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Ethnobotanical study of homegarden by local communities in the urban area of Surakarta City, Central Java, Indonesia

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Abstract. *Ayuningrum LS, Setyaningrum M, Agustin MR, Sabrina MA, Arifiani KN, Nazar IA, Md Naim D, Setyawan AD. 2024. Ethnobotanical study of homegarden by local communities in the urban area of Surakarta City, Central Java, Indonesia. Asian J Ethnobiol 7: 79-88.* Communities in Surakarta City, Central Java Province, Indonesia, utilize many plants from their homegardens daily. Urban homegardens have the potential to provide biological, social, and economic environmental services. However, documentation and further information on local knowledge of food crops and plant diversity in homegardens is still limited and needs to be presented. This study aims to document and reveal local knowledge of the diversity of homegarden plants for daily life in Mojosongo, Kestalan, and Nusukan Villages, Surakarta City, and homegarden patterns in these villages. Data collection was conducted in December 2023 through surveys and direct interviews using the simple random sampling method, with 72 respondents interviewed, with details of 6 men and 66 women. The majority of respondents have a high school/equivalent educational background. The age range of respondents was dominated by 56-65 years. Plant inventory amounted to 148 species from 55 families, consisting of 73 species of food plants, 19 species of medicinal plants, 18 species of shade, 66 species of ornamental plants, and 2 species of mystical plants. The most common growth form found is the type of tree (54 species), and the family found is Zingiberaceae (11 species), followed by Araceae (8 species) and Solanaceae (7 species). Therefore, the study's results show that homegarden plants used by the community are divided into five categories of use: food, medicine, shading, ornamental, and mystical. Local people use many food plants daily, and a homegarden can be an alternative source of diverse and nutritious food plants for households.

Keywords: Food plant, homegarden, local knowledge, ornamental plant, urban area

INTRODUCTION

The interaction between the local population and their surroundings is known as ethnobotany, especially on plants and the study of plant utilization as food, shelter, medicine, clothing, hunting, and traditional rituals (Atmojo 2013). The efficacy of ethnobotanical plants covers various areas of human life, including health, food, religious ceremonies, and various daily needs. In the medical sector, many ethnobotanical plants are used as traditional medicines, from ancient times, when our ancestors used medicinal plants as raw materials for traditional potions, to the present day when contemporary society uses them (Destryana and Ismawati 2019). The very helpful first step to knowing a plant has medicinal properties is from the community's traditional knowledge for generations (Solang 2020). In the food sector, some ethnobotanical plants are also used as a source of nutrition or food. For example, plants that produce seeds, fruits, or leaves can be processed into food. Food needs can be fulfilled on a small scale, such as in rural areas, by utilizing plants in the community environment (Firdawati et al. 2021). In addition, some plants are used in religious ceremonies or local traditions for rituals, offerings, or spiritual medicine. In addition, ethnobotanical plants can also play a role in industry and crafts. Some plants produce fiber, wood, or other materials that can be used to make tools, textiles, and traditional crafts (A'tourrohman 2020).

Homegarden studies are crucial for evaluating the significance of plant livelihoods and the interaction between humans and the natural systems that sustain and surround them in ethnobotanical research (Ahoyo et al. 2017). Small plots of cultivated ground immediately surrounding a house or farmhouse are called homegardens (Cuanalo and Mukul 2008). A homegarden is a ready-to-use traditional garden encircled by residential areas, has different plant species planted in it, is tended to by family members, and yields domestic crops (Shrestha et al. 2004). These backyard gardens have the potential to significantly increase fruit and vegetable production as well as household food self-sufficiency. Homegardens' productivity and output could be a good substitute for producing food and essential nutrients (Ferdous et al. 2016). Homegardens offer numerous benefits, including enhanced food security, increased food availability, better nutrition from various foods, higher income and better rural employment, and environmental benefits from recycling water and waste nutrients (Cabalda et al. 2011; Weinberger

2013). Homegardens, sometimes called household gardens, target women because they are typically responsible for food preparation and family health (Depenbusch et al. 2021). The culture of an ethnic group is one of the numerous variables that affect the diversity of plants grown in homegardens (Galhena et al. 2013). High-plant variety homegardens serve as in situ conservation sites, particularly for native species (Shrestha et al. 2004). According to Das and Das (2005), homegardens can aid in preserving wild flora, such as a diverse range of natural plants.

Maintaining community yard plants is expected to become food security and a source of increasing community and regional incomes. One of the interesting areas to study is Surakarta City, which has the concept of plant maintenance, especially on a household scale. The people of Surakarta City are identical, with a fairly dense settlement with a small yard area. However, the community still uses the narrow area to grow plants to meet their daily needs or even just for home decoration. The community's homegarden plants are planted in the front and back yards and a special area using a hydroponic system. They use their yard for ornamental plants, food, and horticulture. Several villages in Surakarta City have a farmer's group organization for both men (farmers group) and women (women farmers group). Women Farmers Group (KWT, *Kelompok Wanita Tani*) can increase women's knowledge, skills, and participation in the village (Syarif 2018). Then, it can contribute to maintaining knowledge about utilizing food, ornamental, mystical, and traditional medicinal plants. Participation in KWT also improves the family economy through farming, indirectly supporting fulfilling people's daily needs through natural resources (Istiqomah 2022). Urban communities' knowledge about homegarden plants, especially medicinal plants, is important to preserve so that they are sustainable. This study aims to document and reveal local knowledge of the diversity of homegarden plants for daily life in Mojosongo, Kestalan, and Nusukan Villages, Surakarta, Central Java, Indonesia, and homegarden patterns in these villages.

MATERIALS AND METHODS

Study area

This study was conducted in three urban villages in Surakarta City, Central Java, Indonesia, i.e.: Kestalan, Mojosongo, and Nusukan, in December 2023 (Figure 1). Kestalan Village is located at 7°33'35"S and 110°49'23"E with an area of 20.8 ha with an altitude of 150 to 450 m asl (meters above sea level). The second location is Mojosongo Village, located at 7°32'36"S and 110°50'30"E, with an altitude of 80-130 m asl and an area of 532.927 ha. The third location is Nusukan Village at 7°32'56"S and 110°49'15"E with an area of 206.25 ha and an altitude of around 92 m asl. The three research villages have non-government organizations that play a role in improving and developing the community's ability to develop the village agricultural sector, namely planting crops with economic value, such as fruits and vegetables that are harvested and consumed by themselves or sold.

Data collection and analysis

Data was collected using a field survey method and open-ended interviews with a simple random sampling method (Silalahi and Nisyawati 2018). The type of homegarden that is the object of research is all home yards with space or courtyards both at the front and back. Homegarden has access to sufficient water sources and contributes to plant cultivation. Plants that are cultivated are plants both in the ground and in pots, namely plants for consumption, fruits, vegetables, for ornamental, shading, medicinal, and mystical needs. Residential categories are not limited to land. Therefore, 72 informants were obtained with the same number of respondents in each village, and the data was recorded during the interview and the written method. As a result, local names of plant information were identified using websites such as planetnet.org and gbif.org and then were analyzed. During the interviews with informants, the data on the plant uses in the yard for various purposes and how they are managed was documented (Mekonen et al. 2015). The results on plant list data and supporting information are presented in tables and graphs to combine information for easy understanding and data analysis.

Figure 1. The map of the study area in the urban area in A. Mojosongo, B. Nusukan, and C. Kestalan Villages, Surakarta City, Central Java, Indonesia

RESULTS AND DISCUSSION

To gather information for this research, 72 interviewees were obtained, consisting of 66 women and 6 men. Their educational backgrounds ranged from non-education to college, although most held senior high school degrees with 27 informants. The age span covered 17 to 75 years, with the predominant age group being 56 to 65, and most of the informants were housewives. The demographic data of the informants (Table 1) shows that the knowledge within local communities regarding the utilization of homegarden plants in the Villages of Mojosongo, Kestalan, and Nusukan is consistently preserved across various age groups. Despite being rooted in daily practices and ingrained habits, the information about plant usage is notably sustained from the elderly to the younger generation.

Table 1. The demographic structure of informants

Parameter	Specification	Frequency
Gender	Male	6
	Female	66
Age	15-25	2
	26-35	8
	36-45	13
	46-55	18
	56-65	22
	>65	9
Education	No Education	2
	Elementary School	15
	Junior High School	20
	Senior High School	27
	University	8

Plant diversity

Mojosongo, Kestalan, and Nusukan Villages have unique homegarden plant diversity characteristics (Table 3). Mojosongo and Nusukan Villages stand out for their rich variety of homegarden plants. This happens because of the communities' cultural foundations, specifically on agricultural practices such as cultivating and planting; most homes also showcase traditional Javanese style, often featuring spacious front yards. Mojosongo, in particular, has earned the designation of "*Kampung Sayur*" highlighting the community's commitment to vegetable cultivation to foster economic empowerment. In contrast, Kestalan Village leans towards a more modern architectural aesthetic, primarily characterized by shophouses. Notably, houses with well-developed yards and abundant plant life are a rarity in Kestalan. Where ornamental plants are commonly used for yard adornment, the Kestalan Village community generally cultivates fewer plants in their surroundings.

Table 2. Number of species and families used for homegarden purposes by communities of Mojosongo, Kestalan, and Nusukan Villages, Surakarta, Central Java, Indonesia

Purposes	Number of species	Number of families	Percentage (%)
Food plant	73	37	49%
Medicinal plant	19	9	13%
Shading	18	10	12%
Ornamental	66	35	45%
Mystical	2	2	1%

Table 3. Table of differences in plant diversity in research location

Distinctive category	Mojosongo	Nusukan	Kestalan
Location Type	Urban and some areas still have a rural area type.	Almost all areas are included in the urban area category	Almost all areas are included in the urban area category
Types of plants (based on use) that are most commonly found	Food, Medicinal, Mystical	Food, Medicinal, Ornamental	Ornamental, Shading

Multipurpose use plant

In this research, the plant types collected from the homegarden consisting of 148 species and 55 families which are classified into five categories of uses. The local community in the urban area of Surakarta District utilizes homegarden plants for various purposes (Table 2 and Figure 2). The largest family found was Zingiberaceae, with 11 species. The growth form most commonly found is tree (54 species), followed by herbaceous (52 species), shrub (26 species), and climber (16 species). The tree-type growth form dominates the growth form in food, shading, and mystical uses. The herbaceous growth form dominates the growth form in ornamental and medicinal uses. The most widely used by the community are food plants (41.0%), followed by medicinal (10.7%), shading (10.1%), ornamental (37.1%), and mystical plants (1.1%). The study revealed that some plants have more than one purpose. For example, *Moringa oleifera* can be used for medicinal and food crops. *Nephelium lappaceum* and *Mangifera indica* are also used as food and shading plants.

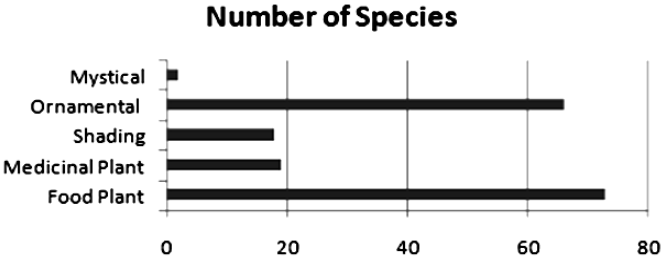

Figure 2. Number of species and families used for homegarden purposes by communities of Mojosongo, Kestalan, and Nusukan Villages, Surakarta, Central Java, Indonesia

Table 4. Diversity of ethnobotany plants used for various purposes

Family	Scientific name	Local name	Growth form	Planting location	Species functions				
					F	O	S	M	MY
Acanthaceae	*Graptophyllum pictum* (L.) Griff.	*Daun ungu*	Shrub	Front yard	-	✓	-	-	-
Acanthaceae	*Pseuderanthemum carruthersii* var. *atropurpureum* (W.Bull) Fosberg	*Melati jepang merah*	Shrub	Back yard	-	✓	-	-	-
Amaranteceae	*Amaranthus spinosus* L.	*Bayam*	Herbaceous	Front yard	✓	-	-	-	-
Amaryllidaceae	*Allium fistulosum* L.	*Bawang daun*	Herbaceous	Front yard	✓	-	-	-	-
Amaryllidaceae	*Allium tuberosum* Rottler ex Spreng.	*Kucai*	Herbaceous	Front yard	✓	-	-	-	-
Amaryllidaceae	*Crinum asiaticum* L.	*Bakung putih*	Herbaceous	Front yard	-	✓	-	-	-
Anacardiaceae	*Mangifera lalijiwa* Kosterm.	*Mangga talijiwo*	Tree	Front yard	✓	-	-	-	-
Anacardiaceae	*Mangifera indica* L.	*Mangga*	Tree	Front yard	✓	-	✓	-	-
Annonaceae	*Annona muricata* L.	*Sirsak*	Tree	Front yard	✓	-	✓	-	-
Annonaceae	*Annona reticulata* L.	*Mulwa*	Tree	Back yard	✓	-	-	-	-
Annonaceae	*Annona squamosa* L.	*Srikaya*	Tree	Front yard	✓	-	✓	-	-
Apiaceae	*Apium graveolens* L.	*Seledri*	Herbaceous	Front yard	✓	-	-	-	-
Apocynaceae	*Plumeria rubra* L.	*Kamboja merah*	Tree	Front yard	-	✓	-	-	-
Apocynaceae	*Allamanda cathartica* L.	*Alamanda*	Herbaceous	Back yard	-	✓	-	-	-
Apocynaceae	*Catharanthus roseus* (L.) G.Don	*Tapak dara*	Shrub	Front yard	-	✓	-	-	-
Araceae	*Aglaonema* sp.	*Sri rejeki*	Herbaceous	Front yard	-	✓	-	-	-
Araceae	*Anthurium plowmanii* Croat	*Gelombang cinta*	Herbaceous	Front yard	-	✓	-	-	-
Araceae	*Caladium bicolor* (Aiton) Vent.	*Lompong*	Herbaceous	Front yard	-	✓	-	-	-
Araceae	*Caladium* sp.	*Keladi*	Herbaceous	Back yard	-	✓	-	-	-
Araceae	*Colocasia esculenta* (L.) Schott	*Talas*	Herbaceous	Front yard	-	✓	-	-	-
Araceae	*Epipremnum aureum* (Linden & André) G.S.Bunting	*Sirih gading*	Climber	Front yard	-	✓	-	-	-
Araceae	*Monstera* sp.	*Janda bolong*	Herbaceous	Front yard	-	✓	-	-	-
Araceae	*Spathiphyllum wallisii* Regel	*Peace lily*	Herbaceous	Front yard	-	✓	-	-	-
Araliaceae	*Polyscias scutellaria* (Burm.fil.) Fosberg	*Mangkonan*	Shrub	Front yard	-	✓	-	-	-
Araliaceae	*Schefflera arboricola* (Hayata) Merr.	*Wali songo*	Shrub	Front yard	-	✓	-	-	-
Arecaceae	*Cocos nucifera* L.	*Kelapa*	Tree	Front yard	✓	-	✓	-	-
Arecaceae	*Salacca zalacca* (Gaertn.) Voss	*Salak*	Tree	Front yard	✓	-	-	-	-
Arecaceae	*Dypsis lutescens* (H.Wendl.) Beentje & J.Dransf.	*Palem kuning*	Tree	Front yard	-	✓	-	-	-
Asparagaceae	*Agave americana* L.	*Lidah buaya amerika*	Herbaceous	Front yard	-	✓	-	✓	-
Asparagaceae	*Cordyline fruticosa* (L.) A.Chev.	*Andong*	Shrub	Front yard	-	✓	-	-	-
Asparagaceae	*Dracaena angolensis* (Welw. ex Carrière) Byng & Christenh.	*Dracaena angolensis*	Herbaceous	Front yard	-	✓	-	-	-
Asparagaceae	*Dracaena marginata* Lem.	*Manggar*	Herbaceous	Front yard	-	✓	-	-	-
Asparagaceae	*Dracaena trifasciata* (Prain) Mabb.	*Lidah mertua*	Herbaceous	Front yard	-	✓	-	-	-
Asphodelaceae	*Aloe vera* (L.) Burm.f.	*Lidah buaya*	Herbaceous	Front yard	-	✓	-	✓	-
Asteraceae	*Lactuca sativa* L.	*Selada*	Herbaceous	Hydroponic farm	✓	-	-	-	-
Asteraceae	*Galinsoga parviflora* Cav.	*Loseh*	Herbaceous	Front yard	-	✓	-	-	-
Asteraceae	*Helianthus annuus* L.	*Matahari*	Herbaceous	Front yard	-	✓	-	-	-
Asteraceae	*Senecio radicans* (L.fil.) Sch.Bip.	*Curio radicans*	Climber	Front yard	-	✓	-	-	-
Basellaceae	*Anredera cordifolia* (Ten.) Steenis	*Binahong*	Climber	Front yard	-	-	-	✓	-
Brassicaceae	*Brassica oleracea* var. *botrytis* L.	*Kembang kol*	Herbaceous	Front yard	✓	-	-	-	-
Brassicaceae	*Brassica rapa* L.	*Pokcoy*	Herbaceous	Hydroponic farm	✓	-	-	-	-
Brassicaceae	*Brassica rapa* subsp. *pekinensis* (Lour.) Hanelt	*Sawi putih*	Herbaceous	Front yard	✓	-	-	-	-
Cactaceae	*Selenicereus undatus* (Haw.) D.R.Hunt	*Buah naga*	Shrub	Front yard	✓	-	-	-	-
Cactaceae	*Epiphyllum anguliger* (Lem.) G.Don	*Wijaya kusuma*	Shrub	Front yard	-	✓	-	-	-
Cactaceae	*Pereskia bleo* (Kunth) DC.	*Jarum tujuh bilah*	Shrub	Front yard	-	✓	-	-	-
Caricaceae	*Carica papaya* L.	*Pepaya*	Tree	Front yard	✓	-	-	-	-
Combretaceae	*Combretum indicum* (L.) De Filipps	*Bunga ceguk*	Climber	Back yard	-	✓	-	-	-
Convolvulaceae	*Ipomoea aquatica* Forssk.	*Kangkung*	Herbaceous	Hydroponic farm	✓	-	-	-	-
Convolvulaceae	*Ipomoea batatas* (L.) Lam.	*Ketela rambat/ ubi jalar*	Climber	Front yard	✓	-	-	-	-
Crassulaceae	*Kalanchoe pinnata* (Lamk.) Pers.	*Cocor bebek*	Herbaceous	Front yard	-	✓	-	-	-
Cucurbitaceae	*Cucumis melo* L.	*Melon*	Climber	Front yard	✓	-	-	-	-

Cucurbitaceae	*Cucumis sativus* L.	*Timun*	Climber	Front yard	✓	-	-	-	-
Cucurbitaceae	*Momordica charantia* L.	*Pare*	Shrub	Front yard	✓	-	-	-	-
Cycadaceae	*Cycas rumphii* Miq.	*Pakis haji (sikas)*	Tree	Front yard	-	✓	-	-	-
Euphorbiaceae	*Manihot esculenta* Crantz	*Singkong*	Shrub	Front yard	✓	-	-	-	-
Euphorbiaceae	*Jatropha multifida* L.	*Jarak tintir*	Shrub	Front yard	-	✓	-	-	-
Euphorbiaceae	*Jatropha podagrica* Hook.	*Jarak bali*	Shrub	Front yard	-	✓	-	-	-
Fabaceae	*Leucaena leucocephala* (Lam.) de Wit	*Petai cina*	Herbaceous	Front yard	✓	-	-	-	-
Fabaceae	*Pisum sativum* L.	*Kacang polong*	Climber	Front yard	✓	-	-	-	-
Fabaceae	*Tamarindus indica* L.	*Asam jawa*	Tree	Front yard	✓	-	✓	-	-
Fabaceae	*Vigna unguiculata* subsp. *sesquipedalis* (L.) Verdc.	*Kacang panjang*	Climber	Front yard	✓	-	-	-	-
Fabaceae	*Clitoria ternatea* L.	*Telang*	Climber	Front yard	-	-	-	✓	-
Fabaceae	*Vigna radiata* (L.) R.Wilczek	*Karet kebo*	Tree	Front yard	-	✓	-	✓	-
Gnetaceae	*Gnetum gnemon* L.	*Mlinjo*	Tree	Front yard	✓	-	✓	-	-
Lamiaceae	*Ocimum sanctum* L.	*Kemangi*	Shrub	Front yard	✓	-	-	-	-
Lamiaceae	*Coleus scutellarioides* (L) Benth.	*Miana*	Herbaceous	Front yard	-	✓	-	-	-
Lamiaceae	*Lavandula angustifolia* Mill.	*Lavender*	Herbaceous	Front yard	-	✓	-	-	-
Lamiaceae	*Mentha xpiperita* L.	*Mint*	Herbaceous	Front yard	-	✓	-	-	-
Lamiaceae	*Orthosiphon aristatus* (Blume) Miq.	*Kumis kucing*	Herbaceous	Front yard	-	✓	-	-	-
Lamiaceae	*Perilla frutescens* var. *crispa* (Thunb.) H.Deane	*Daun shiso*	Herbaceous	Front yard	-	✓	-	-	-
Lauraceae	*Persea americana* Mill.	*Alpukat*	Tree	Back yard	✓	-	-	-	-
Lythraceae	*Punica granatum* L.	*Delima*	Tree	Back yard	✓	-	-	-	-
Lythraceae	*Lagerstroemia* sp.	*Bungur*	Tree	Front yard	-	✓	-	-	-
Malvaceae	*Durio zibethinus* Murray	*Durian*	Tree	Front yard	✓	-	-	-	-
Malvaceae	*Abelmoschus esculentus* (L.) Moench	*Okra*	Herbaceous	Front yard	-	✓	-	-	-
Malvaceae	*Hibiscus rosa-sinensis* L.	*Bunga sepatu*	Shrub	Front yard	-	✓	-	-	-
Malvaceae	*Hibiscus tiliaceus* L.	*Waru*	Tree	Front yard	-	✓	-	-	-
Moraceae	*Artocarpus altilis*	*Jambu sukun*	Tree	Front yard	✓	-	-	-	-
Moraceae	*Artocarpus heterophyllus*	*Nangka madu*	Tree	Front yard	✓	-	✓	-	-
Moraceae	*Morus alba* L.	*Murbei*	Tree	Front yard	✓	-	-	-	-
Moraceae	*Ficus microcarpa* var. *latifolia* (Miq.) Corner	*Beringin dolar*	Tree	Front yard	-	✓	-	-	-
Moraceae	*Ficus benjamina* L.	*Beringin*	Tree	Front yard	-	-	✓	-	-
Moringaceae	*Moringa oleifera* Lam.	*Kelor*	Tree	Front yard	✓	-	-	✓	-
Muntingiaceae	*Muntingia calabura* L.	*Kersen*	Tree	Front yard	✓	-	-	-	-
Musaceae	*Musa ×paradisiaca* L.	*Pisang*	Tree	Front yard	✓	-	-	-	-
Myrtaceae	*Psidium guajava* L.	*Jambu biji*	Tree	Front yard	✓	-	✓	-	-
Myrtaceae	*Syzygium aqueum* (Burm.fil.) Alston	*Jambu air*	Tree	Front yard	✓	-	✓	-	-
Myrtaceae	*Syzygium polyanthum* (Wight) Walp.	*Daun salam*	Tree	Front yard	✓	-	-	-	-
Myrtaceae	*Eugenia uniflora* L.	*Dewa ndaru*	Tree	Back yard	-	-	-	-	✓
Myrtaceae	*Syzygium oleinum* Wall.	*Pucuk merah*	Tree	Front yard	-	✓	✓	-	-
Nyctaginaceae	*Bougainvillea* sp.	*Bougenville*	Tree	Front yard	-	✓	-	-	-
Ochnaceae	*Ochna serrulata* (Hochst.) Walp.	*Wahyu tumurun*	Tree	Back yard	-	✓	-	-	-
Oleaceae	*Jasminum sambac* (L.) Aiton	*Melati*	Shrub	Front yard	-	✓	✓	-	-
Orchidaceae	*Rhynchostylis gigantea* (Lindl.) Ridl.	*Anggrek*	Climber	Front yard	-	✓	-	-	-
Orchidaceae	*Spathoglottis plicata* Blume	*Anggrek tanah ungu*	Climber	Back yard	-	✓	-	-	-
Oxalidaceae	*Averrhoa bilimbi* L.	*Belimbing wuluh*	Tree	Front yard	✓	-	-	-	-
Oxalidaceae	*Averrhoa carambola* L.	*Belimbing*	Tree	Back yard	✓	-	✓	-	-
Pandanaceae	*Pandanus amaryllifolius* Roxb. ex Lindl.	*Pandan wangi*	Shrub	Front yard	✓	✓	-	-	-
Phyllanthaceae	*Phyllanthus acidus* (L.) Skeels	*Cermai*	Tree	Front yard	✓	-	-	-	-
Phyllanthaceae	*Sauropus androgynus* (L.) Merr.	*Katuk*	Tree	Front yard	✓	-	-	✓	-
Phyllanthaceae	*Phyllanthus buxifolius* (Blume) Müll.Arg.	*Seligi*	Tree	Front yard	-	✓	-	-	-
Piperaceae	*Piper nigrum* L.	*Merica*	Climber	Front yard	✓	-	-	-	-
Piperaceae	*Piper betle* L.	*Sirih hijau*	Climber	Back yard	-	-	-	✓	-
Piperaceae	*Piper ornatum* N.E.Br.	*Sirih merah*	Climber	Front yard	-	-	-	✓	-
Piperaceae	*Peperomia ferreyrae* Yunck.	*Happy bean*	Shrub	Front yard	-	✓	-	-	-
Poaceae	*Cymbopogon citratus* (DC.) Stapf	*Serai*	Herbaceous	Front yard	✓	-	-	✓	-
Poaceae	*Saccharum officinarum* L.	*Tebu*	Herbaceous	Front yard	✓	-	-	-	-
Poaceae	*Zea mays* L.	*Jagung hitam*	Tree	Front yard	✓	-	-	-	-
Poaceae	*Bambusa multiplex* (Lour.) Raeusch. ex Schult.f.	*Bambu cina*	Tree	Front yard	-	✓	-	-	-

Poaceae	*Bambusa vulgaris* Schrad. ex. J.C.Wendl.	*Bambu kuning*	Tree	Front yard	-	✓	-	-	-
Portulacaceae	*Portulaca grandiflora* Hook.	*Bunga krokot*	Herbaceous	Front yard	-	✓	-	-	-
Pteridaceae	*Adiantum capillus-veneris* L.	*Suplir*	Herbaceous	Back yard	-	✓	-	-	-
Rhamnaceae	*Ziziphus mauritiana* Lam.	*Bidara*	Tree	Back yard	-	-	-	-	✓
Rosaceae	*Fragaria vesca* L.	*Stroberi*	Herbaceous	Front yard	✓	-	-	-	-
Rosaceae	*Rosa* sp.	*Mawar*	Shrub	Front yard	-	✓	-	-	-
Rubiaceae	*Gardenia jasminoides* J.Ellis	*Ceplok piring*	Shrub	Front yard	-	✓	-	-	-
Rubiaceae	*Ixora acuminata* Roxb.	*Asoka merah*	Shrub	Front yard	-	✓	-	-	-
Rutaceae	*Citrus ×aurantiifolia* (Christm.) Swingle	*Jeruk nipis*	Tree	Front yard	✓	-	-	-	-
Rutaceae	*Citrus ×limon* (L.) Osbeck	*Lemon*	Tree	Front yard	✓	-	-	-	-
Rutaceae	*Citrus ×sinensis* (L.) Osbeck	*Jeruk manis*	Tree	Front yard	✓	-	-	-	-
Rutaceae	*Citrus hystrix* DC.	*Jeruk purut*	Tree	Front yard	✓	-	-	-	-
Rutaceae	*Citrus maxima* (Burm.) Merr.	*Jeruk bali*	Tree	Front yard	✓	-	-	-	-
Rutaceae	*Murraya paniculata* (L) Jack.	*Kemuning*	Tree	Front yard	-	✓	-	-	-
Sapindaceae	*Dimocarpus longan* Lour.	*Kelengkeng*	Tree	Back yard	✓	-	✓	-	-
Sapindaceae	*Nephelium lappaceum* L.	*Rambutan*	Tree	Front yard	✓	-	✓	-	-
Sapindaceae	*Pometia pinnata* J.R.Forst. & G.Forst.	*Matoa*	Tree	Front yard	✓	-	✓	-	-
Sapotaceae	*Manilkara kauki* (L.) Dubard	*Sawo kecik*	Tree	Back yard	✓	-	✓	-	-
Sapotaceae	*Manilkara zapota* (L.) P.Royen	*Sawo manila*	Tree	Front yard	✓	-	✓	-	-
Solanaceae	*Capsicum annuum* L.	*Cabai merah besar*	Shrub	Front yard	✓	-	-	-	-
Solanaceae	*Capsicum frutescens* L.	*Cabai rawit*	Shrub	Front yard	✓	-	-	-	-
Solanaceae	*Physalis angulata* L.	*Ciplukan*	Herbaceous	Front yard	✓	-	-	-	-
Solanaceae	*Solanum lycopersicum L.*	*Tomat*	Shrub	Front yard	✓	-	-	-	-
Solanaceae	*Solanum melongena* L.	*Terong*	Shrub	Front yard	✓	-	-	-	-
Solanaceae	*Limnocharis flava* (L.) Buchenau	*Genjer*	Herbaceous	Front yard	-	✓	-	-	-
Solanaceae	*Solanum nigrum* L.	*Tapak kebo*	Shrub	Front yard	-	✓	-	-	-
Umbelliferae	*Centella asiatica* (L.) Urb.	*Pegagan*	Herbaceous	Front yard	-	✓	-	-	-
Vitaceae	*Vitis vinifera* L.	*Anggur*	Climber	Front yard	✓	-	-	-	-
Zingiberaceae	*Alpinia galanga* (L.) Willd.	*Laos*	Herbaceous	Back yard	✓	-	-	✓	-
Zingiberaceae	*Amomum cardamomum* L.	*Kapulaga*	Herbaceous	Back yard	✓	-	-	✓	-
Zingiberaceae	*Boesenbergia rotunda* (L.) Mansf.	*Temu kunci*	Herbaceous	Back yard	✓	-	-	✓	-
Zingiberaceae	*Etlingera elatior* (Jack) R.M.Sm.	*Kecombrang*	Herbaceous	Back yard	✓	-	-	-	-
Zingiberaceae	*Curcuma longa* L.	*Kunyit*	Herbaceous	Front yard	✓	-	-	✓	-
Zingiberaceae	*Curcuma mangga* Valeton & Zijp	*Kunir putih*	Herbaceous	Front yard	-	-	-	✓	-
Zingiberaceae	*Curcuma xanthorrhiza* Roxb.	*Temulawak*	Herbaceous	Front yard	-	-	-	✓	-
Zingiberaceae	*Kaempferia galanga* L.	*Kencur*	Herbaceous	Back yard	-	-	-	✓	-
Zingiberaceae	*Zingiber officinale* Roscoe	*Jahe*	Herbaceous	Back yard	✓	-	-	✓	-
Zingiberaceae	*Costus* sp.	*Sirih cina*	Herbaceous	Front yard	-	✓	-	-	-
Zingiberaceae	*Zingiber zerumbet* (L.) Roscoe ex Sm.	*Lempuyang*	Herbaceous	Front yard	-	✓	-	✓	-

Note: F: Food, M: Medical, MY: Mystical, O: Ornamental, S: Shading. Back yard includes plants on the side and back of the house.

Figure 3. Examples of food plants in Mojosongo, Nusukan, and Kestalan Villages, Surakarta, Central Java, Indonesia. A. *Morus alba* L. B. *Manilkara zapota* (L.) P. Royen

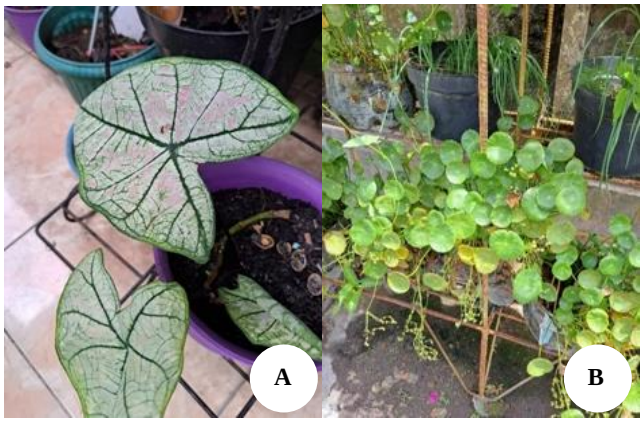

Figure 4. Examples of ornamental plants in Mojosongo, Nusukan, and Kestalan Villages, Surakarta, Central Java, Indonesia. A. *Caladium* sp. B. *Centela asiatica* (L.) Urb.

Plants used for food

The people of Mojosongo, Nusukan, and Kestalan Villages utilize 73 species of food plants, consisting of 37 families (Table 4), with the highest utilization compared to other uses, namely with a percentage of 41%. Most edible plants the community uses are planted in front of the house, making it easier to maintain and utilize. Food plants utilized by most of the community are categorized vegetables and fruits that can be eaten directly, either raw or processed first by cooking. Food plants are mostly grown in garden farms and some respondents also grow vegetables hydroponically. However, interviews show that villagers' knowledge regarding edible plant utilization is limited to plants commonly planted in front of the house and consumed daily; less information is obtained about wild plants they used. Some respondents deliberately cultivated a plant for consumption because it is rare and difficult to obtain, as shown in Figure 3.

Solanaceae families, such as chili peppers, tomatoes, and eggplants, are the most widely utilized food crops in Mojosongo, Kestalan, and Nusukan Villages, Surakarta City. Members of the Solanaceae family consist of *Capsicum annuum, C. frutescens, Physalis angulata, Solanum lycopersicum, S. melongena,* and *S. nigrum.* All Solanaceae species are harvested for cooking as vegetables and also as seasonings. The village area is an urbanized area with limited planting areas, so people choose to grow food crops that are easy to grow in front of their houses and do not cover much space; these crops are also found and used throughout Java Island, Indonesia. The next most widely planted species by the people of Mojosongo, Nusukan, and Kestalan Villages is *C. frutescens*. Rural communities widely cultivated this plant because it is easy and does not require special care (Barik et al. 2020). In addition, Indonesian people, especially Javanese people, like to eat spicy food, so this plant can be consumed daily to add dishes flavors. *Syzygium aqueum* is one of the easier-to-maintain plants. The *S. aqueum* plants can grow practically anywhere in Indonesia (Sari and Wahyuni 2020). The next food crop widely grown by the people in the site areas is *Dimocarpus longan*; this plant is also a seasonal crop, and the fruit tastes sweet and juicy. This plant can bear fruit in large quantities, so many people plant it. Besides that, it is expensive compared to other fruits, especially when not in harvest seasons.

Other vegetable families that dominate after Solanaceae are Brassicaceae, Amaryllidaceae, and Convolvulaceae. Vegetable plant species found include *Amaranthus spinosus, Apium graveolens, Lactuca sativa, Momordica charantia, Manihot esculenta, Vigna unguiculata* subsp. *sesquipedalis*, *Gnetum gnemon, Ocimum sanctum, M. oleifera, Sauropus androgynus*, and *Etlingera elatior*. Several species are planted in front and back yards and with water, such as *L. sativa, Brassica rapa,* and *Ipomoea aquatica.* People who struggle with limited agricultural land may be able to use the hydroponic system as an alternative to modern plant cultivation. The community uses hydroponic processing because the implementation is relatively simple, and the costs are not as high as other traditional planting methods. The community can operate the system with energy efficiency, and if operated intensively, the plants will grow faster and provide higher results (Suryaningprang et al. 2021). The largest family of fruit plants (consumed) planted by the people of Mojosongo, Nusukan, and Kestalan villages is Rutaceae, followed by Sapindaceae, Moraceae, Annonaceae, Oxalidaceae, Myrtaceae, Sapotaceae, Anacardiaceae, Arecaceae, and Cucurbitaceae. Fruit plant species include *Selenicereus undatus, Carica papaya, Tamarindus indica, Fragaria vesca, Phyllanthus acidus, Vitis vinifera, Muntingia calabura, Musa ×paradisiaca, Persea americana, Punica granatum,* and *Durio zibethinus.*

Plants used for ornamental

There are 66 ornamental plants, consisting of 35 families, that the people of Mojosongo, Nusukan, and Kestalan Villages planted. The most widely used plants as ornaments or ornamental the people of Mojosongo, Nusukan, and Kestalan Villages planted, *Anthurium plowmanii*, *Caladium bicolor*, *Caladium* sp., *Colocasia esculenta*, *Epipremnum aureum*, *Monstera* sp., and *Spathiphyllum wallisii* (Figure 4).Those plants are widely used to decorate the house because they are beautiful and can beautify the front yard. In addition, some plants, such as *Monstera* sp., can be used as air purifiers; hence, it is not only for decoration but also has very useful benefits. *Aloe vera* is the most widely planted ornamental plant by the people of Mojosongo, Nusukan, and Kestalan Villages because this plant has many benefits besides decoration. The *A. vera* can also be used as a medicinal plant to make hair loss smoother and denser (Salsabila et al. 2022). Besides that, *A. vera* can also be consumed if properly processed (Purwanti et al. 2022).

Besides *A. vera*, another ornamental plant that is widely planted is *Dracaena trifasciata*. This plant is quite famous among ornamental plant collectors, so many people plant it in their front house. Apart from the aesthetics of this plant, *D. trifasciata* also has an aroma that provides a relaxing effect and relieves stress (Boboc and Cantor 2012). Some ornamental plants were only found in a few places because few people grow them around their homes. Some ornamental plants found only in one respondent's house are *Graptophyllum pictum, Pseuderanthemum carruthersii* var. *atropurpureum, Crinum asiaticum, Catharantus roseus, C. esculenta, C. bicolour, Caladium* sp., *S. wallisii, Schefflera arboricola, Senecio radicans, Helianthus annuus,* and *Galinsoga parviflora*.

Plants used for shading

There are 18 shading plant species, consisting of 11 families, that the people of Mojosongo, Nusukan, and Kestalan Villages planted. Many people use plants that produce fruit as shading plants, such as *M. indica, Annona muricata*, *Annona squamosa*, *Cocos nucifera*, *T. indica*, *D. longan*, and *N. lappaceum*. Plants are used as shade because they have several benefits for the surrounding environment (Akbari 2002). Shade plants can produce sufficient oxygen levels and absorb carbon dioxide in the air (Kusminingrum 2008). In addition, shade plants can also function as filters for air pollution and noise absorbers

(Givoni 1991), which can also fight global warming and air pollution. Shade plants are generally large trees with strong roots to maintain the soil structure strength and increase water content. Shade plants that are widely planted by the people of Mojosongo, Nusukan, and Kestalan Villages are *M. indica* and *S. oleinum*; it can be used as a shade and beautify the front of the house because of its reddish leaf tips. Another plant used as a shade is Ficus benjamina, which is widely used in the suburbs because it has strong roots, grows large, and has a long life.

Plants used for medicinal stuffs

The people of Mojosongo, Nusukan, and Kestalan Villages utilize 19 species of medicinal plants, comprising 9 families. Plants planted in front of the house, in addition to shade or decoration, can also be used for treatment. People usually deliberately cultivated these plants to treat certain diseases. Plants used for treatment are dominated by plants from the Zingiberaceae family, namely *Zingiber officinale*, *Curcuma longa*, *C. xanthorrhiza*, *Kaempferia galangal*, and *C. mangga*. They are perennials that frequently have sympodial (forked) fleshy rhizomes and grow in moist areas of the tropics and subtropics, including some seasonably dry regions (Larsen et al. 1998). Zingiberaceae contains several significant genera with medicinal applications, including Alpinia, *Amomum*, *Curcuma*, *Elettaria*, *Kaempferia*, and *Zingiber* (Kumar et al. 2013). The most widely planted medicinal plants by the Mojosongo, Nusukan, and Kestalan villagers are two plants, namely *K. galangal* and *Z. officinale*. The *K. galanga* is useful for lowering blood pressure, relieving pain, reducing stress, increasing appetite, and preventing cancer (Sumarlina et al. 2022).

The next widely planted plant is *Z. officinale*. This plant can maintain body immunity (Mohammadi et al. 2020), and its numerous advantages make it a useful traditional medicine for treating and preventing acute and chronic illnesses. It can also be used as a spice to enhance culinary preparations (Andriani et al. 2021). This plant is widely processed into drinks to warm the body. Other medicinal plants found in small quantities include *C. xanthorrhiza* and *C. mangga*. This plant is mostly planted to treat certain diseases, so few people grow it or know its health benefits. The three village populations got the traditional medicine they ate from a variety of sources, mostly members of their own families —mothers, grandparents, and ancestors— as well as electronic media, which included print and online publications. Respondents stated that while using medicinal plants, people never experience side effects from consuming medicinal plants because they don't consume excessively.

Plants used for mystical

In Indonesia, many people still believe in mystical powers (Soemarwoto and Conway 1992). Some people deliberately plant certain plants for mystical purposes or certain beliefs. Two species of plants were found, which were used for mystical needs by the community. The mystical plants cultivated were *Ziziphus mauritiana* and *Eugenia uniflora*, and the community now hardly ever used the *Z. mauritiana* organs. The leaves were sometimes used for bathing the corpse because they produced a foam similar to soap when kneaded with water or as a component of a traditional wedding and spiritual ceremony (Rahayu et al. 2018). Young branches of *Z. mauritiana*, which ranged from 5 to 10 meters in height, spread out and frequently dangled. With one or two upright stipular spines on young branches and fewer on mature branches, the branches slope upward; the leaf is simple, ovate, oblong, alternate, and petiolate. Above, the leaf is glossy green and hairless; underneath, it has dense, soft, white hairs, and three prominent veins form a base that runs abaxially. Apex subrounded, margin crenulate, base asymmetric, and base subrounded. Therefore, *Z. mauritiana* has many health benefits due to its mystical. Moreover, numerous studies have investigated the pharmacological potential of different plant parts, including the fruits, leaves, and stems, as hepato-protective, immune-modulatory, antimicrobial, antioxidant, and anti-diarrheal (Prakash et al. 2021). In Javanese terminology, the *E. uniflora* plant, called the dewandaru plant, implies it can be interpreted as "bearer of divine revelation". The dewa ndaru tree in Kawi Mountain is sacred; the local people believe *E. uniflora* can bring good luck and use it as an amulet. *E. uniflora* is also believed to foreshadow events that will occur (Renjana 2020).

A homegarden is the land surrounding a settlement and maintained by a family. Homegardens are social centers and cultural sites in many places worldwide (Chen et al. 2019), and the culture of an ethnic group is one of the many factors that influence homegarden plant diversities. Owners' lives and yards are closely linked (Galluzzi et al. 2010), and households get much food from their yards (Galhena et al. 2013). Homegardens perform significant social tasks and can be considered a representation of the community's social status; hence, homegarden shows the family's social and economic status. Homegarden can help people fulfill social needs and manage the environment. Therefore, making observations in homegardens can be an effective method to study people's knowledge and culture. Culturally important plant species are essential for household income, therapy, decoration, and other non-food benefits (Yinebeb et al. 2022). The culture and habits of people in growing plants in homegardens are important in biodiversity conservation efforts. They can improve household food security and availability and efforts to obtain quality community nutrition through homegardens (Weinberger 2013). Homegarden production and productivity may be a viable alternative to provide food and nutritional security for poor households. Residents' culture and knowledge of their homegarden influence biodiversity conservation and food security (Ferdous et al. 2016).

A homegarden can contribute significantly to the nation's production of fruits and vegetables and promote household food self-sufficiency. Homegarden interventions usually focus on women, mostly responsible for household food preparation and family health (Depenbusch et al. 2021). Homegardens, if developed into a business, have the potential to contribute to food security and also create

employment opportunities that support the community's economy. The homegarden concept tends to contribute to low household income suitably. Ferdous et al. (2016) reported that in a number of Asian nations, including Bangladesh, Sri Lanka, India, and the Philippines, homegarden enterprises have the potential to boost community income and provide jobs, according to the Food and Agriculture Organization of the United Nations In the three villages, vegetable buying and selling activities went well. Several KWT members grow vegetables at home and sell vegetables to the local community.

Homegarden has various ecological functions: contributing oxygen and reducing carbon dioxide in the air; habitat for animals, especially birds, and insects, such as pollinators for various plants; wind barrier and protection from lightning and soil erosion. Homegardeners can contribute to preserving land-derived ecosystems by growing their carbon sequestration, lowering greenhouse gas emissions into the atmosphere, and conserving carbon biomass. As a result, those trees serve as a global mitigation of climate change, assisting in reducing its adverse effects (Raihan et al. 2021). This aligns with research conducted by Septiyani et al. (2010), which found that yard vegetation can reduce the concentration of dust particles in hemorrhoidal air. The more shading the yard vegetation owned by the community, the lower the dust particle concentrations in the ambient air. This shows that the existence of a community-owned yard can improve the quality of the environment which will support the quality of public health. The dense vegetation in the yard causes the yard to become a habitat for animals, and due to the extraordinary plant species diversity, the homegarden is a rich genetic resource. A homegarden can serve as a platform for the conservation of wild plants. The variety of these plants can provide valuable information that can be used to conserve local ethnobotanical knowledge (Benz et al. 1994). Once many wild or semi-wild plants are discovered, these plants can be cultivated for cultivation. Multi-story structures with a high plant species diversity are essential for soil and water conservation, and plant canopy stratification protects the soil from erosion and pests (Santos et al. 2022). Homegardens can trigger an effective waste recycling system; the residents' livestock waste or plants' dry leaves, which are then composted, can be used as fertilizer and plant caring (Karyono 2000). Efforts to maintain and preserve homegarden plants need to be made so that the benefits of homegarden are still obtained for human life and other organisms. Several efforts to preserve ethnobotanical plants, especially medicinal plants, have been carried out in the three villages. These preservation activities are mainly supported by the KWT organization. Efforts to preserve homegarden plants owned by the community are also supported by community service activities carried out by students through local and regional university programs. University community service activities usually involve socialization to community groups such as Family Welfare Movement (PKK) or other community institutions. The hope is that participants can learn or obtain information on how to preserve plants and pass on their knowledge to other communities. Therefore, community knowledge can be maintained and preserved for future generations through socialization activities at these universities.

In conclusion, the people of Mojosongo, Kestalan, and Nusukan Villages use plants for various purposes, such as food, medicinal, shading, mystical, and ornamental plants. The three villages have farmers' groups, which are crucial to increasing the knowledge and skills of the village community regarding the food sector, hence improving the village economy through planted garden incomes. Therefore, the most dominant plants are used for food, while the least utilized is mystic. Village communities use plants for this purpose by cultivating in their yards or certain areas. The leaves and fruit are the most widely used plant parts as food and medicinal plants from 148 plant species of 55 families were identified. The community plant's knowledge and species diversity are still relatively high from the old to the young. Still, this plant's knowledge may be further degraded if there is no teaching about the traditional use in their villages.

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REFERENCES

A'tourrohman M. 2020. Inventarisasi dan kajian etnobotani tanaman akuatik di Taman Akuatik Kebun Raya Eka Karya Bali. BIOSEL 9 (1): 1-10. DOI: 10.33477/bs.v9i1.1312 . [Indonesian]

Ahoyo CC, Houehanou TD, Yaoitcha AS, Prinz K, Assogbadjo AE, Adjahossou CSG, Hellwig F, Houinato MRB. 2017. A quantitative ethnobotanical approach toward biodiversity conservation of useful woody species in Wari-Maro Forest Reserve (Benin, West Africa). Environ Dev Sustain 20 (50): 2301-2320. DOI: 10.1007/s10668-017-9990-0.

Akbari H. 2002. Shade trees reduce building energy use and CO_2 emissions from power plants. Environ Pollut 116: 119-126. DOI: 10.1016/s0269-7491(01)00264-0.

Andriani M, Putri ER, Fatta AK, Meriza AS, Sari DP, Anandita N, Nolasari R, Rizki SP, Astari W. 2021. Pemanfaatan tanaman obat keluarga jahe (*Zingiber officinale*) sebagai pengganti obat kimia di Dusun Tanjung Ale Desa Kemengking Dalam Kecamatan Taman Rajo. Martabe 4 (1): 14-20. DOI: 10.31604/jpm.v4i1.14-19. [Indonesian]

Atmojo SE. 2013. Pengenalan etnobotani pemanfaatan tanaman sebagai obat kepada masyarakat Desa Cabak Jiken Kabupaten Blora. Jurnal Ilmiah WUNY 15 (1). DOI: 10.21831/jwuny.v15i1.3529. [Indonesian]

Barik MZA, Hidayat W, Hasad A, Sikki MI, Sujatmiko A. 2020. Alat penyiram dan monitoring tanaman cabai berbasis internet of things menggunakan wemos D1 R3 dan aplikasi thingspeak. JREC 8 (2): 83-90. DOI: 10.33558/jrec.v8i2.2483. [Indonesian]

Benz BE, Santana FM, Pineda RL, Cevallos JE, Robles LH, and Niz DL. 1994. Characterization of mestizo plant use in the Sierra de Manantlan, Jalisco-Colima, Mexico. J Ethnobiol 14: 23-41.

Boboc P, Cantor M. 2012. Studies concerning sanognetic effects of flower plants. ProEnvironment 5 (12): 227-230.

Cabalda AB, Rayco-Solon P, Solon JAA, Solon FS. 2011. Homegardening is associated with Filipino preschool children's dietary diversity. J Am Diet Assoc 111 (5): 711-715. DOI: 10.1016/j.jada.2011.02.005.

Cuanalo HE, Mukul RRG. 2008. Homegarden production and productivity ina Mayan Community of Yucatan. Hum Ecol 36 (3): 423-433. DOI: 10.1007/s10745-008-9166-5.

Das T, Das AK. 2005. Inventorying plant biodiversity in homegardens: A case study in Barak Valley, Assam, North East India. Curr Sci 89 (1): 155-163. DOI: 10.2307/24110441.

Depenbusch L, Schreinemachers P, Roothaert R, Namazzi S, Onyango C, Bongole S, Mutebi J. 2021. Impact of homegarden interventions in East Africa: Results of three randomized controlled trials. Food Policy 104: 102140. DOI: 10.1016/j.foodpol.2021.102140.

Destryana RA, Ismawati. 2019. Etnobotani dan pengggunaan tumbuhan liar sebagai obat tradisional oleh masyarakat suku Madura (studi di Kecamatan Lenteng, Guluk-Guluk, dan Bluto). J Food Technol Agroind 1 (2): 1-8. DOI: 10.24929/jfta.v1i2.724. [Indonesian]

Ferdous Z, Datta A, Anal AK, Anwar M, Khan ASMMR. 2016. Development of homegarden model for year round production and consumption for improving resource-poor household food security in Bangladesh. Wageningen J Life Sci 78: 103-110. DOI: 10.1016/j.njas.2016.05.006.

Firdawati K, Syamswisna, Fajri H. 2021. Etnobotani tanaman pangan dari masyarakat Desa Mekar Pelita Kecamatan Sayan Kabupaten Melawi. Bioscientist 9 (2): 402-411. DOI: 10.33394/bioscientist.v9i2.4206. [Indonesian]

Galhena DH, Freed R, Maredia KM. 2013. Homegardens: A promising approach to enhance household food security and wellbeing. Agric Food Secur 2: 8. DOI: 10.1186/2048-7010-2-8.

Galluzzi G, Eyzaguirre P, Negri V. 2010. Homegardens: Neglected hotspots of agrobiodiversity and cultural diversity. Biodivers Conserv 19 (13): 3635-3654. DOI: 10.1007/s10531-010-9919-5.

Givoni B. 1991. Impact of planted areas on urban environmental quality: A review. Atmos Environ B: Urban Atmos 25 (3): 289-299. DOI: 10.1016/0957-1272(91)90001-U.

Istiqomah I. 2022. Peningkatan ekonomi masyarakat melalui penanaman hidroponik oleh Kelompok Wanita Tani (KWT) di Kelurahan Pegambiran Kecamatan Lemahwungkuk Kota Cirebon. ICODEV 3 (1): 11-18. DOI: 10.24090/icodev.v3i1.6448. [Indonesian]

Karyono. 2000. Traditional homegarden and its transforming trend. Jurnal Bionatura 2 (3): 117-124.

Kumar KMP, Asish GR, Sabu M, Balachandran I. 2013. Significance of gingers (Zingiberaceae) in Indian system of medicine-Ayurveda: An overview. Anc Sci Life 32 (4): 253. DOI: 10.4103/0257-7941.131989.

Kusminingrum N. 2008. Potensi tanaman dalam menyerap CO_2 dan CO untuk mengurangi dampak pemanasan global. Jurnal Permukiman 3 (2): 96-105. DOI: 10.31815/jp.2008.3.96-105. [Indonesian]

Larsen K, Lock JM, Maas H, Maas PJM. 1998. Zingiberaceae. In: Kubitzki K (eds). Flowering Plants Monocotyledons: Alismatanae and Commelinanae (except Gramineae). Springer Berlin Heidelberg, Berlin. DOI: 10.1007/978-3-662-03531-3_49.

Mekonen T, Giday M, Kelbessa E. 2015. Ethnobotanical study of homegarden plants in Sebeta-Awas District of the Oromia Region of Ethiopia to assess use, species diversity and management practices. J Ethnobiol Ethnomed 11: 64. DOI: 10.1186/s13002-015-0049-8.

Mohammadi G, Rashidian G, Hoseinifar SH, Naserabad SS, Doan HV. 2020. Ginger (*Zingiber officinale*) extract affects growth performance, body composition, haematology, serum and mucosal immune parameters in common carp (*Cyprinus carpio*). Fish Shellfish Immunol 99: 267-273. DOI: 10.1016/j.fsi.2020.01.032.

Prakash O, Usmani S, Singh R, Singh N, Gupta A, Ved A. 2021. A panoramic view on phytochemical, nutritional, and therapeutic attributes of *Ziziphus mauritiana* Lam.: A comprehensive review. Phytother Res 35 (1): 63-77. DOI: 10.1002/ptr.6769.

Purwanti Y, Hasdar MH. Wadli W, Umisara E. 2022. Pelatihan pengolahan *Aloe vera* sebagai pangan sehat berbasis keluarga di Desa Banjarharjo. JAMU 3 (01): 29-34. DOI: 10.46772/jamu.v3i01.775. [Indonesian]

Rahayu ES, Dewi NK, Bodijantoro FPMH. 2018. Profile of *Elaeocarpus grandiflorus* and *Ziziphus mauritiana* as identity plants of Salatiga and Tegal towns, Central Java Province, Indonesia. J Phys: Conf Ser 983 (1): 012195. DOI: 10.1088/1742-6596/983/1/012195.

Raihan A, Begum RA, Mohd Said MN, Pereira JJ. 2021. Assessment of carbon stock in forest biomass and emission reduction potential in Malaysia. Forests 12 (10): 1294. DOI: 10.3390/f12101294.

Renjana E. 2020. Dewandaru (*Eugenia uniflora* L.), buah legendaris yang sarat mitologi di Pegunungan Kawi. Warta Kebun Raya 18 (1): 2-8. [Indonesian]

Salsabila T, Indriyani W, Sari Y, Yuniarsih N. 2022. Utilization of *Aloe vera* plants as a raw materials for cosmetics: A narrative review. Open Access Indones J Med Rev 2 (4): 231-236. DOI: 10.37275/oaijmr.v2i4.220.

Santos M, Moreira H, Cabral JA, Gabriel R, Teixeira A, Bastos R, Aires A. 2022. Contribution of homegardens to sustainable development: perspectives from a supported opinion essay. Intl J Environ Res Public Health 19 (20): 1371. DOI: 10.3390/ijerph19201371.

Sari E, Wahyuni S. 2020. Sosialisasi pemanfaatan jambu air menjadi Nata De *Syzigium*. Dinamisia 4 (2): 209-213. DOI: 10.31849/dinamisia.v4i1.3285. [Indonesian]

Septiyani M, Hermawan R, Sunkar A. 2010. Nilai Fisik dan Sosial Vegetasi Pekarangan dalam Penurunan Konsentrasi Partikel Debu di Desa Gunung Putri, Kecamatan Gunung Putri, Kabupaten Bogor. [Undergraduate Theses]. Institut Pertanian Bogor, Bogor. [Indonesian]

Shrestha P, Gautam R, Rana RB, Sthapit BR. 2004. Managing diversity in various ecosystems: homegardens in Nepal. In: Eyzaguirre PB, Linares OF (eds). homegardens and Agrobiodiversity. Smithsonian Books, Washington.

Silalahi M, Nisyawati N. 2018. The ethnobotanical study of edible and medicinal plants in the homegarden of Batak Karo sub-ethnic in North Sumatra, Indonesia. Biodiversitas 19 (1): 229-238. DOI: 10.13057/biodiv/d190131.

Soemarwoto O, Conway GR. 1992. The javanese homegarden. J Farm Syst Res-Ext 2 (3): 95-118.

Solang M. 2020. Etnobotani Tanaman Obat Masyarakat Tapa dan Bulango. [Thesis]. Universitas Gorontalo, Gorontalo. [Indonesian]

Sumarlina ESN, Darsa UA, Permana RSM. 2022. Family medicine plants in the Covid-19 pandemic based on ancient Sundanese manuscripts. Adv Soc Sci Educ Hum Res 30-41. DOI: 10.2991/assehr.k.220206.004.

Suryaningprang A, Suteja J, Mulyaningrum, Herlinawati E. 2021. Hydroponic: Empowering local farmer knowhow to gain value added on agriculture commodity. Budapest Intl Res Crit Inst J 4 (1): 787-796. DOI: 10.33258/birci.v4i1.1676.

Syarif A. 2018. Pemberdayaan perempuan menghadapi modernisasi pertanian melalui Kelompok Wanita Tani (KWT) pada usahatani sayuran di Kecamatan Bissapu Kabupaten Bantaeng. Ziraa'ah 43 (1): 77-84. [Indonesian]

Weinberger K. 2013. Home and community gardens in Southeast Asia: potential and opportunities for contributing to nutrition-sensitive food systems. Food Secur 5 (6): 847-856. DOI: 10.1007/s12571-013-0299-z.

Yinebeb M, Lulekal E, Bekele T. 2022. Composition of homegarden plants and cultural use in an indigenous community in Northwest Ethiopia. J Ethnobiol Ethnomed 18: 47. DOI: 10.1186/s13002-022-00545-5.