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ETHNOBOTANICAL STUDIES OF SOME PLANTS COMMONLY USED AS VEGETABLES IN SELECTED PROVINCES OF THE PHILIPPINES

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ABSTRACT – Documentation of underutilized vegetables and wild food plants and their utilization in municipalities of Ilocos Norte, Palawan and South Central Mindanao was conducted to prepare strategies for genetic conservation, propagation and eventually, breeding and commercialization of promising vegetables. Respondents were asked on the socioeconomics, ethnographic and ethnobotanical aspect of underutilized vegetables and wild food plants they are familiar with. A total of 27 species (18 families) were identified in Ilocos Norte, 28 species (23 families) in Palawan and 20 species (15 families) in South Central Mindanao. Vegetables cited ranged from herbs to trees with various plant parts being consumed. They were consumed as salad, sautéed dish, or viand cooked with fish paste. Some served as vegetable 'toppings' in popular dishes while others served as souring agents. Based on feedbacks from the respondents, some underutilized and wild food plants were found to have potential for commercialization and can provide an appreciable additional income to farm families. The results of this study will serve as a take-off point for the future evaluation of the different species for the development of varieties and lines as well as evaluation of their nutraceutical value. This will in turn result to promotion and increased utilization and production of the selected vegetables for food security in the midst of the changing climate.

Keywords: ethnobotany, underutilized vegetables, wild food plants utilization

INTRODUCTION

The Food and Agriculture Organization recognizes the importance of consumption of vegetables (and fruits) as the inadequate consumption of these crops was the cause of 14% gastrointestinal cancer deaths, 11% of ischemic heart disease deaths and 9% of stroke deaths (FAO 2016). However, vegetable consumption in the Philippines is only about 111 g per capita per day or 40 kg/capita per year (FNRI 2008), a level far below the requirement of 400 g per capita per day or 150 kg per capita per year (FAO/WHO 2003). In the global context, annual average consumption per capita was 102 kg with the highest level in Asia and lowest in South America and Africa. Contributory factors to this low trend include urbanization which distances people from food production resulting to

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inaccessibility of varied and nutritious diets. Resource poor households can't afford a diverse and varied diet especially on the more popular vegetables in the market. However, production statistics does not include the production and consumption of indigenous (which included the underutilized crops) vegetables which underestimates the published statistics (FAO/WHO 2003).

Many are quite unaware that underutilized vegetables and wild food plants (that can be used as vegetables) can be tapped alongside the more popular vegetables in the market to increase vegetable consumption. Although less popular and underutilized, these vegetables can also provide good nutrition at a minimal cost and effort (Ayodele and Olajide 2011; Abdul Wahab et al., 2015; Dolcas Biotech 2006-2008; Kongkachuichai et al. 2015). Underutilized vegetables and wild food plants are generally adaptable to unfavorable weather conditions and tolerant to pest and diseases. Its integration in the backyard gardens or as intercrop to major crops and in other production systems can be an important source of revenue for resource-deficient households (Oladele 2011; Rahim et al. 2007). These vegetables have their place in the cropping system as a source of nutrition/food, for biodiversity, habitation of natural enemies and other indirect benefits. Some vegetables also serve as medicinal plants (Antonio et al. 2011; Huan et al. 2011; Ibrahim et al. 2010; Lirio et al. 2007; Morris and Wang 2007).

Underutilized vegetables and wild food plants have been given low priority in most research and development programs. Little is known about their utilization, extent and structure of genetic variation, potential for crop improvement through domestication, selection and/or breeding. It is therefore imperative to have relevant studies undertaken and indigenous knowledge documented in order to help counter food insecurity. Documentation of indigenous which included the underutilized vegetables and wild food plants has been made in some parts of the Philippines, including Ilocos Norte (Antonio et al. 2011) and the Cordilleras (Lirio et al. 2007) but none has been reported in Palawan, South Cotabato, Sarangani and Sultan Kudarat. This study then aims to document the utilization of less documented and underutilized vegetables and wild food plants and identify species with commercial potential in Ilocos Norte, Palawan, and three provinces from South Central Mindanao.

MATERIALS AND METHODS

Major ethnobotanical survey and collection of underutilized vegetables and wild food plants were conducted from April 2013 – March 2014. Survey was done in mountainous/upland and remote towns in the provinces of Ilocos Norte, Palawan, South Cotabato, Sarangani and Sultan Kudarat where a number of traditional food plants still exist and still being depended on by rural households (Table 1). The target municipalities were evaluated and identified using the following criteria – (1) the area is remote and not readily reached by industrialization; (2) new plant varieties have very low diffusion rate; (3) agricultural practices still traditional (not much chemical input, machineries); (4) land use patterns have not changed much; (4) none or minimal development projects; and (5) with prior reports of use of rare or not so common vegetables. Other study sites and respondents were identified through the help of the Municipal Agricultural Officers or the Barangay Captains or their representatives.

A structured interview schedule was used in gathering the needed information such as (1) demographic information on the farmer or key informant; (2) underutilized vegetables and wild food plants used by them; (3) location and seasonal abundance; (4) perceptions on the plants' socio-economic importance; (5) status of utilization and conservation; (6) ethnobotany – edible part, method of preparation, recipe prepared; (7) indigenous knowledge systems; and (8) other experiences/knowledge of informants on the target plants.

The following formula was used to determine the frequency of citation of the plant species and families collected:

$$\text{Frequency of citation (\%)} = \frac{\text{No. of informants who cited the species}}{\text{Total no. of informants interviewed}} \text{ x } 100$$

There were 135 key informants from the five provinces of the Philippines (Figure 1). Of the 135 respondents, 58% were male while 42% were female. Their ages were mainly from 26-65 years old. Three of the respondents did not know their age but they were in the study area since birth. Majority of the respondents were married (84%), with 3-4 family members (46%) and have been in the study area since birth (68%). In Palawan, some of the respondents belong to the *Pala'wan*, *Tagbanwa* or *Cuyunon* ethnic group while the rest does not belong to any group but still considered natives of Palawan. Majority of the respondents were farmers (72%) while the rest are either employed in the government or private sector, into small business operation, into poultry and livestock raising or other off-farm activities such as trucking business, carpentry and blacksmith.

RESULTS AND DISCUSSION

Identified underutilized vegetables and wild food plants in Ilocos Norte, Palawan and Region XII

Informants were able to identify vegetables commonly known in their locality. They were also familiar with, and in fact cited, some commonly known and well-reported underutilized vegetables like *Moringa oleifera* (malunggay), *Chorchorus* sp. (saluyot), *Amaranthus* sp., *Basella alba* (alugbati), *Phaseolus lunatus* (patani), *Dolichos lablab* (parda/ bataw), *Cajanus cajan* (kadyos) and others but these were not anymore included in our data as the focus of the study was on the less or undocumented species.

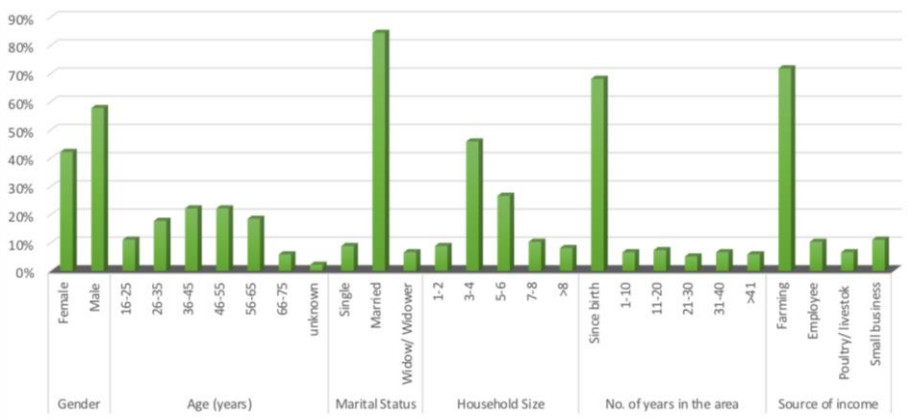

Figure 1. Demographic profile of respondents surveyed from the five (5) provinces in the Philippines (n=135).

Table 1. The survey sites of underutilized vegetables and wild food plants in five provinces.

Province	Municipality	Barangay
Ilocos Norte	Adams	Adams
	Banna	Valdez
	Batac	Payao, Quiling Sur, Rayuray
	Marcos	Fortuna, Daquioag
	Paoay	Mumulaan, San Agustin
	Pasuquin	Surong, San Juan
	Solsona	Puttaw, Katangraran
	Vintar	Danao, Tamdagan
Palawan	Puerto Princesa City	San Jose, Irawan, Inagawan, Mangisgisda, Luzviminda, Sta. Lourdes, Sta. Monica, Milagrosa, Tagburos
	Narra	Bato-bato, Panacan 2, Estrella Village, Malatgao, Elvita, Princesa Urduja, Sandoval
	Quezon	Pinaglabanan, Maasin, Panitian
	Sofronio Española	Labog, Abo-abo
	Aborlan	Plaridel, San Juan, Isaub, Magsaysay, Apurawan
	Balabac	Brgy 6, Brgy. 1
South Cotabato	Lake Sebu	Lamdalag, Poblacion
	T'boli	New Dumangas, Poblacion,
	Banga	Reyes, Poblacion
	Tupi	Acmonan, Bololmala, Brgy. Linan, Lunen, Miasong, Poblacion
	Surallah	Talahik, Libertad
Sarangani	Maitum	Poblacion
	Glan	Poblacion
	Malungon	Malandag
Sultan Kudarat	Bagumbayan	Poblacion
	Sen. Ninoy Aquino	Poblacion

A total of 61 species were identified by the respondents from the provinces of Ilocos Norte, Palawan, and South Central Mindanao (South Cotabato, Sarangani and Sultan Kudarat lumped as one) (Figure 2 and Table 2). A total of 27 species of underutilized vegetables and wild food plants (18 plant families) were identified by the key informants in Ilocos, 28 species (23 plant families) in Palawan and 20 species (15 plant families) in South Central Mindanao. There were species commonly identified by the respondents from the study sites and the only difference is the local names of these species. Even the common names of some of these species were similar. This is because some of the respondents from Palawan were actually born in Ilocos or La Union but migrated to Palawan either at young age or after marrying local residents. On a separate study conducted in Ilocos Norte, a total of 46 Indigenous Food Plants from 27 plant families were identified (Antonio et al. 2011). On the other hand, there were 47 species in 21 families identified in the Cordillera region (Lirio et al. 2007).

Figure 2. Some underutilized vegetables and wild food plants mentioned by the respondents (clockwise) – *Momordica cochinchinensis, Telosma procumbens, Mollugo verticillata, Solanum lasiocarpum, Hibiscus surattensis* and *Abelmoschus manihot.*

On the domestication status of the identified plant species in Ilocos, all except five (5) are wild growing. Cultivated species include *Raphanus caudatus* (rabanos), *Capsicum annuum* (libokeg), *Solanum lasiocarpum* (balbalosa) and *Solanum pimpinellifolium* (botbotinis). In fact, *R. caudatus* is commercially cultivated, being an important ingredient of the Ilocano dish *pinakbet.* The three cultivated *Solanum* spp. (libokeg, balbalosa and botbotinis) are cultivated on a limited scale (home gardens and kaingin farms) but in the Municipality of Adams only. Balbalosa is used to be just wild crop growing but because of efforts to promote it as an exotic dish in the said municipality, demand for the fruits grew. But still, the local people generally follow the "rubbish heap" system of cultivation in which the wildly sprouted plants are tendered and managed culturally. *H. sabdariffa* (roselle) and *C. frutescens* (sili't sairo) used to be wild but are cultivated to some extent. Papait (*M. verticillata*) on the other hand, is wild

growing in Ilocos Norte but it is cultivated in the province of Tarlac (Ilocos Region). In terms of popularity measured based on the frequency of citation, *M. cochinchinensis* (sugod-sugod), *D. luzonensis* (kamangeg), *T. procumbens*(kapas-kapas), *B. luzonica* (allukon), *M. charantia* (parya-atap), *D. hispida* (karot), *C. frutescens* (sili't sairo), *D. esculentum* (pakpako), *Schismatoglottis* (bilagot), and *D. esculenta* ssp. pinosa (buga) are the top 10 popular species in descending order. The least popular are the three (3) species - *Solanum* spp. libokeg, balbalosa and botbotinis, as these are known only in Adams. On the other hand, the domestication status of all the species in Palawan is wild except for three species: *Momordica charantia*, *Alpinia galanga* and *Colocasia esculenta* which are cultivated to some extent. Top five (5) most cited species were *Alpinia galangal* (28%), *Diplazium esculentum* (26%), *Caryota sp*. (25%), *Momordica charantia* (21%) and *Gnetum gnemon* (19%). For South Central Mindanao, all of the identified species were found in the wild and the top five (5) most identified were *Solanum nigrum* (58%), *Dioscorea hispida* (48%), 'abu papaw' (42%), *Etlingera elatior* (29%), *Ocimum x citriodorum* (19%) and *Colocasia esculenta* (19%).

Table 2. Utilization and methods of preparation of identified underutilized vegetables and wild food plants based on the respondents surveyed.

Family/ Botanical Name[1]/ Local Name	**Traditional Use[2]**
ADOXACEAE / *Sambucus canadensis* L. Local names: SCM -Sufo	SCM - Ripe fruits eaten raw; also serve as tarsier and poultry feeds
AMARANTHACEAE/ *Alternanthera sessilis* (L.) R. Br. ex DC./ Pal. - Lupo, SCM - Lupo-lupo	Pal. - Young leaves mixed in 'ginisang mungo': SCM - Young leaves mixed in 'sinabawang isda' and 'ginisang mungo'
ANACARDIACEAE/ *Spondias dulcis* G. Forst/ Pal. - Alabbyud	Pal. - Young leaves as souring agent in *sinigang*
ANNONACEAE/ *Uvaria rufa* Blume/ I.N. - Allagat	I.N. - Ripe fruits eaten raw
APOCYNACEAE/ *Telosma procumbens* (Blanco) Merr./ I.N. - Ampupuyat, kapas-kapas, pusa-pusa, padpadol, bagbagkong, ampupuyat	Immature fruits for viand (dinengdeng, roasted), inflorescence for salad; Pal. - Inflorescence, new shoots and young leaves, fruits mixed with other vegetables in dinengdeng (Ilok.)
ARACEAE/ *Alocasia macrorrhizos* (L.) G.Don/ Local names: SCM - Biga	SCM - Rhizome sliced and fried
ARACEAE/ *Amorphophallus paeoniifolius* (Dennst.) Nicolson/ I.N. - Tigi; Pal. – Balbag	I.N. - Young stalk (with unopened leaves) for viand, boiled feedstuff for pigs; Pal. - Stem is grilled, squeezed and cooked with coconut milk; stems also as feedstuff for pigs

Table 2 (Continued). Utilization and methods of preparation of identified underutilized vegetables and wild food plants based on the respondents surveyed.

Family/ Botanical Name[1]/ Local Name	Traditional Use[2]
ARACEAE/ *Colocasia esculenta* (L.). Schott/ I.N. - Siway/aba-bantay, *Daludal*; Pal. - Gabi; SCM - Gabi, abalong	I.N. - All parts edible, cooked into *guinatan*, *sariwagwag* and *sinag-it*; Pal. - Tuber mixed w/ other vegetables; leaves cooked with fish & coconut milk; SCM - Young stem can be eaten as salad
ARACEAE/ *Schismatoglottis* sp./ I.N. -Bilagot	I.N. - All parts edible, cooked into *guinatan* with fish paste and other viand without fish paste such as sautéed sardines
ARECACEAE/ *Daemonorops draco* Blume/ Pal - yantok; SCM - uway	Pal. - Heart of palm ('ubod') is grilled and eaten as salad alone or mixed with bagoong (fish paste); SCM - Heart of palm ('ubod') cooked with sautéed sardines or mixed with coconut milk
ARECACEAE/ *Caryota sp.*/ Pal – batbat	Pal. - Heart of palm ('ubod') sautéed with sardines or cooked with coconut milk or eaten as salad
ASPARAGACEAE / *Dracaena sp.*/ Pal. Andalawe	Pal. -Young shoots and leaves boiled and eaten alone; can be mixed with other vegetables (sautéed) and also with tumbilikan
ASTERACEAE/ *Ageratum conyzoides* L./ SCM – hapon-hapon	SCM - Young leaves mixed with other vegetables in sautéed sardines
ASTERACEAE/ *Crassocephalum crepidioides* (Benth.) S. Moore/ Pal. - Sapsapon	Pal. - Young leaves and shoots in *dinengdeng*
ATHYRIACEAE/ *Diplazium esculentum* (Retz.) Sw./ I.N. - Pakpako; Pal. - Pako	I.N. - Fiddlehead for salad; Pal. - Immature fronds steamed/ blanched and eaten with fish or soy sauce
BLECHNACEAE/ *Blechnum orientale* L./ I.N. - Parangipang	I.N. - Fiddlehead for salad
BRASSICACEAE/ *Raphanus caudatus* L./ I.N. - Rabanos	I.N. - Pods for *pinakbet*, pickle; leaves eaten raw with fish
CLUSIACEAE/ *Garcinia lateriflora* Blume/ Pal. - Kandis	Pal. - Fruits (either dried or fresh) and young leaves as souring agent in sinigang
CONVULVULACEAE/ *Ipomea triloba* L./ I.N. -Illay/ marakamotig; Pal. - kamo-kamote	I.N.- Tops for salad or mixed with other vegetables in *dinengdeng;* Pal.- Tops mixed in ginisang mungo

Table 2 (Continued). Utilization and methods of preparation of identified underutilized vegetables and wild food plants based on the respondents surveyed.

Family/ Botanical Name[1]/ Local Name	Traditional Use[2]
CUCURBITACEAE/ *Luffa cylindrica* M. Roem./ .N. - Saysay-ot	I.N. - Young fruits sautéed or cooked into *dinengdeng*
CUCURBITACEAE/ *Momordica charantia* L./ I.N. - Parya-bakir simaron, atap; Pal. & SCM - ampalayang ligaw	All areas - Fruits, young leaves and shoots mixed in sautéed mungo;; cooked into dinengdeng; fruits cooked with egg; young leaves and shoots eaten as salad as well
CUCURBITACEAE/ *Momordica cochinchinensis* (Lour.) Spreng./ I.N. - Sugod-sugod, libas, parog-parog	I.N. - Immature fruits cooked into *dinengdeng* with other vegetables or sautéed
DIOSCOREACEAE/ *Dioscorea luzonensis* Schauer/ I.N. - Kamangeg	I.N. - Tubers are boiled/ guinatan snack or cooked into *dinengdeng* with patola, sitao or malunggay
DIOSCOREACEAE/ *Dioscorea esculenta* var. spinosa (J. Roxb. Ex Prain & Burkill) R. Knuth/ I.N. – Buga	I.N. - Tubers for grilled or boiled snack and also mixed in pork stew/ dinengdeng; for grilled viand, tubers are roasted in burning ricehull; SCM - Young shoots and leaves cooked with coconut milk or paksiw
DIOSCOREACEAE/ *Dioscorea pentaphylla* L./ Pal. - Lima-lima	I.N. - Tuber boiled and eaten as staple or snacks
DIOSCOREACEAE/ *Dioscorea hispida* Dennst./ I.N. - Karot; SCM - Klut/kayos	I.N. - tubers for snacks (tubers peeled, sliced thinly & fermented through a series of soaking in water & squeezing) prior to frying; SCM- tubers for snacks (tubers sliced then fermented as well)
FABACEAE/ *Clitoria ternatea* L./ Pal.- Samsamping	Pal. - Fruits/pods mixed in *dinengdeng;* inflorescence as salad
FABACEAE/ *Senna occidentalis* (L.) Link/ Pal.- Mani-mani	Pal. - Young leaves and shoots mixed with sautéed sardines
FABACEAE/ *Sesbania grandiflora* (L.) Pers./ Pal. & SCM- Katuray	Pal. & SCM- Inflorescence steamed/ blanched and eaten with bagoong
FABACEAE/ *Strophostyles helvola* (L.) Elliott/ SCM- Tauri	SCM- Beans cooked with other vegetables in sautéed dishes or *tinolang manok*
FABACEAE/ *Pachyrhizus erosus* (L.) Urb./ I.N.- Kamias	I.N.- Pods cleaned with salt to remove coarseness & cooked with other vegetables into *dinengdeng*

Table 2 (Continued). Utilization and methods of preparation of identified underutilized vegetables and wild food plants based on the respondents surveyed.

Family/ Botanical Name[1]/ Local Name	**Traditional Use[2]**
GNETACEAE/ *Gnetum gnemon* L./ Pal.- Bago	Pal.- Young leaves cooked w/ coconut milk mixed with fish & veg or snail/'suso'); as vegetables in *sinigang* and ginisang munggo
LAMIACEAE/ *Ocimum citriodorum* Vis./ SCM - Bawing	SCM- Young shoots and leaves mixed in tinolang manok.
LYGODIACEAE/ *Lygodium circinnatum* (Burm. F.) Sw./ Pal.- Nito	Pal.- Young shoots and leaves sautéed with fish or meat and other vegetables
LYTHRACEAE/ *Punica granatum* L./ SCM - Granada	SCM- Ripe fruits made as fruit juice
MALVACEAE/ *Hibiscus sabdariffa* L./ I.N.- Rosel; Pal. & SCM - Labog, langkamit, rosel	I.N.- Calyx as souring agent; seeds grilled, ground and brewed for coffee; Pal. & SCM- Leaves as souring agent in sinigang
MALVACEAE/ *Hibiscus surattensi*s L./ Pal.- Kalatuytuy, bisulsug	Pal.- Young shoots and leaves as souring agents in *sinigang* and even in *tinolang manok*
MALVACEAE/ *Abelmoschus manihot* (L.) Medik./ SCM- nating saluyot	SCM- Young shoots and leaves mixed in '*sinabawang isda*'
MOLLUGINACEAE/ *Mollugo verticillata* L./ I.N.- Papait; Pal.- Papait, salsalida; SCM- Papait	I.N.- Tops and leaves for salad, or mixed with mungbean; Pal.- Tops and leaves for salad, or mixed with mungbean
MORACEAE/ *Broussonetia luzonica* Bureau/ I.N.- allukon, tuktukgo (globose); Pal.- himbabao, allukon	I.N. and Pal. - Inflorescence mixed with other vegetables and cooked into *dinengdeng*
OLACACEAE/ *Olax imbricata* Roxb./ I.N.- Karindyubet	I.N.- Tops for salad with fish paste and citrus juice or mixed with mungbean
OPILIACEAE/ *Champereia manillana* (Blume) Merr./ I.N.- Apeng/ pannalayapen	I.N.- Tops cooked with kamias or tomato fruits or cooked dry like pinakbet
PHYLLANTHACEAE/ *Sauropus androgynous* (L.) Merr./ Pal. & SCM- Chinese malunggay	Pal. & SCM- New leaves and young shoots used similarly with that of malunggay
PTERIDACEAE/ *Acrostichum aureum* L./ Pal.- Hagnaya	Pal. - Young shoots and leaves in *dinengdeng*

Table 2 (Continued). Utilization and methods of preparation of identified underutilized vegetables and wild food plants based on the respondents surveyed.

Family/ Botanical Name[1]/ Local Name	**Traditional Use[2]**
SOLANACEAE/ *Capsicum annuum* L./ I.N.- Sili't sairo	I.N.- Tops for tinola; fruits pickled with vinegar
SOLANACEAE/ *Capsicum annuum* L./ I.N.- Libokeg	I.N.- Fruits for pinakbet
SOLANACEAE/ *Solanum lasiocarpum* Dunal/ I.N.- Balbalosa	I.N.- Fruits as ingredient in pinakbet and salad
SOLANACEAE/ *Solanum pimpinellifolium* L./ I.N.- Botbotinis	I.N.- Fruits ingredient for salad and pinakbet
SOLANACEAE/ *Solanum nigrum* L./ SCM- Kawat	SCM- Young shoots and leaves cooked with sardines
SPHENOCLEACEAE/ *Sphenoclea zeylanica* Gaertn./ Pal.- Larang dapo	Pal.- New leaves and young shoots squeezed and soaked in rice washings for 3 days & served as vegetable salad
TALINACEAE/ *Talinum fruticosum* (L.) Juss./ Pal.- Tal-talinung, krapper	Pal.- New leaves and young shoots as addition in *sinigang*
VITACEAE/ *Tetrastigma harmandii* Planch./ I.N.- Ariwat/orro	I.N.- Souring ingredient for fish
ZINGIBERACEAE/ *Alpinia galanga* (L.) Willd./ Pal. & SCM- Langkawas, luya-luya	Pal.- Rhizome, young shoots sautéed and mixed with fish paste/ *bagoong;* SCM- Rhizomes mixed in valenciana as flavoring agent
ZINGIBERACEAE/ *Alpinia brevilabris* C. Presl/ I.N.- Tarosi	I.N.- Ripe fruits eaten raw
ZINGIBERACEAE/ *Kaempferia galanga* L./ SCM- Kesul	SCM- Leaves as flavoring agent in cooked rice.
Unknown/ Unknown/ Pal. - Barok (Pal.)	Pal.- Heart of palm ('ubod') sautéed with sardines or boiled and eaten alone
Unknown/ Unknown/ Pal.- Kanda-kanda	Pal.- Young shoots and leaves sautéed or cooked with coconut milk
Unknown/ Unknown/ Pal.- Luyong-luyong	Pal.- Young shoots and leaves mixed in *sinigang*

Table 2 (Continued). Utilization and methods of preparation of identified underutilized vegetables and wild food plants based on the respondents surveyed.

Family/ Botanical Name[1]/ Local Name	Traditional Use[2]
Unknown/ Unknown/ Pal.- Tumbilikan	Pal.- New leaves and young shoots as vegetable in sinigang or sautéed in combination with andalawe
Unknown/ Unknown/ SCM- Kamantulan	SCM- Young leaves mixed in sautéed mungbean
Unknown/ Unknown/ SCM-Lube-lube	SCM- Heart of palm ('ubod') as a vegetable in sautéed sardines
Unknown/ Unknown/ SCM-Makmon	SCM- Fruits eaten raw
Unknown/ Unknown/ SCM – abu papaw	SCM - Young shoots and unopened flowers cooked with coconut milk and mixed with shrimp or dried fish

[1] Nomenclatures were based on the International Plant Names Index (IPNI, www.ipni.org)
[2] local names cited in: I.N. = Ilocos Norte; Pal = Palawan; SCM = South Central Mindanao

Local knowledge on use of underutilized vegetables and wild food plants

Shown in Table 2 are the family, scientific and local names and utilization of the plant species in Ilocos Norte, Palawan and South Central Mindanao. The edible parts of underutilized vegetables and wild food plants include the immature fruits, young leaves and shoots, inflorescence/flowers, young stalk, fiddlehead or immature fronds, calyx, tubers/ rhizomes, heart of the palm (ubod) and whole plant. The vegetable species from the five (5) provinces are prepared into salad, different viands and dishes like *dinengdeng*, *pinakbet*, *guinataan* or sautéed, *sariwagwag* or *sinag-it*,and *tinolang manok.* Some other vegetables were used as souring ingredient in fish, meat and vegetable dishes. Some species have multiple parts that can be used as vegetable while some others were used in two or three dishes.

The fruit species are eaten simply as raw fruits when ripe or prepared as fruit juice. Root crops are cooked into viand, cooked singly or in combination with other vegetables or meat, or prepared as guinataan, boiled or grilled snack. Other documented uses of the above species are as animal feed (e.g. *A. paeonifolius* and *D. esculenta sp. spinosa)*, in making furniture (e.g. yantok and nito) and in relation to traditional beliefs *i.e*. talisman against witchcraft (e.g. a living *D. hispida* planted in the home garden or near the gate is believed by some Ilocanos as talisman against witch or evil spirits).

Vernacular names

The above-mentioned species have vernacular or local names originating from several dialects used by local residents. In Palawan for example, 'krapper' is a Cuyonon term for *Talinum* while some other Ilocanos residing in Palawan call it 'tal-talinung'. 'Balbag' is a Cuyonon term as well but 'andalawe' and 'tumbilikan' are Pala'wan words. For *Hibiscus surattensis*, 'Kalatuytuy' is a Cuyonon term used by Tagbanwa natives we interviewed while 'bisulsug' is the term used by the Pala'wan natives and 'langkamit' is the term used by the Muslims from Balabac Island for the same plant. Ilocanos residing in the area, most of whom were located near or within the municipality of Narra, Palawan were

familiar with and were utilizing the same plants found in Ilocos such as parda, papait and allukon. Although bagbagkong/ ampupuyat is an Ilocano term, one group from Tagbanwa ethnic group from Sitio Busngol, Sta. Lourdes, Puerto Princesa City we interviewed also use this term (as they learned from their Ilocano friends) but they mentioned that even their forefathers has been eating this plant ever since. 'Larang dapo' is a Kapampangan word which is named by one respondent from Batangas with a parent from Pampanga. In South Central Mindanao on the other hand, 'kawat' *(Solanum nigrum)* is a B'laan term for 'onte-onte' while some other T'boli group residing in T'boli, South Cotabato call it 'kote'. 'Labog' is a term used by Ilonggo's for roselle (*H. sabdariffa)*.

Commercial potential

The underutilized vegetables and wild food plants identified by the respondents were usually gathered in the wild except for some species that are already being cultivated but only in small patches. Either gathered in the wild or cultivated, most of these vegetables are consumed for subsistence rather than as a source of income. The farmers interviewed were planting and selling the more popular vegetables such as eggplant, tomato, ampalaya, bell pepper, pechay, among others. Only very few of these vegetables are sold in the market that have the potential commercial value and provide appreciable cash income to small farm families. Species with commercial potential include *Momordica cochinchinensis* (sugod-sugod), *Telosma procumbens* (kapas-kapas), *Solanum lasiocarpum* (balbalosa), *Mollugo verticillata* (papait) and *Abelmoschus manihot* (nating saluyot, lagikway) and *Hibiscus sabdariffa* (roselle). The commercial value of the abovementioned species was identified based only on the feedbacks from the key informants and not on the cost-and-return analysis *per se*. For instance, several respondents in Ilocos Norte were selling *Telosma procumbens* (kapas-kapas) at a high price whenever these species are abundant in the wild. Also observed were *Mollugo verticillata* (papait/ salsalida) being sold in bundles at Puerto Princesa City and almost throughout the Ilocos Region.

CONCLUSION AND RECOMMENDATIONS

Surveyed communities in Ilocos Norte, Palawan and some provinces in South Central Mindanao such as South Cotabato, Sultan Kudarat and Sarangani, continuously include underutilized vegetables and wild food plants to their daily food intake. The species identified to have good commercialization potential is essential in alleviating the poverty level of rural farm families. However, cost and return analysis on the feasibility of growing these vegetables can be done to give a more comprehensive analysis for its commercialization. The evaluation of the nutritional quality and biochemical properties of these vegetables should also be done for a more complete documentation and further promotion. Investigations on other ways of preparing them as food can be conducted in order to maximize their use and significance as vegetables, in the field of nutraceuticals and even on other purposes. There is also a need to develop and select varieties or lines with decided consumer appeal and advantage in terms of tolerance to stresses related to climate change.

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STATEMENT OF AUTHORSHIP

The first author, as the Project Leader, supervised the work and technical checking and editing of the manuscript; second and third authors carried out field survey and preparation of the draft manuscript; while the last author supervised the field works in Palawan.

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