Diversity of Medicinal Plants in Yard in Several Villages in Indonesia

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Abstract. In Indonesia, yard or home garden as one of the processed land has not received full attention. One of the roles of the yard is as a “living pharmacy”. Research and inventory of plants grown in the yard of 11 villages in Indonesia recorded no less than 120 plant species were used as medicinal herbs. Some were also used as traditional cosmetics and spices. Zingiberaceae family are the most commonly used and cultivated plants. Information on the results of this ethnobotany research is expected to provide input to improve yard development.

Keywords: Yard, medicinal herbs, ethnobotany, Indonesia.

1. Introduction
A yard is defined as a piece of land that has certain boundaries, in which one or more residential buildings are erected, it has a functional, economic, biophysical, and social-cultural relationship with the inhabitants [1]. According ecological perspective, a yard is a habitat with a variety of plant species and is able to prevent soil erosion caused by rain. Up until now, researches related to the utilization of the yard are still rarely conducted.

The role and use of yard varies from one region to another, depending on the needs, social culture, community education, local physical and ecological factors. In some areas, especially in rural areas, the usability of the yard is generally directed to meet the daily needs, including the needs for food and medicine; it is then often referred to as "living barns" or "living pharmacies". When a yard is managed properly, used for cultivation of crops with economic value (banana, pepper) or sources of herbal medicine, it could increase family income [2]; [3]. However, yard, as a mean of farming business has not received serious attention, although its benefits has conciously been felt.

Currently formal health facilities such as Puskesmas, Puskesmas Assistants and doctors have visited villages. However, the local community's interest in the use of medicinal plants is still high. Some species of plants used for traditional medicine are already cultivated, but the cultivation is not yet optimal. In regard to the use of medicinal plants which is still wide and attractive to the community, and the fact that yard is one of the closest farm to its inhabitants, this research is expected to provide a strong foundation for the use of the yard as a "living pharmacy" to support public health, especially in rural areas.
2. Research location and work method

Ethnobotany research on the diversity of medicinal plants in the yard was conducted in 11 villages across the country namely Martoba and Jangga Dolok (North Sumatra), Karimun (Riau), Tanjung Lame (Banten), Cipta Rasa (West Java), Batudulang (Sumbawa island, West Nusa Tenggara) and Jeruk Manis (Lombok island, West Nusa Tenggara), Lampeapi (Wawonii island, Southeast Sulawesi), Wumbu Buro (Kabaena island, Southeast Sulawesi), Tanjung Isuy (East Kalimantan) and Paking (North Kalimantan).

Data collection was carried out by the method of Cunningham [4] and Hoang et al., [5], by direct observation in the field and non-structural open-ended interviews. The species of plants used as traditional medicine are recorded by their local name, parts used, status and other uses. The specimen of plant species with unknown scientific name, is stored and prepared for identification at the "Herbarium bogoriense" Center for Biological Research - LIPI.

3. Results and Discussion

The size of the yard in each village varied. Yard in Batudulang, Tanjung Isuy and Paking are around 150 m²; Martoba, Jangga Dolok, Ciptarasa, and Wumbu Buro are around 200 m²; Tanjung Lame and Jeruk Manis from 300 m²; Karimun and Lampeapi are around 400 m². Most of the yard boundaries are not visible. At the villages of Tanjung Lame, Lampeapi, Batudulang, Tanjung Isuy, Paking and Wumbu Buro, visible boundaries are made from life or dead fences made of bamboo, pieces of wood or concrete blocks. Plant species commonly used as living fences include jatropha (Jatropha curcas and Ricinus communis), mangokan (Polyscias fruticosa) and kadondongan (Polyscias cumingiana).

Results of data collection on the diversity of medicinal plants in the yard of these 11 villages recorded 121 species belonging to 102 genera, and 48 families; of these species, three species were with unknown scientific names. The family of Zingiberaceae (14 species) were recorded as the most widely used as medicinal ingredients, followed by the Asteraceae family (13 species), Meliaceae (8 species), Malvaceae (7 species), Fabaceae and Lauraceae (6 species), Euphorbiaceae (5 species). The Indonesia Medicinal Plants Index [6] recorded 45 species of Zingiberaceae as traditional medicinal ingredients. Six species of 14 species of Zingiberaceae namely Amomum compactum, Curcuma longa, C. manga, C.
P. zanthorrhiza, *Kaempferia galanga* and *Zingiber officinale* were listed in 11 species of Zingiberaceae that have anti-tumor activity [7].

Rural communities generally utilize medicinal plant found in the yard to deal with common diseases including fever, diarrhea, headaches, cut wound cover and postpartum care. Most of these medicinal plants are cultivated. Other uses of these medicinal plants include vegetables and fruits (22 species), cooking spices (12 species), traditional cosmetics (5 species), and ornamental plants (26 species). Some species of plants may have more than one of the above properties.

*Curcuma longa* is a medicinal plant species most often found in the yard (7 villages), followed by *Blumea balsamifera* and *Tinospora crispa* (6 villages); *Psidium guajava, Piper betle* and *Cymbopogon citratus* (5 villages) and *Amomum compactum, Areca catechu, Ageratum conyzoides, Sida rhombifolia, Moringa pterygosperma, Citrus aurantifolia, Physalis minima, Kaempferia galanga, Orthosiphon aristatus and Zingiber officinale* (4 villages). Most varieties of the medicinal plant species were found in the yards of the villages of Karimun and Lampeapi (40 species), followed by Ciptarasa (31 species), Tanjung Lame (27 species), Martoba and Batudulang (25 species), Jeruk Manis (20 species), Jangga Dolok (16 species), Wumbu Buro (8 species), Tanjung Isuy (6 species) and Paking (4 species). Based on observations in the villages of Tanjung Lame, Karimun, Tanjung Isuy and Martoba, yards are deliberately left vacant to be used in time for drying harvested crops from fields or gardens.

Batudulang, Tanjung Isuy and Paking have the same yard area; however, the number of medicinal plants found and used by the local community is higher in Batudulang compared to Tanjung Isuy dan Paking. It is suspected that local people (ethnic Samawa) in Batudulang village still believe in and follow the custom in the health care among others post-natal care and sprained [8]. Leaves or leaf buds are the most widely used parts of plants for medicinal ingredients, followed by roots or rhizomes, fruit and bark or sap. The ingredient can be single or mixed with other plant species; It can then be admitted orally (be drunk or eaten) or as an external medicine (slap or smeared). The use of roots and bark as medicinal ingredients can cause damage or death of these plants. However, the local community or traditional healers have local knowledge and wisdom, to maintain the plants preservation. Tumeric or *Curcuma longa* is often called the "golden spice". Not because of its yellowish gold rhizome color, but to its abundant health benefits. Turmeric rhizomes are commonly used as herbal medicines, to treat arthritis, digestive disorders, healing of internal and external wounds, menstrual infections, preventing liver damage, urinary tract infections and preventing Alzheimers [9]. Other uses of turmeric include spices, natural food coloring and traditional cosmetics [10].

*Kleinovia hospita* is a medicinal plant species commonly found in the yard of the village of Lampeapi. The cultivation of this species in the yard is recommended by the local health office. Young leaves or shoots can be used as vegetable whereas the old leaves are dried and drunk as tea substitute. The dried old leaves is often used in the treatment of liver infection/ yellow sickness [11]. Local ethnic community of Moronene used it for the treatment of headaches and to reduce excessive digestive acid [12]. The leaf extract contains a number of fatty acid compounds such as scololetin, kaempferol and quarten [13]; six types of pentacyclic triterpenoid compounds and five steroids [14]; and klein hospitines compounds [15];[16]. Furthermore Latif suggested that the leaves and the bark contain cyanogenic compounds which act as ectoparasitic disinfectants such as lice, whereas the leaf extract has anti-tumor activity in mice [13]. In addition, [17] suggests that the leaf extract acted as a cytotoxin in hepatocellular carcinoma cells. Furthermore, toxicity studies conducted [18] showed that there were no pathological abnormalities in the liver, kidneys, heart and stomach in animal experiments given "paliasa tea" (*Kleinovia hospita*). Recent study on *Kleinovia hospita* [19] suggested that this species has pharmacological potential especially as anticancer, anti diabetic, antioxidant and hepatoprotective.

*Brusea javanica* is a species tolerant to various conditions, commonly found in open areas such as secondary forests, shrubs and forest edges; grows at altitudes up to 900 m above sea level [20]; [21]. The Dayak Benuaq in East Kalimantan named it "mung melur"; the fruit is used as a medicine for fever or malaria. [22] Stated that *Brusea javanica* fruit extract has potential utilization as an anticancer. The content of active fruit compounds are alkaloids (brucamareine and Yatanine), glycosides (bruceatin,
yatanoside A & B, and cosamine), phenols (brucenol and bruceolid acid). In the village of Tanjung Isuy this species is planted in the yards as ornamental plant.

*Centella asiatica* and *Hydrocotyle sibthorpioides* are wild plants often found in humid habitats. These two species belong to two different families, but the Sasak people in Jeruk Manis village and the Samawa community in Batudulang village call them with same local name, "bebele". At first glance the morphological character of their leaves looks very similar. The Sasak people use *Centella asiatica* as a fever-reducing and fertility drugs, while the Samawa people use *Hydrocotyle sithorpioides* as remedy for headaches, vaginal discharge, bad breath and aches. [23] Reported the efficacy of *Centella asiatica* or known by the common name "pepagan", for a nerve-drug, fever, bronchitis, diabetic, psychoneurosis, hemorrhoids, high blood pressure, appetite enhancer and maintaining vitality. [24] Stated that this species is included in 50 main medicinal plant species. Its active compounds include glycosides, oleic acid, linoleic, palmitic, stearic, sentoat and sentelat which are useful to enchance immune system. Whereas *Hydrocotyle sithorpioides* or known by the common name "semanggi gunung", is native to Southeast Asia, but today it has spread as a weed in various pantropical and subtropical areas around the world [25]. Extra leaves are used to treat edema, fever, sore throat and hepatitis B virus [11].

![Figure 2. Diversity of Medicinal Plants Species in Yard](image_url)

*Plectranthus scutellarioides*, or better known by the common name "Miana", is a herbaceous plant and usually grown as an ornamental plant. This species is thought to have originated in Asia, and is currently spreading to various old world tropical and subtropical regions [26]. The shape and color of the leaves vary greatly from green to purplish red. Observation in locations of Tanjung Lame, Cipta Rasa and Jeruk Manis showed that the leaves were used as wound cover and postpartum care. In Southeast Asia, this species is used to treat various digestive problems such as dysentery, it is also used to ease headaches, wrap bruises and bleeding wounds, relieving dyspepsia, sinusitis and as eye drops.
[27] Hamidah [28] suggested that this species contains anthocyanin active compounds, smarin acid, phytol and quercetin which are considered as anti-inflammatory.

_Crimum asiaticum_ known by the common name "bakung", _Gardenia jasmioides_ known as "gardenia or kacapiring" and _Jasminum sambac_ known as "jasmine", are also commonly grown as an ornamental plants. But at the observation site, these plants were also used for medicinal purposes. The bakung tubers were used in postpartum care, kacapiring leaves were used as a drug for mouth sprue and melati leaves were used to smooth the skin scar and reduce the smell of sweat.

_Annona muricata_ "soursop", _Ananas comosus_ "pineapple", _Carica papaya_ "papaya", _Sandoricum koetjape_ "lute", _Psidium guajava_ "guava", and _Flacourtia rukam_ "rukem", are fruit- producing plants found in the yard of the observed villages. Apart from their edible fruits, these plants are also used for medicinal purposes; soursop leaf decoction is used as rheumatic pain relief, leaf and papaya roots decoction is used as heat-lowering or malaria medicine as well as postpartum care, finely ground lute leaf is used as a wound cover, leaf buds or young leaves of guava is used as diarrhea medicine, decoction of leaves and bark rukam is used to treat sprue, smallpox and wound cover.

Not many species of trees are planted in the yard. Some species of trees that are used as medicinal ingredients include: _Areca catechu_, its root boiled in water is used as a postpartum care and to maintain male vitality; _Crescentia cujete_, its boiled root is used as a toxin antidote; _Graptophyllum pictum_, its boiled root is used to increase appetite in children, whereas its boiled leaf is used to treat diabetic; _Hibiscus tiliaeus_, the decoction of the leaves is used to treat fever; _Melia azedarch_, the decoction of the leaves is used to treat diabetic and postpartum care; and _Senna alata_, its finely ground leaves is used to cure itch.

The observations showed that the care of these yards were quite good, with a minimal number of weeds found in locations. Information from the respondents indicated that pest diseases had never damaged or caused plants to die, but drought and changes of weather did. From the above discussions, it is apparent that diversity of plants grown in the yards could serve as medicinal materials as well as ornamental plants, fruit producer, shade plants, sources of vegetables, spice, living fences etc.

4. Conclusion
This research recorded 121 species of plants used for family medicine in 11 villages across Indonesia, most are cultivated. Their use as medicinal material is generally as a primary effort. Other benefits of medicinal plants include ornamental plants, producing fruits, source of vegetables, cooking spices, and living fences.

The yard is very potential to be used as a "living pharmacy", in addition to a "living barn". This supports government programs to improve family health. In addition, selection, arrangement and management should be tailored to suite the area of the yard, along with selection of species planted to achieve overall aesthetic of the yard.

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