Landscape management strategy of pekarangan to increase community immunity during the covid-19 pandemic in Java Indonesia – inductive research

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Abstract. The research results in the last two decades show the important role of pekarangan as a micro-scale landscape unit in providing space for growing various types of plants, i.e., multi-layers from the grasses to the trees, livestock, and fish. Pekarangan is defined with distinctive spatial patterns and elements as a representation of the harmonious relationship between the owner and the ecological character. Perceptions and preferences based on different social, cultural, and environmental factors shape the pekarangan pattern and function to become more diverse as a form of community local wisdom. The important role of pekarangan needs to be deeper elaborated in efforts to increase community immunity during the Covid-19 pandemic. Pekarangan has great potential to be developed as a mitigation and rehabilitation space by providing a variety of medicinal plants as well as outdoor activity spaces with a healthy environment quality. This research was designed for three years with three main approaches: (1) inductive method, which focuses on building theory from practices that have been known and carried out for generations, (2) implementation as an effort to actualize local knowledge, (3) multiplicative for the benefit of the important value of pekarangan. Studies start from basic research of pekarangan; research on the development of spatial planning and elements forming pekarangan; research on nutritional content contributed from pekarangan products. Data were obtained through pekarangan mapping, structured questionnaires at four selected locations in Cisadane, Citarum, Kali Progo, and Brantas Watersheds. The results of this research are expected to be implemented in public spaces on a meso scale and macro scales.

1. Introduction
This article is an introduction paper based on the research result in relation to the development and implementation of pekarangan. The research has been carried out over the last two decades, from 1998 to 2020. The results of previous research, which is based on ecological studies (bio-physical based on rural-urban landscape relationships), socio-cultural studies (local wisdom and traditional knowledge), and
economics (subsistence and commercial use), will be used as benchmarks. The proposed research is designed with an “area” approach (pekarangan aggregate in the form of a village/neighborhoods unit or RT RW) to be done in 3-years (2021-2022). To make use of pekarangan products as an effort to increase community immunity during the Covid-19 pandemic, an inductive approach was held, building theory from practices that are well known and have been conducted by the community well (figure 1).

The Covid-19 pandemic that occurred in Indonesia required people to work from home (WFH). WFH activities have a positive impact on the community not only as a strategy to prevent the spread of the Covid-19 virus but also increase social and environmental activities in the pekarangan, such as gardening [1], caring for plants, and the proliferation of the urban farming phenomenon [2]. This is believed to have a positive influence in maintaining and increasing the immunity of the human body both physically and psychologically [3, 4, 5].

Pekarangan, as a landscape unit around the house, is the best choice for gardening activities during WFH. This trend is common in urban, sub-urban, and rural areas [2]. Several studies during the Covid-19 pandemic were held, such as the efficacy of herbal plants as supplements that have functioned as prevention, antiviral treatment, and increasing body immunity [6, 7, 8, 9, 10]. Herbal plants such as turmeric, ginger, galangal, and other types of rhizome species which contain lots of vitamins, minerals, and antioxidants that can increase the body's immunity, are widely planted in pekarangan [11]. In addition, the presence of a fish pond and livestock (chicken, duck, meat, egg) can increase protein intake. Gardening and caring for plants are also believed to be able to provide positive energy. Therefore, they can increase the body's immunity [3, 4, 5].

Before the Covid-19 pandemic, many pekarangan studies have been conducted in the last two decades [11, 12, 13, 14]. Pekarangan has been widely used by families as a place to plant various plants, ornamental plants, medicine plants [15], fruit plants, vegetable crops, and non-timber products [16], livestock, and fish [13]. Pekarangan can express the owner's relationship with the ecological character of his environment [17]. Cultural differences in the community make the use of pekarangan different in each place.

In increasing the role of pekarangan in responding to the Covid-19 pandemic, this study aims to: (1) analyze the level of pekarangan utilization in West Java, East Java, and Yogyakarta during the Covid-19 pandemic, which is divided into urban, sub-urban, and rural areas; (2) develop a pekarangan landscape management strategy both in terms of spatial and composition, and (3) Identify plants that are able to provide positive values as an effort to increase body immunity during the Covid-19 pandemic.

2. Methods

2.1. Study site

The research has been conducted at locations using an ecological boundary approach in the form of a watershed (DAS). The selection of the 4 (four) watersheds was based on the domicile of the four universities.
involved, i.e., IPB in the Cisadane watershed, ITB in the Citarum watershed, UGM in the Progo watershed, and UNAIR in the Brantas watershed (figure 2). In each watershed, a representative landscape is determined with *pekarangan* in the upper-stream, middle-stream, and down-stream parts. The location chosen still has strong local wisdom and has cooperation with universities and local government.

![Map of Java Island showing pekarangan research locations](image)

**Figure 2. Pekarangan research locations in 4 (four) watersheds of Java Island**

### Table 1. Study site in each watershed of Java Island

| Sub-Watershed City/District | Cisadane City/District | Citarum City/District | Kali Progo City/District | Kali Brantas City/District |
|-----------------------------|------------------------|-----------------------|--------------------------|--------------------------|
| Sub-Watershed               | Cisadane               | Citarum               | Kali Progo               | Kali Brantas              |
| Three Study Site            | Kel. Mulyaharja        | Kel. Ledeng           | Desa Sidoarjo            | Kel. Jambangan            |
| in Village Level            | Kel. Genteng           | Kel. Hegarmanah       | Desa Gerbosari           | Kel. Wonorejo             |
|                             | Kel. Empang            | Kel. Lebak            | Desa Purwoharjo          | Kel. Sukolilo             |
| Respondent and Sample       | 3 Farmer               | 3 “Buruan SAE”        | 3 Farmer Women Groups    | 3 Farmer Groups           |
| Number                      | n: 90                  | Community Groups      | n: 90                    | n: 90                     |

Remarks: *Kel (kelurahan) = Desa = Village*

### 2.2. Methods

This research was designed with three main approaches, i.e. (1) inductive, which focuses on building theory from practices that have been known and carried out for generations, (2) implementation as an effort to actualize local knowledge, and (3) multiplicative for the benefit of the importance of *pekarangan* on a wider scale. This research is also designed to be held in a multi-year period of 3 (three) years. The achievement targets in Year I (2021) are divided on a quarterly basis, namely the beginning, middle, and end (figure 3) within ten months. The same method will be carried out for the second year and the third year.
At the beginning of Year-I, activities to be carried out are:
1. Preparation and intensive discussion between teams to formulate the survey implementation process;  
2. Online selection and training of enumerators/surveyors from each university;  
3. Simultaneous survey implementation in Bogor, Bandung, Yogyakarta and Surabaya.

In the middle of Year-I of the research, it is hoped that the mapping targets for pekarangan landscape management strategy can be described at each study location, as follows
1. The form of pekarangan development with patterns of edible gardens, spice gardens, and herbs gardens;  
2. Identifying local species of plants that will be used in the form of pekarangan design development;  
3. Determine the management of pekarangan development: individual pekarangan, public landscape such as community gardens, mixed gardens, forest gardens, or school gardens.

At the end of Year-I, the research is targeted to achieve an inductive garden landscape management pattern. Therefore the outputs are:
1. Selected local plant species that have utilization values for the community can be cultivated in the development area of pekarangan;  
2. Analysis of plants nutritional and compounds that are useful for elevating community immune;  
3. An integrated and sustainable landscape design of pekarangan at the aggregated area scale.

The first year's output in the form of an inductive study of pekarangan landscape will be used for implementation preparation in the second year on a larger landscape scale. Therefore, planting will be carried out in pekarangan or in the community garden at various spatial scales. Then the multiplicative approach in the third year is implemented on a wider scale, scaling up to the urban landscape, such as in urban parks, urban forests, or in other abandoned landscapes.

The distribution of work for each team is conducted using a base-development-utilization approach (figure 4), as follows:
1. Research basis: related to the ecology, social, and culture of pekarangan;  
2. Research development: related to the spatial planning of pekarangan and its filling elements;  
3. Research utilization: related to pharmaceuticals, nutritional content, and chemical compounds of plants, as well as their psychological impacts that can increase immunity and public health.
3. Results and discussions

Regarding the Covid-19 pandemic, the initial research, which began in May and June 2021, was postponed due to the Implementation of Community Activity Restrictions (PPKM). The new research is at the stage of visiting the women's farmer groups (KWT) and field observations. The research activities that should be carried out in each research location are as follows.

3.1. Mapping the existing pekarangan structure in the Cisadane Watershed

Research activities to determine the existing condition of pekarangan shall be carried out using the ecological pekarangan approach [12, 13, 18]:

1. Pekarangan Size
2. Pekarangan Pattern/Zoning
3. Vertical Diversity
4. Horizontal Diversity
5. Critical Minimum Size
6. The recall method on plant types before the Covid-19 pandemic is compared to existing ones so that the dynamics of species in pekarangan can be known.
7. Aspects of urbanization and its influence on the structure of pekarangan vegetation.

Preliminary surveys were carried out in May and June 2021 in three locations, i.e., Kelurahan Mulyaharja (the upper part), Kelurahan Genteng (the middle part), and Kelurahan Empang (the down part) of the Cisadane sub-watershed in Bogor City. Research on plant species was held in a public garden managed by the women farmer group (KWT). 80 species, 68 species, and 27 crop species were found at the upper, middle, and down parts, respectively (figure 5). The highest number of plant species was found in Mulyaharja Village, then Genteng Village, and the least in Empang Village, respectively. The number of plant species decreased at the location from upstream to downstream.

In these 3 locations, a total of 125 plant species have been found. These types of plants are categorized as ornamental plants (14%), fruit (21%), vegetables (21%), spices (13%), medicines (29%), and starch crops (2%). Medicinal plants turned out to be the most common species, followed by fruit and vegetable plants (figure 6).
There are plants species that are only found in one location, some are found in two locations, and some are found in all three research locations. There are 15 plants species found in all these locations. The fifteen plants species are spice crops (41%) as the highest, followed by medicinal plants (33%). Meanwhile, fruit plants (13%) and vegetable crops (13%) are both the lowest (table 2). In figure 7 shows the performance of KWT gardens at three research locations in the Cisadane sub-watershed, Bogor City segment. With the Implementation of Community Activity Restrictions (PPKM), all research activities in the field were postponed. Bio-physical research in Bogor pekarangan landscape has not yet been conducted.
Table 2. Some plant species which is found in three research locations

| No | Local Name     | Latin Name                                | Category     |
|----|----------------|-------------------------------------------|--------------|
| 1  | Alpukat        | Persea americana Mill.                    | Fruit        |
| 2  | Bawang Dayak   | Eleutherine bulbosa (Mill.) Urb.           | Medicine     |
| 3  | Binahong       | Anredera cordifolia Spp.                  | Medicine     |
| 4  | Bunga telang   | Clitoria ternatea L.                      | Medicine     |
| 5  | Cabe merah     | Capsicum annuum L.                        | Spice        |
| 6  | Cabe rawit     | Capsicum frutescens L.                    | Spice        |
| 7  | Jahe merah     | Zingiber officinale var. rubrum           | Spice        |
| 8  | Jeruk nipis    | Citrus aurantifolia Swingle.              | Fruit        |
| 9  | Kangkung       | Ipomoea aquatic                          | Vegetable    |
| 10 | Kelor          | Moringa oleifera                         | Vegetable    |
| 11 | Kumis kucing   | Orthosiphon aristatus (Blume.) Miq.       | Medicine     |
| 12 | Kunyit         | Curcuma longa L.                          | Spice        |
| 13 | Lengkuas       | Alpinia galanga L.                        | Spice        |
| 14 | Pandan         | Pandanus amaryllifolius Roxb.             | Spice        |
| 15 | Sirih          | Piper betle L.                            | Medicine     |

Figure 7. Public pekarangan as a demonstration plot of pekarangan plants managed by women farmer groups (KWT) in the lower (left), the middle (center), and the upper (right) areas in Cisadane sub-watershed, Bogor City

3.2. Traditional practices in pekarangan utilization support community immune and resilience in Kali Progo Sub-watershed

Research has been postponed due to the PPKM from June - July 2021. However, this research shows that Covid-19 cases in Kulon Progo (KP) are relatively low, or the lowest compared to districts and cities in Yogyakarta. It’s because KP is an herbal district and people regularly consume “jamu” as their traditional medicines [19,20]. It’s because the condition of the land cover, especially pekarangan is very good, thus creating a comfortable living atmosphere. Unfortunately, the composition of the plants in pekarangan, has not been observed. Therefore, the roles and function of pekarangan in order to serve food, medicine or other economic interests, or for comfort, coolness, and freshness (leisure) have not been explored.

Studies need to be conducted by a survey of community pekarangan, by studying their level of adoption of local plant species with food, medicinal, and other purposes, local knowledge in cropping patterns, crop calendars, and management systems on a household scale in rural landscapes. The study will be carried out in residents’ pekarangan Desa Sidoharjo, Desa Gerbosari, and Desa Purwoharjo (figure 8). The study generally combines (mix methods) of social survey methods and biophysical surveys. Social survey to
assess the level of acceptance and sustainability of the use of pekarangan to increase immunity and economic resilience. The survey was conducted individually or in community groups using a questionnaire in a Focus Group Discussion (FGD). The target respondents are 30 householders per research location. The analysis was carried out using the Adopt software (https://adopt.csiro.au) to determine the time length for adoption and the rate of adoption.

Figure 8. **Pekarangan** in the upper part (left), the middle part (center), and the lower part (right) of Kali Progo Sub-watershed, Kulon Progo Regency, Yogyakarta

3.3. **Spatial planning and garden elements of pekarangan in Citarum Sub-Watershed**

In the last five years, Bandung City has shown a positive trend in an effort to make its citizens happy. Bandung City Happiness Index data in 2018 [21] proves the value of being very happy (75.10 on a scale of 1-100) with the three highest values felt by the community in the religious component (89.89), family harmony (77.95), and environmental conditions (77.68). These three aspects conclude that the development program on a city scale dimension is considered successful in making its citizens happy, especially in increasing religiosity and harmony among its citizens and the environment.

As one that is considered important on a city scale, the environmental aspect proves the success of the public open space revitalization program, which sounded like a response to the urban environment, which tends to be monotonous, uncomfortable, and even unhealthy. The importance of the presence of open spaces, both public and private, was responded to by various revitalization programs such as the construction of thematic parks and the activation of participatory programs such as the urban agriculture movement. One of the thematic parks that were successfully presented was the Cikapundung Terrace, which provided a recreation space with a variety of interesting tourist attractions and played an important role in efforts to restore the Cikapundung river bank as part of the Citarum sub-watershed with a spatial planning and design approach.

The presence of the Cikapundung Terrace has a positive impact on rediscovering the local potential of Bandung City's people in general, especially local residents in relation to traditional ecological knowledge or local wisdom regarding procedures and living spaces. This is what is currently being developed by people living on the upper, middle, and the down parts of the Cikapundung River, precisely in Kel. Ledeng, Kel. Hegarmanah, Kel. Lebak Siliwangi respectively. Kampoeng Tjibarani, which is located in the middle part as one of the representatives of the participatory movement of citizens in creating a harmonious environment, has succeeded in getting the KNPI Award 2020 through urban farming and "glocalization" movement based on local wisdom and independence.

Pekarangan, as the smallest landscape unit on a home scale to neighborhood parks and community parks, even city parks and urban forests on a wider urban scale, is thought to have enormous potential as a space for mitigation and rehabilitation from problems related to urban environmental health. Green open space (RTH) and blue open space (RTB), which are currently present with high aesthetic value, can be enhanced
in their function to providing food, medicinal, fruit, vegetable, spice, industrial, ornamental, and other types of plants.

Figure 9. “Buruan SAE” in the middle part of Cikapundung riparian landscape, Citarum sub-watershed, Bandung City

In addition, as part of the urban landscape mosaic, RTH and RTB can become interconnected and integrated spaces to create a green-blue city network that functions ecologically and has the opportunity to become healthy, safe comfortable, and valuable high social and economic public spaces. These spaces will become more meaningful and valuable with an education-based (edu-tourism) and/or environment-based (ecotourism) approach.

The potential of multi-scale urban landscape units, from pekarangan to urban forests, requires a comprehensive, in-depth study. The spatial planning and design (SPD) approach is used as a research basis to show the importance of the space in the context of the surrounding environment, both on a local, city, regional, to global scale. The SPD approach functions in providing added value to the quality of the space. Therefore, users can feel a different experience that is safer and more comfortable. Another impact of the SPD approach is being able to make the space more attractive so that users are interested in visiting and using the space. This attraction is the initial capital for a space to become a tourist destination.

This spatial study was carried out using a mixed method, both qualitatively and quantitatively. Data were obtained through social and biophysical surveys. The social survey was conducted through structured interviews to obtain user perceptions and preferences regarding the space quality. The biophysical survey was carried out through an identification and mapping process related to a measurable and accurate layout of the landscape units studied (pekarangan in the first year; neighborhood parks and environmental parks in the second year; city parks and urban forests in the third year) and its environmental factors.

The social data was then analyzed using a push and pull motivational theory approach [22, 23] to determine the extent to which push and pull factors influence user perceptions and preferences of the object of study. The spatial data in the form of a description of the layout of the landscape units were analyzed using the Landscape Character Assessment approach [24] to assess the landscape's structure, configuration, and composition. The results of the analysis were then tested using the expert judgment method by relevant resource persons and discussed descriptively to be further developed into a recommendation in the form of a planning and spatial design guideline for each landscape unit being studied. The guideline was prepared using the benchmark method against similar published documents such as the Manual of Physical Distancing [25] and Urban Green Spaces: A Brief for Action [26].

This research plan was prepared considering the safety aspects related to the COVID-19 pandemic but still optimizing the potential for more significant and wider benefits. In addition, the selection of locations in the upstream area of the Cikapundung River is ITB's contribution in supporting government programs in realizing “Cikapundung Bersih and Citarum Harum”.
3.4. Nutritional content of plants and public health in Kali Brantas Sub-watershed

Indonesia has a diversity of plants that have the potential to be used as medicine. There are 40,000 medicinal plant species in the world, and there are 30,000 species widely distributed in Indonesia. There are 9,600 species of medicinal plants known for their medicinal function. About 3000 species of medicinal plants have been developed as traditional medicinal products [27]. Since the past, Indonesian people have used traditional medicinal ingredients for disease prevention, maintenance, and health care. Empirical experience of the use of several medicinal plants that show their efficacy in overcoming several diseases. Various pharmacological activities in plants are caused by the content of metabolites present in these plants [28]. Several flavonoid compounds and alkaloids have been reported to enhance immunity by various mechanisms [29]. The existence of this plant is very important for the community, especially in the current conditions in the era of the Covid-19 pandemic, where various studies have been carried out on the use of plants in improving public health, including improving the immune system. Covid-19 is a virus that has spread widely in the world. The absence of a specific drug for this virus is one of the reasons for the high rate of viral infection. One of the efforts that can be done to inhibit the spread of the virus is to increase the body's resistance or the body's immune system. Balanced nutrition is one of the keys to elevating immunity, besides the use of herbal plants to increase body immunity is an option. Some plants that have been reported to have an effect on increasing immunity include the Euphorbiaceae family such as *Phyllanthus niruri*, Asteraceae such as Echinacea, several Zingiberaceae families such as *Curcuma domestica*, *Curcuma xanthorrhiza*, Acanthaceae families such as *Andrographis paniculata*, and many others such as *Allium sativum*, *Morus alba*, *Acacia catechu*, *Tinospora cordifolia*, and *Mangifera indica*. The plant is used to increase immunity and functions as an antiviral [30, 31, 32, 33].

In an effort to increase the community immune, in this study, an effort was made to optimize *pekaran* for planting productive plants, such as food and herbal. These food plants and herbs can be used by the community for their daily needs. It is also expected to be beneficial for health, especially increasing immunity in the fight against the Covid-19 attack.

**Figure 10.** Three performances of plant structure in *pekaran* landscape in the middle part of Kali Brantas Sub-Watershed, Surabaya City

3.5. Landscape management strategy of pekarangan as an effort to increase community immunity during the covid-19 pandemic

*Pekaran* can be a medium for increasing community immunity during the Covid-19 pandemic. The increase in immunity is achieved through physical and psychological processes. Physical activity that helps to increase the immune system is obtained through nutritious and healthy food, exercise, and sunbathing. Besides the common cultivation in *pekaran*, such as ornamental plants and starch crops, vegetables, fruits, herbs, and spices can also be planted in *pekaran* [12, 13]. In general, *pekaran* research results on Ciliwung riparian landscape show that bigger area *pekaran* produce more diverse plants. Agricultural biodiversity in the function of *pekaran* is to support food security and accelerate the diversification of
food consumption. It is known that the benefits of *pekaran* production are for subsistence, e.g., fruits, vegetables, spices, medicines, and cereal, tuber as a source of carbohydrates [34]. Food sources that provide complete vitamins and nutrients can be met through *pekaran*. Perkarangan also creates a space for physical movements such as gymnastics, light exercise, and sunbathing, which is beneficial to increase community immunity *pekaran*.

Psychologically, the diversity of plants and animals in *pekaran*, e.g., birds, dragonflies, and butterflies, can help reduce stress levels. Planting activities, fruit picking, maintaining the garden, or just enjoying the visuals of *pekaran* can provide relaxation. With the movement of herb and vegetable gardens to support food security, developers in America are designing productive landscapes [35]. This is an implementation of urban agriculture. This vegetable garden and herbal garden also provide amenities for the residents of the apartment.

### Table 3. Research aspects, variables, and objectives of resilient *pekaran*’s parameters

| No | Research aspects | Variable | Objectives |
|----|------------------|----------|------------|
| 1  | *Pekaran* Characteristics | Area, zoning, plants vertical diversity, plants horizontal diversity, existing species | The influence of local wisdom in the research area |
| 2  | Increase immunity physically | Types of plants that focus on increasing immunity during a pandemic, exercise area, sun-bathing space | Identify COVID-19 resilient *pekaran*, focus on physical |
| 3  | Increase immunity psychologically | Types of family activities, neighborhood activities, passive activity | Identify COVID-19 resilient *pekaran*, focus through psychology |

### Table 4. Food sources for immunity

| No | Nutrient | Food Sources |
|----|----------|--------------|
| 1  | Vitamin A | Fish oil, chicken liver, butter, egg yolks, red chilies, carrots, chicken meat, kale, pumpkin, tomatoes, papaya, watermelon, mustard greens. |
| 2  | Vitamin C | Mustard greens, spinach, kale, guava, green chilies, papaya, broccoli, strawberry, lemon, sweet orange, pineapple, and mango. |
| 3  | Vitamin E | Sunflower oil, sunflower seeds, almonds, corn oil, soybean oil, palm oil, margarine, olive oil, kiwi, spinach, broccoli, bean sprouts, and carrots. |
| 4  | Zinc | Oysters, crab, beef, chicken liver, cheese, egg yolk. |
| 5  | Vitamin B6 | Tuna, chicken, salmon, skinless chicken breast, banana, potatoes, beef, brown rice. |
| 6  | Vitamin B12 | Nori, scallops, chicken liver, mackerel (*kembung* fish), salmon, beef, tuna, egg yolk, cow’s milk, tempeh. |
| 7  | Folic acid | Chicken liver, spinach, peanuts, broccoli, oranges, tofu, strawberries, tempeh. |
| 8  | Vitamin D | Mackerel (*kembung* fish), salmon, egg yolks, sardines, cow’s milk |
| 9  | Selenium | Tuna, Sun-bathing at 09.00 for 25 minutes can get vitamin D |
| 10 | Iron | Rice, meat and milk, mustard greens. |
| 11 | Copper | Chicken liver, clams, oysters, spinach, tempeh, kale, tofu, beef, mustard greens. |
| 12 | EPA and DHA fats | Oysters, chocolate, nuts and seeds, chicken liver. |

Source: [36]

The study site shows the influence of local wisdom on the elements of *pekaran* and its activities. The research in Year I was conducted through a survey method with variables for data collection aspects of the study in table 1, food sources for immunity (table 2), and the use function of spice plants (table 3). During
The Covid-19 pandemic, there was a trend to consume more medicinal plants such as ginger, turmeric, aromatic ginger, lemongrass starting to be planted in *pekaran*an*. These plant products are used for family consumption in order to improve body health [3, 4, 5]. Based on the results of previous research, *pekaran* in Bogor and Cianjur, West Java which was studied in the past two decades, showed a tendency to increase the number of fruit plant species. Fruit plants commonly planted in *pekaran* were mangoes, rambutans, and guavas even though, the medicine plant is also currently planted in *pekaran* [11].

**Table 5.** The function of spice plants for covid-19 infection preventive

| No | Spice Plants | Beneficial Spice Plant Function |
|----|--------------|--------------------------------|
| 1  | White ginger, red ginger | Maintain the immune system, prevent and kill bacteria and viruses in the body. It contains high antioxidants that function to prevent free radicals that can cause damage to body cells. |
| 2  | Turmeric      | Contains curcuminoids and essential oils that act as antioxidants, antitumor and anticancer. It contains anti-inflammatory and antioxidants to maximize the body's resistance to various diseases, including the coronavirus. |
| 3  | Lemongrass    | It reduces fever, preventing the occurrence of flu and nasal congestion, as an antifungal, antibacterial, anti-inflammatory, antidepressant, to antioxidant. It is overcoming depression, controlling pressure, and reducing bad cholesterol in the body. |
| 4  | Aromatic ginger | Cure cough with phlegm, make breathing easier. |
| 5  | Curcuma       | It contains antioxidants that can protect the body from exposure to free radicals, which are believed to be the source of various diseases |

Source: [37]

4. Conclusions
The research results presented in this paper are still in general perspective. It consists of a general description of the condition of the *pekaran* landscape and the structure of the plants. The research itself only have been run in the first quarter of 2021 from a multi-year study (2021-2023). Research in the field had started around April to June 2021. The research was temporarily postponed because of several constraints, including the Implementation of Community Activity Restrictions (PPKM) in Java and Bali due to the Covid-19 pandemic.

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