



Ethnobotanical Inventory of Home Garden Plants in Bambu Kuning Village, Pekanbaru, Indonesia

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Abstract

Ethnobotany quantitatively examines the complex interactions between urban communities and plant resources, reflecting the adaptation of local knowledge and cultural values amidst rapid environmental changes. In urban areas, home gardens play a vital role as reservoirs of biodiversity and repositories of traditional wisdom, yet quantitative assessments of their cultural and utilitarian values in rapidly urbanizing Indonesian cities remain limited. This study aims to document the plant species found in home gardens, their utilization patterns, and to assess their use value and cultural significance in the Bambu Kuning Sub-district, Pekanbaru City. The research was conducted from December 2025 to January 2026. Data were collected through purposive sampling involving 20 informants selected based on their experience in plant management and a minimum residency of over 10 years in the area. Data were analyzed quantitatively using Use Value (UVs) and the Index of Cultural Significance (ICS). The results identified 15 dominant plant species utilized for ornamental (40%), food (33%), medicinal (7%), and ritual (20%) purposes. Roses (*Rosa* sp.) and desert roses (*Adenium obesum*) recorded the highest ICS values (12.5) and UVs (2.5 and 1.38, respectively), whereas purely ornamental plants such as *Aglaonema* sp. showed the lowest values (ICS: 0; UVs: 0). This study demonstrates that cultural meaning and utilization intensity significantly influence the sustainability of home garden plants.

Keywords: Ethnobotany; Home garden; ICS; Local knowledge; UVs

1. Introduction

Ethnobotany is a branch of science that examines the relationship between humans and plants within a system that reflects the cultural values and identity of a particular community (Royyani et al. 2024). Ethnobotanical studies focus on how people recognize, utilize, manage, and transmit knowledge related to plants in their surrounding environment (Martins et al. 2022). This knowledge is developed through empirical experience and inherited across generations, which is reflected in various aspects of daily life, including the use of plants for food, traditional medicine, construction materials, handicrafts, rituals, and cultural practices (Chakravarty et al. 2024). Ethnobotany therefore plays an important role in documenting local knowledge and understanding the interactions between human communities and biological resources.

Home gardens represent one of the most important forms of land use that support the sustainability of community life, particularly in urban areas (Alkhajar and Luthfia 2018). In addition to functioning as green spaces that contribute to environmental quality, home gardens also serve as sources of biodiversity, food, medicinal plants, and reservoirs of traditional knowledge (Galluzzi et al. 2010). Ethnobotanical understanding enables communities to utilize plant resources sustainably and improve their quality of life through the preservation of local knowledge systems (Huai and Hamilton 2009). Furthermore, home gardens contribute to household resilience by providing alternative resources for nutrition, health, and small-scale economic activities.

Previous ethnobotanical studies on home gardens have demonstrated that communities possess extensive local knowledge regarding plant selection, management, and utilization (Iskandar 2017). The

patterns of plant use vary among regions and are strongly influenced by environmental conditions, cultural backgrounds, belief systems, and socio-economic dynamics (Medeiros and Albuquerque 2015). Such variations create distinctive characteristics in plant utilization and provide important insights into the relationship between communities and their surrounding environment (Nolan and Turner 2011). Ethnobotanical research is therefore essential not only for documenting useful plant species, but also for understanding the cultural, ecological, and economic values associated with plant use.

Rapid urban development in Riau Province, particularly in Pekanbaru City, has resulted in significant land-use changes and increasing population density (Hutabarat 2012). These conditions have contributed to the reduction of home garden areas and alterations in their patterns of utilization (Beer et al. 2003). Consequently, the role of home gardens as alternative sources of food, traditional medicine, and cultural preservation may gradually decline (Novriyanti et al. 2021). Nevertheless, many communities continue to utilize home garden plants for various purposes, including food, health care, rituals, and ornamental uses, although the intensity and forms of utilization differ among households (Chetri et al. 2020).

Bambu Kuning Subdistrict is one of the urban areas in Pekanbaru City characterized by heterogeneous social and cultural backgrounds, which potentially support diverse ethnobotanical knowledge. However, scientific information regarding the diversity of home garden plants, patterns of utilization, and the cultural importance of plant species in this area remains limited. Such information is important to evaluate the extent to which local communities maintain traditional interactions with plants amid increasing urbanization pressures. In addition, documenting ethnobotanical knowledge is crucial because local traditions and plant-use practices may gradually disappear due to social and environmental changes.

Therefore, this study aims to document the diversity of home garden plants, analyze the forms and intensity of plant utilization, and evaluate the cultural significance and use value of plants among the local community using an ethnobotanical approach. The findings of this study are expected to provide scientific information that supports the conservation of local knowledge, sustainable home garden management, and community-based biodiversity conservation in urban environments.

2. Materials and Methods

2.1. Study Area

This study was conducted in Bambu Kuning Subdistrict, Pekanbaru City, Riau Province, Indonesia, from December 2025 to January 2026. The study area represents an urban residential region in which local communities still utilize home gardens for cultivating various plant species to support household needs. The existence of home gardens in this area reflects the utilization of biological resources associated with food, health, aesthetic, and cultural purposes within the community.

2.2. Data Collection

Data were collected through field surveys and semi-structured interviews involving 20 informants selected purposively based on their knowledge and experience in utilizing home garden plants. Prior informed consent was obtained from all informants before the interviews were conducted. Information gathered during the interviews included local plant names, categories of utilization, plant parts used, methods of preparation, and applications in daily life.

2.3. Plant Inventory and Identification

Plant inventory was conducted directly in the respondents' home gardens through observation and recording of all plant species encountered. Species identification was carried out based on morphological characteristics and supported by relevant botanical literature. Scientific names were verified using current taxonomic references to ensure nomenclatural accuracy.

2.4. Ethnobotanical Analysis

Ethnobotanical data were analyzed quantitatively following Silalahi (2015) using three main parameters, namely Use Value (UVs), Index of Cultural Significance (ICS), and cultural significance value.

2.4.1. Use Value (UVs)

The Use Value (UVs) was used to determine the relative importance or utility value of each plant species within the community. The value was calculated by dividing the total number of use reports for a species by the total number of informants interviewed using the following formula:

$$UVS = \frac{\sum UVis}{is}$$

Where:

UVs = overall use value of species s

UVis = use value of species s reported by informant i

is = total number of informants interviewed for the species

2.4.2. Index of Cultural Significance (ICS)

The Index of Cultural Significance (ICS) was used to evaluate the cultural importance of plant species based on community perception. This index integrates three main variables, namely quality value (q), intensity of use (i), and exclusivity value (e). The ICS was calculated using the following formula:

$$ICS = \sum_{i=1}^n (q \times i \times e)ni$$

For plant species with multiple functions, the ICS value was calculated by summing the scores of each utilization category:

$$ICS = \sum_{i=1}^n (q_1 \times i_1 \times e_1)n_1 + (q_2 \times i_2 \times e_2)n_2 + \dots \dots \dots + (q_n \times i_n \times e_n)n_n$$

The scoring criteria for ICS parameters were as follows:

Quality value (q)

- 1 = minor or rare function
- 2 = additional function
- 3 = moderately important function
- 4 = highly important function
- 5 = primary or essential function

Intensity of use (i)

- 1 = very rarely used
- 2 = rarely used
- 3 = moderately used
- 4 = frequently used
- 5 = very frequently used

Exclusivity value (e)

- 1 = non-exclusive
- 2 = many substitutes available
- 3 = several substitutes available
- 4 = almost no substitute available
- 5 = no substitute available

2.4.3. Cultural Significance Value

The cultural significance value (c) was used to assess the importance of plant functions within the community based on informants' perceptions. The significance value was determined through semi-structured interviews regarding the roles and benefits of plants in daily life. Scores were assigned using a scale ranging from 1 to 5 according to the reported level of importance.

The assessment criteria were as follows:

- score 5 = plants with highly important or essential functions in community life, such as staple needs, traditional rituals, or irreplaceable uses
- score 4 = plants with very important functions but limited alternatives
- score 3 = plants with moderately important functions
- score 2 = plants with complementary or additional functions
- score 1 = plants with minor or rarely reported functions.

3. Results

3.1. Diversity of Home Garden Plants

A total of 391 plant species were documented based on interviews with 20 informants in Bambu Kuning Subdistrict, Pekanbaru, Riau. The recorded plants were utilized for various purposes, including food sources, ornamental plants, traditional medicine, body care, and ritual activities. The diversity of plant utilization reflected the multifunctional role of home gardens within the local community.

Among all recorded species, 15 plant species showed the highest frequency of utilization and cultural importance values. These species belonged to several plant families, including Araceae, Asparagaceae, Solanaceae, Rosaceae, and Musaceae. The species recorded in respondents' home gardens and their ethnobotanical values are presented in Table 1.

Table 1. Plant species and their utilization in Bambu Kuning Subdistrict, Pekanbaru, Riau

Family	Name	Local Name	(i)	(e)	(c)	ICS Value	UVs Value	Utilization	ICS Ranking
Araceae	<i>Aglaonema</i> sp.	Sri rejeki	0	0.5	1	0	0	Ornamental	11
Asparagaceae	<i>Dracaena trifasciata</i>	Lidah mertua	0	0.5	1	0	0	Ornamental	11
Asphodelaceae	<i>Aloe vera</i>	Lidah buaya	2	0.5	2	2	0.2	Ornamental and body care	10
Nyctaginaceae	<i>Bougainvillea</i> sp.	Bunga kertas	3	0.5	5	7.5	0.625	Ornamental and funeral ritual	3
Araceae	<i>Monstera adansonii</i>	Janda bolong	0	2	1	0	0	Ornamental	11
Sapindaceae	<i>Dimocarpus longan</i>	Kelengkeng	5	0.5	2	5	0.83	Food source	4
Caricaceae	<i>Carica papaya</i>	Pepaya	5	0.5	2	5	0.5	Food source	4
Musaceae	<i>Musa</i> sp.	Pisang	5	0.5	2	5	0.55	Food source	4
Cactaceae	<i>Opuntia</i> sp.	Kaktus	0	0.5	1	0	0	Ornamental	11
Rosaceae	<i>Rosa</i> sp.	Mawar	5	0.5	5	12.5	2.5	Ornamental and funeral ritual	1
Piperaceae	<i>Piper</i> sp.	Sirih	3	0.5	2	3	1.5	Medicinal plant	9
Solanaceae	<i>Solanum torvum</i>	Terong rimbang	5	0.5	2	5	1.25	Food source	4
Apocynaceae	<i>Adenium obesum</i>	Kamboja Jepang	5	0.5	5	12.5	1.38	Ornamental and funeral ritual	1
Solanaceae	<i>Capsicum</i> sp.	Cabai	5	0.5	2	5	0.55	Food source	4
Asparagaceae	<i>Cordyline fruticosa</i>	Hanjungang	0	0.5	1	0	0	Ornamental	11

Notes : (i) Intensity, (e) Exclusivity, (c) Significance

3.2. Plant Utilization Categories

The recorded plant species were classified into several utilization categories, including food plants, ornamental plants, medicinal plants, body care plants, and ritual plants. Food plants such as *Dimocarpus longan*, *Carica papaya*, *Musa* sp., *Solanum torvum*, and *Capsicum* sp. showed relatively high intensity values and were commonly cultivated in respondents' home gardens.

Several ornamental plants, including *Aglaonema* sp., *Dracaena trifasciata*, *Monstera adansonii*, and *Opuntia* sp., were primarily maintained for aesthetic purposes. In addition, some species possessed dual functions. For example, *Bougainvillea* sp., *Rosa* sp., and *Adenium obesum* were used both as ornamental plants and in funeral rituals. *Aloe vera* was utilized for ornamental purposes as well as body care, while *Piper* sp. was mainly used as a medicinal plant.

3.3. Use Value (UVs)

The Use Value (UVs) analysis showed variations in the degree of plant utilization among species. *Rosa* sp. exhibited the highest UVs value (2.5), followed by *Piper* sp. (1.5) and *Adenium obesum* (1.38). Species with high UVs values were generally characterized by multiple functions and frequent utilization by the local community. Several food plants, such as *Dimocarpus longan* (0.83), *Capsicum* sp. (0.55), and *Musa* sp. (0.55), also demonstrated moderate UVs values, indicating their importance in supporting household food needs.

3.4. Index of Cultural Significance (ICS)

The Index of Cultural Significance (ICS) analysis indicated that *Rosa* sp. and *Adenium obesum* had the highest ICS values (12.5), ranking first among all recorded species. These plants were commonly associated with ornamental functions and funeral rituals, reflecting their important cultural roles within the community.

Bougainvillea sp. showed the second highest ICS value (7.5), while several food plants, including *Dimocarpus longan*, *Carica papaya*, *Musa* sp., *Solanum torvum*, and *Capsicum* sp., each recorded an ICS value of 5. In contrast, ornamental plants such as *Aglaonema* sp., *Dracaena trifasciata*, *Monstera adansonii*, *Opuntia* sp., and *Cordyline fruticosa* exhibited low ICS values due to their limited functional roles within the community.

4. Discussion

The analysis of the Index of Cultural Significance (ICS) and Use Value species (UVs) demonstrated variations in the cultural importance and utilization intensity of home garden plants within the community of Bambu Kuning Subdistrict. These variations indicate differences in the relationships between local communities and plant species, both as practical resources and as components of social and cultural practices.

Plant species with the highest ICS values were *Rosa* sp. and *Adenium obesum*. The high ICS values of these species were associated with their high utilization intensity and strong cultural significance, particularly in funeral rituals. In addition to their ornamental functions, *Rosa* sp. is specifically used in flower-spreading rituals during funeral ceremonies as a form of respect for ancestors and an expression of spiritual values (Kemalasari et al. 2019). Both species possess symbolic meanings related to respect, emotional expression, and traditional cultural practices. This finding indicates that plant utilization is influenced not only by practical functions but also by cultural meanings inherited across generations (Gaoue et al. 2017). The relatively high UVs values of these species further reflect their intensive use and important social roles within the community.

Bougainvillea sp. also exhibited a relatively high ICS value because it serves dual functions as an ornamental plant and as part of funeral rituals. This species is commonly used in flower-spreading ceremonies symbolizing respect for deceased family members, expressions of grief, and prayers for spiritual peace (Hulu and Ola 2024). The use of flowers in such rituals reflects spiritual values and community beliefs regarding the relationship between life, death, and ancestral respect (Subedi and Hamal

2023). The widespread cultivation of this species in home gardens suggests that plant availability contributes to the continuity of cultural practices associated with its use. Easily accessible plant resources tend to strengthen the interaction between communities and their surrounding biological environment.

Food plants such as *Dimocarpus longan*, *Carica papaya*, *Musa* sp., *Solanum torvum*, and *Capsicum* sp. generally showed moderate ICS values despite their high utilization intensity. These species are routinely used as household food resources, indicating the dependence of local communities on plant resources to fulfill daily nutritional needs and support household-scale food security (Naciah et al. 2023). The fruits of *Dimocarpus longan*, *Musa* sp., and *Carica papaya* were primarily utilized for consumption. In addition, the fruits of *Solanum torvum* were consumed as fresh vegetables, while *Capsicum* sp. fruits were commonly used as cooking ingredients to provide spicy flavor. In *Carica papaya*, utilization was not limited to ripe fruits, but also included young fruits processed as vegetables together with papaya flowers and young leaves. These findings indicate that high utilization frequency does not necessarily correspond to high cultural significance.

Medicinal plants such as *Piper* sp. exhibited relatively low ICS values but comparatively high UVs values. The leaves are commonly boiled to produce herbal preparations or directly crushed to obtain extracts used in traditional medicine (Kumar et al. 2024). This condition suggests that the use of *Piper* sp. is relatively specific and associated with particular traditional healing practices, although it is not widely utilized by all community members. These findings indicate that knowledge regarding medicinal plants is still maintained by certain groups within the community as part of local knowledge systems.

In contrast, purely ornamental plants such as *Aglonema* sp., *Dracaena trifasciata*, *Monstera adansonii*, *Opuntia* sp., and *Cordyline fruticosa* showed low ICS and UVs values. These low values indicate that their functions are largely restricted to aesthetic purposes without direct associations with economic needs, health practices, or cultural traditions. Nevertheless, the presence of ornamental plants still reflects the aesthetic preferences of communities in managing home garden spaces.

The UVs analysis demonstrated differences in the intensity and diversity of plant utilization among species. Species with high UVs values generally possessed multiple functions or were intensively used by many households. Multifunctional plants, such as species serving ornamental and ritual functions simultaneously or medicinal plants frequently used in traditional treatments, tended to have higher UVs values because of their relatively high frequency of mention and utilization. In addition, species deeply embedded within community traditions maintained relatively stable UVs values even when their distribution among home gardens was limited.

Conversely, species with moderate UVs values were generally plants routinely utilized for a single primary function, particularly food plants. Although widely used, their limited functional diversity resulted in relatively lower UVs values compared with multifunctional species. This finding supports previous studies indicating that UVs values are influenced not only by utilization frequency but also by the diversity of reported functions associated with a species (Lake and Crema 2012). Species with low or zero UVs values reflected plants that were rarely utilized or served solely aesthetic purposes without direct functional contributions to community livelihoods. The low UVs values observed in ornamental plant groups indicate limited functional interactions between communities and these species. Although ornamental plants were relatively common in home gardens, their lack of additional uses resulted in low ethnobotanical importance.

Overall, variations in UVs values indicate that plant utilization is influenced by the interaction between usage frequency, diversity of functions, and the depth of local knowledge regarding particular species. High UVs values reflect the practical and functional importance of plant species in daily life, whereas low values indicate limited functions and reduced community dependence. Therefore, UVs can serve as an important parameter for understanding plant utilization patterns and determining priorities for the management and conservation of highly valuable plant resources (Gonçalves et al. 2016).

The ICS values obtained in this study represent the level of importance of plant species within the social, cultural, and economic systems of the community. This index integrates utilization intensity, exclusivity, and cultural significance, thereby reflecting not only practical usefulness but also symbolic and cultural dimensions associated with plant use (Helida et al. 2015; Coe et al. 2020). Species with high ICS values generally possessed strong symbolic meanings and were closely associated with ritual activities

and social traditions. Plants involved in funeral ceremonies and traditional rituals obtained higher ICS values because they were considered culturally important and relatively irreplaceable. Even when exclusivity values were moderate, high utilization intensity and strong symbolic significance substantially increased overall ICS values (Veugelers et al. 2019). These findings indicate that cultural importance is shaped more strongly by symbolic and social functions than by plant abundance alone.

Species with moderate ICS values were primarily plants utilized for practical daily needs, particularly food resources. Although these species showed high utilization intensity, their cultural and symbolic significance remained relatively limited compared with ritual plants. This condition suggests that practical utility does not always correspond to cultural importance because utilitarian uses generally possess lower symbolic meaning (Thompson et al. 2020). Meanwhile, species with low or zero ICS values represented plants with limited functions, mainly restricted to aesthetic or supplementary purposes. The low cultural significance of these plants indicates that they are relatively replaceable and weakly connected to local cultural systems and traditional knowledge.

These findings are consistent with previous ethnobotanical studies in Indonesia reporting that home gardens function as centers of biodiversity conservation and spaces for the transmission of local knowledge. Studies conducted in West Java demonstrated that home gardens serve as important sources of medicinal plants and contribute to household food security through the cultivation of edible species (Iskandar et al. 2023). Similar studies in Bali and Yogyakarta reported that traditional home garden systems maintain high plant diversity because of inherited cultural values and long-standing management practices (Sulistiyowati and Perdana 2023). The similarities observed among these regions suggest that home gardens in urban and semi-urban areas of Indonesia possess relatively similar ecological and social functions (Irwan and Handayani 2023).

In addition, the utilization of home garden plants reflects adaptive interactions between humans and their environment in response to social and ecological changes. Communities develop strategies for selecting plant species according to environmental conditions, economic needs, and space availability. This adaptive process demonstrates that home garden systems represent dynamic forms of local resource management based on traditional ecological knowledge. Overall, the present study indicates that the cultural importance of plant species is more strongly influenced by symbolic meanings and social functions than by plant abundance within home gardens. Species associated with rituals and social activities tend to be maintained because they are closely related to cultural identity and inherited traditions. In contrast, species with purely decorative functions exhibit weaker relationships with local knowledge systems. These findings highlight that home gardens function not only as spaces for plant cultivation but also as important areas for preserving cultural practices and local knowledge within urban communities. In the context of increasing land-use changes caused by urbanization, plant species with high cultural significance may become important factors supporting the sustainability of human–plant interactions in residential environments.

5. Conclusions

This study documented 15 plant species utilized in home gardens in Bambu Kuning Subdistrict, Pekanbaru, with functions ranging from ornamental, food, and medicinal uses to social and ritual purposes. *Rosa* sp. and *Adenium obesum* showed the highest Index of Cultural Significance (ICS) values, indicating their important cultural roles within the community, while purely ornamental plants exhibited the lowest ICS and Use Value species (UVs) values due to their limited functional use. Overall, the findings demonstrate that home gardens serve not only as sources of household plant resources but also as important spaces for preserving local cultural practices and ethnobotanical knowledge in urban communities.

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Conflicts of Interest: The authors declare no conflicts of interest.

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