BIODIVERSITAS ISSN: 1412-033X
Volume 24, Number 10, October 2023 E-ISSN: 2085-4722
Pages: 5618-5625 DOI: 10.13057/biodiv/d241043

Supporting food security through urban home gardening, Rancasari Sub-district, Bandung City, West Java, Indonesia

INDRI WULANDARI[1,2,4,♥], TEGUH HUSODO[1,2,4], DEDE MULYANTO[3], OEKAN S. ABDOELLAH[2,3,4], CIKA ASTI AMALIA[1], SHOFI SITI FARHANIAH[1]

[1]Department of Biology, Faculty of Mathematics and Natural Sciences, Universitas Padjadjaran. Jl. Raya Bandung-Sumedang Km. 21, Jatinangor, Sumedang 45363, West Java, Indonesia. Tel.: +62-22-7796412, Fax.: +62-22-7794545, ♥email: indri.wulandari@unpad.ac.id
[2]Pusat Unggulan IPTEK Perguruan Tinggi, Centre of Environment and Sustainable Science, Directorate of Research, Community Services and Innovation, Universitas Padjadjaran. Jl. Sekeloa, Coblong, Bandung 40134, West Java, Indonesia
[3]Department of Anthropology, Faculty of Mathematic and Natural Sciences, Universitas Padjadjaran. Jl. Raya Bandung-Sumedang Km. 21, Jatinangor, Sumedang 45363, West Java, Indonesia
[4]Program of Environmental Science, School of Graduates, Universitas Padjadjaran. Jl. Sekeloa, Coblong, Bandung 40134, West Java, Indonesia

Manuscript received: 5 October 2023. Revision accepted: 25 October 2023.

Abstract. *Wulandari I, Husodo T, Mulyanto D, Abdoellah OS, Amalia CA, Farhaniah S. 2023. Supporting food security through urban home gardening, Rancasari Sub-district, Bandung City, West Java, Indonesia. Biodiversitas 24: 5618-5625.* Urban areas are closely related to the increase in human population, which triggers increased demand for land for settlements or housing. The increase in human population is in line with the increase in daily food requirements. As agricultural land decreases, agricultural productivity decreases, but much agricultural land has been converted into non-agricultural land, leading to food insecurity. Urban farming through home gardening is one of the methods to maintain food security amidst limited open land. This study aimed to reveal urban farming as a role model for food security through home gardens in the Rancasari Sub-district, Bandung City, West Java, Indonesia. This study used a quantitative approach. Data were collected using purposive sampling in housing >20 years old in Manjahlega and Mekarjaya Village. Plants are divided based on their utilization, including ornamental, spice, medicine, and food plants. The results showed that 803 species and 20,366 individuals of 130 families were found in Manjahlega Village, while 680 species and 10,862 individuals were found in the Mekarjaya Village. In Manjahlega, mango (*Mangifera indica* L.) has the highest IVI value of 64.58, while in Mekarjaya, Chinese evergreen (*Aglaonema commutatum* Schott.) has the highest IVI value of 10.2. Based on their use, ornamental plants have the highest H and R values compared to food, medicines, and spice plants. Ornamental plants dominate home gardens in Rancasari Sub-district. Their home gardens tend to be aimed at providing aesthetic value and beauty rather than producing food, medicines, and spices in the household. Home gardening has not been fully effective in supporting urban farming in Rancasari Sub-district due to the selection of ornamental plants.

Keywords: Food insecurity, tetrachoric correlation

INTRODUCTION

Urban areas are a region that has characteristics with high economic growth rates and high population growth rates. The urban area tends to have high industrial activities, trade, and other commercial activities. The high flow of urbanization in urban areas has increased the population growth rate and increased the demand for land for settlements or housing (Prasada and Masyhuri 2019). On the other hand, the agricultural sector is also faced with the challenge of limited available land. However, agricultural production fulfills the urban people's food (Didomenica and Gordon 2016; Rezai et al. 2016). Conversion of agricultural land into non-agricultural land causes agricultural land to become increasingly narrow, as happened in Rancasari Sub-district, Bandung City. In 2013, the number of housing complexes in the Rancasari Sub-district was 60 and will increase in 2023. The increase in housing of Rancasari is also related to developing the Gedebage Sub-Regional Area as a strategic area for Bandung City based on the Detailed Spatial Plan (*Rencana Detail Tata Ruang*/RDTR) of Bandung City of 2015-2035. Due to land use changes, housing development has reduced Green Space (*Ruang Tata Hijau*/RTH) in East Bandung, Indonesia.

Uncontrolled conversion of agricultural land can threaten local food security and the ability to produce local food. According to the Republic of Indonesia Law No. 18 of 2012 of food, food is the most basic human need, and its fulfillment is part of every Indonesian's human rights. Food must be accessible in sufficient quantities and quality, safe, diverse, nutritious, equitable, affordable, and does not conflict with the people's religion, beliefs, and culture. Implementing a food system that protects those who produce and consume food is necessary to achieve their needs. The Bandung City Government has committed to developing sustainable food systems in the Milan Urban Food Policy Pact, August 2020, to overcome the problem of food insecurity, one of which is urban farming.

Urban farming is the registered practice of cultivating, growing, and distributing food and derivative products by urban farmers or communities utilizing designated land within the city (Atmaja et al. 2020). Urban farming, also known as urban agriculture, was acknowledged as a strategy to improve city resilience associated with social and economic co-benefit (Olsson et al. 2016; Elmqvist et al. 2019; Granceri 2019). Urban farming provides food, improves access to food, and revitalizes the local economy (Jonck et al. 2018; Pulighe and Lupia 2019). The application of the urban farming concept is motivated by people living in urban areas with limited land producing agricultural products. Besides, the concept of urban farming also utilizes lands that were not productive to improve environmental quality, increase green land in the city area, and improve environmental aesthetics. Urban farming also provides opportunities for low-income households to consume good quality products with high nutritional value at affordable prices (Kaufman and Bailkey 2000). Food fulfillment from farming can improve welfare because food expenses can be provided independently (Wahdah and Maryono 2018).

Urban farming also performs in increasing well-being and social benefit (Wang and Pryor 2019), contributes to the expansion of urban green spaces (Contesse et al. 2018), improves water and waste management, reduces energy use and greenhouse gasses emissions for transportation (Lee et al. 2015). Urban farming will enhance flexibility and contribute to social-economic and environmental co-benefits, food security, and thus urban resilience (Atmaja et al. 2020). According to the above explanation, the study aims to reveal urban farming as a role model for food security in the Rancasari Sub-district, Bandung City, West Java, Indonesia.

MATERIALS AND METHODS

Study area

The study was conducted in June-July 2023 in Manjahlega Village (48 M 794589.80 m E 9230999.33 m S) and Mekarjaya Village (48 M 794741.26 m E 9229441.80 m S), Rancasari Sub-district, Bandung City, West Java. The areas of Manjahlega and Mekarjaya Villages are 167.250 ha and 137.930 ha, respectively. Manjahlega is at a height of 670 masl, while Mekarjaya is at a height of 665 masl. Based on biophysics, Manjahlega Village has an average temperature of 29.24°C, humidity of 65%, and light intensity of 8403.04 lux. Mekarjaya Village has an average temperature of 30.88°C, humidity of 64.14%, and light intensity of 4340.48 lux.

Procedures

Data were collected using purposive sampling of >20 years of housing. We assumed that homeowners at that age still manage and utilize home garden plants to meet their daily needs. In the preliminary survey, >20 years of housing have a diverse composition of home garden plants. Based on population data, Manjahlega and Mekarjaya Villages consist of 3,516 and 1,617 units, respectively. These housing have been established since the 1980s. We sampled 10% (Arikunto 2010) of each Village, resulting in a sample of 352 and 162 houses in Manjahlega and Mekarjaya Villages, respectively. Data collection on home gardens was done through direct observation to obtain data on plant species and the number of individuals. The plant uses are divided into four categories: foods, spices, medicines, and ornamental plants.

Data analysis

Data were analyzed using Microsoft Excel. Species diversity was analyzed using the Relative Frequency (RF), Relative Density (RD), Relative Dominance (RD), Important Value Index (IVI), Shannon-winner's diversity index (H'), Margalef richness index (D_{mg}), and evenness index (E).

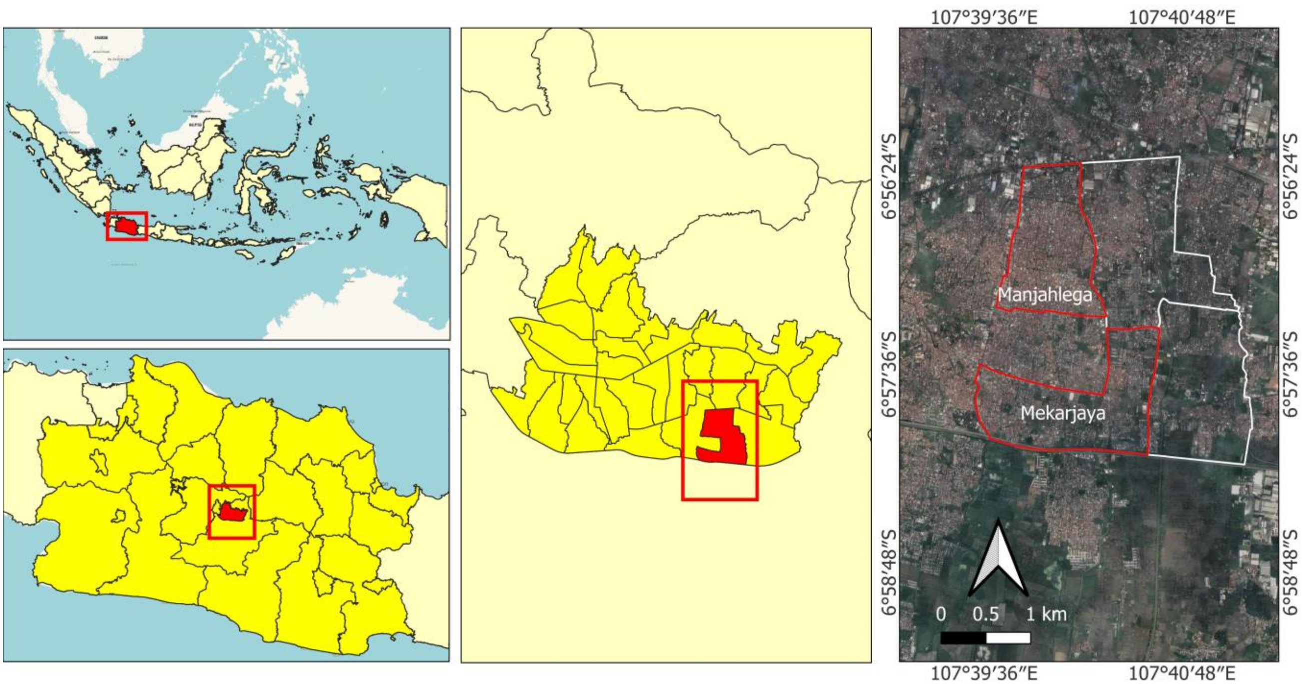


Figure 1. Study area in the Manjahlega Village and Mekarjaya Village, Rancasari Sub-district, Bandung City, West Java, Indonesia

$$IVI = RF + RD + RD$$

$$H' = -\Sigma \left({ni}/{N}\right) \ln \left({ni}/{n}\right)$$

$$E = \frac{H'}{H'max}$$

$$D_{mg} = \frac{S-1}{\ln(N)}$$

$$Species\ similarity\ index = \frac{c}{a+b+c}$$

The Shannon-winner's diversity index (H') determines a community's diversity. In H', n is the number of individuals of a particular plant species (n) divided by the total number of individuals (N). The sum of calculations is ln, which is a natural logarithmic value. The level of species diversity is divided into three categories: high (H'>3), moderate (H'3), and low (H'1). The margalef richness index (D_{mg}) is a species richness index that measures differences in the number of species in an area (Charlotte 2022). In the margalef richness index (D_{mg}), S represents the number of plant species, and N represents the total number of individuals across all species. The level of species richness is classified as high ($D_{mg}\geq5$), moderate ($2.05>D_{mg}<5$), and low ($D_{mg}\leq2.05$). The evenness index (E) determines the evenness of each species in each community encountered. It is calculated by dividing the Shannon-winner's diversity index by its maximum (Hmax). The level of evenness index is classified as depressed communities ($0>E\leq0.5$), unstable communities ($0.5>E\leq0.75$), and stable communities ($0.75>E\leq1$).

The Jaccard similarity index measures the similarity value between two communities or variables in biodiversity analyses. Similarities in plant species between utilization categories were analyzed using the Past 4.13. The higher the percentage means, the more similar the species. If the Jaccard Index shows a value of 1 or 100%, the habitats have a high level of similarity. If the index shows a 0 or 0% value, it means a low level of species similarity or no species in common. The Euclidean similarity index measures the similarity of an object to a reference object by measuring the distance between the two objects. The greater the distance, the more different the two objects, which means dissimilarity and vice versa.

The correlation between plants and their utilization categories was analyzed using the Past 4.13. We used tetrachoric correlation (binary) and analyzed it in a statistical table. The tetrachoric correlation was used to measure rater agreement for binary data (Uebersax 2015). The tetrachoric correlation coefficient is between -1 and 1, with -1 indicating a strongly negative correlation between two variables, 0 showing no correlation, and 1 showing a strong correlation. For this correlation to be reliable, it is assumed that each variable comes from a normal distribution (Zach 2020). Correlation will produce a color circle where blue means positive correlation and red means negative correlation. The different color gradations on the circles show different levels of correlation, where the darker the color means the stronger the correlation.

RESULTS AND DISCUSSION

Various plants can be found in the home gardens of Manjahlega and Mekarjaya Village. Eight hundred-three species and 20,366 individuals of 130 families were found in the Manjahlega Village, while 680 species and 10,862 individuals were found in the Mekarjaya Village. *Mangifera indica* L. has the highest IVI value of 64.58 in Manjahlega. In Mekarjaya, *Aglaonema commutatum* Schott. has the highest IVI value of 10.2. Based on their use, ornamental plants have the highest H' and R values, compared to food, medicine, and spice plants. From 352 home gardens in Manjahlega Village, we found 41 species of medicinal plants, 37 spice plants, and 39 food plants. From 162 home gardens in Mekarjaya Village, 19 species were found of each medicine and spice plant. Food plants were found in greater numbers, with 86 species (Table 1).

Plant utilization

Both in Manjahlega and Mekarjaya Villages, Araceae was found more than others. In Manjahlega, the plant family consisted of 78 species and 5,620 individuals; in Mekarjaya, 76 species and 2,883 individuals. The plant species under the Araceae family are mainly found in home gardens. Several species of Araceae are widely cultivated, including *Dieffenbachia nitidipetiolata* Croat & Grayum, *Epipremnum aureum* Linden & André, and *Aglaonema commutatum* Schott. Globally, Araceae is in third place with relatively high plant diversity. The Araceae family has 144 genera and 3,645 species (Croat 2019).

Plumeria alba L., *Thuja occidentalis* L., *Syzygium myrtifolium* Walp., *Platycerium bifurcatum* (Cav.) C.CHr., *Kirkia acuminata* Oliv., and *Aglaonema commutatum* Schott are widely used as ornamental plants (Table 2). *Plumeria alba* L. is less valuable than other ornamental plants based on relative frequency and density values. However, *Plumeria alba* L. has the highest relative dominance value, considering its habitus is trees, so it has the highest IVI value. *Plumeria alba* L. has an attractive flower part that gives an aesthetic impression.

Averrhoa carambola L., *Gnetum gnemon* L., *Curcuma longa* L., *Aloe vera* (L.) Burm.f., *Piper betle* L., and *Piper ornatum* N.E.Br. are widely used as medicinal plants (Table 2). Some plants also have multi-benefits as food plants, such as *Averrhoa carambola* L. and *Gnetum gnemon* L., and spices, such as *Curcuma longa* L. Although urban people planted the medicine plants, they tend to undergo treatment using pharmaceutical drugs. Pharmaceutical drugs are easier in small shops (*warung*), franchises, and pharmacies. Lack of knowledge of making herbal medicines and appropriate dosages can influence the choice of medicines.

Syzygium polyanthum (Wight) Walp., *Pandanus amaryllifolius* Roxb., *Curcuma longa* L., *Capsicum frutescens* L., and *Zingiber officinale* Roscoe are widely used as kitchen spices (Table 2). *Pandanus amaryllifolius* Roxb. is usually used as a complement in making cakes. *Capsicum frutescens* L. is generally used as a spicy flavor as the Sundanese people's favorite taste. Indonesian bay leaves are often used daily as a flavor and aroma flavoring in cooking.

Mangifera indica L., *Syzygium aqueum* (Burm.f.) Alston, *Cnidoscolus aconitifolius* (Mill.) I.M.Johnst., *Fragaria x ananassa* Duchesnes, and *Artocarpus altilis* (Parkinson) Fosberg are widely used as food plants (Table 2). Based on the IVI value, it shows that more fruits are planted than vegetables in the home gardens of Rancasari. People tend to grow fruits. We assume one of the reasons is that the price is relatively high in the markets compared to vegetables. Planting fruit is simpler because it does not require daily watering and fertilizer. Vegetables are cheaper, nutritious, fibrous, and easily available in shops and traditional and modern markets. Planting vegetables is difficult for people who spend their time working in the non-agricultural sector.

Species similarity

Manjahlega Village

Jaccard similarity index analysis shows plants' similarity between utilization categories. The ornamental plants have nothing in common with the species in other categories. The index value between these utilization categories is 0.33. It is shown with a value of 0, meaning it has low or no similarity. The lower the Jaccard similarity index value, the lower the species' similarity level. The dendrogram depicts a hierarchy between plant utilization categories in Manjahlega Village. The same branching of the medicine, spice, and food plants shows that these three categories have similar utilization between several species. Meanwhile, the ornamental plants that separate themselves show that this category does not have the same species as the other categories.

Utilization similarities were analyzed based on the perspective of the Euclidean similarity index, which shows the distance of similarity between categories. Based on Figure 2, the two categories with the closest distance in common are relatively close, such as food-spices and food-spices and medicine. Meanwhile, ornamental plants have the greatest similarity in distance among all utilization. The ornamental plant has a higher Euclidean index than the whole, with an average above 2.

Mekarjaya Village

Based on the analysis of the Jaccard similarity index, there is a similarity in plants between utilization categories, which is shown in the spices and medicines category at 0.47, spices and food at 0.16, and food and medicine at 0.39. The diagram between the utilization of plants shows that food, medicine, and spices have similar values in the utilization of the species used. However, this differs from ornamental plants, which shows that this category does not have the same species as the other categories.

In this utilization similarity analysis, an analysis is also carried out based on the Euclidean similarity index, namely comparing the closeness of the distance values of two variables to find the closest distance value. Figure 3 shows that the categories of use of spices and medicines and spices and medicines with food have the closest similarities to the use of ornamental plants.

Utilization correlation

Manjahlega Village

Tetrachoric correlation analysis showed that the highest correlation value was in the medicinal and food plants, with a value of 0.407. The values obtained indicate that the correlation between the drug and food categories has a relatively positive correlation. This positive correlation shows that many spice plants were also used as medicinal plants. Meanwhile, the lowest correlation value is between the ornamental and food plants, with a value of -0.952. The correlation of the ornamental and food plants shows that the number of ornamental plants also used as food plants is low.

The order of plant use pairs positively correlates from largest to smallest, namely food-medicine, spices-medicine, and food-spices. Some food plants have a dual function as medicinal plants, such as *Carica papaya* L., *Averrhoa carambola* L., *Moringa oleifera* Lam., and *Gnetum gnemon* L. Many spices were also used as medicine plants. Spice plants are not only useful for enhancing the taste, aroma, and color of food or drinks. However, many spice plants can treat various acute and chronic diseases. Several medicinal plants were used as spices, including *Curcuma longa* L., *Allium sativum* L., and *Salvia rosmarinus* Spenn. These species were also found in the study conducted by Jiang (2019), apart from cinnamon, black pepper, and paprika.

The following order is plants used as foods-spices. Those are plant species under the Rutaceae and Solanaceae families. For example, *Citrus* sp., *Citrus x sinensis*, and *Citrus x limon* are species of Rutaceae. In Rutaceae, especially in the *Citrus*, we can consume it as food, while the leaves are used as a seasoning for cooking. This finding aligns with the statement of Shen et al. (2023), who stated that Rutaceae has an economic role in its use in spices and food.

Table 1. Homegardens in the Manjahlega and Mekarjaya Villages, Rancasari Sub-district, Bandung City, Indonesia

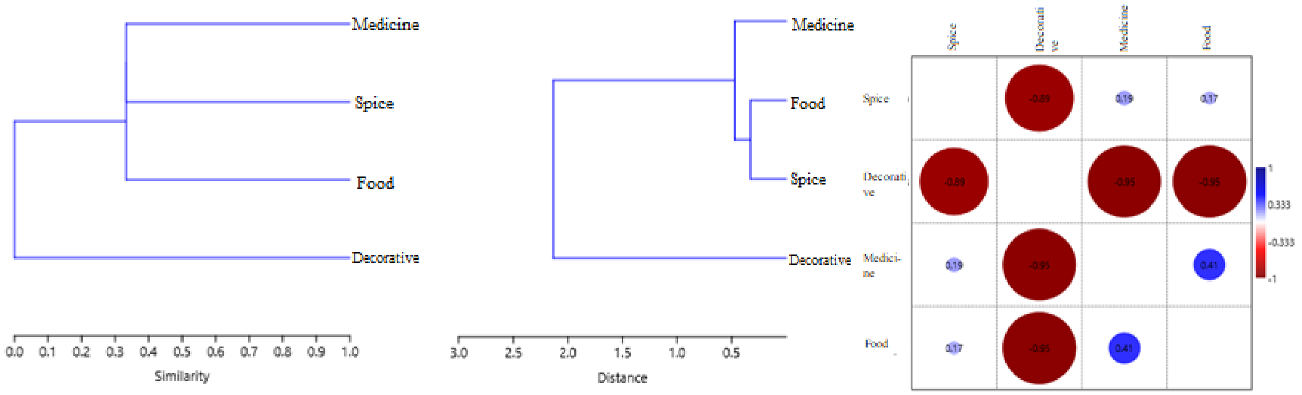
Plant utilization	Manjahlega						Mekarjaya					
	Number of species	Indiv.	Number of families	H'	E	D_{mg}	Number of species	Indiv.	Number of families	H'	E	D_{mg}
Ornamental	710	16862	122	4.95	0.75	107.6	552	7985	98	4.93	0.78	61.32
Medicine	41	1622	27	2.68	0.74	9.40	19	634	15	1.64	0.56	2.79
Spice	37	2322	13	2.67	0.73	4.90	19	710	11	2.18	0.70	3.21
Food	39	1580	26	3.17	0.85	9.73	86	1373	40	3.38	0.76	11.65

Notes: H': Shannon-winner's diversity index, $D_{mg:}$ Margalef richness index, E: Evenness index

Table 2. Important value index

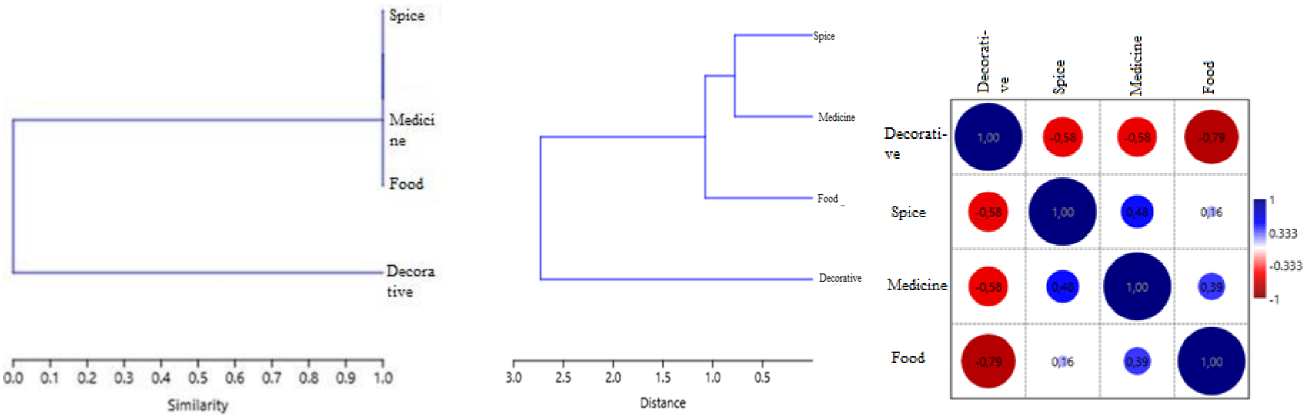
Village | Family | Scientific name	Common name	Local name	IVI
Ornamental plants			
Manjahlega Village			
Apocynaceae			
Plumeria alba L.	White frangipani	*Kamboja putih*	26.51
Myrtaceae			
Syzygium myrtifolium Walp.	Red lip	*Pucuk merah*	23.22
Kirkiaceae			
Kirkia acuminata Oliv.	White seringa	-	21.24
Mekarjaya Village			
Acanthaceae			
Thuja occidentalis L.	Northern white cedar	*Cemara kipas*	61.94
Polypodiaceae			
Platycerium bifurcatum (Cav.) C.CHr.	Staghorn fern	*Paku tanduk rusa*	30.23
Araceae			
Aglaonema commutatum Schott	Chinese evergreen	*Sri rejeki*	13.83
Medicine plants			
Manjahlega Village			
Oxalidaceae			
Averrhoa carambola L.	Star fruit	*Belimbing*	45.50
Gnetaceae			
Gnetum gnemon L.	Gnemon tree	*Melinjo*	44.73
Zingiberaceae			
Curcuma longa L.	Turmeric	*Kunyit*	30.82
Mekarjaya Village			
Asphodelaceae			
Aloe vera (L.) Burm.f.	Barbados aloe	*Lidah buaya*	95.85
Piperaceae			
Piper betle L.	Betel vine	*Sirih hijau*	31.46
Piper ornatum N.E.Br.	Red betel	*Sirih merah*	20.45
Spice plants			
Manjahlega Village			
Myrtaceae			
Syzygium polyanthum (Wight) Walp.	Indonesian bay leaf	*Salam*	85.21
Pandanaceae			
Pandanus amaryllifolius Roxb.	Scented pandan	*Pandan*	37.62
Zingiberaceae			
Curcuma longa L.	Turmeric	*Kunyit*	23.34
Mekarjaya Village			
Pandanaceae			
Pandanus amaryllifolius Roxb.	Scented pandan	*Pandan*	43.60
Solanaceae			
Capsicum frutescens L.	Chilli pepper	*Cabai Rawit*	41.91
Zingiberaceae			
Zingiber officinale Roscoe	Ginger	*Jahe*	24.73
Food plants			
Manjahlega Village			
Anacardiaceae			
Mangifera indica L.	Mango	*Mangga*	68.04
Myrtaceae			
Syzygium aqueum (Burm.f.) Alston	Water apple	*Jambu air*	25.60
Amaryllidaceae			
Cnidoscolus aconitifolius (Mill.) I.M.Johnst.	Chaya	*Pepaya Jepang*	18.29
Mekarjaya Village			
Anacardiaceae			
Mangifera indica L.	Mango	*Mangga*	28.92
Rosaceae			
Fragaria x ananassa Duchesnes	Strawberry	*Stroberi*	22.47
Moraceae			
Artocarpus altilis (Parkinson) Fosberg	Breadfruit	*Sukun*	18.51

Note: IVI: Important Value Index



A B C

Figure 2. A. Dendogram of Manjahlega home gardens utilization based on Jaccard Similarity Index, B. Euclidean Index, and C. Tetrachoric Correlation. Notes: Blue circle: Positive correlation, red circle: Negative correlation



A B C

Figure 3. A. Dendogram of Mekarjaya home gardens utilization based on Jaccard Similarity Index, B. Euclidean Similarity Index, and C. Tetrachoric Correlation. Notes: Blue circle: Positive correlation, red circle: Negative correlation

On the other hand, there is a negative correlation value between utilization categories, namely between the ornamental plant and the others. We assumed that the negative correlation between ornamental plants and food plants is due to the relatively different people's goals in growing ornamental and food plants. According to Romano et al. (2022), the number of edible ornamental plant species varies but is uncertain. The order of negative correlations is ornamental-food, ornamental-medicine, and ornamental-spice. We estimated the negative correlation between ornamental and food plants because the people's goals in growing ornamental plants and food plants are relatively different.

Mekarjaya Village

The tetrachoric correlation analysis shows that the highest value obtained is in the correlation between medicinal and spice plants, with a value of 0.475. This result means the correlation between medicinal and spice plants is positive because it is close to value 1. This correlation shows that many spice plants have multiple uses as medicinal plants. There is also a correlation with the lowest value, namely the ornamental and spice plants, with a value of -0.581. This result means that ornamental plants negatively correlate with spice plants because they are close to -1.

The order of correlation in the home gardens utilization from the largest to the smallest value, namely spices-medicines is 0.48, medicines-food is 0.39, and spices-food is 0.16. Several medicinal-spice plants found include the Zingiberaceae family, namely *Curcuma longa* L., *Zingiber officinale* Rosc., *Kaempferia galanga* L., and *Alpinia galanga* (L.) Sw. Several food and medicinal plants found include *Averrhoa carambola* L. and *Morinda citrifolia* L., whose fruits were used to prevent several diseases. Medicinal plants are used for their treatment and have been identified and used long ago to improve the sensory characteristics of food (Nieto 2020). One spice-food plant found is *Citrus x limon* L.

A negative correlation exists between ornamental plants and the other use categories, namely ornamental-medicine, ornamental-food, and ornamental-spice. The inedible ornamental includes *Dendrobium cumulatum* Lindl, *Chrysanthemum indicium* L., *Rosa* sp., *Alocasia* sp., *Hibiscus* *rosa-sinensis* L., *Begonia* sp., and *Lilium longiflorum* Thunb.

According to the selection of home garden plants, ornamental plants dominate compared to food plants, medicines, and spices. If the home gardens are intended to reduce dependence on imported food supplies from outside the area or abroad, then implementing urban farming through the home gardens is inappropriate. People tend to select plants as ornamental to provide beauty, more green, and aesthetic to their homes. With their lifestyle, urban people tend to meet their food needs in traditional and modern markets. Apart from that, more accessible access and having vehicles to markets or shops provide a quicker and easier option than planting and caring for plants. Technological developments make getting food, spices, and medicines easy through online purchases and delivery orders, so urban people do not need energy to access food. Even though they have a home garden, carbon is still produced through vehicles. Therefore, reducing the carbon footprint as one of the goals of urban farming is ineffective. However, home gardening can support carbon absorption and reduce air temperature. So, ornamental plants in urban farming impact a green environment.

Besides, using plants, such as fruits and rhizomes, requires time until they are mature/ready to harvest. Even though these plants are planted and well maintained, they are not used as the primary source of subsistence, considering production limitations. The need for foods, spices, and fruits is higher because they are used daily, while plant productivity requires a certain period. Meanwhile, fruits have various nutritional and health benefits, so people choose fruits depending on the benefits they need. People choose berries for the antioxidants. Besides, fruit planting can save household expenses, so the higher use of fruits in home gardens provides better economic, health, and environmental benefits.

Jaccard and Euclidean similarity analyses also show that people create home gardens to provide aesthetic value and beauty to the house. The trend of ornamental plants during the COVID-19 pandemic also influenced the plant preference. People are required to work from home, so they spend their time at home. They were collecting ornamental plants to fill their free time or eliminate boredom. Many ornamental plants in the home gardens cannot contribute to local food production and consumption.

Supporting urban farming for food security is more effectively applied in households that use aquaponic, hydroponic (Wahdah and Maryono 2018), and vertical gardens (Koscica 2014). The problem of limited land has always been a problem for people who live in densely populated urban areas. Therefore, maximizing every inch of home space and using the correct type of farm (Andini et al. 2021) is a must. Urban farming can help in food security at the household level. Food security can be seen from food availability because households can independently fulfill their food independence (Fauzi et al. 2019; Said and Nurjaman 2020; Yusida et al. 2021; Kusumawati et al. 2022).

When viewed from an environmental aspect, home gardening can provide supporting services, such as absorbing rainwater to reduce the risk of flooding. Food plants that are dominated by fruits can also contribute to wildlife conservation. Fruit plants tend to flower more to produce fruit. Besides, ornamental plants are usually chosen because of flowers' beauty. A blooming flower can provide food for pollinators, such as bees, butterflies, and nectar bird feeders. Some fruit plants also provide fruits for bats. Pollinators can also help pollinate plants, so indirectly, collecting or planting flowering plants contributes to preserving home gardens in the city. Urban farming supports biodiversity by providing wildlife habitat. Home gardening also can be a life support for the environmental ecosystem. Urban agriculture could reduce the urban heat island effect, improve local air quality, improve stormwater quality (and reduced quantity), increase pollinator populations, and provide climate mitigation services, such as carbon sequestration (Harrison and Winfree 2015; Kulak et al. 2016).

In conclusion, ornamental plants dominate the home gardens in Rancasari Sub-district. Home gardens tend to provide aesthetic value and beauty rather than producing food, medicines, and spices in the household. Implementing urban farming through home gardening is not yet fully effective in supporting urban farming in the city of Bandung.

ACKNOWLEDGEMENTS

Acknowledgements are given to the Rector of Universitas Padjadjaran, Indonesia through Academic Leadership Grant (ALG) by Prof. Dr. Oekan S. Abdoellah, MA, Ph.D., *Direktorat Riset dan Pengabdian pada Masyarakat* (DRPM) Universitas Padjadjaran, PUIPT CESS (*Pusat Unggulan IPTEK Perguruan Tinggi* Center of Environment and Sustainable Science) Padjadjaran University, researcher team, surveyor team, and the local community.

REFERENCES

Andini M, Dewi OC, Marwati A. 2021. Urban farming during the pandemic and its effect on everyday life. Intl J Built Environ Sci Res 5 (1): 51-62. DOI: 10.24853/ijbesr.5.1.51-62.

Arikunto S. 2010. Research Procedures A Practical Approach. Rineka Cipta. Jakarta. [Indonesian]

Atmaja J, Yanagihara M, Fukushi K. 2020. Geospatial valuation of urban farming in improving cities resilience: A case of Malang City, Indonesia. Intl Arch Photogramm Remote Sens Spatial Inform Sci XLIII-B5-2020: 107-113. DOI: 10.5194/isprs-archives-XLIII-B5-2020-107-2020.

Contesse M, van Vliet BJM, Lenhart J. 2018. Is urban agriculture urban green space? A comparison of policy arrangements for urban green space and urban agriculture in Santiago de Chile. Land Use Policy 71: 566-577. DOI: 10.1016/J.LANDUSEPOL.2017.11.006.

Croat TB. 2019. Araceae, a family with great potential. Ann Missouri Bot Gard 104 (1): 3-9. DOI: 10.3417/2018213.

DiDomenica B, Gordon M. 2016. Food policy: Urban farming as a supplemental food source. J Soc Change 8 (1): 1-13. DOI: 10.5590/JOSC.2016.08.1.01.

Elmqvist T, Andersson E, Frantzeskaki N, McPhearson T, Olsson P, Gaffney O, Takeuchi K, Folke C. 2019. Sustainability and resilience for transformation in the urban century. Nat Sustain 2: 267-273. DOI: 10.1038/s41893-019-0250-1.

Fauzi AR, Warid W, Maulidian M. 2019. Community partnership program: Dissemination of urban farming technology for community of Jatinegara west flats. J Soc Dedication 3 (1): 19-26. DOI: 10.21111/ku.v3il.2640.
Harrison T, Winfree R. 2015. Ecology of organisms in urban environments: Urban drivers of plant-pollinator interactions. Funct Ecol 29 (7): 879-888. DOI: 10.1111/1365-2435.12486.
Jiang TA. 2019. Health benefits of culinary herbs and spices. J AOAC Intl 102 (2): 395-411. DOI: 10.5740/jaoacint.18-0418.
Jonck AV, Ribeiro JMP, Berchin II, Perini FC, de Andrade Guerra JBSO. 2018. Urban agriculture practices as initiatives for mitigation and adaptation to climate change. Possibilities for urban farms in a South American City. In: Alves F, Leal Filho, W, Azeiteiro U (eds). Theory and Practice of Climate Adaptation. Climate Change Management. Springer International Publishing, Cham. DOI: 10.1007/978-3-319-72874-2_28.
Kaufman J, Bailkey M. 2000. Farming Inside Cities: Entrepreneurial Urban Agriculture in the United States. Lincoln Institute, Madison.
Kusumawati A, Sinaga GAD, Kurniawan Y, Aminy NA, Ruminar H. 2022. Community voices on the urban farming movement during the COVID-19 pandemic: A reflective studies. Agric Soc Econ J 22 (1): 15-22. DOI: 10.21776/ub.agrise.2022.022.1.3.
Koscica M. 2014. The role of urban agriculture in addressing food insecurity in developing cities. J Intl Aff 67 (2): 177-186.
Kulak M, Graves A, Chatterton J. 2016. Reducing greenhouse gas emissions with urban agriculture: A life cycle assessment perspective. Landsc Urban Plan 111: 68-78. DOI: 10.1016/j.landurbplan.2012.11.007.
Lee G-G, Lee H-W, Lee J-H. 2015. Greenhouse gas emission reduction effect in the transportation sector by urban agriculture in Seoul, Korea. Landsc Urban Plan 140: 1-7. DOI: 10.1016/j.landurbplan.2015.03.012.
Granceri M. 2019. Urban regeneration. A manifesto for transforming UK Cities in the age of climate change. Urban Rest Pract 12 (3): 298-300. DOI: 10.1080/17535069.2019.1639380.
Said NSTNA, Nurjaman A S. 2020. Policy food security urban area improvement program through urban farming in Malang. J Local Gov Issues 3 (1): 37-49. DOI: 10.22219/logos.v3i1.11100.
Nieto G. 2020. How are medicinal plants useful when added to foods?. Medicines 7 (9): 58. DOI: 10.3390/medicines7090058.
Olsson EGA, Kerselaers E, Kristensen LS, Primdahl J, Rogge E, Wästfelt A. 2016. Peri-urban food production and its relation to urban resilience. Sustainability 8 (12): 1340. DOI: 10.3390/su8121340.
Prasada IY, Masyhuri M. 2019. The conversion of agricultural urban areas (Case study of Pekalongan City, Central Java). Agraris J Agribus Rural Dev Res 5 (2): 112-117. DOI: 10.18196/agr.5280.
Pulighe G, Lupia F. 2019. Multitemporal geospatial evaluation of urban agriculture and (non)-sustainable food self-provisioning in Milan, Italy. Sustainability 11 (7): 1846. DOI: 10.3390/su11071846.
Rezai G, Shamsudin MN, Mohamed Z. 2016. Urban agriculture: A way forward to food and nutrition security in Malaysia. Procedia Soc Behav Sci 216: 39-45. DOI: 10.1016/j.sbspro.2015.12.006.
Romano D, La Fornara G, Toscano S. 2022. The edible ornamental plants: a resource for urban Mediterranean horticulture. Acta Hortic 1345: 57-64. DOI: 10.17660/ActaHortic.2022.1345.8.
Shen L, Chen S, Liang M, Qu S, Feng S, Wang D, Wang G. 2023. Comparative analysis of codon usage bias in chloroplast genomes of ten medicinal species of Rutaceae. Res Sq. Preprint. DOI: 10.21203/rs.3.rs-2764098/v1.
Uebersax JS. 2015. Introduction to the Tetrachoric and Polychoric correlation coefficients. www.john-uebersax.com.
Wahdah L, Maryono M. 2018. Urban farming management system in Semarang City. E3S Web Conf 73: 03023. DOI: 10.1051/e3sconf/20187303023.
Wang T, Pryor M. 2019. Social value of urban rooftop farming: A Hong Kong case study. In: Kulshreshtha SN (eds). Agricultural Economics. IntechOpen, London, England. DOI: 10.5772/intechopen.89279.
Yusida E, Maulidin AF, Puspaningrum A. 2021. Community movement in independent vegetable growing to increase household food security during the pandemic. J Interdiscip Soc Econ Community Stud 1 (1): 12-19. DOI: 10.21776/jiscos.ub.01.01.02.
Zach. 2020. What is Tetrachoric Correlation? Statology. Available at https://www.statology.org.