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RESEARCH ARTICLE

Wisdom of Utilization of Edible Wild Vegetables and Fruits in the Na Dun Community, Maha Sarakham Province, Thailand

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ABSTRACT

This research aimed to study the wisdom of the utilization of edible wild vegetables and fruits of the Na Dun community, Maha Sarakham province. The sample used in the research was 45 people who utilized edible wild vegetables and fruits from the Na Dun community, Maha Sarakham province, selected by voluntary sampling. The research tool was the structured interview about the wisdom of utilization of edible wild vegetables and fruits. The data were analyzed by qualitative descriptive method. The results of this research found that: 1) In the forest area of the Na Dun community, a total of 51 types of edible wild vegetables were found, which can be classified according to their plants' habits including: edible wild vegetables, aquatic plants found 7 species, herbaceous plants found 14 species, vine plants found 15 species and trees found 15 species. 2) In the forest area of the Na Dun community, 40 types of edible wild fruits were found, which can be classified according to their plant habit including: edible wild fruits, vine plants found 6 species, shrub plants found 7 species and trees found 27 species. 3) The preservation of edible wild vegetables and fruits is currently being done to keep them for a longer time, there are 3 methods: drying, pickling, and freezing.

INTRODUCTION

Forests are natural resources that benefit humanity in many ways, which may directly benefit life or indirectly benefits that allow humans to live in peace in the world. Forests are natural resources that can be managed under appropriate systems to provide consistent and continuous benefits. Humans are the beneficiaries of forests. Human behavior in forest utilization plays a role in the survival of forest resources. Where forest resources can provide benefits in many ways to humanity as a whole. The concept of preserving forests for the benefit of the public is therefore a concept that has been continuously developed and implemented continuously. The results of developing and conserving forest resources have contributed to the formulation of policies and treatment of forest resources in different ways according to the country's ecological, economic, social and political conditions, which have changed with the times (Komon Praethong, 1991). Forests are a source of biodiversity that supports the livelihood of communities. In particular, communities around the forest have been able to utilize forest products for seasonal consumption, such as wild fruits, mushrooms, bamboo shoots, and various insects. People use forest crops for their livelihoods, income generation and agriculture.

Therefore, the utilization of forest food plants requires a relationship and reliance on the utilization of forest resources, especially as a source of food and income generation (Samart Jaitae et. al., 2022).

Na Dun District, Maha Sarakham province, there is an important forest area, namely Pa Nong Khu - Na Dun National Reserved Forest, or what the villagers call Khok Na Kha or Khok Kaeng or Khok Hin Lad Na Kha - Na Dun. The forest has the characteristics of a deciduous dipterocarp forest. It has an area of approximately 2,500 rai, covering 4 subdistricts, 19 villages in Na Kha subdistrict, Ban Wai subdistrict, Nong Khu subdistrict, Na Dun district, and Nong Ruea subdistrict. Na Chueak district is approximately 54 kilometers south of Maha Sarakham province. Khok Dong Kheng public forest is a forest that the Ministry of Interior declared restricted on January 1, 1949, covering an area of 902 rai for villagers to use together in 1982. Maha Sarakham Province has divided over 400 rai of the Khok Dong Kheng forest area into the construction site for Phra That Na Dun. In 1989, the province gave over 500 rai of Khok Dong Kheng forest area to the Walairukhavej Botanical Research Institute, Mahasarakham University to take care of. Factors that cause villagers to take advantage of the forest are as follows: the basic needs of villagers to take advantage of the forest for their livelihood. Infrastructure in national development, expanding and promoting commercial planting. as well as policies of local government officials such as building fences to prevent dogs from passing through. Characteristics of the use of Khok Dong Kheng Forest, 1949-1989 It was found that in the beginning, villagers were able to use the forest freely and equally for their livelihood. From the year 1969 onwards, the Na Dun Subdistrict has been developed by the public and private sectors in various areas such as roads, electricity, and buildings. Villagers generally make use of the forest area commercially by collecting firewood, medicinal herbs, and other useful forest products.

Fruits and vegetables are rich sources of dietary fiber and various nutrients that are beneficial to the body, such as vitamins, minerals, flavonoids, phytochemicals, etc. Especially vitamin C or ascorbic acid, which is a vitamin that many animals and plants can synthesize. Except in the human body which cannot create itself. Therefore, the only way for the body to get vitamin C is by eating foods that contain vitamin C, including all kinds of fresh fruits and vegetables. Vitamin C plays an important role in the normal functioning of the body and human life. Vitamin C plays a role in helping prevent and treat disease, helps in the recovery of wounds, collagen formation in connective tissue, iron absorption, enhances the body's immunity, and reduces cholesterol. It is an antioxidant involved in the process of hormone synthesis and involved in the process of carbohydrate metabolism, protein and fat (Nutrition Bureau, Department of Health, 2010). In the past, the wisdom of food preservation was used to preserve vegetables and fruits for a long time, which resulted in the processing of fruits and vegetables in various forms, such as fermentation, pickling and drying. Nowadays, with modern technology in everyday life, people have ordered food through online channels for convenience and to reduce the importance of edible wild fruits and vegetables that occur naturally. Instead, they saw a decrease in the value of using naturally edible vegetables and fruits.

Therefore, the researcher saw the wisdom of using edible wild vegetables and fruits in the Na Dun community, Maha Sarakham province, which is an area rich in various kinds of wild vegetables and fruits and the villagers' community has benefited from it for their livelihoods. The villager community has benefited from it for their livelihoods. In terms of consumption and medicine and conservation of local wisdom, it is a way of living together with natural resources and the environment. It is a source of learning about further development for further benefit.

METHOD

Population and sample

The population and sample included villagers who make use of edible wild vegetables and fruits of the Na Dun community, Maha Sarakham province, 45 people, which were derived from purposive sampling.

The research tools and quality of tools

Wisdom in the use of edible wild vegetables and fruits of the Na Dun community, Maha Sarakham province, Thailand is a survey and qualitative research, that collects information about the wisdom of using edible wild vegetables and fruits of the Na Dun community, Maha Sarakham province. Using

an interview form on the wisdom of using edible wild vegetables and fruits of the Na Dun community, Maha Sarakham province. There are steps for finding tool quality as follows:

1) Study basic information from related documents and research by surveying and studying documents about edible wild vegetables and fruits. To provide information in defining the research concept. Collect secondary data, and documents about edible wild fruits and vegetables of the Na Dun community, Maha Sarakham province, knowledge and wisdom regarding the use of edible wild vegetables and fruits and preserving edible wild vegetables and fruits of the Na Dun community, Maha Sarakham province.

2) Create a structured interview which is an open-ended question. The issue is about the types of wild vegetables and fruits that can be eaten, wisdom in use and the wisdom of preserving edible wild vegetables and fruits so that they can be stored and eaten. The interview form consists of:

Part 1: Respondent's information

Part 2: Information on the wisdom of using edible wild vegetables and fruits of the Na Dun community, Maha Sarakham province

3) Present the created interview form to experts to check its accuracy and appropriateness.

4) The interview form was revised according to the recommendations of experts to collect data with the sample group.

Data collection

1) Study basic information from documents about edible wild fruits and vegetables and knowledge about the wisdom of using edible wild vegetables and fruits. And preserving edible wild vegetables and fruits of the Na Dun community, Maha Sarakham province.

2) Conducted a survey and studied basic information about the wisdom of using edible wild vegetables and fruits in the Na Dun community area. Maha Sarakham province

3) Contact community leaders, folk philosophers and villagers, users, or those involved with the area to inquire about basic information.

4) Went to the area to collect information on the wisdom of using edible wild vegetables and fruits of the Na Dun community, Maha Sarakham Province with 45 villagers who take advantage of edible wild vegetables and fruits of the Na Dun community.

5) Collect and check the interview forms for completeness and use them to analyze data on the wisdom of using edible wild vegetables and fruits of the Nadun community, Maha Sarakham province.

6) Summarize the results and prepare a complete report.

RESULTS

The results of the study of wisdom in the use of edible wild vegetables and fruits of the Na Dun community, Maha Sarakham province found that wild vegetables and fruits were edible in the Na Dun community, Maha Sarakham province found a total of 89 species. Divided into 49 species of vegetables and 40 species of wild fruits, they can be summarized as follows:

1**) Wisdom in utilizing edible wild vegetables in the Na Dun community, Maha Sarakham province**

From the study, it was found that Na Dun Community, Maha Sarakham province. There is a total of 51 species of edible wild vegetables. Can be divided according to the habits of the plants, including aquatic plants, herbaceous plants, vine plants, and perennial plants. The details are as follows:

- Aquatic plants, found in 7 species, namely: *Limnophila geoffrayi* Bonati, *Spirogyra* sp., *Nymphoides indica* (L.) O. *Kuntze*, *Limnocharis flava* (L.) Buchenau, *Marsilea crenata* C. Presl., *Jussiaea repens* L. and *Centella asiatica* (L.) Urb.

- Herbaceous plants, found in 1 4 species, namely: *Curcuma sessilis* Gage, *Curcuma cochinchinensis* Gagnep, *Coleus amboinicus* Lour., *Cratoxylum cochinchinense* (Lour.) Blume, *Curcuma alismatifolia*, *Syzygium gratum* (Wight) S.N. Mitra var. gratum, *Bambusa burmanica, Dendrocalamus Membranaceus* Munro, *Thyrsostachys siamesi* Gamble, *Bambusa nutans* Wall., *Gigantochloa albociliata, Amorphophallus brevispathus* Gagnep., *Asystasia gangetica* (L.) T. Anders.
- Vines plants, found in 1 5 species, namely: *Celastrus paniculata* Willd., *Dioscorea hispida* Dennst., *Telosma cordata* (Burm. f.) Merr., *Aganonerion polymorphum* Pierre ex Spire, *Aganosma marginata* (Roxb.) G.Don, *Cissampelos pareira L. var. hirsuta* (Buch. ex DC.) Forman., *Smilax davidiana* A.DC., *Coccinia grandis* (L.) Voigt., *Basella alba* L., *Adenia viridiflora* Craib, *Dioscorea filiformis* Blume, *Tiliacora triandra* Diels, *Asparagus racemosus Willd., Acacia concinna* (Willd.) DC. and *Calamus viminalis* Willd.
- Perennial plants, found in 1 5 species, namely: *Barringtonia acutangula* (L.) Gaertn.ST/T, *Careya sphaerica* Roxb., *Acacia tomentosa* Willd., *Feroniella lucida* (Scheff.) Swingle, *Cassia siamea Lamk., Dolichandrone serrulata* (DC.) Seem., *Garcinia cowa* Roxb. ex Choisy, *Cratoxylum formosum* (Jacq.) Benth. & Hook.f. ex Dyer, *Cratoxylum cochinchinense* (Lour.) Blume, *Crateva adansonii* DC., *Shorea roxburghii* G.Don, *Spondias pinnata* (L.f.) Kurz, *Diospyros filipendula* Pierre ex Lecomte, *Azadirachta indica* A. Juss. Var.siamensis Valenton, *Dipterocarpus obtusifolius* Teijsm.ex Miq. Examples of edible wild vegetables of the Na Dun community are shown in Figure 1.

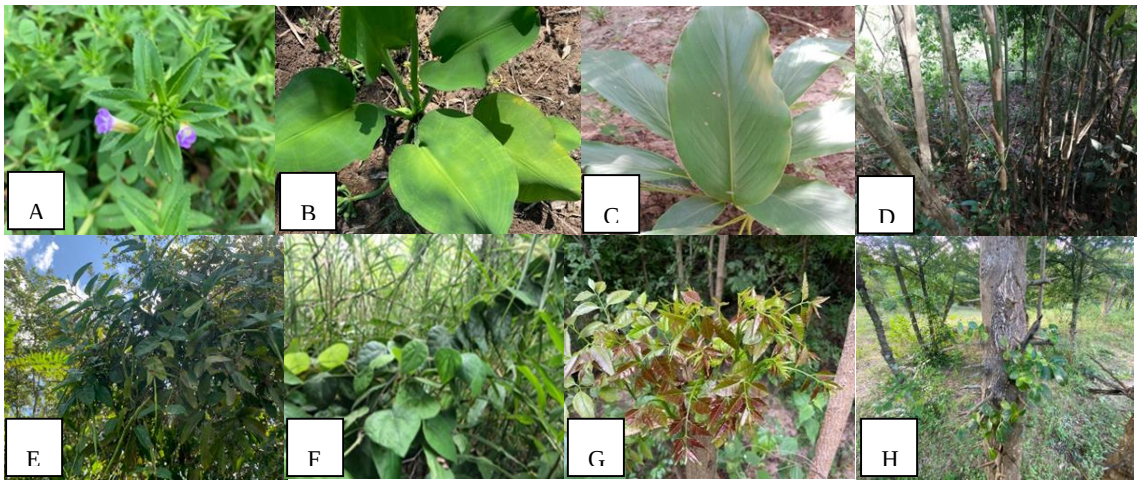

Figure 1: The edible wild vegetables in the Na Dun community: A. *Limnophila geoffrayi* Bonati.; B. *Limnocharis flava* (L.) Buchenau; C. *Curcuma cochinchinensis* Gagnep; D. *Bambusa nutans* Wall.; E. *Aganonerion polymorphum* Pierre ex Spire; F. *Cissampelos pareira L. var. hirsuta* (Buch. ex DC.) Forman.; G. *Azadirachta indica* A. Juss. Var.siamensis Valenton; H. *Feroniella lucida* (Scheff.) Swingle.

2) Wisdom in utilizing edible wild fruits in the Na Dun community, Maha Sarakham province

From the study, it was found that Na Dun Community, Maha Sarakham province. There is a total of 4 0 species of edible wild fruits. Can be divided according to the habits of the plants. The details are as follows:

- Vine plants, found in 6 species, including: *Atherolepis pierrei* Costantin, *Uvaria rufa* Blume, *Olax psittacorum* (Willd.) Vahl, *Ziziphus oenopolia* (L.) Mill., *Embelia subcoriacea* (C.B. Clarke) Mez and *Passiflora edulis f. flavicarpa* O. Deg.
- Shrub, found in 7 species, including: *Polyalthia debilis* (Pierre) Finet & Gagnep., *Flacourtia indica* (Burm.f.) Merr., *Ellipanthus tomentosus* Kurz, *Calycopteris floribunda* Lamk., *Polyalthia evecta* (Pierre) Finet & Gagnep., *Rhodamnia dumetorum* (DC.) Merr. & L.M.Perry and *Lepisanthes rubiginosa* (Roxb.) Leenh.
- Perennial plants are found in 27 species, including *Irvingia malayana* Oliv. ex. A. W. Benn., *Lannea coromandelica* (Houtt.) Merr., *Salacia chinensis* L., *Walsura trichostemon* Miq., *Dialium cochinchinense* Pierre, *Vitex pinnata* L., *Schleichera oleosa* (Lour.) Merr., *Nephelium*

hypoleucum Kurz., *Diospyros rhodocalyx* Kurz., *Strychnos nux-blanda* A.W. Hill, *Filicium decipiens* (Wight & Arn.)Thwaites & Hook., *Microcos tomentosa* Sm., *Ziziphus mauritiana* Linn., *Adenanthera pavonina* L., *Canarium sabulatum* Guillaumin, *Spondias pinnata* (L.f.) Kurz, *Phyllanthus emblica* L., *Aegle marmelos* (L.) Correa, *Parinari anamensis* Hance., *Mangifera caloneura* Kurz., *Anacardium occidentale* L., *Artocarpus lakoocha* Roxb., *Sindora siamensis* Teijsm.& Miq., *Terminalia chebula* Retz., *Rothmannia wittii* (Craib.) Bremek., *Antidesma ghaesembilla* Gaertn. and *Syzygium cinereum* (Kurz) Chantar. & J.Parn. Examples of edible wild fruits of the Na Dun community are shown in Figure 2.

The parts of wild vegetables and wild fruits used for consumption are the shoots, leaves, flowers, fruits, pods, shoots, tubers, rhizomes, roots, and stems. Eating fresh, blanched, boiled, curry, stir-fried, pickled, minced, steamed, and spicy salad is the consumption methods. Wild vegetables and fruits that are eaten fresh include: *Coleus amboinicus* Lour., *Cratoxylum cochinchinense* (Lour.) Blume, *Centella asiatica* (L.) Urb., *Syzygium gratum* (Wight) S.N.Mitra var. gratum, *Asystasia gangetica* (L.) T. Anders., *Celastrus paniculata* Willd., *Telosma cordata* (Burm. f.) Merr., *Aganonerion polymorphum* Pierre ex Spire, *Aganosma marginata* (Roxb.) G. Don, *Smilax davidiana* A.DC., *Coccinia grandis* (L.) Voigt., *Asparagus racemosus* Willd., *Acacia concinna* (Willd.) DC., *Barringtonia acutangula* (L.) Gaertn.ST/T, *Careya sphaerica* Roxb., *Acacia tomentosa* Willd., *Feroniella lucida* (Scheff.) Swingle, *Garcinia cowa* Roxb. ex Choisy, *Cratoxylum formosum* (Jacq.) Benth. & Hook. f. ex Dyer, *Cratoxylum cochinchinense* (Lour.) Blume, *Dipterocarpus obtusifolius* Teijsm.ex Miq. etc. Blanching methods include: *Curcuma sessilis* Gage, *Curcuma cochinchinensis* Gagnep, *Curcuma alismatifolia, Bambusa burmanica, Dendrocalamus Membranaceus* Munro, *Thyrsostachys siamesi* Gamble, *Bambusa nutans* Wall., *Gigantochloa albociliata, Dioscorea hispida* Dennst., *Basella alba* L., *Adenia viridiflora* Craib, *Dioscorea filiformis* Blume, *Dolichandrone serrulata* (DC.) Seem., *Crateva adansonii* DC. and *Azadirachta indica* A. Juss. Var.siamensis Valenton. Curry methods include: *Amorphophallus brevispathus* Gagnep., *Cissampelos pareira L. var. hirsuta* (Buch. ex DC.) Forman., *Tiliacora triandra* Diels, *Calamus viminalis* Willd. and *Cassia siamea* Lamk.

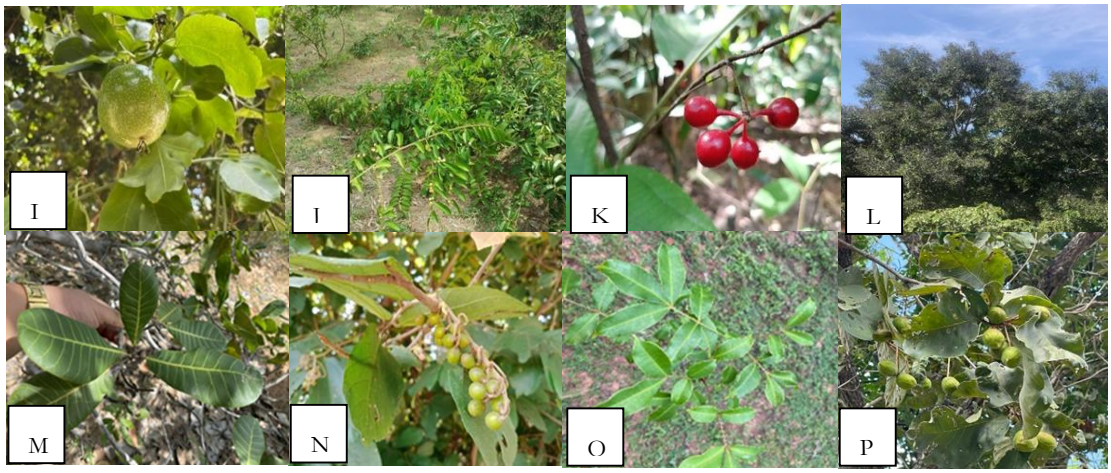

Figure 2: The edible wild fruits in the Na Dun community: I. *Passiflora edulis f. flavicarpa* O. Deg.; J. *Olax psittacorum* (Willd.) Vahl; K. *Polyalthia evecta* (Pierre) Finet & Gagnep.; L. *Dialium cochinchinense* Pierre; M. *Anacardium occidentale* L.; N. *Microcos tomentosa* Sm.; O. *Spondias pinnata* (L.f.) Kurz; P. *Terminalia chebula* Retz.

3) Wisdom in the preservation of edible wild vegetables and fruits in the Na Dun community, Maha Sarakham province

From the study of wisdom in preserving edible wild vegetables and fruits in the Na Dun community, it was found that preserving edible wild vegetables and fruits is based on local wisdom that the villagers are currently practicing, namely: drying, pickling and freezing. The preservation of edible wild vegetables and fruits in the Na Dun community. In addition to providing nutritional value, it also provides economic value, saving costs from collecting wild vegetables and fruits instead of buying

vegetables from the market and the cultural value associated with wild vegetables and fruits according to beliefs and traditions. The method for preserving vegetables is to remove as much water and moisture from the vegetables as possible. The villagers prefer to use the sun-drying method. Because it is an easy and economical method. If it is a sunny day, the villagers will rotate the vegetables to cover all sides. Local vegetables that villagers like to dry to preserve their nutritional value and increase their value according to local wisdom, such as bamboo shoots. When using dried bamboo shoots, soak them in warm water until soft, then use them in cooking, such as curry, boiling, or spicy bamboo shoots Salad. There are also dried bael fruit, dried wild almonds, etc. Pickling is a method of preserving food so that it can be stored for consumption on other occasions for a longer period. Villagers store pickled vegetables and fruits in bottles or jars that can be tightly closed. It is important to keep the pickling water covering the vegetables at all times, otherwise, the vegetables that are above the water will turn dark and will rot and usually stored in a dark place. Vegetables and fruits that local people like to pickle include pickled bamboo shoots and pickled hog plum. Pickling can be classified into three flavors: sour, salty and sweet. Freezing is the process of dropping the temperature of an item below its freezing point. Freezing causes changes in the composition of the material being cooled, as in the case of food, freezing causes the water in the food's tissues to turn into ice. The microorganisms in the food cannot be used, but freezing does not kill the microorganisms, such as washing the vegetables or fruits that have been stored thoroughly. Then put them in a ziplock bag and store them in the freezer, such as frozen hog plum, so they can be stored for longer.

DISCUSSION

Wisdom of utilization of edible wild vegetables and fruits in the Na Dun community, Maha Sarakham province. The researchers have the following points to discuss the results:

1) Wisdom in utilizing edible wild vegetables in the Na Dun community, Maha Sarakham province

From the study of wisdom in utilizing edible wild vegetables in the Na Dun community, Maha Sarakham province found that there is a total of 51 species of edible wild vegetables. It can be divided according to the habits of the plants, including aquatic plants, herbaceous plants, vine plants, and perennial plants. It was found that edible wild vegetables as aquatic plants, found in 7 species, 14 species of edible wild vegetables as herbaceous plants, 15 species of edible wild vegetables as vines plants, and 15 species of edible wild vegetables of perennial plants. This is consistent with the concept of Wilaiporn Chittaporn et al. (2020) local food plants refer to vegetables that are available in the local area. which may occur naturally and that the villagers brought to cultivate. There are trees, herbaceous plants, vines and shrubs. The villagers took various parts of plants, such as the tops, leaves, flowers, fruits, shoots, tubers, rhizomes, roots, and stems, to use as food. Local food plants are considered the first important factor among the four factors that can be obtained from nature because it is the main food in everyday life and is widely present in nature. Rungrudee Rattanawilai (2016) said that local vegetables or wild vegetables are a group of plants that grow naturally or are brought to be grown in households. The produce is harvested in season, usually local vegetables, both perennial and annual plants, such as bamboo shoots, Siamese neem tree, Cassod tree, Trumpet tree, Agasta, Leucaena, Amaranth, Ivy gourd, Vietnamese coriander, Melinjo, Orchid tree, Paco fern, Climbing wattle, Patana oak, Barometer Earthstars, Termite Mushroom, and various wild mushrooms. And Isara Bowaree (2016) said that traditional plants are plants that grow naturally in local areas, such as forests, gardens, fields, rice fields, canals, or villagers may bring them to plant near their homes for consumption. Local vegetables may have specific names and specific cooking methods depending on the local methods. Villagers may eat different parts of the plant, such as young leaves, flowers, fruits, seeds, shoots, or roots. Local vegetables have long been an important ingredient in Thai food that has helped maintain health. It is a way of consuming food that is in line with locality and physical condition, and is both food and medicine. This is consistent with the research of Angsuma Kanjak and Somsanguan Passago (2012) studied local vegetables, and the origin of local wisdom to develop quality of life. It was found that the local vegetables that the villagers of the 3 villages in Maha Sarakham Province know and like to use for regular consumption in their households are 56 species. They are divided according to the external characteristics of the stem into

perennial plants, herbaceous plants, climbing plants, aquatic plants, canals, and garden vegetables. The parts of local vegetables that are used are the shoots, leaves, flowers, fruits, pods, shoots, tubers, rhizomes, roots and stems. Achiraya Kamchanthasupasin et al. (2015) studied the diversity and nutritional utilization of local vegetables in Krung Ching Subdistrict, Nopphitam District, Nakhon Si Thammarat Province. It was found that there were 48 species of local vegetables used by the community for food, representing 25 families, with the Fabaceae family being the local vegetable that was most commonly used for food. The Araceae and Solanaceae families are the next most commonly used for food. The community has two forms of utilizing local vegetables: consuming them fresh as side dishes and using them in various forms of food, both savory and sweet. It can be applied as a guideline for creating food security in the community in the future. Sachula et al. (2020) researched wild edible plants collected and consumed by the locals in Daqinggou, Inner Mongolia, China, the study found that the knowledge and experience of naming and consuming wild plants by the Mongolian people and Han Chinese in Daqinggou are an important manifestation of the direct interaction between locals and plants. The CSFI evaluation of the wild edible plants consumed by the locals in Daqinggou establishes the utilization of some wild plants as part of the traditional knowledge of medical food. Haile Tesfaye Duguma (2020) researched wild edible plant nutritional contribution and consumer perception in Ethiopia, the study found that in Ethiopia, rural communities use wild edible plants as a means of survival especially during times of drought and famine and during other forms calamities and crises. Wild edible plants have high nutritional content, including proteins, vitamin B2, and vitamin C, which can be used as alternatives to conventional plant-based human diets. Alka Mishra et al. (2021) has conducted a study examines the role of wild edible plants (WEPs) in meeting the food, nutrition and household income of indigenous communities under the biodiversity rich landscape of the Achanakmaar-Amarkantak Biosphere Reserve of Central India, the study found that, a total of 172 WEPs comprising 60 vegetables, 70 fruits, seeds and nuts, 23 underground tubers and 19 mushrooms were collected. And Tulsidas Nimbekar and Dilip Sanghi (2022) found that, wild edible vegetables play an important contribution to the livelihood of the households. the present work was undertaken which documents as many as 50 plant species that easily found in the surveyed area. The area for wild edible vegetables having some medicinal potential has been carried out in 12 villages of Gondia district, Maharashtra, India. The study showed that the plants used are either eaten raw, cooked by boiling in water, frying in oil or baked to be served as dishes such as stew, salad as hot drink and as nutraceuticals.

2) Wisdom in utilizing edible wild fruits in the Na Dun community, Maha Sarakham province

From the study of wisdom in utilizing edible wild fruits in the Na Dun community, Maha Sarakham province found that there is a total of 40 species of edible wild fruits. It can be divided according to the habits of the plants, including vine plants, found in 6 species, 7 species of edible wild fruits as shrubs, and 27 species of edible wild fruits of perennial plants. This is consistent with the concept of Wanida Subbanseni (2011) said that wild fruits or the term "wild variety" here refer to naturally occurring plant species and are original fruit trees that have not been selected for breed improvement in any way. Although some species have been cultivated in households, some species have been imported from abroad and cultivated, but the quality is still inferior, such as Star gooseberry, Star fruit and Cucumber tree. Which is not yet popular to eat fresh. It must go through a processing process to become pickled or candied fruit first. Yodkhwan Sakhai (2018) said that fruit is a product that comes from living things such as plants. By the general characteristics, it will be shaped like a sphere or oval. There may be some differences depending on the variety. Usually, fruits have a peel or something that covers the flesh inside, which is often eaten by humans or animals. Phawadee Thakrairat (2017) said that forest utilization means the use of various forms, including fuel. Especially firewood and charcoal for use in household cooking. Food: Forest products are used as food by humans and animals in many ways, such as flowers, fruits, leaves, seeds, bamboo shoots, mushrooms, and various tubers and herbs to be used as medicine. This is consistent with the research of Thanandon Phetdee et al. (2018) studied the forest utilization value at Nong Khu Forestry Research Station, Surin province. It was found that the collection of forest products in the national forest reserves was at a high level. There were 11 types of forest products collected for use, including firewood, bamboo, bamboo shoots, wild fruits, wild vegetables, mushrooms, tuberous plants, insects and insect products, resin and resin, small animals, and herbs. Somying BooKaew et al. (2009)

studied the diversity of plant species and the utilization of products from the Khok Yai community forest, Wapi Pathum District, Maha Sarakham Province. It was found that the characteristics of the community's forest product utilization include the use of 42 types of wild mushrooms, 23 types of wild vegetables, 27 types of wild fruits, 5 types of tuberous plants, 18 types of wild animals, 14 types of insects, 14 types of herbs, 2 types of popular animal grasses, and various tree tops. Adi Bejo Suwardi et al. (2019) studied the diversity of edible wild fruits and traditional knowledge in the West Aceh region, Indonesia. Rural communities in the West Aceh region still collect and consume a wide variety of edible wild fruits. A total of 44 edible fruit species are the top 6 most widely consumed wild fruits in the region. Local communities use edible wild fruits as food (44 species), medicine (11 species), building materials (9 species), and furniture (9 species). Dandy Badimo et al. (2015) researched the utilization of edible wild plants and their contribution to household income in Gweta Village, central Botswana, the study found that twenty-four species were found that belong to thirteen families, used as sources of food and beverage. Most utilised edible wild plants include Grewia flava, Grewia bicolor, Scloreocarya birrea, Amaranthus thunbergii, Cleome gynandra, Corchorus olitorius. They are the main source of food and income, and are harvested by almost everyone in the Village. About 52% of the respondents were engaged in the sale of nine EWPs, and the sale contributed between BWP 50.00 to more than BWP 400.00 per week. Callistus Bvenura and Dharini Sivakumar (2017) found that wild fruits and vegetables are nutritionally rich and high in phytochemicals, especially antioxidants and therefore can play a significant and positive role in delivering a healthy and balanced diet. Asaye Asfaw et al. (2023) found that forty-three species of wild edible plants were documented in Ensaro district, North Shewa zone, and Amhara Regional State, Ethiopia. Moraceae, Fabaceae, and Tiliaceae were the most popular families of wild edible plants. The most prevalent plant growth habits were shrubs, and the most commonly utilized plant parts were fruits.

3) Wisdom in the preservation of edible wild vegetables and fruits in the Na Dun community, Maha Sarakham province

From the study of wisdom in the preservation of edible wild vegetables and fruits in the Na Dun community, it was found that preserving edible wild vegetables and fruits is based on local wisdom that the villagers are currently practicing, namely: drying, pickling and freezing. This is consistent with the concept of Siri Duangporn (2016) which say that food preservation by drying means reducing, inhibiting and preventing all chemical reactions and the growth of all types of microorganisms. To obtain dried food that can be stored for a long time and does not rot due to microbial growth. Or there are no chemical residues due to chemical reactions during the preparation process or storage, such as vegetables or fruits that need to be blanched in hot water before drying to stop the enzyme reaction and reduce the amount of bacteria present. Narin Charoenphan and Ratchanee Puttha (2020) said that fermentation refers to the use of certain microorganisms that are not harmful to humans. Microorganisms create certain substances in food that can inhibit the growth of other microorganisms. Therefore, the fermentation process makes the food safe from other microorganisms. It also creates new types of food that have different characteristics from the original, adding a different smell and taste to the food. This is consistent with the research of Chanthani Thirawetchacharoenchai (2017: 55-70) studied the development of local wisdom of local food into products for community enterprises. It was found that the potential of local vegetables based on local wisdom that can be processed into community food products 11 types of local vegetables have appropriate potential, including: Bamboo grass, mulberry leaves, roselle, Soap Pod, Siamese neem tree, Rice paddy herb, Climbing Wattle, Screw pine, Pink mempat, Custard apple shoots and Chinese violet. The processing part focuses on using local materials and equipment in the process. Four products are processed: local vegetable powder, local dried vegetables for food flavoring, dried bamboo shoots, and semi-prepared bamboo shoot curry sets. Wongtrakun Maket (2016) studied the creation of food security assurance at the community level: a case study of the Pa Trong community, Mueang Prachin Buri District, Prachin Buri Province. It was found that the food management method is that during normal times, the community has food reserves to eat, such as pickled bamboo shoots, fermented fish, sun-dried fish, and salted eggs. There is a rotation of plants around the house. During times of emergency (disaster). The community has food to eat because of food processing by pickling, soaking, drying, and processing food to preserve value, add value to food, and increase family income.

As for the food that is often popularly prepared, it is pickled fish, sun-dried fish, pickled fruit, and salted eggs. Chanjira Wichai and Lehla Tri-ekkanukul (2017) studied the multiculturalism of food preservation of ethnic groups in the special economic zone on the border of Mae Sai District, Chiang Rai province. It was found that food preservation of ethnic groups in the special economic zone on the border has 10 ethnic groups living everywhere. Every ethnic group has food preservation for consumption outside the season according to the type of food, namely pickling. It consists of pickling vegetables and fruits, and pickling various types of fish and meat, which are found in all ethnic groups. and drying using sunlight and heat from the fire. Jutiporn Atsawasowon et.al. (2020) studied the wisdom of the Pra-Napitam forest, Napitam District, Nakhon Si Thammarat Province. It was found that the wisdom of the way of using forests for food includes roasting, pickling, boiling, frying, coating and cooking. Leul Kidane and Leul Kidane and Alemu Kejela (2021) researched food security and environment conservation through sustainable use of wild and semi-wild edible plants: a case study in Berek Natural Forest, Oromia special zone, Ethiopia, found that wild edible plants are valuable resources for improving the environment, food and nutritional security and income of households in rural areas. And Welile P. Maziya et al. (2017) found that food preservation may be one way of alleviating hunger and avoiding waste. However, a minority of people practiced food processing for the preservation of fruits and vegetables produced or those collected from the wild. Fruit and vegetable processing methods mostly used were drying, botling and pickling. Other processing methods like blanching, pasteurization, canning, concentration and freezing were less known in the community.

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REFERENCES

Achiraya Kamchansuppasin, Jureeporn Nounmusig, Warasri Saengkrajang and Wandee Kaewsuwan. 2015. Diversity and Ethno-Utilization of Indigenous Plants at Krung Ching Sub District in Nopphitam District, Nakhon Si Thammarat Province. *Wichcha journal Nakhon Si Thammarat Rajabhat University*. Vol. 34 No. 2 (2015): July-December: 52-63.

Adi Bejo Suwardi, Zidni Ilman Navia, Tisna Harmawan, Syamsuardi and Erizal Mukhtar. 2019. The diversity of wild edible fruit plants and traditional knowledge in West Aceh region, Indonesia. *Journal of Medicinal Plants Studies*. Vol. 7, No. 4, September 2019: 285-290.

Alka Mishra, Singam Laxmana Swamy, Tarun Kumar Thakur, Rajeev Bhat, Arvind Bijalwan and Amit Kumar. 2021. Use of Wild Edible Plants: Can They Meet the Dietary and Nutritional Needs of Indigenous Communities in Central India. *Foods*, 2021, 10, 1453: 1-22. DOI: 10.3390/foods10071453.

Angsuma Kanjak and Somsanguan Passago. 2012. Local vegetables, the source of local wisdom for improving quality of life. Research and Development Institute, Maha Sarakham University. Mueang Surin District, Surin Province. *King Mongkut's Agricultural Journal*. 34 (3): 96-97.

Asaye Asfaw, Ermias Lulekal, Tamrat Bekele, Asfaw Debella, Samuel Tessema, Asfaw Meresa and Eyob Debebe. 2023. Ethnobotanical study of wild edible plants and implications for food security. *Trees, Forests and People*. 14 (2023) 100453: 1-11. DOI: 10.1016/j.tfp.2023.100453.

Callistus Bvenura and Dharini Sivakumar. 2017. The role of wild fruits and vegetables in delivering a balanced and healthy diet. *Food Research International*. Volume 99, Part 1, September 2017: 15-30. DOI: 10.1016/j.foodres.2017.06.046.

Chanjira Wichai and Lehla Tri-ekkanukul. 2017. Multiculturalism in food preservation of ethnic groups in the special economic zone of Mae Sai District, Chiang Rai Province. *Academic Social Science Journal*. 11(1), January-April: 119-132.

Chanthani Thirawetchacharoenchai. 2017. Development of food preservation and processing towards Thailand 4.0. *RomPhruek Journal, Krirk University*. 35(1) January-April: 55-70.

Dandy Badimo, Joyce Lepetu and Demel Teketay. 2015. Utilization of edible wild plants and their contribution to household income in Gweta Village, central Botswana. *African Journal of Food Science and Technology*. Vol. 6(7), November, 2015: 220-228. DOI: 10.14303/ajfst.2015.074.

Haile Tesfaye Duguma. 2020. Wild edible plant nutritional contribution and consumer perception in Ethiopia. *International Journal of Food Science*, Volume 2020: 1-16. DOI: 10.1155/2020/2958623.

Isara Bowaree. 2016. Consumer behavior in eating food from local vegetables in Bangkok. *VRU Research and Development Journal*. 11(1), January-April: 319-325.

Jutiporn Atsawasowon et.al. 2020. Ecological wisdom of the Pra-Napitam forest, Napitam District, Nakhon Si Thammarat Province. *Nakbutr Parittasan Journal, Nakhon Si Thammarat Rajabhat University*. 12(2) May-August: 53-70.

Komon Praethong. 1991. *Community forest concept in community forests in Thailand*. Bangkok: Royal Forest Department. pp: 5.

Leul Kidane and Alemu Kejela. 2021. Food security and environment conservation through sustainable use of wild and semi-wild edible plants: a case study in Berek Natural Forest, Oromia special zone, Ethiopia. *Kidane and Kejela Agric & Food Secur*, (2021), 10:29: 1-16. DOI: 10.1186/s40066-021-00308-7.

Narin Charoenphan and Ratchanee Puttha. 2020. Optimum formula for the production of pickled sunflower seeds and kimchi from sunflower seeds. *Science and Technology Journal*. 28(7) July: 1202-1215.

Nutrition Bureau, Department of Health. 2010. *Nutritional value of fruits. Department of Health, Ministry of Public Health*. Printing House of the Agricultural Cooperatives Association of Thailand Co., Ltd.

Phawadee Thakrairat. 2017. Local wisdom and community forest management in border areas. *Nakhon Phanom University Journal*. 7(1) January-April: 128-134.

Rungrudee Rattanawilai. 2016. Utilization and economic value of local vegetables in Khu Yai Mi Subdistrict, Sanam Chai Khet District, Chachoengsao Province. *Business Review Journal*, 8(1): 85-101.

Sachula, Geilebagan, Yan-ying Zhang, Hui Zhao and Khasbagan. 2020. Wild edible plants collected and consumed by the locals in Daqinggou, Inner Mongolia, China. *Journal of Ethnobiology and Ethnomedicine*. 16:60: 1-16. DOI: 10.1186/s13002-020-00411-2.

Samart Jaitae, Surasak Nummisri, Siwalee Rattanapunya, Janjiraporn Stantripob, Nuttron Sukseetong, Sasikan Numboonjit, Chatsiri Vipawin and Atchara Khamfun. 2022. People's Utilization and Participation in Conservation of Wild Edible Plants, Saluang-Keelek, Mae Rim District, Chiang Mai Province. *Journal of Community Development and Life Quality*. 10(2): 180-189.

Siri Duangporn. 2016. Study of the drying kinetics of pork using a solar dryer. *RMUTI Journal*. 9(3) September-December: 165-176.

Somying BooKaew et al. 2009. Plant diversity and product utilization from the Khok Yai community forest, Wapipathum District, Maha Sarakham Province. *Journal of Environment and Natural Resources*, 7(1): 36-50.

Thanandon Phetdee et al. 2018. Forest utilization value at Nong Khu Forestry Research Station, Surin Province. *Thai Journal of Forestry*. 37 (2): 99-107.

Tulsidas Nimbekar and Dilip Sanghi. 2022. Wild Edible Vegetables Used for Health Benefit by Rural People of Gondia District in Maharashtra State, India. *Traditional Medicine.* Volume 3, Issue 1: 1-9. DOI: 2022: 10.35702/Trad.10009.

Wanida Subbanseni. 2011. *Forest products in Thailand*. Bangkok: Forestry Academic Office.

Welile P. Maziya, Patricia J. Musi and Michael T. Masarirambi. 2017. Fruit, vegetable and field crop post-harvest handling and processing in rural Swaziland, Southern Africa. *American Journal of Food and Nutrition*. 2017, 7(1): 1-12. DOI: 10.5251/ajfn.2017.7.1.1.12.

Wilaiporn Chittaporn. 2020. Survey of native food plants from community forests in Ponsai Subdistrict, Luang Prabang, Lao People's Democratic Republic. *Phranakhon Rajabhat Research Journal, Science and Technology*. 15(1): 13-14.

Wongtrakun Maket. 2016. Ensuring food security at the community level: A study of Patong community, Mueang Prachin Buri District, Prachin Buri Province. *Research and Development Journal Loei Rajabhat University*, 11(38), pp: 67.

Yodkhwan Sakhai. 2018. Knowledge, attitude and behavior towards vegetable and fruit consumption of lower secondary school students at Srinakharinwirot University Prasarnmit Demonstration School (Secondary School). *Humanities, Social Sciences and Arts*, 11(3): 1038-1055.