 2019; Phatlamphu et al. 2021).

Study conceptual

The economic evaluation of edible plants in Muang District, Kalasin Province, was conducted between March 2019 and February 2021. Prices of edible plants (THB/kg) and the trading period were collected by the semi-structure interview method through an on-site survey and randomly informant selections in 13 local markets in Muang District (Numpulsuksant et al. 2021; Saisor et al. 2021; Susandarini et al. 2021). In addition, the local name and edible plant specimens and their consumption methods (or their properties if the plants can be used for health treatments) were collected from trading sites, in natural (in case the edible plant was a natural product) and cultivation area. Then, the edible plants that were traded in the study area will be separated into two groups of growing sources: 1) local vegetables (including wild edible plants) and 2) crop plants (Table 1).

The Economic Value of Edible Plants (EVEP)

The EVEP assessment was designed from the local scale of economy perspective to explore the relationships between edible plant traders and consumers in the study area. The economy allowed the combination of quantitative research methodologies based on botanical knowledge to ensure the scientific name of edible plants used by people in Kalasin Province. The population that participated in this study was the edible plant traders, edible plant growers, and consumers (or buyers). Then, the price data of edible plants were collected by seasonal (every four months) throughout two years (2020-2021). The EVEP assessment was conducted by calculating an average price for each species of edible plant that consumers are willing to pay for a product (when the maximum and minimum prices are added together and divided by 2), and the formula is as follows:

$$EVEP = AP \times SM \times SP$$

Where:

AP : Average price of edible plant (THB/kg)

SM : Total volume of edible plants that traders can sell in a month (kilograms per month)

SP : Total number of months that edible plants are sold in a year

Therefore, the EVEP is the sum of the edible plant values traded in a year. On the other hand, the EVEP is the income traders gain from selling each edible plant species in a year.

Table 1. Local traders trade the most common plant families in Muang District, Kalasin Province, Thailand

Family	No. of species in each family
Fabaceae	8
Apiaceae	6
Solanaceae	5
Amaryllidaceae, Lamiaceae, Zingiberaceae	4
Cucurbitaceae, Myrtaceae, Poaceae	3
Anacardiaceae, Arecaceae, Bignoniaceae, Meliaceae, Piperaceae, Rutaceae	2
Alismataceae, Annonaceae, Apocynaceae, Araceae, Athyriaceae, Basellaceae, Brassicaceae, Caricaceae, Cleomaceae, Clusiaceae, Convulvulaceae, Hypericaceae, Irvingiaceae, Lecythidaceae, Lythraceae, Menispermaceae, Moraceae, Musaceae, Nelumbonaceae, Nymphaeaceae, Opiliaceae, Oxalidaceae, Phyllanthaceae, Plantaginaceae, Polygonaceae, Sapindaceae	1

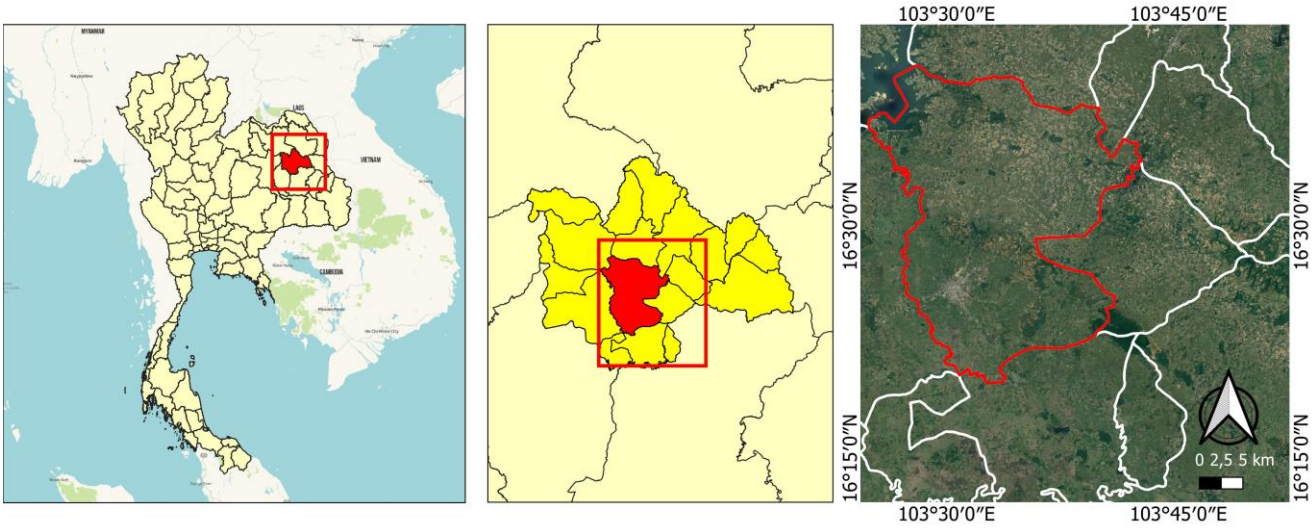

Figure 1. Muang District, Kalasin Province, Thailand (Kalasin Provincial Office SIPD 2013)

RESULTS AND DISCUSSION

Number of species used and edible plant families

Edible plants of 78 species belonging to 67 genera and 41 families have been found. The family Fabaceae had the highest number (8 species) of edible plant species, followed by Apiaceae (6 species) and Solanaceae (5 species). Moreover, 26 families had one species (Table 1). This result follows Thongpukdee et al. (2014), who reported that the family Fabaceae and Apiaceae had the highest number of species members utilized as edible plants in Kalasin Province. Moreover, Cruz-Garcia et al. (2016) recorded that the family Fabaceae was used in people's daily life in the previous study in Kalasin Province. In addition, Rahman and Parvin (2014) utilized the family Fabaceae species for food consumption by local people and folk healers to cure diseases and body nourishment. This was following other study projects stated that humans consumed the member of Fabaceae for several advantages and it had more important to people for a long time (Gwalwanshi et al. 2014; Agarwal et al. 2019; Sutjaritjai et al. 2019; Oladeji et al. 2021). At the same time, 26 plant families gave the lowest number of edible plant species trading in Kalasin Province (one species each) because people in Kalasin Province are not consuming these edible plants as normally. In addition, some of these wild edible species are challenging to find in the wild or the public forest (some natural areas do not allow people to find wild products).

We identified the edible plant into two groups based on their sources: 1) the economic plants (edible plants that were growing on larger scales with the complex process and trading in commercial systems) and 2) the local plants (wild edible plants or local vegetables) were found 40 species of economic plants (51%) and 38 species of local plants (49%) (Figure 2).

The subdistrict with the highest number of edible plant species traded was Phu Por (74 species; 94.9%), followed by the Huay Pho (66 species; 84.6%), respectively. Most edible plants found in the Phu Por subdistrict are used for cooking and body healing because the Phu Por subdistrict is located on the hill and the farthest from the central Muang District (Kalasin Province). Phu Por community had the highest population density in the province and had the municipal market, the local market, and department stores (Phatlamphu et al. 2021). However, people in Phu Por subdistrict cannot regularly access food sources from large markets in the city. So, they grow the edible plant by themselves in the spatial area around their living places or farm, and people can sell it to neighbors or the local small shop. Moreover, people can find some species in public forests or swamps. On the other hand, although the Kalasin is one of the subdistricts with the largest number of traders, this does not mean that the variety of edible plants traded in this subdistrict will also be greater than the Phu Por subdistrict. However, the economic plants can be sold with higher volume and make more profit than the local plant (wild edible plant). Meanwhile, Loup is the subdistrict with the lowest number of edible plants (59 species; 75.6%) because this sub-district is located near the central Muang District, and there is clearly a mixed pattern of land used between the urban/semi-urban and cultivation area. Many people can access the municipal market in the Kalasin subdistrict for economic plants or grow some local plants in their home gardens. However, they have less opportunity to give wild edible plants because there is no abundant public forest in Loup. However, the number of edible plant species found in Loup was not different from 15 other subdistricts, such as Khamin (61 species; 79.5%), Nuae, and Phai (59 species; 75.6% each) (Figure 3).

The percentage of the edible plant parts traded shows that fruit, aerial part, and leaf were the most edible plant parts used for 38.46%, 21.79%, and 12.82%, respectively. Fruits are edible plant parts that are easy to eat as fresh fruits and used as food ingredients. Meanwhile, Phak Chi (*Coriandrum sativum* L.) is the only edible plant species (1.28%) that can be traded and used with whole plant parts in Muang District, Kalasin Province.

In addition, 50 species of edible plants were used in all subdistricts, including 31 species of economic plants and 19 species of local plants (Figure 5). That shows the economic plant was widely used for food consumption in Muang District, Kalasin Province, and five species were used in a single subdistrict with four species of the local plant (Figure 5). These results clearly state that people in Muang District, Kalasin Province, used wild edible plants with fewer used reports than economic plants.

The trading period of edible plants in Muang District, Kalasin Province

The trading period is important in the edible plant market because it indicates the volume of edible plant trading in a year and its annual values. This study was surveyed for two years (2019-2021) to give information about the trading period of edible plants in every season (rainy season and dry season) and collected the number of months in a year that each species of edible plant was traded in the market (Figure 4). We found that 43 species of edible plants were traded throughout the year (12 months), including 14 species of local plants (32.6%) and 29 species of economic plants (67.4%). At the same time, nine species of edible plants were trading in the shortest trading period (2 months), including the local plants and economic plants (6 species; 66.7%, 3 species; 33.3%, respectively). Moreover, when we focused on trading between 2 to 9 months, the local plant was traded with more species than the economic plant. That means most local plant species are not traded regularly (Figure 6).

The EVEP assessment and their value

The edible plants traded in Muang District, Kalasin Province, have the highest value to *Oryza sativa* L. (rice), which gains income for averaging 684,000 THB annually/trader, followed by *Coriandrum sativum* L. (coriander) and *Alpinia galanga* (L.) Willd. (galangal) with averaging values of 216,000 and 187,200 THB annually/trader, respectively (Table 2). These species are the most valuable because they are growing economically, and farmers take particular care of all processes with high costs. So this reason makes farmer price their crop products in expectation of profit. Moreover, rice is one of the most important edible plants in the world. Over half the population uses rice to make their own local food variously, especially in countries that consume rice as the staple food (China, India, Thailand, Lao PDR) (Muthayya et al. 2014; Cruz-Garcia et al. 2016). Meanwhile, coriander and galangal are annual herbs grown a lot in Thailand. They are popular among consumers as a spice ingredient and have also been used in pharmaceutical and cosmetic industries (Muthayya et al. 2014; Nabi et al. 2018; Micić et al. 2019). On the other hand, a local plant that gains the lowest value is *Averrhoa carambola* L. (star fruit). This cheapest species is priced between 10 and 15 THB/kg (averaging 750 THB annually/trader) because people can find the star fruit tree as a common plant in Muang District. Otherwise, local people consume star fruit in small volumes for food flavor (sweet and sour) and eat it as fresh fruit.

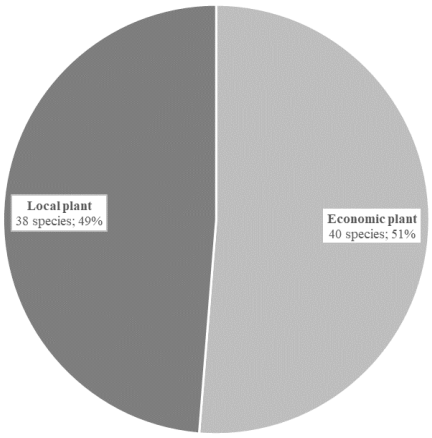

Figure 2. Percentage of edible plants trading in Muang District, Kalasin Province, Thailand

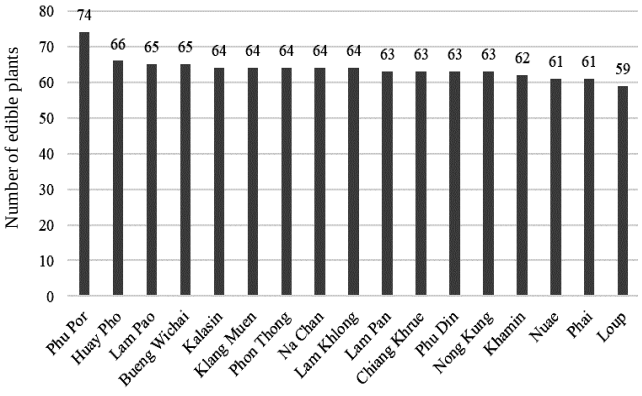

Figure 3. Number of edible plants traded by local traders in 17 subdistricts in Muang District, Kalasin Province, Thailand

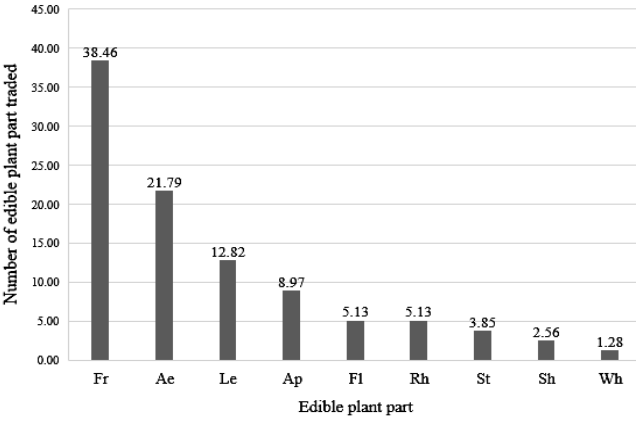

Figure 4. Percentage of edible plant parts traded in Muang District, Kalasin Province, Thailand (Part of trades: Ae: Aerial part, Ap: Apical, Fl: Flower, Fr: Fruit, Le: Leaf, Rh: Rhizome, Sh: Shoot, St: Stem, Wh: Whole plant)

Table 2. Family and scientific names of edible plant species and their prices and trading period in Muang District, Kalasin Province, Thailand

Family	Scientific name	Local name	* Trading groups	** Part of trades	Price (THB/kg.)		Trading periods	Average yearly income (THB/a trader)
					Max	Min		
Alismataceae	*Limnocharis flava* (L.) Buchenau	Bon chin	Local	Ae	20	30	Whole year	36,000
Amaryllidaceae	*Allium cepa* L.	Hom	Econ	Ae	80	120	Whole year	144,000
	A. fistulosum L.	Hom chin	Econ	Ae	60	80	Whole year	126,000
	A. sativum L.	Kra thiam	Econ	Rh	70	100	Whole year	183,600
	A. tuberosum Rottler ex Spreng.	Kui chai	Econ	Ae	80	90	Whole year	61,200
Anacardiaceae	*Mangifera indica* L.	Ma muang	Local	Fr	35	40	Jan-May	11,250
	Spondias pinnata (L.fil.) Kurz	Ma kok	Local	Fr	50	50	May-Oct	15,000
Annonaceae	*Annona squamosa* L.	Noi na	Econ	Fr	40	40	Jul-Aug	9,600
Apiaceae	*Anethum graveolens* L.	Thian khao plueak	Local	Ae	90	120	Whole year	113,400
	Apium sellowianum H.Wolff	Khuen-chai	Econ	Ae	80	100	Whole year	129,600
	Centella asiatica (L.) Urb.	Bua bok	Local	Ae	10	10	Whole year	1,800
	Coriandrum sativum L.	Phak chi	Econ	Wh	120	180	Whole year	216,000
	Eryngium foetidum L.	Phak chi farang	Econ	Ae	80	120	Whole year	108,000
	Oenanthe javanica (Blume) DC.	Phak chi lom	Econ	Ae	60	75	Whole year	36,450
Apocynaceae	*Myriopteron extensum* (Wight & Arn.) K.Schum.	Cha em	Local	Fr	80	100	Dec-Jan	2,700
Araceae	*Amorphophallus brevispathus* Gagnep.	Buk i rok khao	Local	St	100	110	May-Aug	12,600
Arecaceae	*Calamus viminalis* Willd.	Wai khom	Local	Sh	90	120	Apr-Jul	12,600
	Cocos nucifera L.	Ma phrao	Econ	Fr (coconut milk)	60	60	Whole year	108,000
Athyriaceae	*Diplazium esculentum* (Retz.) Sw.	Phak kut khao	Local	Ae	20	30	Whole year	2,250
Basellaceae	*Basella alba* L.	Phak plang	Local	Ap, Le	30	35	May-Jul	5,850
Bignoniaceae	*Dolichandrone serrulata*)DC.) Seem.	Kahae khao	Local	Fl	50	50	May-Jul	3,000
	Oroxylum indicum (L.) Kurz	Pheka	Local	Fr	25	40	Aug-Sep	7,800
Brassicaceae	*Brassica oleracea* L.	Phak kha na	Econ	Ae	40	70	Whole year	59,400
Carucaceae	*Carica papaya* L.	Malako	Econ	Fr	30	50	Whole year	144,000
Cleomaceae	*Cleome gynandra* L.	Phak sian	Local	Ae	40	50	Whole year	8,100
Clusiaceae	*Garcinia cowa* Roxb.	Cha muang	Local	Ap, Le	80	100	May-Jul	24,300
Convolvulaceae	*Ipomoea aquatica* Forssk.	Phak bung	Econ	Ae	40	60	Whole year	36,000
Cucurbitaceae	*Coccinia grandis* (L.) Voigt	Phak tam lueng	Econ	Ap, Le	30	40	Mar-Dec	10,500
	Cucurbita moschata (Duchesne) Duchesne ex Poir.	Fak thong	Econ	Fr	15	30	Whole year	81,000
	Trichosanthes cucumerina L.	Buap khom	Econ	Fr	25	40	Whole year	46,800
Fabaceae	*Bauhinia saccocalyx* Pierre	Siao pa	Local	Ap	30	30	May-Jun	1,800
	Tamarindus indica L.	Ma kham	Econ	Fr	80	80	Nov-Jul	67,200
	Leucaena leucocephala (Lam.) de Wit	Kra thin	Local	Fr	20	30	Whole year	3,750
	Neptunia oleracea Lour.	Phak krachet	Local	Ae	60	70	Whole year	11,700
	Pithecellobium dulce)Roxb.(Benth.	Ma kham thet	Econ	Fr	20	50	Mar-May	31,500
	Senegalia pennata (L.) Maslin	Cha om	Econ	Ap	80	110	Whole year	51,300
	Senna siamea (Lam.) H.S.Irwin & Barneby	Khi lek	Local	Fl	50	80	May-Jul	5,850
	Sesbania grandiflora)L.) Poir.	Khae ban	Local	Fl	80	100	Nov-Feb	5,400
Hypericaceae	*Cratoxylum formosum* (Jack) Benth. & Hook.fil. ex Dyer	Tio khao	Local	Ae	120	120	Apr-Jun	21,600
Irvingiaceae	*Irvingia malayana* Oliv. ex A.W.Benn.	Kra bok	Local	Fr	80	100	Apr-Jun	20,250

Lamiaceae	*Ocimum basilicum* L.	Horapha	Econ	Le, Ap	50	60	Whole year	39,600
	O. tenuiflorum L.	Ka phrao	Econ	Le, Ap	45	50	Whole year	34,200
	O. × *africanum* Lour.	Maeng lak	Econ	Le, Ap	30	40	Whole year	25,200
	Mentha × *villosa* Huds.	Saranae	Econ	Le, Ap	20	40	Whole year	21,600
Lecythidaceae	*Careya arborea* Roxb.	Kradon	Local	Le, Ap	10	30	Apr-Jul	4,800
Lythraceae	*Punica granatum* L.	Thapthim	Econ	Fr	35	50	Mar-May	19,125
Meliaceae	*Epicharis parasitica* (Osbeck) Mabb.	Langsat	Econ	Fr	25	35	Apr-May	36,000
	Azadirachta indica A.Juss.	Sadao	Local	Ap	20	20	Mar-Oct	7,200
Menispermaceae	*Tiliacora triandra*)Colebr.(Diels	Ya nang	Local	Le	20	40	Whole year	21,600
Moraceae	*Artocarpus heterophyllus* Lam.	Khanun	Econ	Fr	25	40	Apr-Jul	78,000
Musaceae	*Musa* × *paradisiaca* L.	Kluai namwa	Econ	Fr	35	50	Oct-Jul	63,750
Myrtaceae	*Psidium guajava* L.	Farang	Econ	Fr	30	50	Nov-Jul	96,000
	Syzygium cumini)L.) Skeels	Wa	Local	Fr	50	60	Apr-May	8,250
	S. antisepticum (Blume) Merr. & Perry	Samet Chun	Local	Le, Ap	25	30	Whole year	4,950
Nelumbonaceae	*Nelumbo nucifera* Gaertn.	Bua luang	Local	Fr	50	80	May-Aug	17,550
Nymphaeaceae	*Nymphaea pubescens* Willd.	Bua sai, Chong konni	Local	St	35	35	May-Aug	9,450
Opiliaceae	*Melientha suavis* Pierre	Phak wan, Phak wan pa	Local	Ap	150	200	Apr-Nov	42,000
Oxalidaceae	*Averrhoa carambola* L.	Ma fueang	Local	Fr	10	15	Aug-Sep	750
Phyllanthaceae	*Breynia androgyna*)L.) Chakrab. & NP.Balakr.	Phak wan ban	Local	Le, Ap	60	60	May -Jul	5,400
Piperaceae	*Piper nigrum* L.	Phrik thai	Econ	Fr	100	150	Whole year	67,500
	P. sarmentosum Roxb.	Cha phlu	Local	Le	50	60	Whole year	59,400
Plantaginaceae	*Limnophila aromatica*)Lam.(Merr.	Phak kha yaeng	Local	Ae	30	30	Whole year	10,800
Poaceae	*Bambusa bambos*)L.) Voss	Phai pa	Local	Sh	20	40	Whole year	108,000
	Cymbopogon citratus)DC.) Stapf	Ta khrai	Econ	St	20	25	Whole year	56,700
	Oryza sativa L.	Khao chao	Econ	Fr	45	50	Whole year	684,000
Polygonaceae	*Persicaria odorata*)Lour.(Soják	Phak phaeo	Local	Ae	20	20	Whole year	10,800
Rutaceae	*Citrus hystrix* DC.	Ma krut	Local	Le	30	40	Whole year	18,900
	C. × *aurantiifolia*)Christm.(Swingle	Ma nao	Econ	Fr	45	100	Whole year	104,400
Sapindaceae	*Dimocarpus longan* Lour.	Lamyai	Econ	Fr	30	30	Oct-Nov	7,200
Solanaceae	*Capsicum annuum* L.	Phrik	Econ	Fr (Wet)	60	100	Whole year	144,000
	Solanum heterodoxum var. *heterodoxum*	Ma khuea pro	Econ	Fr	25	40	Whole year	93,600
	S. lycopersicum L.	Ma khuea thet	Econ	Fr	40	60	Whole year	90,000
	S. stramoniifolium var. *stramoniifoli*	Ma khuea phuang	Econ	Fr	50	65	Apr-Nov	13,800
	S. stramonifolium Jacq.	Ma uek	Local	Fr	60	70	Jul-Oct	3,900
Zingiberaceae	*Alpinia galanga* (L.) Willd.	Kha	Econ	Rh	50	80	Whole year	187,200
	Boesenbergia rotunda (L.) Mansf.	Krachai	Econ	Rh	100	150	Whole year	67,500
	Curcuma angustifolia Roxb.	Au daeng	Local	Fl	100	200	May-Jun	4,500
	C. longa L.	Khamin	Econ	Rh	60	90	Whole year	81,000

Note: * Trading group: Local: Local edible plants and Wild edible plants, Econ: Economic plants. ** Part of trades: Ae: Aerial part, Ap: Apical, Fl: Flower, Fr: Fruit, Le: Leaf, Rh: Rhizome, Sh: Shoot, St: Stem, Wh: Whole plant

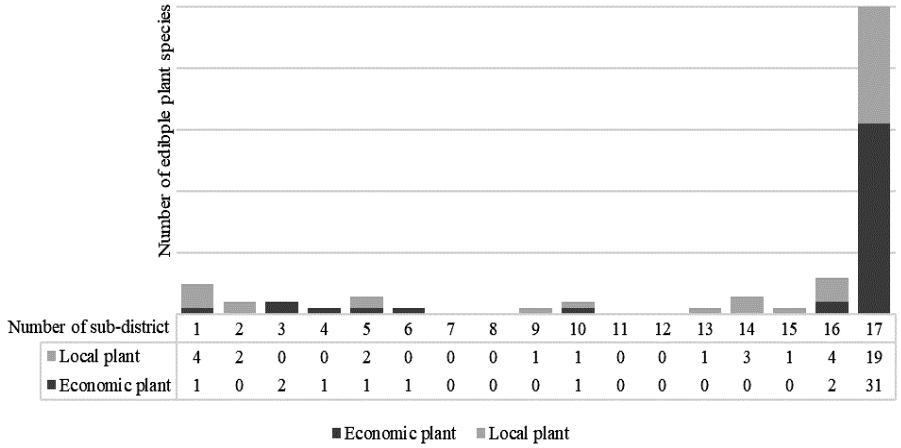

Figure 5. Frequency comparative between the local plant and economic plant trading in 17 subdistricts of Muang District, Kalasin Province, Thailand

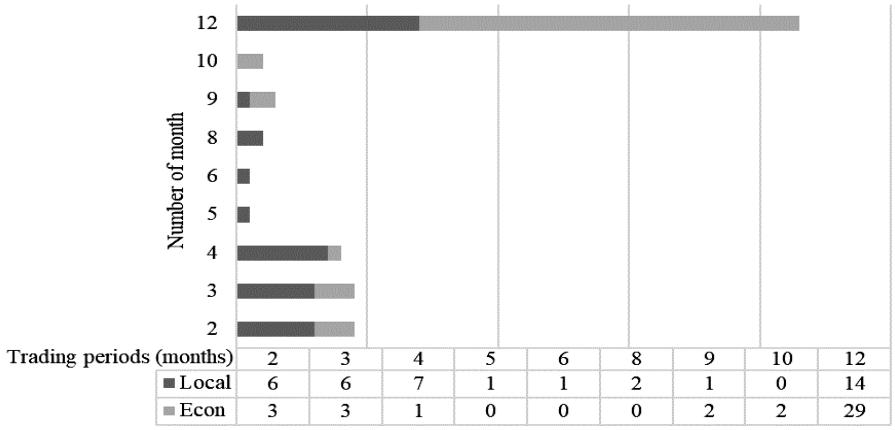

Figure 6. The trading period comparative between the local plant and economic plants in Muang District, Kalasin Province, Thailand

This economic values assessment shows that only 14 species of edible plants give values of more than 100,000 THB annually/trader. They are in the group of economic plants traded in Muang District, Kalasin Province. However, most edible plant species have relatively small values due to their prices and trading volume in a year; many edible plants can grow in home gardens or be found in nature with less volume by local people, just enough for each family in a day. Rice is a species that can be traded with high value and volume throughout the years and make more income to the rice traders even though many local people in Muang District, Kalasin Province, have their own rice paddies. Although many farmers sell unmilled rice (un-edible rice) to the local rice brokers or the bigger rice production company and keep some of the yields for household consumption, rice is still in first-place demand in Muang District, Kalasin Province. However, 22 species of edible plants that give values less than 10,000 THB annually/trader are in the group of local plants represent edible plants in which people still keep their local culture about traditional food consumption. That indicates the local people in Muang District, Kalasin Province, have strong food security by growing their own edible plants and sharing them with a neighbor. At the same time, 8 species can be traded on short periods (1-2 months/year) with low prices (>10,000 THB annually/trader), and they have not been used by people widely because the plant cannot trade in the market with high volume in a long period. Therefore, we are concerned that many local edible plant traders will lose their opportunity to secure their incomes soon. This is an opportunity to look forward to focusing on the local edible plant that can be grown on a crop scale to ensure their yield can be supplied in the market and meet broader demand. The product transformation technique and good agricultural practices should be given to the edible plant trader and local people based on scientific knowledge to make more valuable products and increase yield per area. Furthermore, dealers of edible plants should brush up on their fundamental understanding of contemporary marketing; this will help them access online platforms and create new channels for reaching customers in the digital age.

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