

# Plants diversity and socioecological functions of homegarden in Sundanese rural area: A case in Sumedang District, West Java, Indonesia

OPAN S. SUWARTAPRADJA<sup>1,\*</sup>, JOHAN ISKANDAR<sup>2</sup>, BUDIAWATI S. ISKANDAR<sup>1</sup>, DEDE MULYANTO<sup>1</sup>, SUROSO<sup>3</sup>, DEDEDEN NURJAMAN<sup>4</sup>, FEJIH FATHIMAH NISYAPURI<sup>2</sup>

<sup>1</sup>Department of Anthropology, Faculty of Social and Political Sciences, Universitas Padjadjaran. Jl Raya Bandung-Sumedang Km21, Jatinangor, Sumedang 45363, West Java, Indonesia. Tel./Fax.: +62-22-7796974. \*Email: opan.suwartapradja@unpad.ac.id

<sup>2</sup>Department of Biology, Faculty of Mathematics and Natural Science, Postgraduate of Environmental Science, and Center for Environment and Sustainability Science, Universitas Padjadjaran. Jl. Sekeloa Selatan 1, Bandung 4034, West Java, Indonesia

<sup>3</sup>Graduate program of Environmental Science, Universitas Padjadjaran. Jl. Dipati Ukur No.35, Bandung 40132, West Java, Indonesia

<sup>4</sup>Universitas Halim Sanusi. Jl. Garut No. 2, Kacapiring, Bandung 40271, West Java, Indonesia

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**Abstract.** Suwartapradja OS, Iskandar J, Iskandar BS, Mulyanto D, Suroso, Nurjaman D, Nisyapuri FF. 2023. *Plants diversity and socioecological functions of homegarden in Sundanese rural area: a case in Sumedang district, West Java, Indonesia. Biodiversitas 24: 156-175.* Homegarden is one of the traditional agroforestry systems in Indonesia, which is traditionally planted with various annual and perennial plants. It has provided social, economic, cultural, and ecological functions. The objective of this study is to elucidate the vegetation structure and function of the homegarden system of two groups of rural communities who are affected by the development project of Jatigede Dam, Sumedang, West Java. The first community group of residents who lost their village, their homegarden, and another agricultural land due to the Jatigede dam and settled in new resettlement provided by the local government in Cihegar Mekar Hamlet. The second community group, residents living in the neighboring Kampung Cihegar Mekar, whose settlements and homegarden were not inundated by the Jatigede Dam, but the Jatigede Dam inundated their agricultural lands. Qualitative and quantitative methods were used with an ethnobotanical approach. The results showed that the diversity of species of the homegarden of Cihegar Mekar and Ciboboko Hamlets affected by the Jatigede dam project was high. In Cihegar Hamlet, the number of species, genera, and family in 2018 and 2022 was recorded at 63 and 155, 58 and 130, and 39 and 59, respectively. While in Ciboboko, Hamlet in 2018 and 2022 recorded the number of species, genera, and family at 81 and 144, 76 and 114, and 44 and 55, respectively. These variables have significantly increased in the past 4 years (2018-2022). The residents are intensifying the cultivation of their homegarden because other agricultural land types, such as wet-rice fields, have been dramatically reduced or even lost due to inundation by the Jatigede dam. The 224 plant species found in the homegarden consist of 127 (56.70%), 30 (13.39%), 27 (12.05%), and 13 (5.80%) ornamental, fruit, vegetable, and spice species. At least 20 species and varieties (landraces) of the homegarden have been considered to fulfill the daily household need, and some surpluses are sold to obtain household income. So, the high diversity of plant species in the village homegarden has essential functions to support food security and the population well-being of those affected people of the development project of Jatigede Dam. Homegardens appear to be an important strategy for attaining the rural development program and can be accomplished with proper planning.

**Keywords:** Dam, ethnobotany, homegarden, plant diversity, Sundanese

## INTRODUCTION

Homegarden is one of the traditional agroforestry types that has long been practiced in various rural areas across cultures in Indonesia, including other countries (Kaswanto and Nakagoshi 2014; Sujarwo and Caneva 2015; Gbedomon et al. 2017; Mellisse et al. 2018; Agustina et al. 2019; Castaneda-Navarette 2021; Gerny et al. 2021; Ivanova et al. 2021; Mulia et al. 2022; Roy et al. 2022; Thangjam et al. 2022). Rural homegarden systems are established with a mixture of various species of plants, including trees, shrubs, vines, and agricultural crops, in association with or without livestock, within small landholding around or adjacent to the home (Galhena et al. 2013; Kuswanto and Nakagoshi 2014; Sujarwo and Caneva 2015; Alcudia-Aguilar et al. 2018; Sharma et al. 2022).

The rural homegarden systems have various social, economic, cultural, and ecological functions (Galhena et al. 2013; Gbedomon et al. 2017; Kumar and Tiwari 2017; Alcudia-Aguilar 2018; Meillisse et al. 2018; Paebonan et al. 2018; Park et al. 2019; Kewessa 2020; Asfaw and Zewodi 2021; Sharma et al. 2022; Thangjam et al. 2022). Economically, it has a subsistence, commercial, or intermediate function, which implies that various species of plants can be harvested to meet the daily needs of the residents. The edible food plants contain carbohydrates, proteins, vitamins, and minerals that play an essential role in overcoming hunger and poverty in rural areas. Based on the study of food ecology, for example, an Indonesian homegarden can contribute about 10.8% of the calories and 5.9% of the protein in daily household intake. In addition,

it can contribute up to 126.4% of the RDA vitamin A and up to 22.8% of Vitamin A and C (Christanty 1990).

In terms of commercial and economic function, the surplus of production of various homegarden plants, such as fruits, can be sold to generate cash as a household income source. While the sociocultural functions of the homegarden, including part of the front of the house, are culturally used for social interaction, socializing, playing with children, and carrying out traditional ceremonies (Achmad et al. 1978; Masriah et al. 2019). Meanwhile, the system also has various ecological functions, such as the conservation of multiple plant species, carbon sequestration, enhanced soil fertility, water quality supply, control of pests and diseases, animal habitat conservation, climate regulation, and aesthetic features (Iskandar et al. 2018).

The rural people manage the traditional homegarden using an organic farming system, Low External Inputs, and Sustainable Agriculture (LEISA). Various inputs of the homegarden farming system, including local plant varieties, organic fertilizers, and biopesticides, have been obtained from the village instead of buying from the market (external). Therefore, in managing the homegarden, the rural people maximize internal inputs and minimize external inputs from outside, known as practicing the LEISA (Reijntjes et al. 1992).

The system in rural areas is not static but dynamic due to various biophysical and socioeconomic cultural changes, including human population density and intensive penetration of the market economy system. The size becomes narrow due to the human population increase, and various species are converted into a monoculture system, such as commercial vegetables and fruit. Consequently, there is a change in the input system, such as modern plant varieties, inorganic fertilizers, and synthetic chemical pesticides, by buying from the market instead of using various inputs, such as local plant varieties, organic fertilizers (compost and animal manure), and biopesticides that are predominant in the rural ecosystem. In other words, the traditional homegarden system with LEISA practice was changed to a modern homegarden by practicing the Height External Inputs (HEI). That causes the weakening or loss of various ecological functions in rural ecosystems.

Some research on the homegarden in rural communes that are not affected by development projects, including dam project development in West Java and other rural areas, has been conducted (Swandayani et al. 2016; Alelang et al. 2018; Hakim and Hong 2018; Hakim et al. 2018; Paembonan et al. 2018; Prihatini et al. 2018; Silalahi and Nisyawati 2018; Wakhidah et al. 2020; Irham et al. 2021). However, research on the homegarden system in rural communities affected by dam development is still rare. The study can contribute to an understanding of the construction of structure and functions of the rural homegarden of the new settlements affected by the Jatigede dam and compared to existing neighboring homegarden of a rural community that is not affected by losing their settlement and their homegarden. However, the disadvantage of this research is that the baseline data on the original homegarden of the affected have disappeared due

to being inundated by the Jatigede dam. So, for comparison with the former homegarden system before inundating dam, the neighboring homegardens that were not inundated by the Jatigede dam have been used. The loss of the homegardens may significantly impact the affected resident negatively because the homegardens have an important role in socioeconomic and culture in rural communities. In addition, the high diversity of plant species in rural homegarden ensures continuous production of fruits, vegetables, spices, medicinal, and cash crops. Based on some studies of the homegarden in Indonesia, the contribution income to income through the marketing of homegarden product range from less than 5% to over 50% (Christanty 1990).

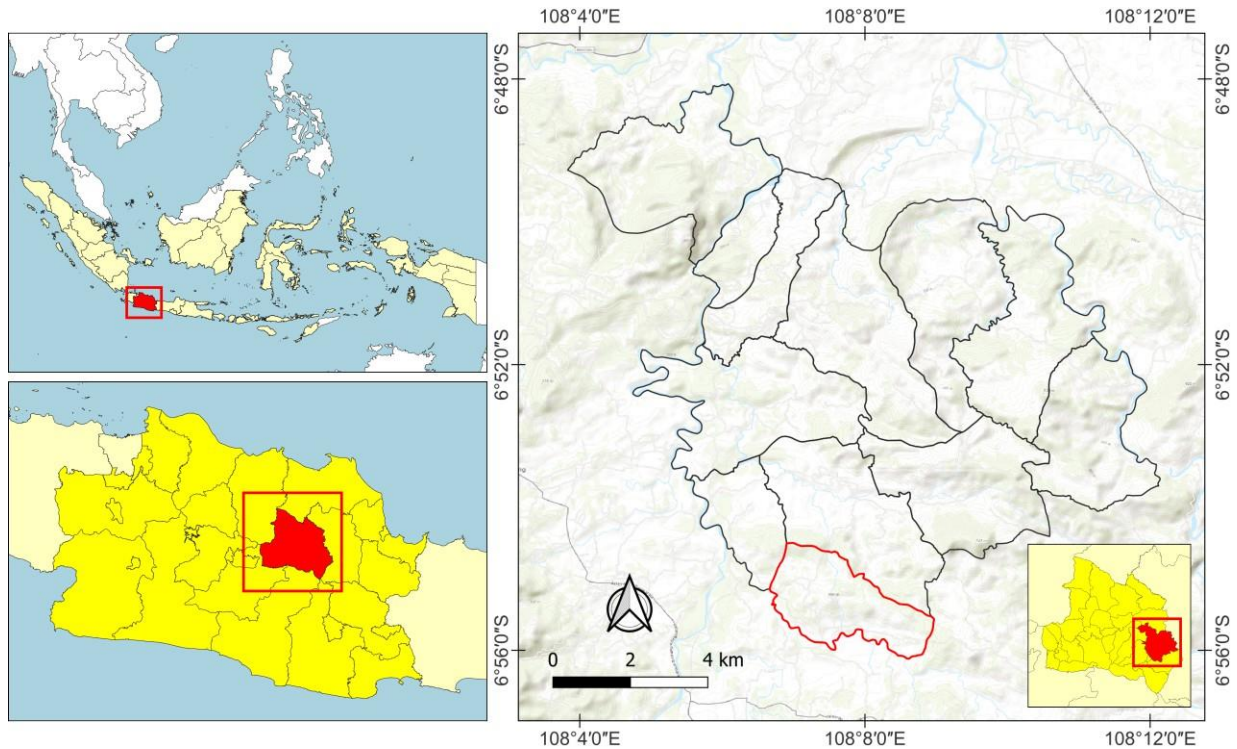
Biophysical and socio-economic-cultural factors, including homegarden size, altitude, population density, and cash crop, may influence the plant diversity of the homegarden (Christanty et al. 1986; Iskandar and Iskandar 2016). The homegarden size, for example, the larger homegarden, the greater the number of plant species. The altitude factor is greater diversity in lowland areas than in upland areas. The population density is high population there is a tendency to grow cash crops; therefore, the diversity of plants in the homegarden is reduced. While the cash crops, that is, the number of vertical layers and the number of crop species, are less when cash crops predominate.

The consequence of the inundation of Jatigede Dam has been predicted may affect the vegetation structure and function of the homegarden of the community of new settlement of affected people and the existing homegarden of non-affected people. The homegarden plants of the affected people of Cihegar Mekar who were relocated to a new village after 4 years (2018-2022), while were homegardens of Ciboboko, Mekarasih Village, were selected because it is a neighbor of Cihegar Mekar Village, inhabited by local people, not moving from other areas. However, the agricultural land types, such as wet-rice fields and gardens or mixed gardens, are partially or completely inundated by the Jatigede dam.

## MATERIALS AND METHODS

### Study location

This study was conducted in Cihegar Mekar and Ciboboko Hamlet, Mekarasih Village, Jatigede Sub-district, Sumedang District, West Java Province, Indonesia. Cihegar Mekar Hamlet is located at coordinates 6°55'18.55" S and 108° 7'11.66" E. Meanwhile, Ciboboko Hamlet is located at coordinates 6°55'43.97" S and 108° 7'25.15" E, as depicted in Figure 1. Nowadays, Cihegar Mekar Hamlet of Mekar Asih Village is occupied by displaced residents of another village, Cihideung Village, Darmaraja Sub-district of Sumedang District, affected by the Jatigede dam development. However, Coboboko Hamlet of Mekar Asih Village was resided by the local community, their settlement was not inundated by Jatigede Dam (Figure 2).



**Figure 1.** Study area in Cihegar Mekar and Ciboboko Hamlets, Mekarasih Village, Jatigede Sub-district, Sumedang District, West Java, Indonesia



**Figure 2.** Part of Mekarasih Village and several other villages in Jatigede Sub-district, Sumedang District, West Java, Indonesia were submerged by Jatigede inundation

Cihegar Mekar was selected as the study area considered representative of the new homegarden in the new resettlement of the affected people. In contrast, Ciboboko was considered representative of the initial homegarden of the non-affected people of Jatigede Dam in the District of Sumedang, West Java Province. The vegetation structure and functions of the home garden have been predicted mainly influenced by the socioeconomic background of the owners, namely the affected and non-affected Jatigede Dam Development.

Currently, the remaining land in Mekarasih Village is approximately 600 hectares, consisting of 200 hectares of

semi-irrigated rice fields and 200 hectares of land in the form of gardens and mixed-gardens (*talun*) system, settlements of approximately 190 hectares and public facilities, about 10 hectares. Meanwhile, the area of Cihegar Mekar Hamlet consists of 10 and 5 hectares of land and settlements, while the area of Dusun Ciboboko is approximately 220 hectares.

Cihegar Mekar Hamlet is a new village inhabited by residents affected by the Jatigede dam development, and they settled in the village in 2016 after the flood in 2015. Ciboboko Village, a neighbor of Cihegar Mekar Hamlet, was not inundated, and the residents were unaffected. The

villages are located about 700 meters from the edge of Lake Jatigede.

### Data collection

The qualitative and quantitative methods were used with the ethnobotanical approach (Albuquerque et al. 2014; Araujo et al. 2014; Iskandar 2018). The number of respondents in Cihegar Mekar and Ciboboko Hamlet is based on the total census. The total number of households in Cihegar Mekar is 51; however, 8 households moved to other areas, and their house has been abandoned. As a result, the total respondents of Cihegar Mekar have selected 43 heads of households. While the total number of respondents in Ciboboko was selected 34 heads of households have homegardens. Based on 43 homegarden samples of Cihegar Mekar, the homegarden sizes are similar, on average 140 m<sup>2</sup>. That is because the local government provided the land for the new resettlement, as village land (*Tanah Kas Desa=TKDP*) distributed for each household got the same size of land. In comparison, each of the total 34 respondents in Ciboboko has various sizes of homegarden, on average between 90 m<sup>2</sup> and 100 m<sup>2</sup>. That is because their homegardens have been obtained by individual households, by various means, including inheritance from their parents. Residents who live in the new resettlement of Cihegar Mekar are originally residents from another village, Leuwihideung Village, Darmaraja Sub-district, where the Jatigede dam inundated all settlement land and agricultural land. Meanwhile, the Coboboko residents are originally from the Mekarasih village, Jatigede Sub-district, whose village was not inundated by the Jatigede Dam, but their agricultural lands were inundated.

As a first approach to botanical research, consent seeking, rapport building, and ethical considerations are critical steps. A special letter was made by the Padjadjaran University and submitted to the head village of Mekarasih, Jatigede, Sumedang, to obtain permission. In addition, permission was always asked to conduct interviews with each informant, including surveying plant species of the homegarden for all respondents. Each species and the number of individuals of each homegarden of respondents were recorded. Moreover, to identify the plant species of the homegarden plants, several plant identification books were used, including Van Steenis (2008).

Semi-structured interviews were employed with each respondent to determine the function of each plant. The informants considered competent were selected by purposive methods, such as old male and female farmers, local informal leaders, and village and hamlet heads. In semi-structured interviews, respondents and informants responded intensively to a series of questions. Some were prepared in advance, while others arose naturally during the conversation.

The research was conducted in 2 periods in November-December 2018, three years after being inundated by the Jatigede Dam. Some villages were inundated by the Jatigede dam in 2015. At the same time, the new resettlement of the affected resident was built in 2016. Therefore, the perennial crops, particularly fruits of the

new-resettlement homegardens, had not yet been produced before two years. As a result, the real total crop production of the annual and perennial crops of the new resettlement homegarden cannot be analyzed. Moreover, six years after inundation, in August-September 2022, the re-conducted study by considering the structures and functions of the homegardens of the new resettlement that are already stable, including the area of the field study of homegarden in the new resettlement and neighboring new settlement.

### Data analysis

The qualitative data obtained from the interview as transcript interview, the field observation data, the village statistical data, and research reports, including the Environmental Impacts Assessment (EIA) of the Jatigede Dam Development Project, were analyzed by crosschecking, summarizing, synthesizing, and making a narrative as descriptive and evaluative analysis (Newing et al. 2011; Iskandar 2018). Crosschecking was conducted by checking the data obtained from each informant's information, the direct field observations, and the EIA reports. Moreover, the data crossed or validated is summarized, synthesized, and made into a narrative descriptive and evaluative analysis.

The dominant plant species were analyzed using the index of SDR (Summed Dominant Ratio) (Iskandar and Iskandar 2016). The formula for the index of SDR is:

$$SDR = \frac{FR + DR}{2}$$

$$FR = \frac{\text{Frequency of a certain plant species} \times 100\%}{\text{Total frequency of total plant species}}$$

$$DR = \frac{\text{Individual of certain plant species} \times 100\%}{\text{Total individuals of plants species}}$$

Where:

F : Absolute frequency of certain plant species recorded in all plots of homegarden

Fr : Relative frequency

Dr : Relative dominance

One homegarden is considered a plot

SDR is the sum of relative frequency and relative dominance. Therefore, the plant species with a high SDR index means that this species has a high frequency or can be recorded in many samples and has a high number of individuals in the samples of the study area (Iskandar and Iskandar 2016).

## RESULTS AND DISCUSSION

### Plant diversity of home garden

Based on a survey of the homegarden plants, it can be seen in Figure 3 that the number of species, genera, and family of the homegarden plants in Cihegar Mekar in 2018 was documented at 63, 58, and 39, respectively. While in Ciboboko in 2018, the number of species, genera, and family

was recorded at 81, 76, and 44, respectively. The number of species, genera, and family of homegarden plants in Ciboboko is higher than those in Cihegar Mekar because the homegarden in Cihegar Mekar was established in 2016, one year after Jatigede Dam inundated some villages. Therefore, since the homegarden of Cihegar has been established relatively new, the number of species, genera, and family of the homegarden plant is lower. On the other hand, while the homegarden of Ciboboko is not a new settlement, it has been established for some decades, and the number of species, genera, and family of the homegarden is higher than those of Cihegar Mekar.

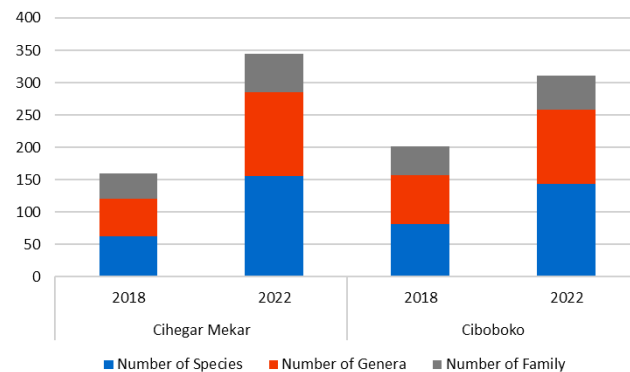
Four years later, in 2018, the homegarden plant re-survey was conducted in Cihegar Mekar and Ciboboko. It revealed that the number of species, genera, and family of the homegarden plants in Cihegar Mekar was recorded at 155, 130, and 59, respectively. While the number of species, genera, and family of the homegarden plants in Ciboboko were documented at 144, 114, and 53, respectively (Figure 3), more detail of plant species is presented in Table 1. Figure 3 shows that the number of species, genera, and family of the homegarden plants of Cihegar Mekar are higher than those of Ciboboko.

Undoubtedly, the number of species, genera, and family of the homegarden plants in both Cihegar Mekar and Ciboboko increased. However, even the number of species, genera, and family of the homegarden plants are higher than those of Ciboboko. Many factors, including biophysical and socioeconomic factors, may cause it. Biophysical factors, for example, the average size of the homegarden of the Cihegar Mekar is higher than those of Ciboboko. Based on some ecology studies of the homegarden in Citarum Watershed, West Java, there is a positive correlation between the size of the homegarden and the species number of the homegarden plants (Christanty 1990; Karyono 1990, Iskandar and Iskandar 2016).

Regarding water availability, the Cihegar Mekar has an artesian well, while Ciboboko has only the traditional dug well. Therefore, during the dry season, various annual homegarden plants of Cihegar Mekar are given water, and those plants are growing well. Conversely, some annual homegarden plants are not given water due to lack of water. Regarding the social-economic aspect, the local government gave some subsidies, including fruit and vegetable seed crops. In addition, the cropping system management of the homegarden plants in Cihegar Mekar is more intensive than those of Ciboboko because the resident who lives in the new resettlement of Cihegar Mekar had moved from Cihideung Village that their settlement and homegarden and their agricultural land were inundated by Jatigede Dam. So, the production of their homegarden is considered as the main function of food supply and additional income. Therefore, the cause of cropping intensification of the homegarden was the increased number of species, genera, and family in Cihegar Mekar. Based on this study, it can be inferred that the structure of the plant community of the homegarden both in Cihegar Mekar and Ciboboko has changed over time that is influenced by biophysical and socioeconomic factors.

Generally, the plant species diversity recorded in Cihegar Mekar and Ciboboko has a high variety compared to other West Java areas. For example, in Hegarmanah and Cinatayan Villages, Sukabumi, West Java, recorded 40 species, consisting of 28 woody trees and 12 herbaceous vegetables, ornamentals, and weeds (Park et al. 2019). Meanwhile, the species of the homegarden plants in Sukapura Village, Bandung District, West Java, recorded 156 species representing 67 and 61 family in traditional and commercial garden systems (Prihatini et al. 2018). However, the plant species diversity in Cihegar Mekar and Ciboko Hamlet was lower than in Pujon Sub-district, Malang Regency, East Java, which recorded 447 species representing 94 family of trees, shrubs, herbs, palms, and climbers (Agustina et al. 2019). That is because the homegarden system is one of the agroecosystem types, which is influenced by physical and environmental factors such as soil fertility, altitude, and rainfall (Karyono 1990).

In addition, the vegetation structure and the functions of the homegarden are influenced by the socio-economic-cultural systems of the owner, such as education, income, the purpose of planting, and market economy (Iskandar and Iskandar 2016; Iskandar et al. 2018; Prihatini et al. 2018). Enriching the number of plant species in both hamlets is important for residents since they are affected by the Jatigede Dam development. Due to inundated agricultural land, they have reduced income from a farming system of wet-rice fields and gardens. Based on the socioeconomic study, the resident who lived in the new resettlement of Cihegar Mekar before Jatigede Dam inundated their original settlement documented that all of them had homegarden with an average size of 181 m<sup>2</sup>, and 9 households have homegarden and rice fields of average 0.2 ha (Suwartapradja et al. 2017). However, currently, they have only a homegarden in the new resettlement with an average size of 140 m<sup>2</sup>. Therefore, the residents of Cimekar Hegar rely heavily on income from producing various species of homegarden plants. In addition, some of them sometimes go to urban to get an off-farm job to get income for their household.



**Figure 3.** Number of species, genera, and family of home garden plants recorded in Cihegar Mekar and Ciboboko Hamlet, Jatigede, Sumedang, Indonesia in 2018-2022

### SDR index

Based on the analysis of the Summed Dominant Ratio (SDR) index, various plants species in Cihegar Mekar Hamlet in 2018 with a high SDR Index were recorded as *Allium fistulosum* (13.96), *Mangifera indica* (6.24), *Carica papaya* (5.17), *Nephelium lappaceum* (3.98), *Musa x paradisiaca* (3.17), *Apinia galanga* (2.86), *Capsicum annum* (2.53), *Manihot esculenta* (2.34), *Psidium guajava* (2.74), and *Zingiber officinale* (2.79). In 2022, the plant species with a high SDR Index are not much different, namely *Manihot eculeta* (6.34), *Mangifera indica* (5.28), *Zingiber officinale* (4.27), *Musa x paradisiaca* (4.86), *Nephelium lappaceum* (3.56), *Psidium guajava* (2.49), and *Allium fistulosum* (2.37). Meanwhile, in the Ciboboko Hamlet homegarden in 2018 and 2022, the plant species with high SDR Index were *Allium fistulosum* (21.90; 2.97), *Mangifera indica* (6.38; 3.32), *Capsicum annum* (3.19; 3.35), and *Curcuma longa* (2.19; 3.29) as indicated in Table 1 and Figure 4.

### The function of the homegarden

#### Subsistence and commercial production functions

The interview with informants revealed that various plants of the homegarden, both in Cihegar Mekar and Ciboboko, can be divided into subsistence and commercial. The subsistence function is that the various productions are not sold but are used to meet the household's daily needs. For example, based on the informants from the Cihegar Mekar and Ciboboko Hamlet, the 224 plant species can be grouped into staple food, vegetable, spice, vegetable and spice, fruit, ornamental, industrial, and medicinal. The

groups of plants with a high number of species are ornamental 127 (56.70%), fruit 30 (13.39%), vegetable 27 (12.05%), and spice 13 (5.80%), as depicted in Table 2 and Figure 5.

Most of these homegarden plants are used by residents to meet their daily needs in the form of additional staple food, such as *Manihot esculenta* Crantz, *Colocasia esculenta* (L) Schott; fruits: *Ananas comosus* (L) Merr, *Annona muricata* L, *Artocarpus heterophyllus* Lam, *Carica papaya* L, *Mangifera indica* L, *Averhoa carambola* L, *Musa x paradisiaca* L, spices: *Allium cepa* L, *A. fistulosum* L, *Kaempferia galangal* L, vegetables: *Amaranthus hybridus* Rottler ex Spreng; *Breynia androgyna* (L) Chakrab & NP Balakr, *Cucumis sativus* L., and traditional medicines: *Cymbopogon nardus* (L) Rendle, *Curcuma xanthorrhiza* D. Dietr as presented in Table 1.

The existence of carbohydrates, fruits, cooking spices, and vegetables causes residents to obtain food nutrients that are healthy, fresh, and rich in nutrients, such as calories, protein, and vitamins A and C, which can nourish the human body. In addition, the advantages of various medicinal plants that grow in the homegarden can be taken to maintain the community's primary health.

The surplus variety of garden plants is sold as commercial products. In addition, various homegarden plant species, such as *Musa x paradisiaca* L, *Nephelium lappaceum* L, *Artocarpus heterophyllus* Lam, *Capsicum annum* L, and *Zingiber officinale* Roscoe, are also commonly traded as presented in Table 3. Therefore, selling plant species can generate cash income for rural people (Paembonan et al. 2018; Iskandar et al. 2018).



**Figure 4.** Various plant species in the home garden which high SDR Index: A. *Mangifera indica*, B. *Mangifera indica*, *Carica papaya*, and *Musa x paradisiaca*, C. *Manihot esculenta* and *Carica papaya*, and D. *Zingiber officinale*

**Table 1.** Various Plant Species and its function and Summed Dominance Ratio (SDR) were recorded in Cihegar Mekar and Ciboboko Hamlet, Jatigede, Sumedang, Indonesia in 2018 and 2022

| Family         | Species   | Vernacular name  | Function                      |   | Summed Dominant Ratio (SDR) |      |          |      |
|----------------|---|--|-------------------------------|---|-----------------------------|------|----------|------|
|                |   |  | Plant part & main function    | Plant part & additional function            | Cihegar mekar               |      | Ciboboko |      |
|                |   |  |                               |   | 2018                        | 2022 | 2018     | 2022 |
| Asphodelaceae  | <i>Aloe vera</i> (L.) Burm.f.                                   | Lidah buaya  | All parts: ornamental         | Leaf: medicinal, fever, and nourishing hair | 0.59                        | 1.97 | 1.29     | 1.16 |
| Amaranthaceae  | <i>Alternanthera ficoidea</i> (L.) P.Beauv.                     | Kriminil   | All part: ornamental          |   | -                           | 0.26 | -        | -    |
|                | <i>Amaranthus blitum</i> L.                                     | Bayem  | Leaf: vegetable               |   | 0.39                        | -    | -        | -    |
|                | <i>Amaranthus hybridus</i> L.                                   | Bayem  | Leaf: vegetable               |   | -                           | 0.13 | -        | 0.67 |
|                | <i>Gomphrena globosa</i> L.                                     | Bunga sisik  | Flower: ornamental            | Leaf: low back pain                         | -                           | -    | -        | 0.16 |
| Amaryllidaceae | <i>Allium ampeloprasum</i> L.                                   | Bawang prei  | Leaf: spice, vegetable        |   | -                           | -    | 0.25     | -    |
|                | <i>Allium cepa</i> L.   | Bawang beureum   | Bulb: spice, vegetable        | Bulb, medicinal                             | -                           | -    | -        | 0.51 |
|                | <i>Allium fistulosum</i> L.                                     | Bawang daun  | Leaf: spice, vegetable        |   | 13.96                       | 2.37 | 21.9     | 2.97 |
|                | <i>Allium tuberosum</i> Rottler ex Spreng.                      | Bawang kucay   | Bulb: vegetable               |   | -                           | -    | -        | 0.72 |
|                | <i>Amaryllis</i> sp   | Lili   | All parts: ornamental         |   | -                           | 0.28 | -        | 0.2  |
|                | <i>Crinum asiaticum</i> L.                                      | Bakung besar   | Leaf, flower: ornamental      |   | -                           | 0.59 | -        | 0.48 |
| Anacardiaceae  | <i>Anacardium occidentale</i> L.                                | Jambu monyet   | Fruit: fruit                  | Leaf: vegetable                             | -                           | 0.58 | -        | 0.16 |
|                | <i>Mangifera indica</i> L.                                      | Buah, varieties (landraces): buah gajah, buah gedong gincu, buah simana lagi, buah aromanis, buah cengkir, buah golek. | Fruit: fruit                  |   | 6.24                        | 5.28 | 6.38     | 3.32 |
|                | <i>Spondias dulcis</i> G.Forst.                                 | Kadondong  | Fruit: fruit                  |   | -                           | 0.26 | -        | 0.71 |
| Annonaceae     | <i>Annona muricata</i> L.                                       | Nangka sirsak  | Fruit: fruit                  | Leaf: medicinal, fever                      | 0.65                        | 1.01 | 0.29     | 0.53 |
|                | <i>Annona squamosa</i> L.                                       | Srikaya  | Fruit: fruit                  |   | 0.32                        | 0.26 | -        | 0.16 |
|                | <i>Kenanga odorata</i> (Lam.) Hook.f. & Thomson                 | Kenanga  | Flower: ornamental            |   | 1.23                        | 0.13 | 0.5      | 0.16 |
|                | <i>Monoon longifolium</i> (Sonn.) B.Xue & R.M.K.Saunders        | Glodogan tiang   | All parts: ornamental         |   | -                           | -    | -        | 0.16 |
| Apiaceae       | <i>Apium graveolens</i> L.                                      | Seledri  | Leaf: ornamental              | Leaf: medicinal, high blood pressure        | 1.99                        | 1.52 | 0.93     | 2.19 |
|                | <i>Foeniculum vulgare</i> Mill.                                 | Adas   | Seed: medicinal               | All part: ornamental                        | -                           | 0.4  | -        | 0.48 |
| Apocynaceae    | <i>Adenium obesum</i> Roem. & Schult.                           | Adenium  | All part, ornamental          |   | -                           | 0.97 | -        | 1.49 |
|                | <i>Allamanda cathartica</i> L.                                  | Kembang endog  | All parts: ornamental         |   | -                           | 0.13 | 0.5      | 0.16 |
|                | <i>Asclepias curassavica</i> L.                                 |  | Flower: ornamental            |   | -                           | -    | -        | 0.16 |
|                | <i>Catharanthus roseus</i> (L.) G.Don                           | Tapak dara   | All part: flower              |   | -                           | 0.13 | -        | 0.2  |
|                | <i>Plumeria</i> sp.   | Kamboja  | Flower: ornamental            |   | 1.03                        | -    | 0.88     | -    |
|                | <i>Tabernaemontana divaricata</i> (L.) R.Br. ex Roem. & Schult. | Tabernaem  | All parts: ornamental         |   | -                           | -    | -        | 0.16 |
| Araceae        | <i>Aglaonema commutatum</i> Schott                              | Sri rejeki   | All parts: ornamental         |   | -                           | 0.79 | 1.1      | 2.49 |
|                | <i>Alocasia</i> sp.   | Taleus hideung gede  | Tuber: additional staple food |   | -                           | 0.13 | -        | -    |
|                | <i>Anthurium amnicola</i> Dressler                              | Anthurium.   | Flower: ornamental            |   | -                           | 0.21 | -        | -    |
|                | <i>Anthurium andraeanum</i> L.                                  | Kembang pitaloka   | Flower: ornamental            |   | 1.09                        | -    | -        | -    |
|                | <i>Anthurium crystallinum</i> Linden & André                    | Kuping gajah   | Leaf: ornamental              |   | -                           | 0.45 | -        | 0.49 |
|                | <i>Anthurium plowmanii</i> Croat                                | Gelombang cinta  | Leaf: ornamental              |   | -                           | 0.39 | 0.43     | 0.88 |
|                | <i>Anthurium salvinii</i> Hemsl.                                | Anthurium  | Leaf: ornamental              |   | -                           | -    | -        | 0.32 |

|               |  |                  |                               |      |      |      |      |
|---------------|--|------------------|-------------------------------|------|------|------|------|
|               | <i>Anthurium schlechtendalii</i> Kunth                           | Anthurium keris  | Leaf: ornamental              | -    | -    | -    | 0.2  |
|               | <i>Anthurium</i> sp.   | Anthurium        | Flower: ornamental            | -    | 0.13 | -    | -    |
|               | <i>Anthurium</i> sp.1  | Anthurium 2      | Flower: ornamental            | -    | -    | -    | 0.24 |
|               | <i>Caladium bicolor</i> (Aiton) Vent.                            | Keladi           | Leaf: ornamental              | -    | 0.59 | -    | 1.24 |
|               | <i>Colocasia esculenta</i> (L.) Schott                           | Taleus           | Tuber: additional staple food | 0.97 | 0.34 | 0.75 | 0.6  |
|               | <i>Dieffenbachia seguine</i> Schott                              | Cariang          | Leaf: ornamental              | -    | 0.13 | -    | 0.8  |
|               | <i>Dieffenbachia</i> sp.   | Cariang putih    | Leaf: ornamental              | -    | -    | -    | 0.16 |
|               | <i>Epipremnum aureum</i> (Linden ex André) G.S.Bunting           | Sirih gading     | All parts: ornamental         | -    | 0.13 | -    | 0.16 |
|               | <i>Monstera adansonii</i> Schott                                 | Janda bolong     | Leaf: ornamental              | -    | 0.39 | -    | -    |
|               | <i>Philodendron erubescens</i> K.Koch & Augustin                 | Taleus hideung   | All parts: ornamental         | -    | 0.13 | -    | 0.52 |
|               | <i>Syngonium podophyllum</i> Schott                              | Syngonium        | All parts: ornamental         | -    | 0.13 | -    | 0.4  |
|               | <i>Xanthosoma</i> sp.  | Taleus           | All parts: ornamental         | -    | -    | -    | 0.16 |
|               | <i>Zamioculcas zamiifolia</i> (Lodd.) Engl.                      | Daun dolar       | All parts: ornamental         | -    | 0.26 | -    | 1.05 |
| Araliaceae    | <i>Polyscias fruticosa</i> Harms                                 | Bunga nyamuk     | Flower: ornamental            | -    | 0.13 | -    | 0.9  |
|               | <i>Polyscias scutellaria</i> (Burm.f.) Fosberg                   | Mamangkokan      | Leaf: medicine                | -    | -    | -    | 0.39 |
|               | <i>Schefflera arboricola</i> (Hayata) Hayata ex Merr.            | Walisongo        | All parts: vegetable          | -    | -    | -    | 0.16 |
| Areaceae      | <i>Areca catechu</i> L.  | Jambe, Pinang    | Fruit: other, betel           | -    | -    | 0.25 | -    |
|               | <i>Chamaedorea seifrizii</i> Burret                              | Palem            | All part: ornamental          | -    | 0.13 | -    | 0.2  |
|               | <i>Cocos nucifera</i> L.   | Kalapa           | Fruit: spice                  | -    | 0.52 | 0.88 | 0.32 |
|               | <i>Dypsis</i> sp.  | Palem            | All parts: ornamental         | -    | -    | -    | 0.2  |
|               | <i>Dypsis lutescens</i> (H.Wendl.) Beentje & J.Dransf.           | Palem kuning     | All parts: ornamental         | 1.03 | 0.17 | -    | -    |
|               | <i>Livistonia</i> sp.  | Palem            | All parts: ornamental         | -    | -    | -    | 0.16 |
|               | <i>Phoenix dactylifera</i> L.                                    | Kurma            | All parts: ornamental         | -    | 0.13 | -    | 0.16 |
|               | <i>Pinanga</i> sp.   | Bingbin          | All parts: ornamental         | -    | -    | -    | 0.2  |
|               | <i>Salacca zalacca</i> (Gaertn.) Voss                            | Salak            | Fruit: fruit                  | -    | 0.13 | 0.25 | 0.16 |
| Asparagaceae  | <i>Agave amica</i> (Medik.) Thiede & Govaerts                    | Sedap malam      | All part, ornamental          | -    | -    | 0.25 | -    |
|               | <i>Chlorophytum filipendulum</i> subsp. <i>amaniense</i>         |                  | Leaf: ornamental              | -    | 0.39 | -    | -    |
|               | <i>Cordyline fruticosa</i> (L.) A.Chev.                          | Hanjuang         | Leaf: ornamental              | 1.29 | 1.72 | 1.95 | 1.52 |
|               | <i>Dracaena angolensis</i> (Welw. ex Carrière) Byng & Christenh. | Sansiviera       | Leaf: ornamental              | -    | -    | -    | 0.16 |
|               | <i>Dracaena fragrans</i> (L.) Ker Gawl.                          | Dracaena         | Leaf: ornamental              | -    | 0.72 | -    | 0.16 |
|               | <i>Dracaena reflexa</i> Lam.                                     | Hanjuang bodas   | Leaf: ornamental              | -    | 0.13 | -    | 0.16 |
|               | <i>Dracaena surculosa</i> Lindl.                                 | Bambu jepang     | All parts: ornamental         | -    | 0.13 | -    | 0.16 |
|               | <i>Dracaena trifasciata</i> (Prain) Mabb.                        | Lidah mertua     | Leaf: ornamental              | 0.65 | 1.3  | 0.43 | 1.58 |
| Asteraceae    | <i>Aster amellu</i> L.   | Aster            | Flower: ornamental            | 0.32 | -    | -    | -    |
|               | <i>Chrysanthemum</i> sp  | Krisan           | Flower: ornamental            | -    | 0.5  | -    | -    |
|               | <i>Cosmos caudatus</i> Kunth                                     | Kenikir          | Leaf: vegetable               | -    | 2.29 | -    | -    |
|               | <i>Dahlia pinnata</i> L.   | Bunga dahlia     | Flower: ornamental            | 0.78 | -    | -    | -    |
|               | <i>Gymnanthemum amygdalinum</i> (Delile) Sch.Bip.                | Daun paprika     | Leaf: medicinal               | 0.26 | 0.26 | 1.76 | 0.16 |
|               | <i>Helianthus annuus</i> L.                                      | Bunga matahari   | Flower: ornamental            | -    | -    | 0.25 | -    |
|               | <i>Tithonia diversifolia</i> L.                                  | Kembang bulan    | Flower: ornamental            | -    | -    | 0.25 | -    |
|               | <i>Zinnia elegans</i> L.   | Kembang kertas   | Flower: ornamental            | -    | 0.13 | -    | -    |
| Balsaminaceae | <i>Impatiens balsamina</i> L.                                    | Pacar            | All part: ornamental          | 1.17 | 0.34 | -    | 0.16 |
| Basellaceae   | <i>Anredera cordifolia</i> (Ten.) Steenis                        | Binahong /ganola | All parts: ornamental         | 0.97 | 0.26 | 0.65 | 0.16 |

Leaf: medicinal, wound,  
another for dying

|                |  |  |                               |                            |      |      |      |      |
|----------------|--|--|-------------------------------|----------------------------|------|------|------|------|
| Begoniaceae    | <i>Begonia</i> sp  |  | Leaf: ornamental              |                            | -    | -    | -    | 0.16 |
| Brassicaceae   | <i>Brassica juncea</i> L.                                  | Sawi   | Leaf: vegetable               |                            | 0.52 | -    | -    | -    |
|                | <i>Brassica oleracea</i> L.                                | Brokoli  | Leaf: vegetable               |                            | 0.71 | -    | -    | -    |
| Bromeliaceae   | <i>Brassica rapa</i> L.                                    | Pakcoy   | Leaf: vegetable               |                            | -    | 0.13 | -    | -    |
|                | Ananas comosus (L.) Merr.                                  | Danas, Nanas   | Fruit: fruit                  |                            | 0.84 | 0.37 | -    | 0.2  |
| Cactaceae      | <i>Cereus jamacaru</i> DC.                                 | Kaktus 2   | All parts: ornamental         |                            | -    | 0.17 | -    | -    |
|                | <i>Epiphyllum oxypetalum</i> (DC.) Haw.                    | Wijayakusuma   | All parts: ornamental         |                            | 0.26 | 0.46 | 1.42 | 0.49 |
| Campanulaceae  | <i>Opuntia ficus-indica</i> (L.) Mill.                     | Kaktus   | All parts: ornamental         |                            | -    | 0.43 | 0.75 | 0.32 |
|                | <i>Selenicereus megalanthus</i> (K.Schum. ex Vaupel) Moran | Buah naga kuning   | Fruit: fruit                  |                            | -    | 0.39 | -    | -    |
|                | <i>Selenicereus monacanthus</i> (Lem.) D.R.Hunt            | Buah naga merah  | Fruit: fruit                  |                            | 1.62 | 1.54 | 1.34 | 1.45 |
|                | <i>Hippobroma longiflora</i> (L.) G.Don                    | Ki tolod   | Leaf: mredicinal              |                            | -    | 0.13 | -    | -    |
| Caricaceae     | <i>Platycodon grandiflorus</i> A.DC.                       | Kembang balon  | Flower: ornamental            |                            | -    | -    | 0.38 | -    |
|                | <i>Carica papaya</i> L.                                    | Gedang, varieties (landraces): gedang manuk, gedang California | Fruit: fruit                  | Leaf and flower: vegetable | 5.17 | 1.16 | 1.58 | 0.89 |
| Cleomaceae     | <i>Cleome spinosa</i> Jacq.                                | Bunga pink   | Flower: ornamental            |                            | -    | 0.13 | -    | -    |
| Combretaceae   | <i>Terminalia mantaly</i> H.Perrier                        | Kiara payung   | All parts: ornamental         |                            | -    | 0.26 | -    | 0.16 |
| Commelinaceae  | <i>Tradescantia pallida</i> (Rose) D.R.Hunt                | Adam hawa  | All parts: ornamental         |                            | -    | 0.66 | -    | -    |
|                | <i>Tradescantia spathacea</i> Sw.                          | Tradescantia zebrina   | All part: ornamental          |                            | -    | 0.41 | -    | 0.68 |
| Convolvulaceae | <i>Tradescantia zebrina</i> Bosse                          | Tradescantia zebrina   | All part: ornamental          |                            | -    | 0.21 | -    | -    |
|                | <i>Ipomoea aquatica</i> Forssk.                            | Kangkung   | Leaf: vegetable               |                            | -    | 0.3  | -    | -    |
| Costaceae      | <i>Ipomoea batatas</i> (L.) Lam.                           | Ubi  | Tuber: additional staple food |                            | -    | 0.13 | -    | 0.16 |
|                | <i>Costus guanaiensis</i> Rusby                            | Daun merah   | Leaf: ornamental              |                            | -    | -    | -    | 0.32 |
| Crassulaceae   | <i>Kalanchoe pinnata</i> (Lam.) Pers.                      | Cocor bebek  | Leaf: ornamental              | Leaf: medicinal, fever     | -    | 0.56 | 0.43 | -    |
| Cucurbitaceae  | <i>Cucumis sativus</i> L.                                  | Bonteng, Mentimun  | Fruit: vegetable              |                            | -    | -    | 0.25 | -    |
|                | <i>Cucurbita moschata</i> Duchesne                         | Waluh gede   | Fruit: vegetable              |                            | -    | 0.13 | -    | -    |
|                | <i>Momordica charantia</i> L.                              | Paria  | Fruit: vegetable              | Leaf: medicinal, fever     | -    | -    | -    | 0.2  |
|                | <i>Psophocarpus tetragonolobus</i> (L.) DC.                | Jaat   | Fruit: vegetable              |                            | -    | -    | -    | 0.16 |
| Cupressaceae   | <i>Sechium edule</i> Sw.                                   | Waluh lejet  | Fruit: vegetable              |                            | -    | 0.13 | -    | -    |
|                | <i>Platycladus orientalis</i> (L.) Franco                  | Cemara   | All parts: ornamental         |                            | 0.26 | -    | -    | -    |
| Cycadaceae     | <i>Cycas rumphii</i> Miq.                                  | Pakis haji   | Leaf: ornamental              |                            | -    | 0.17 | 0.77 | 0.53 |
| Dioscoreaceae  | <i>Dioscorea alata</i> L.                                  | Hui, Ubi   | Tuber: additional staple food |                            | -    | -    | 0.5  | -    |
| Euphorbiaceae  | <i>Acalypha hispida</i> Burm.f.                            | Buntut kucing  | Flower, ornamental            |                            | -    | -    | 0.43 | -    |
|                | <i>Acalypha siamensis</i> Oliv. ex Gage                    | Tehtehan   | All parts, ornamental         |                            | -    | 0.13 | -    | -    |
|                | <i>Cnidocolus aconitifolius</i> I.M.Johnst.                | Sampeu jepang  | All parts: ornamental         |                            | -    | 1.27 | -    | 0.87 |
|                | <i>Codiaeum variegatum</i> (L.) A.Juss.                    | Puring   | All parts: ornamental         |                            | -    | 0.92 | 0.43 | 1.08 |
|                | <i>Euphorbia mellifera</i> Aiton                           | Euphorbia 1  | All parts: ornamental         |                            | -    | -    | -    | 0.16 |
|                | <i>Euphorbia milii</i> Des Moul.                           | Euphorbia milii  | All parts: ornamental         |                            | -    | 0.8  | -    | 1.31 |
|                | <i>Euphorbia nivulia</i> Buch.-Ham.                        | Kaktus euphorbia   | All parts: ornamental         |                            | -    | 0.13 | -    | -    |
|                | <i>Euphorbia</i> sp.                                       | Euphorbia  | All parts: ornamental         |                            | 1.1  | -    | 2.11 | -    |
|                | <i>Euphorbia tirucalli</i> L.                              | Patah tulang   | All parts: ornamental         | Leaf: medicinal, toothache |      | -    | 0.5  | -    |
|                | <i>Euphorbia tithymaloides</i> L.                          | Euphorbia kakalabangan   | All parts: ornamental         |                            | -    | -    | -    | 0.36 |
|                | <i>Jatropha integerrima</i> Jacq.                          | Euphorbia bunga  | Flower: ornamental            |                            | -    | -    | -    | 0.2  |
|                | <i>Jatropha multifida</i> L.                               | Betadin  | Flower: ornamental            | Tem sap: medicinal, wound  |      | 0.78 | 0.3  | 1.31 |

|               |  |   |   |  |   |  |   |  |
|---------------|--|---|---|--|---|--|---|--|
|               | <i>Manihot esculenta</i> Crantz  | Sampeu, varieties (landraces): sampeu roti, sampeu manihot keju, sampeu manihot biasa, sampeu mentega, sampeu krikil. | Tuber: additional staple food   | Leaf: vegetable, fodder  | 2.34  | 6.34   | 1.53  | 1.24   |
| Equisetaceae  | <i>Manihot</i> sp.<br><i>Equisetum ramosissimum</i> subsp. <i>debile</i> (Roxb. ex Vaucher) Hauke  | Singkong mentega<br>Bambu air   | Tuber: additional staple food<br>All parts: ornamental  | Leaf: vegetable, fodder  | -   | -  | 1.34  | -<br>0.16  |
| Fabaceae      | <i>Indigofera zollingeriana</i> Miq.<br><i>Leucaena leucocephala</i> (Lam.) de Wit<br><i>Parkia speciosa</i> Hassk.<br><i>Phaseolus lunatus</i> L.<br><i>Tamarindus indica</i> L.  | Indigofera<br>Lamtoro gung<br>Peuteuy<br>Kacang roay<br>Asem  | Leaf: fodder<br>Fruit: vegetable<br>Fruit: vegetable<br>Fruit: vegetable<br>Fruit: sice   | Leaf: fodder   | -<br>-<br>1.37<br>-                         | 0.79<br>0.26<br>1.11<br>0.26<br>0.39           | -<br>0.84<br>0.75<br>-                      | -<br>0.16<br>0.8<br>0.16<br>0.49                 |
| Gesneriaceae  | <i>Aeschynanthus radicans</i> Jack   | Bunga lipstik   | All parts, ornamental   |  | -   | 0.13   | -   | 0.16   |
| Heliconiaceae | <i>Heliconia</i> sp. 1<br><i>Heliconia</i> sp. 2   | Pisang hias<br>Pisang pisang  | All parts: ornamental<br>All parts: ornamental  |  | -<br>-                                      | -<br>-   | -<br>-                                      | 0.2<br>0.32                                      |
| Iridaceae     | <i>Eleutherine bulbosa</i> Urb.  | Bawang dayak  | Rhizome: medicinal, antioxidant   |  | -   | 0.26   | -   | -  |
| Lamiaceae     | <i>Trimezia longifolia</i> (Link & Otto) Christenh. & Byng<br><i>Clerodendrum paniculatum</i> L.<br><i>Ocimum tenuiflorum</i> L.<br><i>Orthosiphon aristatus</i> var. <i>aristatus</i><br><br><i>Plectranthus scutellarioides</i> R.Br.<br><br><i>Salvia rosmarinus</i> Schleid. | Iris<br>Bunga pagoda<br>Surawung<br>Kumis kucing<br><br>Jawer kotok<br><br>Rosemary                                   | All parts: ornamental<br>Flower: ornamental<br>Leaf: vegetable<br>Leaf: medicinal, treat urinary disorder<br><br>All parts: ornamental<br><br>All parts: ornamental | Leaf: medicinal, stomach medicine<br>Leaf: medicinal, repellent            | -<br>-<br>1.42<br>0.52<br><br>0.71<br><br>- | 0.21<br>-<br>0.71<br>0.13<br><br>2.55<br><br>- | -<br>-<br>2.53<br>0.25<br><br>0.54<br><br>- | -<br>0.32<br>1.84<br>0.69<br><br>3.67<br><br>0.2 |
| Lauraceae     | <i>Tectona grandis</i> Linn. f.<br><i>Persea americana</i> Mill.   | Jati<br>Alpukat   | All parts: other, shading<br>Fruit: fruit   | Stem: building material<br>Leaf: medicinal, high blood pressure, gastritis | -<br>-                                      | -<br>0.59                                      | 0.25<br>0.25                                | -<br>-   |
| Lythraceae    | <i>Cuphea hyssopifolia</i> Kunth<br><i>Lagerstroemia indica</i> L.<br><i>Lagerstroemia speciosa</i> Pers.<br><i>Punica granatum</i> L.   | Si cantik Taiwan<br>Bungur kecil<br>Bungur<br>Delima  | All parts: ornamental<br>Flower: ornamental<br>Flower: ornamental<br>Fruit: fruit   | Stem: building material  | -<br>-<br>-<br>1.04                         | -<br>0.13<br>0.39<br>-                         | -<br>-<br>-                                 | 0.48<br>0.32<br>-<br>0.16                        |
| Magnoliaceae  | <i>Magnolia champaca</i> (L.) Baill. ex Pierre<br><i>Michelia alba</i> L.  | Cempaka<br>Bunga kantil   | Flower: ornamental<br>Flower: ornamental  | Flower: traditional ritual   | -<br>-                                      | 0.13<br>-                                      | 0.25<br>-                                   | -<br>-   |
| Malvaceae     | <i>Abelmoschus manihot</i> L.<br><i>Durio zibethinus</i> L.<br><i>Gossypium arboreum</i> L.<br><i>Hibiscus rosa-sinensis</i> L.<br><i>Hibiscus schizopetalus</i> (Dyer) Hook.f.<br><i>Theobroma cacao</i> L.   | Ki mujarab<br>Kadu, Duren<br>Kapas<br>Kembang sepatu<br>Kembang sepatu<br>Coklat                                      | Flower, ornamental<br>Fruit: fruit<br>Fruit: other, corpse cover<br>Flower: ornamental<br>Flower: ornamental<br>Fruit: industrial                                   |  | 0.26<br>-<br>-<br>-<br>-<br>-               | -<br>0.13<br>0.37<br>0.39<br>0.26<br>-         | -<br>0.25<br>-                              | -<br>0.2<br>-<br>0.65<br>0.16<br>-               |
| Marantaceae   | <i>Calathea ornata</i> (Linden) Körn.  | Zebra   | Leaf: ornamental  |  | -   | 0.13   | -   | -  |
| Moraceae      | <i>Artocarpus altilis</i> (Parkinson) Fosberg<br><i>Artocarpus heterophyllus</i> Lam.<br><i>Dorstenia elata</i> Gardner  | Sukun<br>Nangka ageung<br>Tusuk konde   | Fruit: fruit<br>Fruit: fruit<br>All parts: ornamental   |  | -<br>1.11<br>-                              | 0.13<br>1.11<br>-                              | 0.43<br>1.29<br>-                           | -<br>0.69<br>0.16                                |

|                |   |   |                               |   |      |      |      |      |
|----------------|---|---|-------------------------------|---|------|------|------|------|
|                | <i>Ficus benjamina</i> L.                                   | Beringin  | All parts: ornamental         |   | -    | 0.13 | 0.38 | 0.6  |
|                | <i>Ficus carica</i> L.                                      | Buah tin  | Fruit: fruit                  |   | -    | 0.13 | -    | -    |
|                | <i>Ficus drupacea</i> Thunb.                                | Kiara gamir   | All parts: ornamental         |   | -    | -    | -    | 0.72 |
|                | <i>Ficus punctata</i> Thunb.                                | Beringin dolar  | All parts: ornamental         |   | -    | 0.13 | -    | 0.16 |
|                | <i>Ficus tinctoria</i> subsp. <i>gibbosa</i> (Blume) Corner | Kihampelas  | All parts: ornamental         |   | -    | -    | -    | 0.36 |
|                | <i>Morus alba</i> L.  | Arbei   | Fruit: fruit                  |   | -    | -    | 0.45 | -    |
|                | <i>Streblus asper</i> Lour.                                 | Ki serut  | All parts: ornamental         |   | -    | 0.81 | -    | 1.11 |
| Moringaceae    | <i>Moringa oleifera</i> Lam.                                | Kelor   | Leaf: medicinal               |   | -    | -    | -    | 0.16 |
| Musaceae       | <i>Musa ×paradisica</i> L.                                  | Cau, varieties (landarces): cau roid, cau bagja, cau kapas, cau muli, cau nangka, cau ambon gedé/bodas, cau siem, cau raja. | Fruit: fruit                  | Flower bud, leaf: vegetable, food wrapper, fodder | 3.17 | 4.86 | 1.99 | 2.36 |
| Myrtaceae      | <i>Plinia cauliflora</i> (Mart.) Kausel                     | Anggur brazil   | All parts: ornamental         | Fruit: fruit                                      | -    | 0.13 | -    | -    |
|                | <i>Psidium guajava</i> L.                                   | Jambu kluthuk   | Fruit: fruit                  |   | 2.74 | 2.49 | 1.38 | 1.24 |
|                | <i>Syzygium aqueum</i> (Burm.f.) Alston                     | Jambu air   | Fruit: fruit                  |   | 0.59 | 0.76 | -    | 0.36 |
|                | <i>Syzygium aromaticum</i> (L.) Merr. & L.M.Perry           | Cengkeh   | Fruit: industrial             | Fruit: medicinal, toothache                       | -    | 0.24 | -    | -    |
|                | <i>Syzygium malaccense</i> (L.) Merr. & L.M.Perry           | Jambu bol   | Fruit: fruit                  |   | -    | 0.26 | -    | 0.16 |
|                | <i>Syzygium polyanthum</i> (Wight) Walp.                    | Salam   | Leaf: space                   | Fruit: fruit                                      | -    | 0.65 | 0.5  | 0.49 |
|                | <i>Syzygium pycnanthum</i> Merr. & L.M.Perry                | Jambu kopo  | Fruit: fruit                  |   | -    | 0.13 | -    | -    |
|                | <i>Syzygium zeylanicum</i> (L.) DC.                         | Pucuk merah   | Leaf: ornamental              |   | 1.04 | 1.25 | 2.1  | 1.24 |
| Nyctaginaceae  | <i>Bougainvillea glabra</i> Choisy                          | Bogenvile   | Flower: ornamental            |   | -    | 0.13 | 0.72 | 1.31 |
| Oleaceae       | <i>Jasminum sambac</i> (L.) Aiton                           | Melati  | Flower: ornamental            |   | 0.26 | 0.46 | 0.43 | 0.36 |
| Orchidaceae    | <i>Cymbidium</i> sp.  | Anggrek   | All parts: ornamental         |   | -    | -    | -    | 0.16 |
|                | <i>Dendrobium crumenatum</i> Sw.                            | Anggrek merpati   |                               |   | -    | 0.39 | -    | 0.49 |
|                | <i>Dendrobium</i> sp.                                       | Anggrek   | Flower: ornamental            |   | -    | 0.17 | -    | 0.16 |
|                | <i>Phalaenopsis</i> sp.                                     | Anggrek   | Flower: ornamental            |   | -    | -    | -    | 0.16 |
|                | <i>Vanda</i> sp.  | Anggrek   | Flower: ornamental            |   | -    | -    | -    | 0.16 |
| Oxalidaceae    | <i>Averrhoa bilimbi</i> L.                                  | Balingbing wuluh  | Fruit: spice                  | Fruit: medicinal, high blood pressure             | -    | 0.13 | -    | 0.16 |
|                | <i>Averrhoa carambola</i> L.                                | Balingbing  | Fruit: fruit                  |   | 1.05 | 0.78 | 0.29 | 0.24 |
|                | <i>Oxalis triangularis</i> A.St.-Hil.                       | Daun kukupu   | Flower: ornamental            |   | -    | 0.13 | -    | 0.16 |
| Pandanaceae    | <i>Pandanus amaryllifolius</i> Roxb.                        | Pandan  | Leaf: soice                   | Leaf: natural clouring                            | 1.17 | 0.95 | 0.5  | 0.87 |
| Passifloraceae | <i>Passiflora edulis</i> Sims                               | Markisa   | Fruit: fruit                  |   | -    | 0.13 | -    | 0.16 |
| Phyllanthaceae | <i>Breynia androgyna</i> (L.) Chakrab. & NP.Balacr.         | Katuk   | Leaf: vegetable               | Medicinal:rich brest feeding produce              | -    | 1.07 | 1.35 | -    |
| Piperaceae     | <i>Piper betle</i> L.                                       | Sirih   | Leaf: betel                   | Leaf: medicinal, wound                            | 1.29 | 0.26 | 2.92 | -    |
|                | <i>Piper ornatum</i> N.E.Br                                 | Sirih merah   | All parts: ornamental         | Leaf: medicinal, cough                            | -    | -    | -    | 1.16 |
|                | <i>Piper sarmentosum</i> Roxb.                              | Sirih bogor   | Leaf: ornamental              | Leaf: medicinal, cough                            | -    | 0.13 | -    | -    |
| Poaceae        | <i>Bambusa vulgaris</i> (Schrad ex J.C Wendl).              | Bambu Hias  | All parts: ornamental         |   | -    | -    | 0.65 | -    |
|                | <i>Cymbopogon nardus</i> (L.) Rendle                        | Sereh   | Leaf: ornamental              | Leaf: medicinal: toothache                        | 1.1  | 0.94 | 2.86 | 0.88 |
|                | <i>Saccharum officinarum</i> L.                             | Tiwu  | Stem: sugar, crabohydrate     |   | -    | 0.26 | -    | -    |
|                | <i>Zea mays</i> L.  | Jagung, Jagung  | Fruit: additional staple food | Leaf: fodder                                      | -    | 0.4  | -    | -    |
| Portulacaceae  | <i>Portulaca grandiflora</i> Hook.                          | Krokot  | All parts: ornamental         |   | 1.74 | 0.26 | 1.1  | 1.31 |
| Rhamnaceae     | <i>Zizhipus</i> sp.   | Bidara  | All parts: ornamental         | All parts: demon repellent                        | -    | 0.13 | -    | -    |

|               |  |  |                                |  |      |      |      |       |
|---------------|--|--|--------------------------------|--|------|------|------|-------|
| Rosaceae      | <i>Fragaria xananassa</i> (Duchesne ex Weston)<br>Duchesne ex Rozier | Stroberi   | Fruit: fruit                   |  | 6.49 | 0.81 | 0.95 |       |
|               | <i>Rosa hybrida</i> L.   | Mawar  | Flower: ornamental             | Flower: traditional ritual                   | 0.65 | 0.76 | 2.87 | 0.69  |
|               | <i>Rosa</i> sp.  | Bunga mawar putih  | Flower: ornamental             | Flower: traditional ritual                   | 1.16 | -    | -    | -     |
| Rubiaceae     | <i>Gardenia jasminoides</i> J.Ellis                                  | Kaca piring  | All parts: ornamental          |  | -    | 0.13 | -    | 0.43  |
|               | <i>Ixora</i> sp.   | Soka   | Flower: ornamental             |  | -    | -    | 0.25 | 0.4   |
|               | <i>Serissa japonica</i> (Thunb.) Thunb.                              | Tanaman salju  | All parts: vegetable           |  | -    | -    | -    | 0.2   |
| Rutaceae      | <i>Citrus amblycarpa</i> Ochse                                       | Jeruk limo   | Fruit: spice                   |  | -    | 0.43 | -    | 0.16  |
|               | <i>Citrus aurantiifolia</i> (Christm.) Swingle                       | Jeruk nipis  | Fruit: spice                   | Fruit: medicinal, cough                      | 0.52 | 0.13 | 0.25 | -     |
|               | <i>Citrus hystrix</i> DC.  | Jeruk purut  | Fruit: spice                   |  | -    | 0.13 | -    | -     |
|               | <i>Citrus maxima</i> (Burm.) Merr.                                   | Jeruk bali   | Fruit:fruit                    |  | -    | 1.2  | 2.63 | 0.36  |
|               | <i>Murraya paniculata</i> Kaneh.                                     | Kemuning   | All parts: ornamental          |  | 0.39 | 1.19 | -    | 0.36  |
| Sapindaceae   | <i>Dimocarpus longan</i> Lour.                                       | Lengkeng   | Fruit: fruit                   |  | 1.23 | 0.43 | -    | 0.49  |
|               | <i>Nephelium lappaceum</i> L.  | Rambutan, varieties (landraces):<br>rambutan rapih, rambutan aceh,<br>rambutan binjay. | Fruit: fruit                   |  | 3.98 | 3.56 | 0.63 | 0.81  |
| Sapotaceae    | <i>Manilkara zapota</i> (L.) P.Royen                                 | Sawo   | Fruit                          | Fruit  | -    | 0.13 | 0.75 | 0.32  |
|               | <i>Pouteria campechiana</i> (Kunth) Baehni                           | Sawo walanda   | Fruit: fruit                   |  | -    | 0.13 | 0.25 | -     |
| Solanaceae    | <i>Capsicum annuum</i> L.  | Cabe   | Fruit: spice                   |  | 2.53 | 1.81 | 3.19 | 3.35  |
|               | <i>Lycopersicon esculentum</i> Mill                                  | Tomat Jepang   | Fruit: vegetable               |  | 0.65 | -    | -    | -     |
|               | <i>Solanum lycopersicum</i> L.                                       | Tomat  | Fruit: vegetable               |  | 3.35 | 0.59 | -    | 0.4   |
|               | <i>Solanum melongena</i> L.  | Terong   | Fruit: vegetable               |  | 0.97 | 0.26 | -    | 0.63  |
|               | <i>Solanum nigrum</i> L.   | Leunca   | Fruit: vegetable               |  | -    | 0.26 | 0.59 | 0.16  |
|               | <i>Solanum torvum</i> Sw.  | Takokak  | Fruit: vegetable               |  | -    | 0.13 | -    | 0.32  |
| Verbenaceae   | <i>Duranta erecta</i> L.   | Ki nakal   | All parts: ornamental          |  | 0.65 | 0.26 | 0.43 | 0.24  |
|               | <i>Lantana camara</i> L.   | Saliara  | Flower: ornamental             |  | -    | -    | -    | 0.24  |
| Vitaceae      | <i>Vitis vinifera</i> L.   | Anggur   | Fruit: fruit                   |  | 1.04 | 0.26 | -    | 0.16  |
| Zingiberaceae | <i>Alpinia galanga</i> (L.) Willd.                                   | Laja   | Rhizome: spice                 | Rhizome: medicinal                           | 2.86 | 2.35 | 0.7  | 1.27  |
|               | <i>Curcuma longa</i> L.  | Koneng   | Rhizome: spice                 | Rhizome: supplement                          | 1.04 | 2.07 | 2.19 | 3.29  |
|               | <i>Curcuma xanthorrhiza</i> D.Dietr.                                 | Temu lawak   | Rhizome: spice                 | Rhizome: medicinal,<br>gastritis, hepatitis  | -    | 0.13 | -    | -     |
|               | <i>Kaempferia galanga</i> L.   | Cikur  | Rhizome: spice                 | Rhizome: medicinal,<br>bruised               | 0.59 | 0.92 | 0.25 | 1.74  |
|               | <i>Kaempferia pulchra</i> Ridl.                                      |  | Leaf, flower: ornamental       |  | -    | 0.13 | -    | -     |
|               | <i>Zingiber officinale</i> Roscoe                                    | Jahe, varieties (landraces): jahe<br>beureum, jahe bodas.                              | Rhizome: spice                 | Rhizome: medicinal,<br>gastritis, supplement | 2.79 | 4.27 | 1    | 11.13 |
|               | <i>Zingiber purpureum</i> Roscoe                                     | Panglay  | Rhizome: medicinal, dermatitis |  | -    | 0.26 | -    | -     |
| Total species | 63   | 155  | 81                             | 144  |      |      |      |       |



**Figure 5.** Various ornamental plants in the home garden: A. *Hibiscus rosa-sinensis*, *Clerodendrum paniculatum*, and *Dieffenbachia seguine*; and B. *Aglaonema commutatum*, *Tradescantia pallida*, *Codiaeum variegatum*, *Chlorophytum filipendulum* subsp. *amaniense*, and *Begonia* sp.

**Table 2.** Main functions of home garden plants recorded in Cihegar Mekar and Ciboboko, Jatigede, Sumedang, Indonesia in 2018 and 2022

| Main function                         | Plant's part                 | Species number | Percentage of the total |
|---------------------------------------|------------------------------|----------------|-------------------------|
| Additional staple food                | Tuber, fruit                 | 7              | 3.13                    |
| Vegetable                             | All part, leaf, bulb, fruit  | 27             | 12.05                   |
| Spice                                 | Fruit, Rhizome, leaf         | 13             | 5.80                    |
| Vegetable and Spice                   | Leaf, bulb, fruit            | 4              | 1.79                    |
| Fruit                                 | Fruit                        | 30             | 13.39                   |
| Ornamental                            | Flower, all part             | 127            | 56.70                   |
| Industrial                            | Fruit                        | 2              | 0.89                    |
| Medicinal                             | Rhizome, seed, leaf          | 8              | 3.57                    |
| Others: shading, battle, corpse cover | All parts, leaf, stem, fruit | 6              | 2.68                    |
| Total                                 |                              | 224            | 100.00                  |

**Table 3.** Various crops products commonly traded by rural people of Cihegar Mekar and Coboboko, Jatigede, Sumedang, Indonesia in 2022

| Vernacular name    | Species                           | Price/Kg (IDR) | Vernacular name | Species                              | Price/Kg (IDR) |
|--------------------|-----------------------------------|----------------|-----------------|--------------------------------------|----------------|
| Pisang ambon bodas | <i>Musa x paradisiaca</i> L       | 2,500          | Cikur           | <i>Kaempferia galanga</i> L.         | 80,000         |
| Pisang roid        | <i>Musa x paradisiaca</i> L       | 4,000          | Cabe            | <i>Capsicum annum</i> L.             | 150,000        |
| Pisang kapas       | <i>Musa x paradisiaca</i> L       | 4,000          | Koneng          | <i>Curcuma longa</i> L.              | 80,000         |
| Pisang siem        | <i>Musa x paradisiaca</i> L       | 2,500          | Laja            | <i>Alpinia galanga</i> (L.) Willd.   | 5,000          |
| Pisang raja        | <i>Musa x paradisiaca</i> L       | 4,000          | Mangga          | <i>Mangifera indica</i> L            | 5,000          |
| Pisang bagja       | <i>Musa x paradisiaca</i> L       | 4,000          | Rambutan        | <i>Nephelium lappaceum</i> L         | 5,000          |
| Pisang muli        | <i>Musa paradisiaca</i> L         | 1,000          | Bawang daun     | <i>Allium fistulosum</i> L.          | 4,000          |
| Pisang nangka      | <i>Musa x paradisiaca</i> L       | 2,500          | Nangka          | <i>Artocarpus heterophyllus</i> Lam. | 15,000         |
| Sampeu             | <i>Manihot esculenta</i> Crantz   | 1,500          | Lengkeng        | <i>Dimocarpus longan</i> Lour.       | 60,000         |
| Jahe merah         | <i>Zingiber officinale</i> Roscoe | 1,500          | Jahe bodas      | <i>Zingiber officinale</i> Roscoe    | 60,000         |

**Table 4.** Production of home garden based on cash crops in Cihegar Mekar and Ciboboko, Jatigede, Sumedang, Indonesia

| Items  | Cihegar Mekar       | Ciboboko              |
|--|---------------------|-----------------------|
| Average of the homegarden size (m <sup>2</sup> ) | 140 m <sup>2</sup>  | 90-100 m <sup>2</sup> |
| Total species and varieties                      | 26                  | 19                    |
| Total individual plant (individual)              | 220                 | 148                   |
| Total plant productive (individual)              | 204                 | 125                   |
| Total production (IDR)*                          | 2,101,500-5,836,000 | 2,340,000-5,015,000   |

Note: not include for the home consumption

As shown in Table 2 that because of the high diversity of plant species, including additional staple food, the rural homegarden systems have an important role in maintaining food security. In addition, since various rural local foods, including *karedok*, *lotek*, *kiripik singkong*, *kiripik pisang*, and *sale pisang*, have traditionally been the basic ingredients of home garden productions, the homegardens also have an important function for food conservation (Iskandar et al. 2022).

#### *Sociocultural function*

Based on the residents of Cihegar Mekar and Ciboboko Hamlets, the spatial layout of the homegarden can be divided into the front (*buruan*), the back (*pungkur*), and the left and right edges of the house (*pipir*). Traditionally, the front of the house is not planted with various species, which is used for sociocultural functions, including social interaction activities and working of residents, children's playgrounds, places to dry agricultural products and traditional cakes, small shops building (*warung*), work, cages for raising livestock, ponds for fish, and traditional ritual activities.

#### *Social interaction activities and working of residents*

Residents in the hamlets of Cihegar Mekar and Ciboboko have a very close relationship with their fellow members (*tatanggaan*). In their leisure time, such as in the afternoon, villagers often congregate in their homegarden with neighbors to share information and discuss various problems. Residents will be pleased when their community members provide multiple solutions to the difficulties encountered. Numerous conversations in the homegarden foster social engagement and a deeper bond between residents.

Villagers interact socially based on the norms prevailing in the community, such as mutual respect. Residents or families not used to hanging out with their neighbors are considered arrogant. The homegarden in the village is not fenced to enhance proper interaction with neighbors (Masriah et al. 2019). A bamboo fence can also be used with ornamental plants as a boundary. The rationale is that a walled-in homegarden makes it impossible for others to access.

The social interaction of the village community between their neighbors is not limited to chatting. However, working together among their neighbors in the homegarden is also customary. They usually help each other work together in the homegarden, where men, women, children, and adults can prepare local food. Activities with villagers between neighbors increase, especially during family events. Different preparations are assisted by neighbors or other relatives in the homegarden (Figure 6). The positive impact of working together is building social relations between neighbors to be more harmonious and closer.

The front of the homegarden (*buruan*) of the rural people of West Java was used as a playground in the village. Children are permitted to play in anyone's homegarden, provided they do not disrupt the plants, such as flower pots.

The owner of the homegarden often feels responsible for the children playing there. The neighbor's children are considered their own and are inspired not to fight while playing and respect each other (Achmad et al. 1978).

Based on the informants from the residents of Cihegar Mekar and Ciboboko Hamlets, children still play in the homegarden. Some of the games commonly played include "*ucing-ucingan*," "*ngadu kaleci*," "*karet geulang*," "*beklen*," "*loncat tali karet*," and "*bebedugan*" as illustrated in Figure 7. Children's games in rural areas have various positive benefits, such as a healthy sport, physical movement skills, friendship, honesty, entertainment, socializing, and inheriting local knowledge (Alif 2016).

#### *The place to dry agricultural products and traditional cakes*

On the front of the homegarden, which is not planted with various plants (*buruan*), the residents of Cihegar Mekar and Ciboboko Hamlets use it to dry agricultural products, such as rice. In addition, the *buruan* is used to dry traditional cakes produced by the home industry, such as *opak* made from cassava or glutinous rice, as depicted in Figure 8.

#### *The place to sell small shops*

The homegarden is used to build a small shop (*warung*), as portrayed in Figure 9, and daily necessities, including pastries, banana chips, cassava chips, coffee, sugar, salt, cooking oil, cigarettes, soft drinks, and others, are traded at the small shop. The various commodities traded in the small shop result from the owners' purchases in urban markets, such as Sub-district urban. The market stall owners ride their motorcycles weekly to transport a wide variety of goods from the city's Sub-districts to their storefronts. Additionally, traders at the stand get most of their supplies from local vendors who make weekly deliveries utilizing pick-up cars and motorcycles. As a result of the availability of essentials in the hamlet's stores, the locals may avoid making the long and expensive trip to the Sub-district town for things like food and cooking supplies.

Livestock is an integrated part of the homegarden system; for example, chickens of the native breed are released to forage for food in people's gardens. Therefore, they look for food in the homegarden and provide their feces as organic fertilizer.

#### *The place to sell small shop*

In the homegarden system of Cihegar Mekar and Ciboboko Hamlet, apart from being planted with a mixture of annual and perennial plants, livestock is kept by a resident, including native chickens, ducks, sheep, goats, and cows. Chicken, duck, goat, and sheep cages are also built in the homegarden, as shown in Figure 10.

Livestock is an integrated part of the home garden system. Native chickens are usually released wild to live looking for food in the home garden. As a result, native chickens usually look for various foods in the homegarden and provide their feces in the homegarden. Beneficially various pests of garden plants, such as caterpillars, can be

eaten by chickens. In addition, the amount of chicken manure in the homegarden can help the fertility of the homegarden soil. Ordinarily, people usually collect the manure in cattle pens for organic fertilizer in homegarden, gardens, and wet-rice fields. Raising livestock residents,

besides being useful for manure for organic fertilizer, meat animal is also a source of protein food. Some of these individual cattle are usually sold to earn cash, adding to a source of income for the villagers.



**Figure 6.** Social interaction activities of the villagers: (A) residents are working together to prepare local food, peeling the skin of cassava tubers while chatting, and (B) the men are busy cutting lamb to prepare for a family celebration while chatting.



**Figure 7.** Children's games in the home garden (A) ngadu kaleci, and (B) loncat tali karet



**Figure 8.** The front of home garden is usually used as drying agricultural products and traditional cakes: (A) grain rice, and (B) traditional cake 'opak' which is made of cassava or glutinous rice.



**Figure 9.** Small shop in the home garden to trade the daily needs of the villagers

#### *The place for raising fish in the fish pond*

Traditionally, the Sundanese rural community in West Java raises fish in their homegarden to adapt the rural people to their local water-rich environment (Iskandar and Iskandar 2011, Iskandar 2017). For example, several households in Cihegar Mekar and Ciboboko Hamlet made fish ponds, as indicated in Figure 11. Some species of fish kept in garden ponds include catfish (*Clarias batrachus*), common carp (*Cyprinus carpio*), tilapia (*Oreochromis mossambicus*), and Nile tilapia (*Oreochromis niloticus*). Additionally, various species of vegetable crops are planted around the fish pond, including celery (*Apium graveolens* L), welsh onion (*Allium fistulosum* L), tomato (*Lycopersicon esculentum* Mill), and cassava (*Manihot esculenta* Cratz).

Rural fish ponds have ecological and socioeconomic functions for rural people. The ecological functions prevent rainwater from entering the river directly, regulating flood issues during the rainy season. In the dry season, water is available for plants in the homegarden. Concerning the economic function, fish products can be used as a source of family animal protein food, and even surplus fish can be sold.

#### *The place for traditional ceremonial activities*

The front of the open homegarden is used by residents in Cihegar Mekar and Ciboboko Hamlets for traditional

ceremonies, such as weeding (*nikahan*), circumcision (*nyepitan* or *sunatan*), and *Isra* and *Mi'raj* of Prophet Muhammad (*Rajaban*). In addition, neighbors and relatives visit houses with traditional ceremonial activities conducted in the homegarden (Figure 12). Many people, neighbors, and relatives attend these activities. For example, it can often provide a strong sense of group solidarity that unifies individuals of diverse backgrounds, ages, and socioeconomic interests into a larger and more cohesive unit in the village.

Socially, traditional ceremonial activities attended by many people, neighbors, and relatives have an important function. For example, it can often provide a strong sense of group solidarity that unifies different individuals or groups of individuals of diverse backgrounds, ages, and/or socioeconomic interests into a large and more cohesive unit in the village.

#### *Ecological function*

According to the residents of Cihegar Mekar and Ciboboko Hamlets, the homegarden system has various ecological functions, such as fertilizing and protecting soil erosion, bird and insect habitat, shade, windbreaks, protection from lightning hazards, while keeping the house in good environmental condition. Additionally, the dense vegetation of garden plants causes the homegarden to become a habitat for bird species (Figure 13).

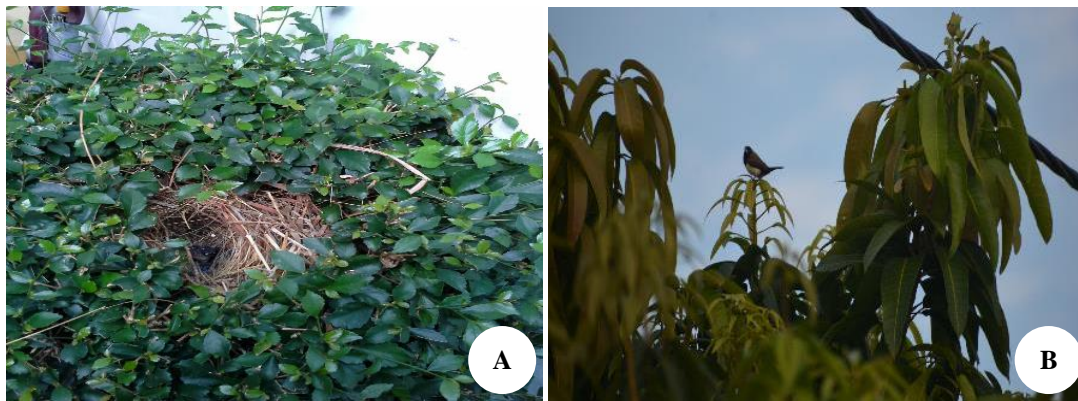
Some birds, including gereja (*Passer montanus*), piit (*Lonchura leucogastroides*), cangkurileung (*Pycnonotus aurigaster*), manuk manganeuh/burung cabe (*Dicaeum trochileum*), cinenen (*Orthotomus ruficeps*), caladi ulam (*Dendrocopos macei*), and sriganti (*Cinnyris jugularis*) are found in the homegarden (Iskandar and Iskandar 2022). Furthermore, it is a habitat for various beneficial insects, such as pollinators of various species of plants. It also produces honey, such as odeng (*Apis dorasta*) and nyiruan (*Apis indica*). The homegarden has a function for conserving various local plant species and varieties (landraces). For example, Cihegar Mekar and Ciboboko recorded some local species and varieties (landraces), including *Musa x parasiaca* L, *Mangifera indica* L, *Nephelium lappaceum*, *Manihot esculenta* Crantz, and *Carica papaya* (Table 1).



**Figure 10.** The cattle barn is placed in home garden, (A) sheep barn, and (B) ducklings in their barn of the home garden



**Figure 11.** Fish pond in the home garden (A) home garden for raising lele (*Clarias batrachus*), and (B) fish pond that is planted by various plants, including vegetables



**Figure 13.** Homegarden system as bird habitat: (A) bird nest of *Lonchura leucogastroides*, and (B) *Lonchura leucogastroides* is perching on the top of mango tree of homegarden



**Figure 12.** Traditional rituals or ceremonies, including traditional ceremony of wedding (nikahan) is usually undertaken in the home garden

### Discussion

The diversity of plant species in Cihegar Mekar and Ciboko Hamlet has increased for about 4 years (2018-2022). Therefore, the homegarden system can play an essential role in food security for residents affected by the Jatigede dam program with the high diversity of plant

species. Food security includes availability, access, utilization, and stability (Saediman et al. 2021). Regarding food availability, the homegarden systems have provided various foods, including vegetables, spices, and fruit. Since the plant can be harvested daily, the homegarden system supports food availability for Cihegar Mekar and Coboboko communities. The owners can easily pick or harvest various plant productions for family consumption or sale because the homegarden is integrated into the house. Planting a homegarden with a wide range of annual and perennial species ensures that it will meet its contents' quality and nutritional needs. The use of edible plants enhances the food security of rural people (Park et al. 2019; Castaneda-Navarrette 2021; Ngcaba et al. 2021; Saediman et al. 2021; Setiani et al. 2022; Turnsek et al. 2022).

The wide variety of annual and perennial plants in homegarden systems increases food security, and their production occurs almost continuously all year round for home consumption and sale. In addition, the homegarden has a sociocultural and ecological function for the people of Cihegar Mekar and Coboboko Hamlets affected by the Jatigede dam development. Sociocultural processes enable social interaction, playing and socializing with children, and traditional village ceremonies. Therefore, the homegarden is important in strengthening cooperation and

mutual assistance between residents. It becomes a critical social capital in the form of mutual trust and cooperation for the people of Cihegar Mekar and Ciboboko Hamlet.

The Cihegar Mekar and Ciboboko hamlet homegarden systems, with a high diversity of plants, have important ecological functions, such as cooling from the oxygen produced by plant vegetation, shade from the hot sun, and strong windbreaks. The homegarden system also plays a role in genetic conservation and various plant species, fertilizing soil from recycled materials, preventing erosion, maintaining the hydrological system of the watershed area, and as a habitat for wildlife. The garden system is vital in supporting sustainable development (Mulia et al. 2022; Sharhma et al. 2022).

Based on the results, the diversity of homegarden plants in Cihegar Mekar and Ciboko Hamlets is high. In 2018, the variety of species, genera, and family in Cahegar Mekar was recorded at 63, 58, and 39, while in Coboko Hamlet, it was at 81, 76, and 44. The species of homegarden plants often change with time after the Jatigede inundation in the two villages increases drastically. In 2022, the number of species, genera, and family of garden plants was recorded at 155, 130, and 59 in the hamlet of Cihegar Mekar, while in Ciboboko Hamlet, it was recorded at 144, 114, and 53.

Some of the species and varieties (landraces) of the homegarden, including *Musa x paradisiaca* L., *Manihot esculenta* Crantz, *Zingiber officinale* Roscoe, *Kaempferia galanga* L., *Capsicum annuum* L., *Curcuma longa* L., *Alpinia galanga* (L.) Willd., *Nephelium lappaceum* L., *Allium fistulosum* L., *Artocarpus heterophyllus* Lam., and *Dimocarpus longan* Lour. have been an important role not only for economic subsistence but also commercial, economic production. Therefore, the rural homegarden system is vital in fighting for sustainable development, such as reducing poverty and hunger in rural communities affected by the development projects, including the Jatigede Dam of Sumedang, West Java.

These research results have important implications for both academic and practical purposes. In terms of academics, the study can contribute to an understanding of the reconstruction of the structure and functions of the homegarden in the new resettlement as a strategy adaptation of the affected residents by the development project of the Jatigede Dam to get the household income. While practical aspects, the study can be used as inputs for considering in making policies of the development programs, particularly construction of the homegarden systems of the local government to enhance the food security of the affected residents of the development project in a rural area.

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#### REFERENCES

- Achmad H, Martadiharja A, Suharto, Wawan, Gunawan, Hadiyana. 1978. Cultural aspect home garden. paper presented in Seminar Pekarangan II, Institute of Ecology Unpad, Bandung 25-26 October 1978. [Indonesian]
- Albuquerque UP, de Lucena RFP, Neto EML. 2014. Selection of research participants. In: Albuquerque UP, Cruz da Cunha LF, Paiva de Lucena RF, Alves RRN (eds.). *methods and techniques in ethnobiology and ethnoecology*. Humana Press, Springer Science+ Business Media, New York. DOI: 10.1007/978-1-4614-8636-7.
- Agustina TP, Nisyawati, Waluyo EB. 2019. Plant diversity and uses of homegarden in Pujon Sub-district, Malang Regency, East Java, Indonesia. *AIP Conf Proc* 2120 (1): 040021. DOI: 10.1063/1.5115659.
- Alcudia-Aguilar A, Van Der Wal H, Suarez-Sanchez J, Martinez-Zurimendi P, Castillo-Uzcanga MM. 2018. Home garden agrobiodiversity in cultural landscapes in the Tropical Lowlands of Tabasco, Mexico. *Agroforest Syst* (2018) 92: 1329-1339. DOI: 10.1007/s10457-017-0078-5.
- Alelang IF, Hakim L, Batoro J. 2018. The Ethnobotany of Abu's homegarden and its potentially to support rural tourism development in Alor, Indonesia. *J Indones Tourism Dev Stud* 6 (2):120-125. DOI: 10.21776/ub.jitode.2018.006.02.07.
- Alif MZ. 2016. Transmission of value in the form of children jobs in the Inner Baduy Community. Unpublished Doctor Dissertation of Fine Arts and Design, Institute of Technology Bandung, Bandung. [Indonesian]
- Araujo de L, Ferraz EMN. 2014. Analysis vegetation in ethnobotanical studies. In: Albuquerque UP, Cruz da Cunha LF, Paiva de Lucena RF, Alves RRN (eds.). *methods and techniques in ethnobiology and ethnoecology*. Humana Press, Springer Science Business Media, New York. DOI: 10.1007/978-1-4614-8636-7\_10.
- Asfaw A, Zewdie S. 2021. Soil macrofauna abundance, biomass and selected soil properties in the homegarden and coffee based agroforestry systems at Wondo Genet, Ethiopia. *Environ Sustain Indicators* 12: 100153. DOI: 10.1016/j.indic.2021.100153.
- Castaneda-Navarrete J. 2021. Homegarden diversity and food security in Southern Mexico. *Food Secur* (2021) s13: 669-683. DOI: 10.1007/s12571-021-01148-w.
- Christanty L. 1990. Homegardens in Tropical Asia, with special reference to Indonesia. In: Landaurer K, Brazil M (eds.). *Tropical Homegardens*. The United Nations University, Tokyo.
- Christanty L, Abdoellah OS, Marten GG, Iskandar J. 1986. Traditional agroforestry in West Java: The Pekarangan (Homegarden), Kebun-Talun (Rotation Annual-Perennial rotation cropping system). In: Marten GG (eds.). *Traditional Agriculture in Southeast Asia: A Human Ecology Perspective* West View Press, Boulder, Colorado.
- Galhena DH, Freed R, Maredia K. 2013. Homegardens: A promising approach to enhance household food security and wellbeing. DOI: 10.1186/2048-7010-2-8.
- Gbedomon RC, Salako VK, Fandohan AB, Idohon AFR, Kakai RG, Assogbadjo AE. 2017. Functional diversity of home gardens and their agrobiodiversity conservation benefits in Benin, West Africa. *J Ethnobiol Ethnomed* 13 (16): 1-15. DOI: 10.1186/s13002-017-0192-5.
- Gerny R, Marsh R, Mwebembezi J. 2021. The promise and challenges of vegetable home gardening for improving nutrition and household welfare: New evidence from kasese district, Uganda. *Afr J Food Agric Nutr Dev* 21 (1): 17272-1729. DOI: 10.18697/ajfand.96.20125.
- Hakim L, Hong SK. 2018. Homegarden and the local community of Pancasila Village in Tambora Geopark, Sumbawa Island: Biodiversity conservation and ecotourism site development. *J Trop Life Sci* 8 (2): 192-199. DOI: 10.11594/jtls.08.02.14.
- Hakim L, Pamungkas NR, Wicaksono KP, Soemarno. 2018. The conservation of osingnese traditional homegarden agroforestry in Banyuwangi, East Java, Indonesia. *Agrivita J Agric Sci* 40 (3): 506-514. DOI: 10.17503/agrivita.v40i3.1605.
- Irhama, Gusfarina DS, Widada AW, Nurhayati A. 2021. Contribution of homegarden farming to household income and its sustainability in

- Yogyakarta City, Indonesia. IOP Conf Ser Earth Environ Sci 883 (2021): 012035. DOI: 10.1088/1755-1315/883/012035.
- Iskandar J. 2017. Human ecology and sustainable development. Postgraduate study program of environmental science. Universitas Padjadjaran, Bandung. Revision Edition. [Indonesian]
- Iskandar J. 2018. Ethnobiology, ethnoecology and sustainable development. plantaxia, Yogyakarta. [Indonesian]
- Iskandar J, Iskandar B. 2011. Sundanese agroecosystem. Kiblat Buku Utama, Bandung. [Indonesian]
- Iskandar J, Iskandar BS. 2016. Plant architecture: village homegarden structure and urban Green Open Space. Teknosain. [Indonesian]
- Iskandar J, Iskandar BS. 2022. Ethnornithology: Society and birds in Citarum Watershed, West Java. ITB Press, Bandung. [Indonesian]
- Iskandar BS, Iskandar J, Mulyanto D, Aliifah F. 2022. Local knowledge of the Sundanese community of Cijambu Village, West Java, on traditional foods to enhance the family food security. Internal Report of ALG Program. Universitas Padjadjaran, Bandung. [Indonesian]
- Iskandar J, Iskandar BS, Partasasmita R. 2018. Review: The impact of social and economic change on domesticated plant diversity with special reference to west rice field and homegarden farming of West Java, Indonesia. Biodiversitas 19 (2): 565-577. DOI: 10.13057/biodiv/d190227.
- Ivanova T, Bosseva Y, Chervenkov M, Dimitrova D. 2021. Enough to feed our selves food plants in bulgarian rural homegardens. Plants 10: 2520. DOI: 10.3390/plants10112520.
- Karyono. 1990. Homegardens in Java: their structure and function. In: Landauer K, Brazil M (eds.). Tropical Homegardens. The United Nations University, Tokyo.
- Kaswanto RL, Nakagoshi N. 2014. Landscape ecology based approach for assessing pekarangan condition for protected area in West Java. In Nakagoshi N and Mamubahay JA (eds.). Designing Low Carbon Societies in Landscapes. Springer, Tokyo. DOI: 10.1007/978-4-431-54819-5\_17.
- Kewessa G. 2020. Home garden agroforestry as a tool for sustainable production unit in Ethiopia. J Resour Dev Manag 67: 14-19. DOI: 10.7176/JRDM/67-02.
- Masriah, Iskandar BS, Iskandar J, Partasasmita R. 2019. Economic, social and culture of homegarden in Mekarasih Village, Jatigede, Sumedang, West Java. Pros Sem Nas Masy Biodiv Indon 5 (1): 22-28. DOI: 10.13057/psnmbi/m050105. [Indonesian]
- Mellisse BT, Van de Ven GWJ, Giller KE, Descheemaeker K. 2018. Home garden system dynamics in Southern Ethiopia. Ageofor Syst 92: 1579-1595. DOI: 10.1007/s10457-017-0106-5.
- Mulia R, Le TT, Tran ND, Simelton E. 2022. Policy Support for home gardens in Vietnam can link to sustainable development goals. Agriculture 12: 253. DOI: 10.3390/agriculture 12020253.
- Ngcaba P, Maroyi A. 2021. Home garden in the Eastern Cape Province South Africa: A promising approach to enhance food security and well being. Biodiversitas 22 (9): 4045-4053. DOI: 10.13057/biodiv/d220953.
- Paebonan SA, Millang S, Dassir M, Ridwan M. 2018. Species variations in homegarden agroforestry system in South Sulawesi, Indonesia and its contribution to farmers income. IOP Conf Ser: Earth Environ Sci 157 (2018): 012004. DOI: 10.1088/1755-1315/157/1/012004.
- Park JH, Woo SY, Kwak MJ, Lee JK, Leti S, Soni T. 2019. Assessment of the diverse roles of home gardens and their sustainable management for livelihood improvement in West Java, Indonesia. Forests 10 (11): 970. DOI: 10.3390/f 101100970.
- Prihatini J, Iskandar J, Partasasmita, Nurjaman D. 2018. The impact of traditional home garden conversion into the commercial one: A case study in Sukapura Village of the Upstream Citarum Watershed, West Java, Indonesia. Biodiversitas 19 (5): 1926-1940. DOI: 10.13.57/biodiv/di90545.
- Reijntjes C, Haverkort B, Waters-Bayer A. 1992. Farming for the future: an introduction to low-external-input and sustainable agriculture. The Macmillan Press Ltd, London and Basingstoke.
- Roy M, Sarkar BC, Sukla G, Sukhla G, Vineeta, Debnath MK, Nath AJ, Bhat JA, Chakravarty S. 2022. Traditional homegardens and ethnomedicinal plants: insights from the indaian Sub-Himalayan Region. Trees, Forests and People 8: 100236. DOI: 10.1016/j.tfp.2022.100236.
- Setiani S, Setiawan E, Huang WC. 2022. Taneyan lanjang shared homegardens and sustainable rural livelihoods of ethnic madurese in Madura Island, Indonesia. Sustainability 14: 5960. DOI: 10.3390/su 14105960.
- Silalahi M, Nisayawati. 2018. The ethnobotanical study of edible and medicinal plants in homegarden of Batak Karo Sub-Ethnic in North Sumatra, Indonesia. Biodiversitas 19 (1): 229-238. DOI: 10.13057/biodiv/d190131.
- Saediman H, Gafaruddin A, Hidrawati H, Salam I, Ulimaz A, Rianse IS, Sarinah S, Taridala 2021. The Contribution of home food gardening program to household food security in Indonesia: A review. WSEAS Trans Environ Dev 17:795-809. DOI: 10.37394/232015.2021.17.75.
- Suwartapradja OS, Soemarwoto R, Hermawati R, Rajab B, Hardja A. 2017. Final report. Research Academic Leadership Grant (ALG) Jatigede Regarding Resettlement Affected by Jatigede Reservoir Development Concerning Social Mapping Affected by Jatigede Reservoir Development in the Sumedang District, West Java. Faculty of Social and Political Sciences, Padjadjaran Univererity. [Indonesian]
- Sujarwo W, Caneva G. 2015. Ethnobotanical study of cultivated plants in homegardens of traditional villages in Bali (Indonesia). Hum Ecol 43 (5): 769-778. DOI: 10.1007/s10745-015-9775-8.
- Swandayani RE, Hakim L, Indrayani S. 2016. Homegarden of Sasak people in Sayang Village, Sembalun, East Lombok, Indonesia. Intl J Res Stud Agric Sci (IJRSAS) 2 (1): 32-40. DOI: 10.20431/2454-6224.0201005.
- Thangjam U, Thong P, Sahoo UK, Ahirwal J, Malsawmkima B, Hrahsel L. 2022. Trees species diversity in relation to site quality and homegarden types of North-East India. Agroforest Syst 96: 187-204. DOI: 10.1007/s10457-021-00715-6.
- Turnsek M, Skar SLG, Piirman M, Thorarinsdottir RI. 2022. Homegardening and Food Security Concerns During the COVID-19 Pandemic. Horticulture 8: 778. DOI: 10.3390/horticulture8090778.
- Van Steenis CGGJ. 2008. Flora for schools in Indonesia. PT Percetakan Penebar Swadaya, Jakarta. [Indonesian]
- Wakhidah AZ, Chikmawati T, Purwanto Y. 2020. Homegarden ethnobotany of Twto saibatin villages in Lampung, Indonesia: Species diversity, uses, and values. For Soc4 (2): 338-357. DOI: 10.24259/fs.v4i2.9720.