# Study of Landscape Plant Nursery in Bogor Regency for Development of Plant Supply Information System

**A I Syafitri[1] and N Nasrullah[2*]**

[1]Alumni of Undergraduate Program, Department of Landscape Architecture Faculty of Agriculture, IPB University
[2]Lecturer in The Department of Landscape Architecture Faculty of Agriculture, IPB University. Jl. Meranti, IPB University, Dramaga Campus, Bogor West Java Indonesia 16680

***Email** : nizar_nasrullah@apps.ipb.ac.id

**Abstract.** Adequate plants supply for the landscape industry depend on the success of nursery to provide a variety of plant. This research aimed to assess features of the landscape plant nursery in Bogor Regency. The aspect of nursery that have been analyzed including aspect of plant, physical features, production and marketing. Another objectives were to create website prototype for online plant marketing. Its were observed 30 nurseries in 10 sub regencies. Research results showed, there were 290 species of plants that are sold which it is consisted of 128 species of groundcovers, 55 species of herbs, 40 species of shrubs, 32 species of trees, 27 species of climber plants, and 8 species of epiphyte.. Based on correlation analysis results, it was found that plant stock was influenced by nursery area, type of nursery, and nursery utilities. Otherwise type of nursery was influenced by nursery area. Success in sales can be achieved by creating a website as a functional media that can provide the information on stock and price of plants at the nurseries in Bogor Regency. The website that have been constructed used a MySQL database system, the local desktop PHP MyAdmin, and CodeIgniter as a system framework.

Keywords: aspects of nursery, correlation, nursery, species of plants, website

## 1. Introduction

Plants can provide beauty, comfort and various other functions for human life. This need is increasing in line with the emergence of awareness of environmental sustainability and appreciation of the beauty of plants. This can be seen in the development of the landscape industry at this time. The supply of plants as the main element in the landscape industry is very dependent on the success of nurseries as plant providers, although very often the presence of nurseries in the landscape industry is considered less important. Plant nursery is a place for trees , shrubs, ground cover plants, vines, and other herbaceous plants are propagated and developed [1]. Likewise, ornamental plants are increasingly popular with people at this time, both plants that have beautiful flowers and beautiful leaves. This shows that the development of nursery necessary to meet the needs of the plant-loving community. Economic principles and increased demand for plants, changing nurseries from seasonal businesses to year-round businesses [2].

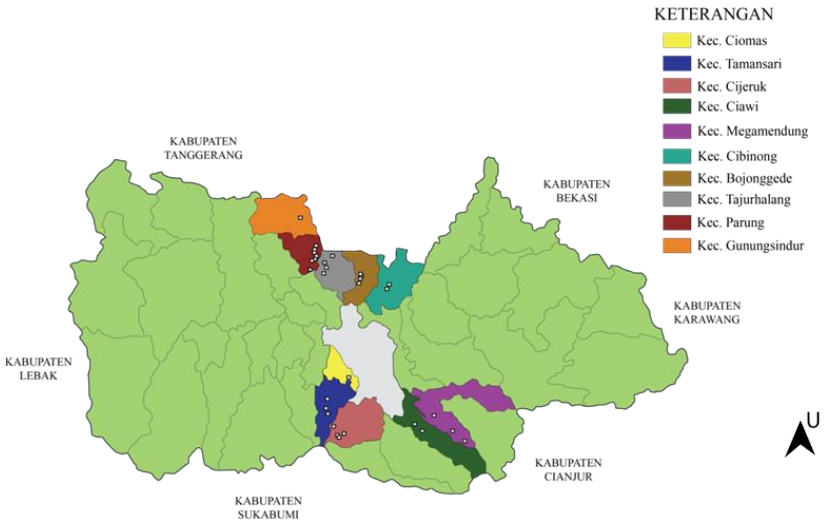
Urban activities at this time require fast time and mobility. One of the functions of the nursery is to provide plant materials that are in accordance with the planting schedule. The use of technology is

expected to provide great benefits to the competitive business world. Web technology on the internet plays a very important role that it allows organizations or companies to enter the market in a way that is easy, inexpensive, and without geographical restrictions. Everything will be in what is called cyberspace. In this case, the organization or nursery company will compete with other businesses in cyberspace or in virtual world [3]. Therefore, one of the outputs of this research is expected to facilitate the urban community to get easily a plant information in the nursery in the form of a website. The purpose of this research is to examine the character of nursery including aspects of plant diversity, physical, production, and marketing. Besides it was to analyze the factors which influence plant product in the nursery and to create a prototype of website for online buying and selling plants.

## 2. Research method

### *2.1. Research location and time*

This research activity took 30 nurseries as respondents, which located in ten sub-districts in Bogor Regency, West Java. The ten districts (Figure 1) are Ciomas District (1 nursery), Tamansari (3 nursery), Cijeruk (4 nursery), Ciawi (2 nursery), Megamendung (3 nursery), Cibinong (2 nursery), Bojonggede (3 nursery), Tajurhalang (4 nursery), Megamendung (3 nursery), Cibinong (2 nursery), Bojonggede (3 nursery), Parung (7 nursery), and Gunung sindur (1 nursery). The study was conducted for eight months from January to September 2018.




Source: Processed from Google Earth Pro 2018

**Figure 1** Research location

### *2.2. Research stages*

*2.2.1. Pre survey*. At this stage a questionnaire was made for 30 nurseries covering aspects of plant product diversity and stock number, plant specifications, production activity and marketing of the nursery. Then find the location of the nursery by consulting to the Agency of Agriculture and Horticulture Bogor Regency and than applied a permit to distribute questionnaires.

*2.2.2. Survey*. The selection of 30 nursery locations was done by purposive sampling in each district. The selection of each type of nursery is only considered subjectively, namely 10 small nurseries, 10 medium nurseries, and 10 large nurseries. Interviews were conducted by asking directly to both the owner and the worker. The study on aspects of plants diversity includes to identify the species of plants,

record and document the plants, calculate the stock of each type of plant in the nursery along with its specifications, land, facilities, water sources and irrigation systems, and utilities. Study of production aspects includes propagation, transplanting and potting, as well as control of pests and plant diseases. Finally, the assessment of marketing aspects includes the sale of products, types of consumers, marketing, and the presence of nursery. Secondary data is obtained from literature sources in the form of books and other online literature.

### *2.3. Data analysis*

*2.3.1. Percentage.* Percentage value is calculated to understand the result of observation in aspect of plant, physical, production and marketing nursery product. Besides, correlation analisis is done to understand the closeness correlation between two variabel of nursery.

*2.3.2. Pearson correlation test*. Pearson correlation analysis is an analysis to measure the closeness of the linear relationship between two variables that have a normal data distribution. The data used is interval or ratio type in the form of nursery area data, number of facilities, number of utilities, total plant stock, and the number of plant species.

*2.3.3. Spearman correlation test*. Spearman rank correlation is a statistical test tool used to test the associative hypothesis of two variables if the data is ordinal scale (ranking). Data used in this test are categorical data in the form of nursery data, nursery distance to market, and consumer ratings.

## 3. Results and Discussion

### *3.1. General Description*

Bogor Regency consists of 40 Districts. Ornamental plants farmer in Bogor Regency are scattered in various districts. According to Bogor Regency Agriculture Office, in 2016 there were 15 districts conducting business of ornamental plant (Table 1).

**Table 1.** Districts and SubDistrict in Bogor Regency conducting ornamental plant production

| No. | District | Sub District/Village |
|---|---|---|
| 1 | Cijeruk | Sukaharja, Kp. Pondok Bitung, dan Pasir tengah |
| 2 | Tamansari | Sukamantri, Sukajaya, Pasireurih, Sukajadi, dan Sukaharja. |
| 3 | Ciomas | Kota batu, Laladon, dan Ciapus. |
| 4 | Cisarua | Cisarua, Citeko, Batulayang, Kopo, dan Tugu selatan. |
| 5 | Ciawi | Banjarwaru |
| 6 | Megamendung | Sukamaju, Sukamanah, Ciletuh, dan Sukagalih. |
| 7 | Pamijahan | Gunung Sari, Gunung Picung, dan Gunung Bunder II. |
| 8 | Nanggung | Curug bitung dan Parakan muncang. |
| 9 | Gunung Sindur | Cibinong, Rawakalong, Pengasinan, Cikodom, dan Gunung Sindur. |
| 10 | Ciseeng | Cihoe |
| 11 | Tajur halang | Kalisuren, Sasak panjang, dan Citayam. |
| 12 | Parung | Jabon mekar, Pamager sari, Waru, dan Bojong indah. |
| 13 | Babakan madang | Kadumanggu, Cipambuan, dan Bojong koneng. |
| 14 | Bojong gede | Bojong gede, Kedung waringin, Waringin jaya, Cimanggis, Bojong baru, Pabuaran, Rawa panjang, Susukan, dan Ragajaya. |
| 15 | Cigombong | Pasir jaya |

### *3.2. Idenification of plant aspect in nursery*

*3.2.1. Plant which dominantly produced and traded*. Plants are divided into six categories namely ground cover plant (GCP), bush, shrubs, trees, vines/climber plants, and epiphytes. Two categories of plants that are quite difficult to distinguish are the bush and shrub. Bush is a plant that has branch directly spreads starting from the surface of the growing media, while shrub plants are plants that have woody stems and grow taller [4]. Table 2 describes the identification of five dominant plant species for each plant category that are produced in nurseries in Bogor Regency Total species of plant species found in nursery was 264 species including 110 species of ground cover plant, 57 species of bush plants,32 species of shrub plants, 31 species of trees, 24 species of climber plants, and 10 species of epiphytic plants. It is showed that many option of plant can be selected to fulfill demand of plant for landscape construction and maintenance.

**Table 2.** The top five species in each plant category produced in nursery

| No. | Cate-gory | Species name | Sum of nursery | No. | Cate-gory | Spesies name | Sum of nursery |
|---|---|---|---|---|---|---|---|
| 1. | GCP | *Eudio ridleyi* | 10 | 4. | Trees | *Syzigium oleana* | 18 |
| | | *Aglaonema variegata 'butterfly'* | 9 | | | *Dypsis lutescens* | 10 |
| | | *Chlorophytalum commosum* | 8 | | | *Terminalia catappa* | 8 |
| | | *Calathea triostar* | 6 | | | *Plumeria rubra* | 6 |
| | | *Ophiopogon japonicus* | 6 | | | *Bismarckia nobilis* | 5 |
| 2. | Bush | *Tabernaemontana divaricata* | 17 | 5. | Climber/ hanging | *Vernonia elliptica* | 9 |
| | | *Excoecaria cochinchinensis* | 13 | | | *Philodendron erubescens* | 8 |
| | | *Ixora coccinea* | 13 | | | *Philodendron burle-marxii* | 7 |
| | | *Ixora javanica* | 9 | | | *Epiphyllum anguliger* | 5 |
| | | *Dieffenbachia bowmannii* | 8 | | | *Philodendron cordatum* | 5 |
| 3. | Shrubs | *Codiaeum variegatum* | 18 | 6. | Epiphytes | *Asplenium antiquum* | 4 |
| | | *Dracaena reflexa* | 16 | | | *Platyceriumbifurcatum* | 3 |
| | | *Cordyline fruticosa* | 8 | | | *Asplenium nidus* | 2 |
| | | *Podocarpus neriifolius* | 7 | | | *Platycerium superbum* | 2 |
| | | *Dracaena marginata* | 6 | | | *Phalaeonopsis amabilis* | 1 |

*3.2.2. Nursery type according to plant type which propagated*. Grouping the nursery in terms of plants type that are propagated, nursery are divided into two groups , namely wholesale nurseries and specialist nurseries (Table 3). Specialist nurseries are nurseries that produce plants in one genus, while wholesale / retail nursery are nurseries that sell several types of plants [5]. Survey of 30 nurseries in Bogor Regency shows that 30% of nurseries were specialist nurseries, while the other 70% were wholesale nurseries.

**Tabel 3.** Plant production in Specialist Nurseries and in Wholesale Nurseries

| Plant category | Sampel of *specialist nursery* | | Sampel of *wholesale/retail nursery* | |
|---|---|---|---|---|
| | Ciapus Bromeliads | Monfori Nursery | Tiara Nursery | Pak Endang Nursery |
| Ground cover plant | *Aechmea Alcantarea Neoregelia* | *Aglaonema Caladium Calathea* | *Alocasia Alcantarea Begoni, etc* | *Calathea triostar Chlorophytalum comosum, etc* |
| Bush | | | *Anthurium Medinilla cummingii Excoecaria cochinchinensis, etc* | *Dieffenbachia aglaonematifolia Ixora etc.* |

| | | | | |
|---|---|---|---|---|
| Shrub | | *Cordyline* | *Loropetalum lanceum*<br>*Dracaena reflexa, etc* | *Dracaena surculosa*<br>*Jasminum grandiflorum, etc* |
| Tree | | | *Dypsis lutescens*<br>*Syzigium oleana, etc* | *Terminalia catappa*<br>*Caesalpinia pulcherrima, etc* |
| Climber/ hanging | *Tillandsia* | | *Peperomia*<br>*Platycerium bifurcatum, etc* | *Philodendron burle-marxii,*<br>*Philodendron erubescens* |

Table 3 showed plants in specialist nurseries propagates several species in one Family. For example, in The Ciapus Bromeliads nursery, as the name implies, this nursery produce the types of plants in one family namely Bromeliaceae, while in Monfori nursery produce ground cover plants with many varieties on Aglaonema, Caladium, and Calathea plants. In wholesale nursery, production of plants do not have a specific concept. Even though there is a propagation of plants that have many species or varieties in one genus, but the genus of plants that are propagated is more diverse. Plants that are propagated also include two or almost all categories of plants, both from types of ground cover plants, bush, shrubs, trees, or vines / hanging plant.

### *3.3. Physical aspect of nursery*

*3.3.1. Nursery type*. Generally nurseries are divided into three main types, namely plant propagation nurseries, plant enlargement (grow-on) nurseries, and retail nurseries. The survey results show that nursery type in Bogor Regency, 43% was propogation nurseries, 37% are plant enlargement nurseries, and the remaining 20% are retail nurseries.

*3.3.2. Growing medium*. Based on the survey results, soil is still the main planting medium which still be used even though the proportion used was not dominant in planting media mixes. Other used media were 97% paddy husk , 73% manure (chicken or goat), and another 20% used mix of compost, ferns, and sawdust by 7%, 10% using cocopite, and 3% using bamboo shaving.

*3.3.3. Nursery area.* The land area of 30 nurseries was varied, 11 nurseries or 36.7% of the land area category is hundreds square meters, 15 nurseries or 50% were thousands square meters, and 4 nurseries or 13.3% are in the category of tens of thousands square meters.

3.3.4. *Amenities*. Table 4 show a description of facilities and the number of nurseries that have various facilities, namely at the administrative office (3 nurseries), road and parking (12 nurseries), employee facilities (21 nurseries), public areas (21 nurseries), storage of equipment (19 nurseries), pesticide storage (5 nursery), mother plant stock (16 nursery), propa-gation area (23 nursery), potting area (22 nursery), and development area (29 nursery). It is showed that almost all nursery has unused land that can be utilized to enlarge production block if nursery accept big order.

**Table 4** Number and percentage of each physical category of nursery

| No. | Sub-Aspect | category | Number | % |
|---|---|---|---|---|
| 1. | Land area | Hundreds $m^2$ | 11 | 36,7 |
| | | Thousands $m^2$ | 15 | 50 |
| | | Ten Thousands $m^2$ | 4 | 13,3 |
| 2. | Facilities | Administration office | 3 | 10 |
| | | Road dan parking | 12 | 40 |
| | | Employe facylities | 21 | 70 |
| | | Public area | 21 | 70 |
| | | Equipments and material storage | 19 | 63,3 |
| | | Pesticide/chemicals storage | 5 | 16,7 |
| | | Mother plant area | 16 | 53,3 |
| | | Propagation area | 23 | 76,7 |

| | | | | |
|---|---|---|---|---|
| | | Potting area | 22 | 73,3 |
| | | Depelopment area | 29 | 96,7 |
| | Utility | Shadehouse | 9 | 30 |
| | | Trolly | 2 | 6,7 |
| | | Small Lorry | 15 | 50 |
| | | Shovel | 19 | 63,3 |
| | | Hoe | 29 | 96,7 |
| | | Pruning shears | 26 | 86,7 |
| | | Sprayer | 17 | 56,7 |
| | | Label | 5 | 16,7 |
| 3. | Water sources | Ground water | 20 | 67 |
| | | River/ pond | 10 | 33 |
| 4. | Irrigation system | Sub-irrigation | 2 | 6,7 |
| | | Flowing | 2 | 6,7 |
| | | Sprinkle | 2 | 6,7 |

*3.3.5. Water sources and irrigation systems.* Water sources of nursery are divided into two main types, namely 67% ground water and 33% river/pond, while irrigation systems are divided into four types that are often used, namely manual hose, sub-irrigation system, ebb and flowing, and both automatic sprinkles or not. Manual system was the main irrigation system in all nurseries. But there were nurseries that carry out other irrigation systems, each of which amounted to two nurseries or 6.7% in each system.

*3.3.6. The utility*. The percentage of nursery used utilities among 30 nurseries was 30% . Almost 85% of the total nursery used hoe and pruning shears, and the lowest was in the trolley and label tools.

### 3.4. Production Aspect

*3.4.1. Propagation*

From the observation data, as many as 93% nurseries propagate by cuttings; 33.3% did generative propagation, namely using seed for planting, and another 6.7% nurseries using tissue culture and division of grass sod (Table 5)

Table 5. Number and percentage of each category of production aspect

| No. | Sub-Aspect | Category | Number | % |
|---|---|---|---|---|
| 1. | Propagation | Vegetative (cutting) | 28 | 93 |
| | | Generative | 10 | 33,3 |
| | | Others (Tissu culture) | 2 | 6,7 |
| 2. | Transplanting and potting | Transplanting | 8 | 26,7 |
| | | Repotting | 13 | 43,3 |
| 3. | Growing medium | Paddy husk | 29 | 97 |
| | | Animal manure | 22 | 73,3 |
| | | Others | 6 | 20 |
| 4. | Maintenance/ Watering | Ones/day | 9 | 30 |
| | | Twice per day | 8 | 26,7 |
| | | Ones per two days | 13 | 43,3 |
| 5. | Fertilizing | NPK | 19 | 63,3 |
| | | Animal manure | 13 | 43,3 |
| | | Urea | 5 | 16,7 |
| | | Others (leaf fertilizer) | 1 | 3,3 |

*3.4.2. Maintenance*

In the sub-aspects of maintenance, the activities carried out include watering, fertilizing, and others. In the watering there were diverse treatments from each nursery. Watering once a day is done by 30% nurseries; watering twice a day is done by 27% nursery; and watering every other day by 43% of nurseries. For fertilizing activities, it can be seen that from 30 nurseries as a dominant sample with a percentage of 63.3% used NPK fertilizer, then followed by 4.3% manure, 16.7% Urea, and others such as leaf fertilizar with a percentage of 3.3%.

*3.4.3. Plant attacted Insect and Desease*

In the interview results regarding this matter, 90% of farmers /businessmen of nuseriess stated that insect dominantly disturbed the plant (Figure 2). It can be seen that the dominant pest attacking the plants are caterpillars with a percentage of 41%, followed by grasshoppers and ants with a percentage of 14%, ticks with a percentage of 10% and 18% of other insect, namely flies, thrips, leafhoppers, termites, snails, and fungi. Countermeasures are carried out with pesticida. Survey showed that the dominant insecticide used was the Decys brand with a percentage of 40%, followed by the Curacron brand by 37%, then the Furadan brand with a percentage of 13%, and others such as Lipol, Confidor, Furtigor, and so on by 10%.

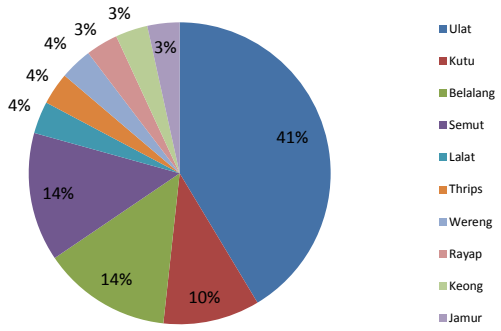



Figure 2. Percentages of plant insect attack.

**3.5. Marketing Aspect**

*3.5.1. Selling*

In the Table 7, it can be seen that the districts that produce the most ground cover plant were Parung sub-district (63 species) and Cijeruk (50 species) and totally 110 species of ground cover plants found in 30 nursery samples. Furthermore, for shrub species, there are two producing districts, namely Parung (21 species) and Ciawi (19 species) of 57 species.

Most types of bush are produced in Megamendung District (38 species) and Parung (25 species). In trees, Parung and Cijeruk districts have 26 species and 9 species of trees of 31 species. The highest number of vines / hanging plants was in Cijeruk sub-district (14 species) and Parung (12 species) of the 24 plant species. Whereas in epiphytic plants, Tamansari District (6 species) and Cijeruk (2 species) became two nurseries with the most variations of epiphytic plant species. It can be concluded that Parung District is the most complete ornamental plant production center in Bogor Regency and followed by Cijeruk District in second.

### *3.5.2. Product supplies*

In certain nurseries, not only sell plants but also sell equipment that can support gardening activities. Equipment that was often sold are pots, fertilizers, rocks, pond pumps, medicinal plants (pesticides and plant fertility), planting furniture (ponds, sculpture, etc.), to planting media. The percentage of nurseries sold equipment is only 23.3% among of 30 nurseries studied.

Table 6. Number of plant species sold in each district

| No. | Disrict | Sam pel | Number of plan species | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | GCP | Shrubs | Bush | Tree | Mr/Mg | Epiphytes |
| 1. | Ciomas | 1 | 3 | 6 | 8 | 1 | 0 | 0 |
| 2. | Tamansari | 2 | 32 | 5 | 2 | 0 | 5 | 6 |
| 3. | Cijeruk | 5 | 50 | 22 | 10 | 9 | 14 | 2 |
| 4. | Ciawi | 2 | 26 | 19 | 13 | 8 | 4 | 1 |
| 5. | Megamendung | 3 | 23 | 19 | 38 | 2 | 8 | 0 |
| 6. | Cibinong | 2 | 37 | 11 | 6 | 4 | 8 | 1 |
| 7. | Bojonggede | 3 | 13 | 9 | 4 | 6 | 4 | 0 |
| 8. | Tajurhalang | 4 | 23 | 15 | 5 | 8 | 6 | 0 |
| 9. | Parung | 7 | 63 | 21 | 25 | 26 | 12 | 0 |
| 10. | Gunung sindur | 1 | 4 | 7 | 2 | 3 | 0 | 0 |

### *3.5.3. Services*

Nursery is an activity to trade a plants which is a necessity for beautifying of an area. It was found nursery provide services such as garden design, supply of garden buildings, education/study tours, and park renovations. There were two nurseries (6.67%) of 30 nurseries provide service of garden design, garden building suppliers, and study tour. But for park renovation services, there were seven nurseries or as many as 23.3% who do park renovations. Renovation requests usually come from housing / private projects, urban planning, and so on.

### *3.5.4. Consumer*

In Table 7 there are three main types of consumers in the nursery, there are those who buy in the form as individuals, traders / supply, and exports. There are 80% of nurseries that sell to individually, sell 63.33% to traders / suppliers, and sell for export by 10%.

Table 7 Number and percentage of each marketing aspect

| No. | Sub-aspect | Category | Number | % |
|---|---|---|---|---|
| 1. | Consument | Individual | 24 | 80 |
| | | Trader/ *supplier*/ *florist* | 19 | 63,3 |
| | | Eksport | 3 | 10 |
| 2. | Marketing | *Online* | 4 | 13,3 |

### *3.5.5. Marketing*

Survey of 30 nurseries in Bogor regency ( Table 6) found that only 13.3% do online marketing. It was identified there were two nurseries using website and two nurseries using social media Instagram in marketing products. It was also found that there were nurseries make periodic trade agreements with certain contractors, so there is no need to look at other consumer opportunities, and so on.

*3.5.6. Street to Market*

In the distance (proximity) sub-aspect, the distance of nurseries to market in the city is divided into three categories, namely very close, far enough, and very far. The classification is based on Law No. 38 of 2004, where roads according to their function are divided into arterial roads, collector roads, local roads, and environmental roads as described in Table 8.

Tabel 8. Number of nursery in each category of distance to market

| No. | Note | Category 1 Collector road | Category 2 Local road | Category 3 Environmental Road |
|---|---|---|---|---|
| 1. | Definision | Services for collector transporation 15 | Services for local transportation with short distance 12 | Services for environmental transportation with short distance, 3 |
| 2. | Region | City | District | Sub district |

Category 1 is collector roads, where there is a theory that small nurseries are generally close to major roads, Category 2 is given to the local road, and finally category 3 is given to the environmental road because according to the theory if large nursery are generally located in areas that are quite difficult to access or located only in environmental roads. In the distribution of road category, among of 30 nurseries there were 15 nurseries or 50% that fall into the category 1, 12 nurseries or 40% go to category 2, and only 3 nurseries or 10% belong to category 3.

**3.6. Correlation among nursery aspect**

*3.6.1. Correlation between facilities and area of nurseries*

Results of Pearson correlation analisis showed that in the case of nurseries in Bogor Regency, increasing of nurseries area was followed by the increasing of the number of facilities in it (Figure 3). The total completeness of facilities at the nursery is 10 facilities. The area of category 1 with an area of hundreds $m^2$ usually only has 1-5 facilities in it, category 2 with an area of thousands $m^2$ has 5-8 facilities, and category 3 with an area of tens of thousands of $m^2$ has 8-10 facilities.

The average facilities owned in the 1 category are public areas, propagation areas, and development areas; the 2 category is the existence of workers' facilities, public areas, storage / equipment areas, brood stock areas, propagation areas, potting areas, and development areas; and in the 3 category, which is the same as the second category with the addition of parking circulation facilities and chemical facilities

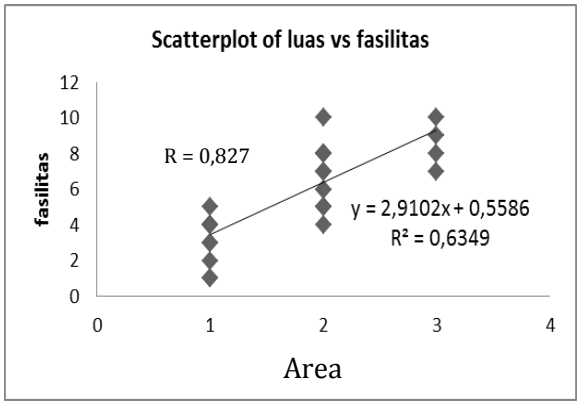



Figure 3. Correlation between nursery area and number of facilities

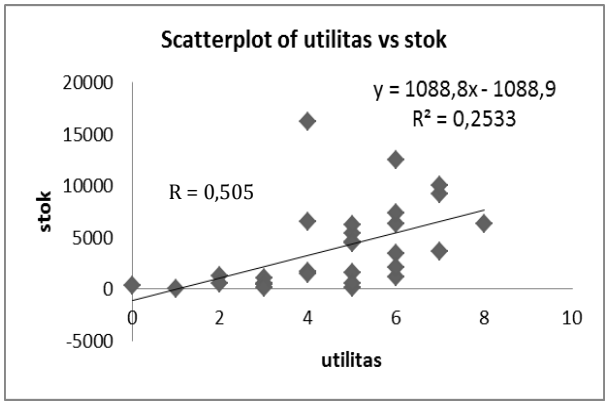



Figure 4. Correlation between number of utilities and plant Stock

*3.6.2. Correlation between number of utilities and number of plant stock*

The results show that a positive regression line means that the more utilities used in a nursery, the stock of plants produced also increased, but the correlation number is small. The types of plants that are propagated in each nursery are different, both from ground cover plants, bush, shrubs, trees, to other plants. The absence of a standard size in calculating the amount of stock is one indicator that affects the small value of the correlation. For example, there is a nursery that has a high amount of stock, but the number of utilities that are owned is small or propagated plant was small/ young or the type of ground cover plants that are propagated has small size.

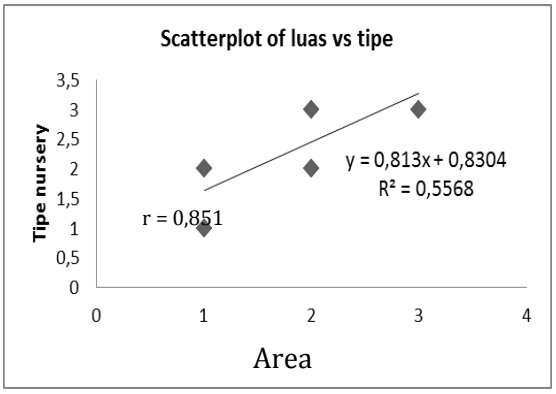



Figure 5. Correlation between nursry area and nursery type

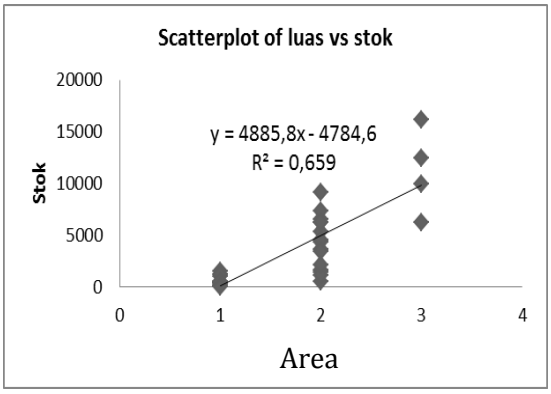



Figure 6 Correlation between nursery area and plant stock

*3.6.3. Correlation between nursery area, type nursery, and nursery stock*

Result of Spearman analysis show strong correlation between nursery area and nursery type. In the Figure 5 it can be seen that the propagation nursery (type 1) has a wider area than the plant enlargement nursery (type 2) and then the sales nursery (type 3). This is because the stock at the multiplication stage must be widely produced in order to be marketed to other nurseries. In the propagation nursery, the area of the land is not only to accommodate plants that are still small, but also usually has land for plant enlargement to the area of mother plant where the mother plant has a size that is large enough. Facilities

built in propagation nursery are also complete to meet production activities. Plant enlargement (grow on) nurseries require land according to how many and the size of plants that are owned.
Propagation activities can be done, but not the main, sales nurseries have smaller land sizes than other types. This is due to the amount of plant stock which will be sold is not too much and usually located in the area of urban highways, where the size of the leased area is already set and price of each area is high enough.
The results of this test indicate the higher the total amount of stock in a nursery, then it takes more larger area. Nursery area in category 3 or tens of thousands $m^2$ on average has a number of stocks in the range of tens of thousands, category 2 or thousands of m2 has an average number of stocks in the range of 1,000-10,000, and category 3 or hundreds $m^2$ has total stock in the range of numbers below 2,000. The range of stock values in the area of thousands of m2 is quite high, this is due to the large amount of stock that was successfully produced not only by paying attention to the availability of land, but can also be supported by utilities to facilitate production activities.

## 4. Information System of nursery for online plant market

Website is a collection of documents that are published via the internet or intranet so that it can be accessed by users through a web browser [6]. A dynamic website is a website where content can change according to the contents change in the database. One does not need to change the programming of the website, but rather do an update on the database [7].
To promote product of nursery in Bogor Regency, website was constructed which provide information such as plant species, specification and plant stock and price. Besides, it also can be used by customer to order plant with certain quantity.
To create the Website as the first step is to download the CodeIgniter template at https://github.com/kirilkirkov/Ecommerce-CodeIgniter-Bootstrap. Then install the XAMPP.Software. This software used to install PHPMyAdmin and MySQL software. PHPMyAdmin software is a programming language used to create website programs where the program code that has been created is compiled and run on the server to produce dynamic website pages [8]. Whereas MySQL is a database server to accommodate a very large data and it can be accessed by many users. Then install the CodeIgniter framework template into XAMPP. The database on the website contains aspects of plants, namely types of plants, plant specifications, amount of stock, prices, and photos of plants from each nursery. and nursery descriptions for additional data as blog posts. Cleansing data is divided into two, namely data for buying and selling of plants and data in the form of nursery descriptions in the form of blogs. Plant trading data is entered by the vendors themselves in the CodeIgniter software section. While the blog data and website appearance are processed by the administrator. Furthermore, from data entry, the website can then be applied. In the website view there is a tabHome (initial appearance of the website containing new products that are inputted and a brief display of nursery descriptions, Shop tab (containing ornamental plants, ie GCP, bush, shrubs, trees, and vines/hanging plants), Blog tab (contains descriptions of some nurseries), tabCheckout (list of plants that are stored or want to be purchased), Shopping Cart tab (filling in buyer data forms), and Contacts tab (ie sending messages or criticizing / suggesting from buyers).

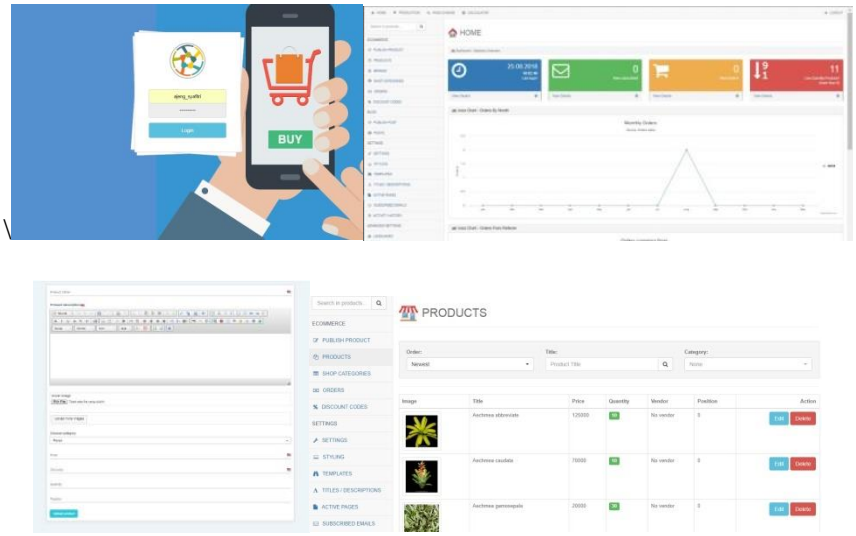



Figure 7. View of data entry or inputting in CodeIgniter Administrator

## 5. Conclusions and Suggestion

Total species found in nurseries Bogor Regency was 264 species consisting of 110 species of GCP, 57 species of shrubs, 32 species of shrubs, 31 species of trees, 24 species of climbing / hanging plants, and 10 species of epiphytes. Large class of nurseries are characterized by thousands of land area up to tens of $m^2$, have 8-10 facilities, have 10-16 utilities, are in areas with local and environmental roads, and consumers include individuals, suppliers, and exports. The middle class nursery is characterized by land area of thousands of $m^2$, has 5-8 facilities, has 6-10 utilities, is on the local and collector road area, and consumers include individuals and suppliers. Small class nurses have the characteristics by land area of hundreds of $m^2$, have 1-4 facilities, have 1-5 utilities, are in the area of local roads and collector roads, and consumers only include individuals. In the correlation test between sub aspects has a range of correlation values strong enough to strong, namely between the sub aspects of the nursery type with total sales; utility with stock; nursery type with area; and broad correlation with stock. Success in sales can be achieved by creating a website as a functional media that can facilitate and provide stock availability and price information of plants in nurseries in Bogor Regency. In the website view there is a tabHome (initial appearance of the website containing new products that are inputted and a brief display of nursery descriptions, Shop tab (contains types of ornamental plants, ie ground cover plants, bush, shrubs, trees, and vines / hanging), Blog tab (contains description of several nurseries), Checkout tab (list of plants that are ordered or want to be purchased), Shopping Cart tab (filling in buyer data forms), and Contacts tab (sending messages or criticizing / suggesting buyers).

### Suggestion

This research is expected to help ornamental plant lovers, landscape contractors and so on in terms of identifying plant aspects such as plant types, specifications, stocks, nurseries that produce and their prices. Furthermore, it can be developed more specifically in one nursery or in certain areas to determine the diversity of nurseries and types of plants produced in various regions. Prototype can also be further developed to make an example of an integrated plant selling / buying website.

## References

[1] Davidson H dan Mecklenburg R. 1981. *Nursery Management :Administration and culture.* NewJersey(US): *Prentice-Hall*
[2] Edmond J B, T L Senn, F S Andrew, and R G Halfacre. 1981. *Fundamental of Horticulture*. 560 p
[3] Nugroho A. 2006. *E-Commerce* Memahami Perdagangan Modern di Dunia Maya. Bandung (ID) : Informatika.
[4] Garsinia L dan Puspa I. 2008. Galeri Tanaman Hias Lanskap. Jakarta (ID) : Penebar Swadaya
[5] Mason J. 1951. *Nursery Management.* Australia : *Australian Copyright Act 1968*
[6] Sardi I. 2004. Manajemen, Desain, dan Pengembangan Situs Web dan Adobe Photoshop 7.0. Jakarta (ID) : Elex Media Komputindo
[7] Rahman, S. 2013. Apa itu *framework*? Diambil dari : http://www.syakirurohman.net/2013/12/mengenal-pengertian-framework-website.html (20 Agustus 2018)
[8] Madcoms 2011. Aplikasi Web Database dengan Dreamweaver dan PHP-MySQL. Yogyakarta (ID) : Andi