

Plant knowledge richness in the Sundanese upland village: A case study in Sindangsari, West Java, Indonesia

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Abstract. Soemarwoto R, Iskandar J. 2021. Plant knowledge richness in the Sundanese upland village: A case study in Sindangsari, West Java, Indonesia. *Biodiversitas* 22: 3722-3735. According to ecological history, Sundanese people of West Java, Indonesia, have highly rich knowledge of plants. However, due to population increase, rapid development of market economy, and rapid change of rural ecosystem, the local plants knowledge has tended to decrease rapidly. This research's objective is to elucidate the plant knowledge richness of the Sundanese. The study was undertaken in the upland village of Sindangsari, West Java, using mixed-method with ethnobotanical approach, from July to August 2017, and March 2018. The study found 204 landraces which consisted of 181 species, representing 161 genera, and 70 families. The use of plants could be classified into food, spices, medicine, construction, ornament, cosmetic, commercial plants, fodder, industry, food color, erosion control, and social function. The highest secondary citations, that is plants for food and medicine, were known by less than 50% of respondents; other plants were hardly known, recognized only by 0.1% to 0.5% of respondents. The results showed little practical knowledge among the younger generation. The intensive mobility of young population between the village and the city induces intergenerational transfer of knowledge between old and young generations mainly through oral narratives. This study concludes that it is important to consider population mobility of the young generation to predict knowledge loss.

Keywords: Knowledge exchange, plant knowledge richness, population mobility, upland village

INTRODUCTION

Plants knowledge has notably had positive impact on the economic and health care development, conservation, and sustainable development program (Yuan et al. 2016; Baydoun et al. 2017; de la Parra and Quave 2017; Shrestha and Medley 2017; Pandey and Tripathi 2017). A plant knowledge approach to local culinary and healing practices has become essential for providing food and drug research (Quave and Pieroni 2015). In biodiversity, the knowledge on the utilization and types of germplasm is a prerequisite for the maintenance of food crops (Brouwer et al. 2016) and becomes a buffer of losing genetic diversity due to genetic pollution (Carvalho et al. 2012). In Indonesia, the recent development of plant use is reflected in the raising license application for distribution of traditional medicine. According to Drug and Food Monitoring Agency (*Badan Pengawasan Obat dan Makanan*- BPOM 2017), in the period of 2015 to 2017, there was an increase in the applications for the traditional medicine distribution licenses; 34.46% from 2015 to 2016, and 52.63% from 2016 to 2017. Accordingly, the permits issued by BPOM rose from 29.58% in 2016 to 56.90% in 2017. At present, traditional medicines are easily found in the form of sachets at convenience stores at an affordable price.

However, some studies show that regional development and environmental changes often lead to the loss of local plants use (Wiryo et al. 2017; Aswani et al. 2018; Hopping et al. 2018; Ludwinsky and Hanazaki 2018; Suryana et al. 2018; Wiryo et al. 2019). In Colombia, unsustainable land use, overharvesting, and climate change are the direct causes of declining availability of medicinal plants (Rodríguez et al. 2018). Some studies show that caution is needed to declare the loss of ethnobotanical knowledge (Carvalho et al. 2012; Vandebroek and Balick 2012). Transformation, segmentation, and heterogeneity of ethnobotanical knowledge are also influenced by demographic, geographic, and communication factors (Mathez-Stiefel and Vandebroek 2012; Pirker et al. 2012; Hopkins et al. 2015; Caneva et al. 2017; Weckmüller et al. 2019). Levi-Strauss (Levi-Strauss 1966) argues that traditional knowledge is rooted in day-to-day curiosity to solve problems and fulfill the needs. Thus, it differentiates knowledge as a concept of know and a practice of know-how. Continuous desirable results substantiate the need of mastering and transferring knowledge to the next generation (Tam 2015; Sharif et al. 2016).

This study reveals the richness of plant knowledge consisting of plant names, uses, and cultivation sites, related to population mobilization in Sindangsari Village, West Java Province, Indonesia.

MATERIALS AND METHODS

Study area

This research was undertaken in Sindangsari, Sumedang, West Java Province, Indonesia (Figure 1). Sindangsari is an upland village situated at around 1,287 m above sea level in the hillside of Manglayang Mountain (Figure 2). The climate of Sindangsari belongs to type A (MoA 2015). The average annual temperatures range from

25°C to 30°C, and the humidity varies between 79% to 82%. It has an average annual rainfall in between 1,294–2,827 mm with a sequential pattern of monsoonal. The highest rainfall usually occurs in January. In June, July, Augustus, and September, rainfall is usually low. The number of dry months with intensity < 100 mm/month is 3–5 months, and intensity > 200mm/month is 6–7 months. As there is no fully linked irrigation channel infrastructure, the village agricultural activities depend on the season.

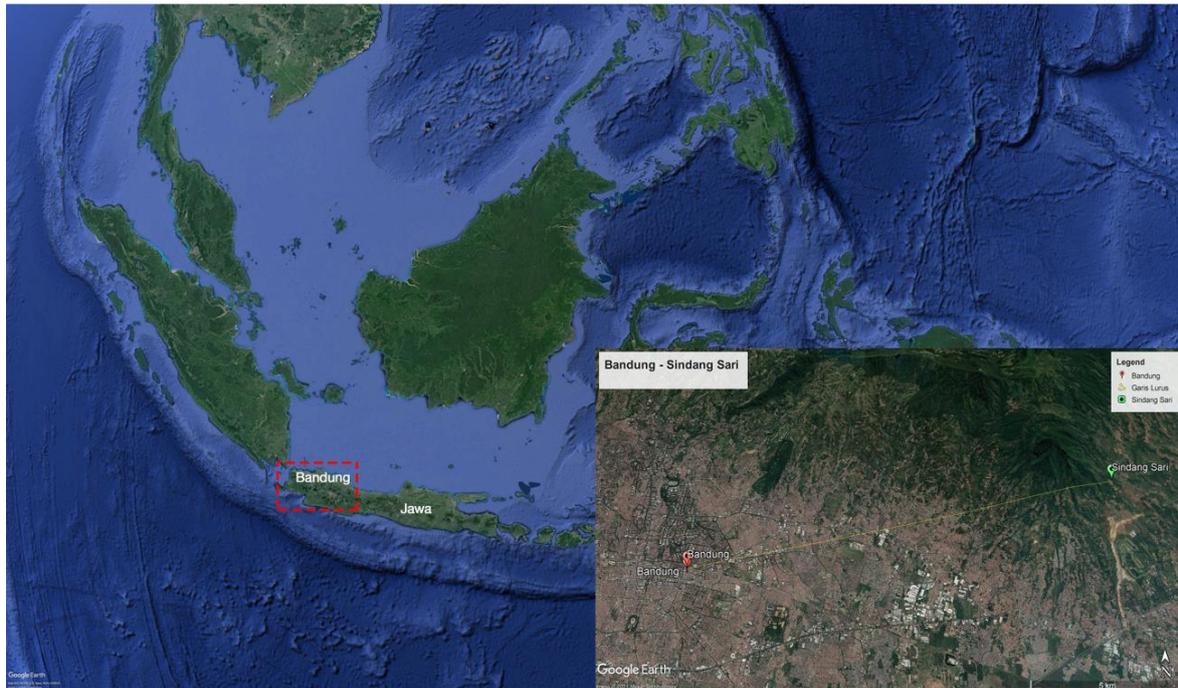


Figure 1. Study area, Sindangsari Village, Sukasari Sub-District, Sumedang District, West Java, Indonesia



Figure 2. The village office (A) is located in the Manglayang mountain valley (B) of Sumedang District, West Java, Indonesia

The Sindangsari population is dominated by the Sundanese who have been practicing agricultural way of life for generations. Their village land consists of 69 ha *sawah* (irrigated ricefields) and 509 ha other rain-fed rice fields, gardens, and homegardens. During the dry season, there is usually no enough water for agriculture (Kabupaten Sumedang 2018). The village flat lands cater freshwater fishes and chickens whilst the hilly ones are for goats, sheep, and cows.

Procedures

The methodology used in this study was mixed-method with ethnobotanical approach to provide complementary insights into the overall topic of interest, which is focused on the interaction of plants and village people (Newing et al. 2010). Lynch et al. (1974) statistical formula was used to determine the number of random respondents. The calculation is as follow:

$$n = \frac{N \times Z^2 \times P(1-P)}{N \times d^2 + Z^2 \times P(1-P)}$$

n : sample number (respondents) = 91
 N : total population of households = 1891
 Z : normal variable value = 1.96
 P : possible maximum proportion = 0.50
 d : error = 0.10

$$= \frac{1891 \times 1.96^2 \times 0.50 (1-0.50)}{1891 \times 0.1^2 + 1.96^2 \times P (1-0.50)} = \frac{1816.12}{19.87} = 91.4$$

The total number of respondents was 91. The demographic data recorded age, sex, occupation, and place of residency. There is no record of formal education as it has not significantly affected traditional knowledge (Surtikanti et al. 2019); and plants knowledge listed ricefield, home garden, and garden plants name and use. The survey was followed by 'walking in the field', observation 'on the practice of plants use', and in-depth interviews (Tongco 2007). The informants were purposely selected based on their competency, that is local experts, including the village leader and his staff, informal leaders, men, women, young and old (Martin 2004; Torres-Aviles, de Medeiros, and Albuquerque 2016; Voeks 2007; Albuquerque et al. 2017). The research was undertaken from July to August 2017 and March 2018. The interview was carried out in both Bahasa Indonesia, and local language, Sundanese. Prior informed consent was always obtained.

Data analysis

Qualitative data were analyzed by several steps namely cross-checking, summarising, and synthesizing from different sources to build up a narrative account (Newing et al. 2010). The cross-checking was undertaken to check the correct data collected by direct observation and answers from some informants, including some document reports and statistical data. The appropriate data were then summarized and synthesized. Furthermore, a narrative, which is descriptive analysis and evaluative, was made.

While, the quantitative data were analyzed using statistics, the frequency was calculated based on a respondent's answer to the total respondents, then the descriptive analysis and evaluation were narrated. Some books, including Backer and Bakhuizen v.d. Brink (1963, 1965, 1968), Heyne (1987), Partoharjono and Grubben (1996), Siemonsa and Grubben (1996), and Widjaja (2019) were used to identify the plant species in the study area.

The quantitative data collected by structured interview with respondents were analyzed by simple statistical calculation as follows (Newing et al. 2010):

$$P = \frac{f}{n} \times 100 \%$$

Where,

P : percentage of the total answer of respondents

f : number of respondent answers

n : total respondent

The results of statistical analysis were interpreted and narrated with descriptive and evaluated analyses.

RESULTS AND DISCUSSION

The demographic data recorded in Table 1 show that the highest number of respondents is in the age between 41 to 50 years. They are within the highest demand category for economic, social, and cultural choruses of households and families. The occupation composition is expected to result in knowledgeable respondents; the composition of women to men, 61: 30, means that plants for medicinal uses may represent more than other uses. Many literature mentions the richness of medicinal knowledge belongs to women (Alqethami et al. 2017) who mostly work on homegarden; the place of residency distributed to nine neighborhood associations may represent extensive dissemination of knowledge throughout the village.

The landrace in Sindangsari

The interviews with respondents revealed that 204 landraces were found in the agroecosystem types, namely wet-rice fields, gardens, and homegarden. We use the word landrace which is applied by scholars, including Iskandar and Ellen (Iskandar and Ellen 1999) to distinguish local categories of plants, based on knowledge of Sindangsari people, Sumedang, with Western botanical sense. The landrace is different from the botanical scientific name in that it is based on categories for subdivision of ancestral plant species and varieties in the conventional Western taxonomic sense. Total 204 landraces documented in Sindangsari consists of 181 species, representing 161 genera, and 70 families (Figure 3). Figure 3 shows the ratio between the number of plants species, citations, and secondary citations show the narrow diversity use per plant.

Table 1. Demographic data of respondents of Sindangsari Village, West Java, Indonesia

Demographic data	n = 91	%
Age		
21-30	10	10.99
31-40	19	20.89
41-50	28	30.77
51-60	17	18.68
61-70	11	12.09
71-80	3	3.30
81-90	3	3.30
Sex		
Men	30	32.97
Women	61	67.03
Occupation		
Worker ^a	12	13.19
Housewife ^b	34	37.36
Farmer ^c	18	19.78
Breeders ^d	4	4.40
Entrepreneur ^e	18	5.50
No job ^f	5	19.78
Place of Residency		
Salam (RW1)	5	5.49
Salam (RW2)	6	6.59
Babakan Kawung (RW3)	19	20.88
Babakan Kawung (RW4)	18	19.78
Babakan Kawung (RW5)	1	1.09
Sindanglaya (RW6)	5	5.49
Sindanglaya (RW7)	11	12.09
Cibacang (RW8)	25	27.47
Cibacang (RW9)	1	1.10
Total	91	100.00

Note: The occupation classification follows the Indonesian Central Bureau of Statistics (*Badan Pusat Statistik Indonesia*), which is then modified following natives definition. However, there are no clear cut in-between categories, but they are the respondents' first occupation: ⁽ⁱ⁾ A worker is a respondent who mainly has routine and full-time work outside agricultural sector, such as civil servants and factory laborer^s. ⁽ⁱⁱ⁾ A housewife is a respondent who mostly spends their time on domestic chores. ⁽ⁱⁱⁱ⁾ A farmer is a respondent who mainly works in agricultural sector. Amongst them are the farmer with their land, a worker who works on someone else's land, a farmer who seeds for trading, and a farmer who has small number of livestock such as chicken and sheep. ^(iv) A breeder is a respondent who keeps livestock, and planting grasses, for trading. The livestock generally includes sheep, goat, and cow. ^(v) An entrepreneur is a respondent who owns a business. Some respondents open a small village shop. Included in this category is respondent who makes a house wall from woven bamboo. ^(f) A no job is a respondent who is not able to do a job. They are not able due to being physically unable or being 'sepuh' (lit. old age); thus, they are not allowed to work by their relatives.

The traditional knowledge of species in Sindangsari

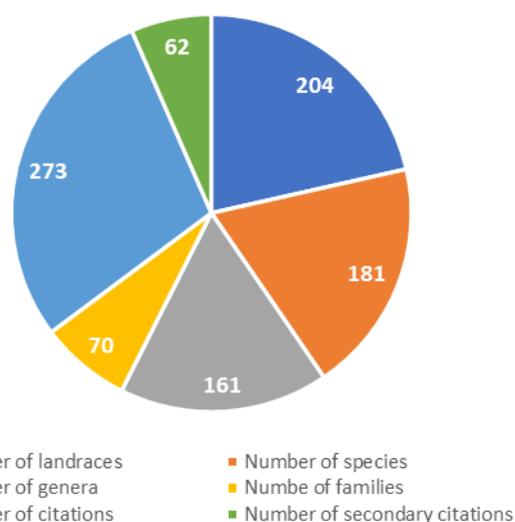
On the survey of the plants use, the various plants can be categorized into twelve: food, spices, medicine, construction, ornament, cosmetic, commercial plants, fodder, industry, food color, erosion control, and social function, as shown in Table 2, while, more detail of the plant species and commonly utilized by the village people of Sindangsari can be seen in Figure 4.

Figure 4 shows that the plants usage overlap in-between categories, that is one species may have more than one category of use. For example, one plant may be used for curing illnesses, for spices and ornament, and so on (Figure 5). It means the definition of category itself may sometimes overlap. For example, medicine is defined as plants to cure illnesses, but sometimes it also includes plants for preventing illnesses (but also in spices category) and casting out a negative supernatural power (an ornament).

The category of plants for food and medicine shows significantly a high number of species and secondary use. The most cited plant use category is food, followed by medicine, commercial, ornament, spices, and construction. The sum citations of other uses of plants, such as food color, cosmetics, fodder, industrial, erosion control, and social functions, have fallen to no more than 10 citations. The data represent that plants link to people immediate compare to secondary needs are likely cited higher. Interestingly, although, by the number, the category of social function are cited low, the informants emphasize its importance.

Knowledge on cultivated site and knowledge distribution

On the survey of plant cultivation sites, it was found that based on respondent perception, 108 landraces were present in homegardens, 55 in gardens, and 41 in *sawahs*, as shown in Table 3. The result may link to the higher number of women respondents than men. Further, the definition of *sawah* and garden are interchangeable depending on the season. As the time of the survey is in the dry season, *sawah* is drying up and the respondent defines some as garden. This dried-up *sawah* is planted with seasonal garden species (Figure 6).

**Figure 3.** Summary of the number of useful plants classification and citation

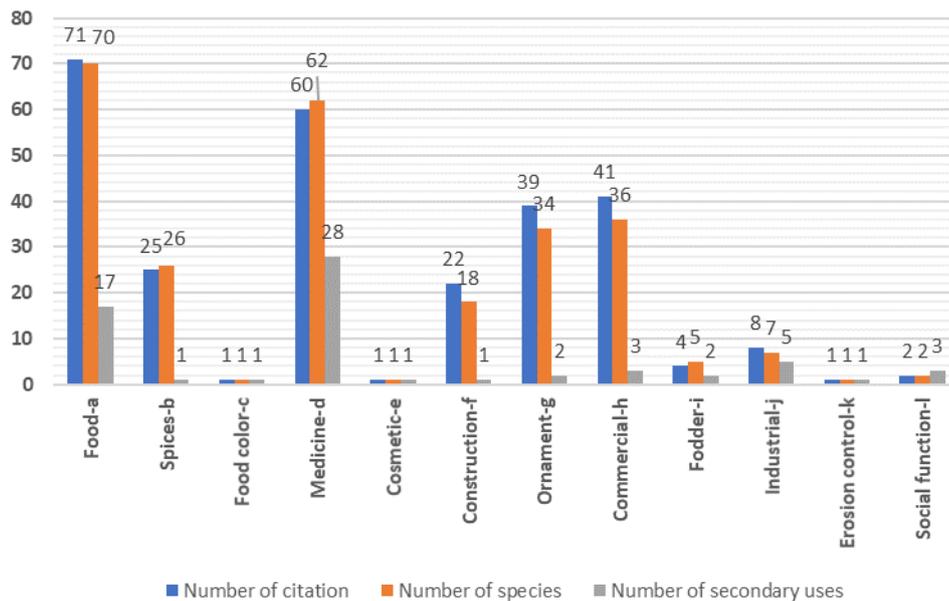


Figure 4. The main functions of plants and number citations are based on respondents. Note: The category definition of plants use as respondents explain them: **Food:** plants that are eaten on their own or together with other parts of the plants: fresh fruits, vegetables, *lalab* (raw vegetables to be eaten with chili sauce or paste), *lotek* (salad of slightly boiled), leaf jelly (*cincau*), *sambal* (chili sauce or paste), *combro* (grated cassava and *oncom*, fermented peanut residue), chips (*kiripik*). **Spices:** herbs. **Food color:** color additives for food. **Medicine:** high blood pressure, constipation, diabetes, flatulence, cracked skin, diarrhea, kidney disease, sore itching, uric acid, skin itchy, stomach problems, maintain health, ulcers abscess, gout, fever, heartburn, rheumatic, cough, muscle pain, chills, stomach ache, myalgia, gastric problem, diuretic problem, back pain, sprue, sprain, external wound, toothache, postnatal care, hair care, casting out negative supernatural power. **Cosmetic:** plants for face powder. **Construction:** plants for building materials. **Ornament:** plants for adding aesthetics values to house, including casting out a negative supernatural power. **Commercial:** plants that can be sold, such as wood, seeds/seedling, and firewood. **Fodder:** plants for animal food, such as beehives. **Industry:** processed products. **Erosion control:** plant to prevent avalanche. **Social functions:** plants to be shared with neighbors, give a shade for people, or function as windbreak for the village.



Figure 5. A. Katuk (*Sauropus androgynus*)-leaves are used as vegetable and medicinal feverish; B. Manalika (*Anona muricata*) fruit is used as fresh fruit and medicinal stomach; C. Tomat (*Solanum lycopersicum*)-fruit is used as spices and medicinal sprue (left); D. Sereh (*Cymbopogon citratus*) stem is used as spices and as medicinal a high blood pressure

Table 2. Plant species and various utilizations based on interview with respondents in the Sindangsari, Sumedang, Indonesia

Vernacular name/landraces	Scientific name	Family	Utilization	
			Plant part	Used method/function
Akasia	<i>Acacia decurrens</i> Willd	Fabaceae	Seedling	The seedlings are sold; function as commercial
Alkor	Sp. 3		Trunk	The wood is used for construction materials; functions as construction
Alpuket/Alpukat	<i>Persea americana</i> Mill	Lauraceae	Fruit	The fruit is used as fresh fruit, to treat high blood pressure, and sold; function as food, medicine, commercial
Anggrek kalajengking	<i>Arachys flos-aeris</i> (L) Archb.f	Orchidaceae	Flower	The flowers are used for ornament; function as ornament
Anggur	<i>Vitis vinifera</i> L	Vitaceae	Fruit	The fruit is used as fresh fruit; functions as food
Antanan	<i>Centella asiatica</i> (L) Urban	Apiaceae	Leaf	The leaves are used to treat itchy skin; function as medicine
Arbei	<i>Morus alba</i> L	Moraceae	Fruit	The fruit is used as fresh fruit, to treat high blood pressure and constipation; function as food, medicine
Aren/Kawung	<i>Arenga pinnata</i> (Wurmb) Merr	Arecaceae	Inflorescences, fruit	The inflorescences are sap for making sugar, fruits are made for making sweetmeat (<i>kolang-kaling</i>); function as an industry
Asem	<i>Tamarindus indica</i> L	Fabaceae	Fruit	The fruit is used for spices; function as food
Awi betung	<i>Dendrocalamus asper</i> (Schult.f) Backer	Poaceae	Clums	The culms are used for construction material; function as construction, industry
Awi cangker	<i>Bambusa</i> sp.	Poaceae	Clums	The culms are used as ornament; function as ornament
Awi gombong, Awi surat	<i>Gigantochloa verticillata</i> (Willd) Munro	Poaceae	Clums	The culms are used for sale, construction materials, tools; function as construction, industry
Awi hideung	<i>Gigantochloa atroviolacea</i> Widjaja	Poaceae	Clums	The culms are used for construction materials and Sundanese musical instrument material (<i>calung</i>); function as construction, industry
Awi tali	<i>Gigantochloa apus</i> (Schult.f) Kurz	Poaceae	Clums	The culms are used for sale, construction material, woven bamboo, and kite; function as construction, industry
Awi temen	<i>Gigantochloa atter</i> (Hassk) Kurz	Poaceae	Clums	The culms are used for construction and for sale; function as construction and industry
Bako/Tembakau	<i>Nicotiana tabacum</i> L	Solanceae	Leaf	The leaves and processed leaf products are sold; function as industry
Bakung	<i>Crinum asiaticum</i> L	Liliaceae	Flower	The flowers are used as ornament; function as ornament
Baluntas	<i>Pluchea indica</i> L	Lauraceae	Leaf	The leaves are used to treat stomach problems; function as medicine
Bambu total	<i>Bambusa maculata</i> Widjaja	Poaceae	Tree	The tree is used as ornament; function as ornament
Batrawali	<i>Tinospora crispa</i> L	Menispermaceae	Stem	The stem is used to maintain health; function as medicine
Bawang beureum/ Bawang merah	<i>Allium fistulosum</i> L	Amaryllidaceae	Bulb	The bulb is used as spices, and sold; function as spices, commercial
Bawang daun	<i>Allium fistulosum</i> L	Amaryllidaceae	Leaf	The leaves are used as spices, sold, and given to neighbors; function as species, commercial, social
Bawang gajah	<i>Allium fistulosum</i> L	Amaryllidaceae	Bulb	The bulb is used as spices; function as spices
Bayem hejo	<i>Amaranthus hybridus</i> L	Amaranthaceae	Leaf	The leaves and stems are cooked and consumed; function as food
Bayem beureum/ Bawang merah	<i>Amaranthus tricolor</i> L	Amaranthaceae	Stem	The stem and leaves are used as vegetable, and to treat gout; function as food, medicine
Belimbing	<i>Averrhoa carambola</i> L	Amaryllidaceae	Fruit	The fruit is eaten as fresh fruit; function as food
Binahong	<i>Anredera cordifolia</i> (Ten) Stenis	Basellaceae	Leaf	The leaves are used to treat high blood pressure, skin itchy, ulcers, immediately eaten; function as medicine
Bonsai beringin	<i>Ficus benjamina</i> L	Moraceae	Tree	The tree is used as ornament; function as ornament

Borneo	Sp. 4		Trunk	The wood is used as construction and sold; function as construction, commercial
Brokoli	<i>Brassica oleracea</i> var. "italica"	Brassicaceae	Leaf	The leaves are used as vegetable and sold; function as food, commercial
Buah/Mangga	<i>Mangifera indica</i> L	Anacardiaceae	Fruit and tree	The fruit is used as fresh fruit, the trees is used as shade from the sunshine and to blocking the strong wind; function as food, social
Buah naga	<i>Hylocereus lemairei</i> (Hook.) Briton & Rose	Cactaceae	Fruit	The fruit is used as fresh fruit and sold; function as food, commercial
Bugenvil	<i>Bougenvillea spectabilis</i> Willd	Nyctaginaceae	Flower	The flowers are used as ornament; function as ornament
Buncis	<i>Phaseolus vulgaris</i> L	Papilionaceae	Fruit	The fruits are used as vegetable and sold; function as food, commercial
Buntiris	<i>Kalanchoe piñata</i> (Lamk) Pers	Crassulaceae	Leaf	The leaves are used to treat fever and heartburn; function as medicine
Cabe bendot	<i>Capsicum annum</i> L. var "grossum"	Solanaceae	Fruit	The fruits are used as spices; function as spices
Cabe kriting	<i>Capsicum annum</i> L	Solanaceae	Fruit	The fruits are used as spices; function as spices
Cabe/Cabe merah	<i>Capsicum annum</i> L	Solanaceae	Fruit	The fruits are used as spices and sold; function as spices, commercial
Calincing	<i>Oxalis acetosella</i> L	Oxalidaceae	Leaf	The leaves are used to treat fever, diarrhea; function as medicine
Caludih	<i>Gynura divaricata</i> (L.) DC	Asteraceae	Leaf	The leaves are used to treat fever, stomach ache; function as medicine
Camcau/Cincau	<i>Cyclea barbata</i> Miers	Menispermaceae	Leaf	The leaves are used for making a leaf jelly (<i>cincau</i>) and eaten; function as food
Campoleh	<i>Madhuca cuneta</i> (Bl.) Macbr.	Sapotaceae	Fruit	The fruit is used as fresh fruit; function as food
Cangkudu/ Mengkudu	<i>Morinda citrifolia</i> L	Rubiaceae	Fruit	The fruit is used to treat high blood pressure; function as medicine
Cau ambon bodas	<i>Musa x varadisiaca</i> L var."sapiantum"	Musaceae	Fruit	The fruit is used as fresh fruit, and sold; function as food, commercial
Cau bogo	<i>Musa x paradisiaca</i> L	Musaceae	Fruit	The fruit is used as fresh fruit, and sold; function as food, commercial
Cau nangka	<i>Musa x paradisiaca</i> L	Musaceae	Fruit	The fruit is used as fresh fruit, and sold; function as food, commercial
Cecenet/ Ceplukan	<i>Physalis angulate</i> L	Solanaceae	Fruit	The fruit is used to treat back pain; function as medicine
Cempaka putih	<i>Magnolia champaca</i> (L.) Figlar	Magnoliaceae	Flower	The flower is used for ornament; function ornament
Cengek	<i>Capsicum frutescens</i> L	Solanaceae	Fruit	The fruit is eaten directly, chilly sauce, processed to <i>lotek</i> (salad of slightly boiled), treat external wound, and sold; function as food, medicine, commercial
Cengek	<i>Syzygium aromaticum</i> L	Myrtaceae	Fruit	The fruit is used to treat stomach aches; function as medicine
Cikur/Kencur	<i>Kaempferia galanga</i> L	Zingiberaceae	Rhizome	The rhizome is used as spices; function as spices
Dangdeur	<i>Bombax ceiba</i> L	Bombaceae	Leaf	The leaves are used to treat stomachache; function as medicine
Daun adam hawa	<i>Rhoeo spathacea</i> (Sw.) Stearn	Commelinaceae	Plant	The plant is used as ornament; function as ornament
Daun edi	<i>Abelmoschus manihot</i> L	Malvaceae	Leaf	The leaves are used to treat sprue; function as medicine
Daun insulin	<i>Smallanthus sonchifolius</i> Poepp & Endl	Asteraceae	Leaf	The leaves are used to treat diabetes; function as medicine
Daun sembung	<i>Blumea balsamifera</i> L	Acanthaceae	Leaf	The leaves is used to treat flatulence; function as medicine
Delima	<i>Punica granatum</i> L	Punicaceae	Fruit	The fruit is used as fresh fruit; function as food
Durian	<i>Durio zibethinus</i> L	Malvaceae	Fruit	The fruit is used as fresh fruit; function as food
Engkol/Kol	<i>Brassica oleracea</i> L	Brassicaceae	Leaf	The leaves for fresh vegetable, and made for <i>lotek</i> (salad of slightly boiled), sold; function as food, commercial
Eurih	<i>Imperata cylindrica</i> C.E. Hubb	Graminae	Root and stem	Roots and stems are used to treat high blood pressure; function as medicine
Gabon, Jabon	<i>Anthocephalus cadamba</i> Miq	Rubiaceae	Trunk	The wood is used for construction materials; function as construction
Gedang/ Pepaya	<i>Carica papaya</i> L	Caricaceae	Fruit and leaf	The fruit, young fruit is used as salad, young leaves as vegetables, to treat cracked skin; function as food, medicine
Gedang ranti	<i>Carica papaya</i> L	Cariaceae	Fruit	The fruit is used to treat ulcer; function as medicine
Ginseng	<i>Panax</i> sp	Araliaceae	Root	The roots are used to maintain health; function as medicine
Hanjuang	<i>Cordyline fruticosa</i> (L.) A.Chev	Asparagaceae	Plant	The plant is used as ornament, and to withhold negative supernatural power; function as ornament, medicine

Haur hejo	<i>Bambusa vulgaris</i> var <i>striata</i>	Poaceae	Tree	The tree is used as ornament; function as ornament
Haur hitam	<i>Gigantochloa atroviolacea</i> Widjaja	Poaceae	Tree	The tree is used as ornament; function as ornament
Haur koneng	<i>Bambusa vulgaris</i> var “ <i>vulgaris</i> ” Schrud. ex J.C. Wendl	Poaceae	Tree	The tree is used as ornament; function as ornament
Hiris	<i>Cajanus cajan</i> (Linn.) Mills	Leguminosae	Bean	The beans are used as vegetable and to make salad; function as food
Honje	<i>Etilingera elatior</i> (Jack) R.M Smith	Zingiberaceae	Fruit, flower	The fruit and flower are used as spices, and to treat high blood pressure; function as spices, medicine
Hui/Ubi	<i>Ipomoea batatas</i> (L.) Lam	Convolvulaceae	Tuber	The tuber is used as food, sold; function as food, commercial
Indri	Sp. 5		Trunk	The wood is used as construction material, sold; function as construction, commercial
Jagong	<i>Zea mays</i> L	Poaceae	Bean	The roasted and boiled corn are used as food, processed, and sold; function as food, commercial
Jahe	<i>Zingiber officinale</i> Roscoe	Zingiberaceae	Rhizome	The rhizome is used as spices, and to treat toothache; function as spices, medicine
Jambe/Pinang	<i>Areca catechu</i> L	Arecaceae	Fruit	The fruit is used for chewing; function as food
Jambu batu/Jambu biji	<i>Psidium guajava</i> L	Myrtaceae	Fruit	The fruit is used as fresh fruit; function as food
Jambu air	<i>Syzygium aquaeum</i> (Burm.f.) Alston	Myrtaceae	Fruit	The fruit is used as fresh fruit; function as food
Jaringao	<i>Acorus calamus</i> L	Accoraceae	Leaf	The leaves are used to treat myalgia (<i>nyeri otot</i>); function as medicine
Jati/Jati bodas/Jabon	<i>Gmelia arborea</i> Roxb	Verbenaceae	Trunk	The wood is used as construction material, sold; function as construction, commercial
Jawer kotok	<i>Coleus scutellaroides</i> (L.) Benth	Lamiaceae	Leaf	The leaves are used to treat gastric problem, and recovering women after giving birth; function as medicine
Jawer ayam	<i>Celosia argentea</i> L var. “ <i>crinata</i> ”	Amaranthaceae	Plant	The plant is used as ornament; function as ornament
Jayanti	<i>Sesbania sesban</i> (L) Merr	Fabaceae	Leaf	The leaves are used to treat high blood pressure, diuretic problems; function as medicine
Jengjen/Albasiah	<i>Paraserianthes falcataria</i> (L.) Nielsen	Fabaceae	Trunk	The wood is used for construction material; function as construction
Jengkol	<i>Archidendron pauciflorum</i> (Benth) I.C Nielsen	Fabaceae	Fruit	The fruits are used as vegetable; function as food
Jeruk	<i>Citrus</i> sp.	Rutaceae	Fruit	The fruit is used as fresh fruit, to treat fever; function as food, medicine
Jeruk purut	<i>Citrus hystrix</i> DC	Rutaceae	Fruit	The fruits are used as various spicy side dishes (<i>sambal</i>); function as spices
Jeruk lemon	<i>Citrus limon</i> L	Rutaceae	Fruit	The fruit is used as spices; function as spices
Jeruk garut	<i>Citrus</i> sp.	Rutaceae	Fruit	The fruit is used as fresh fruit; function as food
Jeruk bali	<i>Citrus maxima</i> (Burm.) Merr.	Rutaceae	Fruit	The fruit is used as fresh fruit; function as food
Jeruk nipis	<i>Citrus aurantifolia</i> (Christm)	Rutaceae	Fruit	The fruit is used for spices; function as spices
Jeruk paris	Sp.1		Fruit	The fruit is used as fresh fruit; function as food
Jukut ibun	<i>Drynaria hirsute</i> Bartl	Caryophyllaceae	Leaf	The grasses are used to treat ulcer abscess, constipation; function as medicine
Jukut	<i>Pennisetum pupureum</i> Schumach	Poaceae	Leaf	The grasses are used for fodder; function as fodder
benggala/Kaso/Bede				
Jukut pager/Rumput pagar	<i>Duranta erecta</i> L	Verbenaceae	Plant	The plant is used for ornament; function as ornament
Jukut pelak	Sp. 11		Leaf	The grasses are used for fodder; function as fodder
Kacang panjang	<i>Vigna unguiculata</i> (L) Walp	Fabaceae	Bean	The bean is used as vegetable, sold; function as food, commercial
Kacang beureum/ Kacang merah	<i>Vigna angularis</i> (Willd) Ohwi & H.Ohashi	Fabaceae	Bean	The bean is used as vegetable, sold; function as food, commercial
Kacapiring	<i>Gardenia augusta</i> (L.) Merr	Rubiaceae	Plant	The plant for ornament, function as ornament
Kaktus	<i>Mammillaria</i> sp	Cactaceae	Plant	The plant for ornament, function as ornament
Kalendra	<i>Acasia abida</i> (Del.)	Fabaceae	Stem, flower, tree	The stems and trees are used as firewood, leaves as fodder, and flowers are used as source food of honey bees; function as commercial, fodder
Kaliajet	Sp. 6		Plant	The plant for ornament, function as ornament
Kaliki beureum	<i>Jatropha gossypifolia</i> L.	Euphorbiaceae	Leaf	The leaves are used to release constipation, function as medicine
Kalitis/Litus	<i>Eucalyptus</i> sp.	Myrtaceae	Trunk	The wood is used as construction, function as construction

Kamboja	<i>Plumeria acuminata</i> W.T. Aiton	Apocynaceae	Plant	The plant is used for ornament, function as ornament
Kamper	<i>Dryolanops aromatic</i> Gaertn.F	Dipterocarpaceae	Trunk	The wood is used for construction, sold; function as construction, commercial
Kangkung darat	<i>Ipomoea reptans</i> L	Convolvulaceae	Leaf	The leaves and stems are cooked as vegetable; function for food
Kapol	<i>Amomum cordomomum</i> (L.) Maton	Zingiberaceae	Fruit	The fruit is used to treat high blood pressure; function as medicine
Kapulaga	<i>Elettaria cardamomum</i> (L.) Malton	Zingiberaceae	Rhizome	The rhizome is used as spices, to treat stomach problems; function as spices, medicine
Karet	<i>Hevea brasiliensis</i> (Willd ex A. Juss) M.A	Euphorbiaceae	Sap	Sap is tapped and sold; function as commercial
Katuk/Katepos	<i>Sauropus andoroginus</i> (L.) Merr	Phyllanthaceae	Leaf	The leaves are used as vegetable, cooked, to treat fever; function as food, medicine
Kaweni	<i>Mangifera odorata</i> Griff	Anacardiaceae	Fruit	The fruit is used as fresh fruit; function as food
Kedelai	<i>Glycine max</i> (L.) Merr	Fabaceae	Bean	The bean is used as vegetable; function as food
Kelapa	<i>Cocos nucifera</i> L	Arecaceae	Fruit	The fruit is used as fresh drink; function as food
Keladi	<i>Collocasia esculenta</i> (L.) Schott	Araceae	Plant	The plant is used as ornament; function as ornament
Kemuning	<i>Muraya paniculata</i> (L.)	Rutaceae	Seedling	The seedlings are usually sold; function as commercial
Kentang	<i>Solanum tuberosum</i> L	Solanaceae	Tuber	The tuber is usually sold; function as commercial
Kiciat	<i>Ficus septica</i> Burm.f.	Moraceae	Leaf	The leaves are used to treat gastric pain or gastric ulcer; function as medicine
Kiciwis	<i>Brassica oleracea</i> L	Brassicaceae	Leaf	The leaves are used as salad of slightly boiled (<i>sayur lotek</i>); function as food
Kijambe	<i>Cycas revolute</i> Tunb	Cycadaceae	Trunk	The wood is used as construction material; function as construction
Ki urat	<i>Plantago major</i> L	Plantaginaceae	Leaf	The leaves are used to treat sprain, high blood pressure, back pain; function as medicine
Koneng/Kunyit	<i>Curcuma longa</i> L	Zingiberaceae	Rhizome	The rhizome is used as spices, sold; function as spices, commercial
Kopi	<i>Coffea arabica</i> L	Rubiaceae	Fruit, seeds	The fruits are used to treat fever, mature seeds are sold, and seedling are sold; function as medicine, commercial
Kumis kucing	<i>Orthosiphon aristatus</i> (Blume) Miq	Lamiaceae	Leaf	The leaves are used to treat fever, rheumatics, high blood pressure, cough, constipation; function as medicine
Kuping gajah	<i>Anthurium</i> sp	Araceae	Plant	The plant is used as ornament; function as ornament
Laja	<i>Alpinia galanga</i> (L.) Willd	Zingiberaceae	Rhizome	The rhizome is used as spices, to treat muscle pain; function spices, medicine
Lampuyang	<i>Zingiber zerumbet</i> (L.) Smith	Zingiberaceae	Rhizome	The rhizome is used to treat high blood pressure; function as medicine
Lejet/Waluh siem	<i>Sechium edule</i> (Jacq) Sw	Cucurbitaceae	Fruit	The fruit is used as cooked vegetable, made <i>lotek</i> (salad of slightly boiled), to treat high blood pressure; function as food, medicine
Lengkeng	<i>Dinocarpus longan</i> Lour	Sapindaceae	Fruit	The fruit is used as fresh fruit; function as food
Leunca	<i>Piper nigrum</i> L	Piperaceae	Fruit	the fruit is used as fresh vegetable and cooked; function as food
Lidah buaya	<i>Aloe vera</i> L	Asphodelaceae	Leaf	The leaves is used to treat fever, heartburn, external wound, hair care; function as medicine
Lidah mertua	<i>Sansieviera</i> sp	Asparagaceae	Plant	The plant is used as ornament; function as ornament
Lili paris	<i>Chlorophytum comosum</i> (Thunb) Jaques	Agavaceae	Plant	The plant is used as ornament; function as ornament
Mahkota dewa	<i>Phalaeria macrocarpa</i> (Scheff) Boerl	Thymelaeaceae	Fruit	The fruit is used to treat diabetes; function as medicine
Mahkota duri	<i>Euphorbia millii</i> Des Moul	Euphorbiaceae	Plant	The plant is used as ornament; function as ornament
Mahoni	<i>Swietenia mahagoni</i> (L.) Jacq	Meliaceae	Trunk, seeds	The wood is used as construction material, seeds are used to treat high blood pressure; function as construction, medicine
Manalika/Sirsak	<i>Annona muricata</i> L	Annonaceae	Fruit	The fruit is used as fresh fruit, to treat diarrhea; function as food, medicine
Markisa	<i>Passiflora edulis</i> Sims	Passifloraceae	Fruit	The fruit is used as fresh fruit, to treat stomach ache; function as food, medicine
Mawar	<i>Rosa hybrida</i> Hort	Rosaceae	Plant	The plant is used as ornament; function as ornament
Muncang/Kemiri	<i>Aleurites moluccana</i> (L.) Willd	Euphorbiaceae	Fruit	The fruits are sold; function as commercial
Nanas	<i>Ananas comosus</i> (L) Merr	Bromelioideae	Fruit	The fruit is used as fresh fruit; function as food

Nangka	<i>Artocarpus heterophyllus</i> Lam	Moraceae	Fruit, trunk	The fruit is used as fresh fruit, cooked, sold, its wood is used as construction material; function as food, construction
Pacing	<i>Costus speciosus</i> (J. Koeinig) Sm	Costaceae	Rhizome	The rhizome is used to treat kidney disease; function as medicine
Paku ekor kuda	<i>Equisetum debille</i> Roxb ex. Vaucher	Equisetaceae	Plant	The plant is used as ornament; function as ornament
Palem	<i>Cryptostachys renda</i> Blume	Arecaceae	Plant	The plant is used as ornament; function as ornament
Pandan wangi	<i>Pandanus amaryllifolius</i> Roxb	Pandanaceae	Leaf	The leaves are used as spices; function as spices
Panglay	<i>Zingiber cassumunar</i> Roxb	Zingiberaceae	Rhizome, plant	The rhizome is used as spices, the plant to protect from negative supernatural power: function as spices, medicine
Pare/Padi	<i>Oryza sativa</i> L	Poaceae	Fruit	The fruits are used as staple food; function as food
Pecah beling	<i>Strobilantes crispus</i> L	Acanthaceae	Fruit	The leaves are used as to treat fever, the feeling of chills; function as medicine
Pecay	<i>Brasica oleracea</i> L	Brassicaceae	Leaf	The leaves are used as vegetable, sold; function as food, commercial
Peuteuy/Petai/Pete	<i>Parkia speciosa</i> Hassk	Fabaceae	Fruit	The fruit is used as vegetable; function as food
Peuteuy selong/ Selong/Lamtoro	<i>Leucaena leucocephala</i> Hassk	Fabaceae	Fruit	The mature fruits are cooked as vegetable; function as food
Pilisium/Kiara payung	<i>Filicium decipiens</i> (Wight & Arn)	Sapindaceae	Trunk	The wood is used as construction material, sold; function as construction, commercial
Pinus	<i>Pinus merkusii</i> Jungh. & de Priese	Pinaceae	Trunk	The wood is used as construction material; function as construction
Pisuk	Sp. 7		Trunk	The wood is used for construction, sold; function as construction, commercial
Pohpohan	<i>Pilea melastomoides</i> (Poir) Bl	Urticaceae	Leaf	The leaves are used as vegetable, to maintain health; function as food, medicine
Pucuk merah	<i>Syzigium myrtifolium</i> Walp	Myrtaceae	Plant	The plant is used as ornament, sold; function as ornament, commercial
Pupur Jawa	Sp. 8		Leaf	The leaves are used as powder cosmetic; function as cosmetic
Puring	<i>Codiaeum variegatum</i> L	Euphorbiaceae	Plant	The plant is used as ornament; function as ornament
Puspa	<i>Schima wallichii</i> (DC) Korth	Theaceae	Trunk	The wood is used as construction material; function as construction
Rambutan	<i>Nephelium lappaceum</i> L	Sapindaceae	Fruit	The fruit is used as fresh fruit; function as food
Rosela	<i>Hibiscus sabdariffa</i> L	Malvaceae	Flower	The flowers are used to maintain health; function as medicine
Roay	<i>Lablab purpureus</i> (L.) Sweet	Fabaceae	Bean	The beans are used as vegetable; function as food
Randa midang	<i>Cosmos caudatus</i> Kunth	Asteraceae	Leaf	The leaves are used to treat gastric problems; function as medicine
Rumput carulang	<i>Eulisia indica</i> (Linn) Gaertn	Poaceae	Leaf	The grasses are used as fodder; function as fodder
Saga	<i>Abrus precatorius</i> L	Fabaceae	Leaf	The leaves are used to treat cough; function as medicine
Salak	<i>Salacca zapota</i> (L.) P.Royen	Sapotaceae	Fruit	The fruit is used as fresh fruit; function as food
Selada bokor	<i>Nasturtium officinale</i> W.T Aiton	Brassicaceae	Leaf	The leaves are used as vegetables; function as food
Saledri	<i>Apium graveolens</i> L	Apiaceae	Leaf	The leaves are used as spices, vegetable, to treat high blood pressure; function as spices, medicine
Salam	<i>Syzygium polyanthum</i> (Wight) Walp	Myrtaceae	Leaf	The leaves are used as spices; function as spices
Salowedia	Sp.9		Plant	The plant is used as ornament, sold; function as ornament, commercial
Sambiloto	<i>Adrographis paniculata</i> (Burm.f.) Wall ex Nees	Acanthaceae	Leaf	The leaves are used to treat fever; function as medicine
Sambung nyawa	<i>Gynura procumbens</i> (Lour) Merr	Asteraceae	Leaf	The leaves are used to treat diabetes; function as medicine
Sampeu/Singkong	<i>Manihot esculenta</i> Crantz	Euphorbiaceae	Tuber	The tuber is used as food, cooked leaves is used as vegetable, made of cassava chips (<i>kiripik</i>), mixed with fermented cake made from peanut sediment (<i>combro</i>), sold; function as food, commercial
Sancang	<i>Premna microphylla</i> Turcz	Lamiaceae	Plant	The plant is used as ornament; function as ornament
Sawo	<i>Manilkara zapota</i> (L)	Sapotaceae	Fruit	The fruit is used as fresh fruit; function as food
Sebet/Bunga tasbih	<i>Canna hybrid</i> Hort ex Back	Cannaceae	Plant	The plant is used as ornament; function as ornament
Sedap Malam	<i>Polianthes tuberosa</i> L	Amaryllidaceae	Plant	The plant is used as ornament; function as ornament
Sereh/Serai	<i>Cymbopogon citratus</i> (DC) Stapf	Poaceae	Stem and leaf	The stem is used as spices, leave is used to treat high blood pressure; function as spices, medicine

Seureuh/Sirih	<i>Piper betle</i> L	Piperaceae	Leaf	The leave is used to treat sore itching, chewing (<i>nyeupah</i>); function as food, medicine
Sikas	<i>Cycas circinalis</i> L	Cycadaceae	Plant	The plant is used as ornament, sold; function as ornament, commercial
Sintrong	<i>Crassocephalum crepidioides</i> (Benth)	Asteraceae	Leaf	The leaf is used as vegetable; function as food
Sobsi/Kayu Afrika	<i>Maesopsis eminii</i> Engl	Rhamnaceae	Trunk	The wood is used as construction; function as construction
Sosin	<i>Brassica rapa</i> L	Brassicaceae	Leaf	The leaf is used as vegetable, cooked, sold; function as food, commercial
Sri rejeki	<i>Aglaonema</i> sp	Araceae	Plant	The plant is used as ornament; function as ornament
Stroberi	<i>Fragaria x ananassa</i> Duch	Rosaceae	Fruit	The fruit is used as fresh fruit; function as food
Suji	<i>Pleomele angustifolia</i> (Roxb) N.E. Br	Agavaceae	Leaf	The leaves are used as food coloring; function as food color
Sukun	<i>Artocarpus communis</i> (Parkison) Fosberg	Moraceae	Fruit	The fruit is used as fresh fruit; function as food
Surawung	<i>Ocimum basilicum</i> L	Lamiaceae	Leaf	The leaf is used as spices, vegetable, sauce made by crushing spices in a mortar (<i>sambal nyibek</i>); function as food, spices
Surian/Suren	<i>Toona sureni</i> (Blume) Merr	Meliaceae	Trunk	The wood is used as construction material; function as construction
Suuk/Kacang tanah	<i>Arachis hypogaea</i> L	Fabaceae	Fruit	The fruit is used as food, made <i>lotek</i> (salad of slightly boiled), sold; function as food, commercial
Taleus lahun indung	<i>Collocasia esculenta</i> (L.) Schott	Araceae	Tuber	The tuber is used as food, to treat high blood pressure; function as food, medicine
Taleus padang	<i>Colocasia esculenta</i> (L) Schott	Araceae	Tuber	The tuber is used as food, to treat high blood pressure; function as food, medicine
Takokak	<i>Solanum torvum</i> Sw	Solanaceae	Leaf	The leaves are used to treat uric acid; function as medicine
Tangkil/Malinjo	<i>Gnetum gnemon</i> L	Gnetaceae	Fruit	The fruit is used as vegetable; function as food
Temu kunci	<i>Boesenbergia rotunda</i> (L.) Mansf	Zingiberaceae	Rhizome	The rhizome is used as spices; function as spices
Tapak dara	<i>Catharanthus roseus</i> (L.) G.Don	Apocynaceae	Plant	The plant is used as ornament; function as ornament
Tepemegah tanah	Sp10		Tree	The trees are used as soil erosion control; function erosion control
Terong	<i>Solanum melongena</i> L	Solanaceae	Tree	the fruit is used as fresh vegetable and cooked; function as food
Tisuk	<i>Hibiscus macrophyllus</i> Roxb. ex.Hornem	Malvaceae	Trunk, tree	The wood is used as construction material, tree is used as ornament; function as construction, ornament
Tiwu/Tebu	<i>Sacharum officinarum</i> L	Poaceae	Stem	The thick stem is made sugar; function as food
Tomat	<i>Solanum lycopersicum</i> L	Solanaceae	Fruit	The fruit is used as spices, fresh fruit, to treat sprue, sold; function as food, spices, medicine
Wijaya kusumah	<i>Epiphyllum anguliger</i> (Lem.) G.Don	Cactaceae	Plant	The plant is used as ornament; function as ornament



Figure 6. The homegarden (A) and the wet-rice rice field is usually planted by various non-rice crops during the dry season (B)

Table 3 shows that it is generally accepted that the diversity of crops in wet-rice fields or gardens is lower than that of homegarden (Iskandar and Iskandar 2011). The village homegardens of West Java not only function as settlement but also in a variety of other roles. In a typical village in West Java, the houses are almost completely concealed by trees which has an important role in ecological functions, including hydrologic and erosion control, gene bank, and microclimatic effect, and socioeconomic functions, such as subsistence and commercial production of fruits, vegetable, spices, and so on (Soemarwoto and Soemarwoto 1984).

In terms of the village knowledge, based on the survey of distribution of knowledge, it revealed that two to 10 people cited 80 species. This is the highest number of species cited by respondents. It means that the wealthiest use of plants species knowledge belongs to two to 10 people, and 41 to 50 people only known one species. The deep knowledge of plants uses confine to restricted people within population (Table 4).

The depth interview, observation, and 'walk in the fields' revealed that the younger generation memorized the names and uses of plants but doubtful to point out plants when in the field. For example, one informant confidently spelled the name and use of *panglay* (*Zingiber cassumunar*) but failed to identify the *panglay* when they grew in groups with similar plants. *Panglay* is one of the most ingredients in quite lots of rituals.

Richness of plant knowledge

Some factors affect the richness of plants knowledge. In the research of plants knowledge of the upland people of Sindangsari, the combination of the mobility of young generation takes a decisive role, added by the modernization of health and food system as an interfering factor.

The government's policy to establish Jatinangor as the Higher Education Region (*Kawasan Pendidikan Tinggi*), at about five-kilometer, opens opportunities for the Sindangsari population to work outside their village. Interviews with parents, young people, and the wives of the

Sindangsari residents show that they agree and encourage their relatives to find a job in Jatinangor. However, most Sindangsari people work in low-paid jobs; therefore, they keep attached to the village, which provides the *silih* life, taking care of each other. As the *silih* is enforced through village ceremonies and rituals that construct and enforce kinship, the mobile villagers being enforced to be participated (Janowski and Kerlogue 2007). However, the rituals involve plants elaboration and transformation from one state to another, physically and spiritually, such as the rice grains (*pare*) to rice (*nasi*) from the sacred to mundane. To fulfill the participation, the mobile villagers arrange for someone else to accomplished the task for them. As a result, they have lost their practical ability. The skill of practicing for the young mobile villagers becomes doubtful and less convincing. Moreover, the young have learned to use ready-made herbal sachets.

Table 3. Cultivated site and number of species based on respondents of Sindangsari people

Agroecosystem types	Number of landraces	Percent to total (%)
Homegarden	108	52.94
Garden	55	26.96
Sawah*	41	20.09
Total	204	100.00

Note: *) During the dry season is predominantly planted by non-paddy

Table 4. The plant species are recognized by respondent (n=91)

Respondent number	Species number recognized	Percentage of total
51-55	2	1.10
41-50	1	0.55
31-40	2	1.10
21-30	6	3.31
11-20	12	6.62
2-10	89	49.17
1	70	0.55
Total 91 respondents	181 species	100.00

In this study, it can be concluded that 204 landraces were recognized by the village people of Sindangsari, Sumedang. Based on scientific-botanical knowledge, it consists of 181 species, representing 161 genera, and 70 families. This research presents case of plants knowledge decline due to development, particularly among the young generation. In the form of knowledge, the Sindangsari people practice less of their traditional plants knowledge.

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