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# Plant Biodiversity of MTR Forest Area in PT PLN Nusantara Power, Cirata, West Java

Edi Permana[a], Armaiki Yusmur[a], Ismail Rahman[a], Rendy Pratna[b], Tri Astuti Rini[b], and Rizki Gusti[b]

[a] IPB Consulting, Komplek IPB Science Techno Park Taman Kencana Bogor, 16128, Indonesia
[b] PT PLN Nusantara Power Unit Pembangkitan Cirata, Cadas Sari, Kecamatan Tegal Waru, Kabupaten Purwakarta, 41162, Indonesia

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**Corresponding Author:**
Armaiki Yusmur
Komplek IPB Science Techno Park Taman Kencana, Jl. Taman Kencana No 3, Bogor 16128, Indonesia.
E-mail: armaikiyusmur@gmail.com



**Abstract**

The biodiversity park in the Cirata Reservoir Main Transformer (MTR) area is a part of Mount Cantayan, is located in Purwakarta Regency. The elevation of area is 140 to 280 meters above sea level with total area 11.2 hectares. The research aims to identify plant species and their diversity and provide recommendations for species enrichment in biodiversity parks. The data collection method used purposive sampling. Vegetation analysis is carried out using Nested Sampling. Vegetation data analysis includes the Important Value Index (IVI) and species diversity index (H'). The research results found 23 families consisting of 59 species including seedlings, saplings, poles and trees. Diversity index of Shanon-Wiener (H') in for seedlings, saplings, poles and trees was 2.72; 3.34; 3.40 and 4.04. This diversity index is included in the high category. In the plant growth phase at seedling level, the highest IVI was for the kidahu (*Dracontomelon dao*) species at 82.95%. At the highest IVI sapling level, robusta coffee (*Caffea canaephora*) was 58.6%. At the pole level, the highest IVI was for mahogany (*Swietenia mahogany*) 300%, and at tree level, the highest IVI was obtained for mahogany (*Swietenia mahogany*) 174.7%. The recommendation species for enrichment planting in biodiversity park are 26 species. The species combination of Pingku (*Dysoxylum densiflorum*) (Blume) Miq., Tangkele (*Kleinhovia hospita*), Kosambi (*Scleichera oleosa*), Loa (*Ficus variegata*) and Nangsi (*Villebrunea rubescens*) has the potential to become the dominating plant species in the future.

Keyword: biodiversity, vegetation species, enrichment planting, IVI, Cirata Reservoir Main Transformer

## 1. Introduction

Cirata Reservoir, which is part of the Citarum watershed (DAS), one of the national critical and strategic watersheds (RPJMN 2015–2019), needs attention. As the manager, PT PLN Nusantara Power UP Cirata has implemented a sustainable development program that recognizes the need to protect the environment, natural resources, and the Cirata reservoir's surrounding ecosystem. One of the methods carried out by PLN NP UP Cirata is the development of biodiversity. Biodiversity has a strategic role in controlling environmental crises, because of its potential use as a source of food and medicine for humans, and its environmental services maintain the balance of natural ecosystems [1-4].

The endemic ecosystem for some flora and fauna of the Citarum watershed in West Java Province includes the habitat surrounding the Cirata reservoir. West Java Province is renowned for having a wide variety of plants. There are 3,882 different species of flowering plants and ferns, in addition to 258 new species that have been brought there [5]. Furthermore, 642 species of orchids were also found in West Java [6]. Of the 1,106 species of plants including trees, 51 species are important, such as rasamala (*Altingia excelsa*), teak (*Tectona grandis*), jamuju (*Podocarpus imbricatus*), kepuh (*Sterculia foetida*), puspa (*Schima wallichii*), kosambi (*Schleichera oleosa*), bayur (*Pterospermum javanicum*), beleketebe (*Sloenea sigun*), tide (*Lithocarpus* spp.), pedada (*Sonneratia alba*), and mangrove species (*Rhizhopora mucronata*) in the coastal area of West Java [7]. All of the aforementioned are a part of Indonesia's diverse ecosystem, which is thought to contain 25% of the world's flowering plant species, 40% of which are endemic or indigenous to Indonesia [8].

According to Dansereau in Dumbois and Ellenberg [9], vegetation structure can be defined as the organization of individual plants in space that form stands and more broadly form vegetation types or plant associations. Kershaw [10] stated that the form of vegetation is limited by three main components, namely: (1) stratification which is the layers that make up vegetation (strata) which can consist of tree, pole, sapling, seedling and herb. (2) the horizontal distribution of the types of vegetation which describes the position between individuals (3) The number of individuals (abundance) of certain types of vegetation.

The Main Transformer (MTR) region was turned into a biodiversity park by PLN Nusantara Power UP Cirata as one method of exploring possible natural resources close to its operational area. One of the creative and effective strategies for encouraging the conservation of natural resources in urban settings is the creation of biodiversity parks [11]. The protection, conservation, reproduction, and extension of ecosystems' genetic resources as well as the delivery of ecosystem services depend on these activities. The MTR region has a very high standing as an ecosystem service provider [12]. Additionally, this activity strengthens localized climate action.

Monitoring biodiversity is essential for achieving sustainable development, particularly with regard to the vegetation around the MTR. To notice an increase in population and diversity in the area, this exercise involves identifying vegetation as well as providing recommendations for planting flora types according to the conditions of suitable plant types to increase the biodiversity of flora species in the MTR. Having a negative influence on biodiversity will also have a negative impact on ecosystem services, which will affect how well species, communities, and ecosystems can adapt to changing environmental circumstances and to climate change.

## 2. Materials and Methods

The location of the activity is in Citamiang Village, Maniis District, Purwakarta Regency, West Java's MTR forest region (Figure 1). The research area in the MTR forest is 11.2 hectare in size. Area 1 is 3.12 ha, Area 2 is 2.95 ha, Area 3 is 1.8 ha, and Area 4 is 3.35 ha. These four locations are the MTR forest area. Vegetation identification was carried out in August 2023.

According to the state of the land cover, transect locations were chosen using the purposive sampling technique. The flora data collection location is located in the MTR area, bon the interpretation of Google Earth satellite imagery acquired on January 11 2016, consisting of Area-1 covering an area of (3.12 ha) types of land cover is old secondary vegetation and banana plants mixed with bushes, Area-2 covering an area of (2.95 ha) land cover type is mosaic of banana plant, old shrubs and shrubs, area 3- covering an area of (1.8 ha) land cover type is old shrub vegetation and Area-4 covering an area of (3.35 ha) land cover type is quite similar with Area 3 is old shrub vegetation total area 11.22 Ha, altitude ranges from 112.5 m – 262 m above sea level. Administratively, the MTR Forest data collection location is in Citamiang Village, Maniis District, Purwakarta Regency. To determine the condition of the vegetation, a field survey was then carried out, several sample plots were made in the form of paths/transects the transect location was separated into four observation location, sample plots are a combination of quadrates and a line of squares, where within a larger squares there are a small squares, known as nested sampling to identify different types of vegetation, then 12 plot paths/transects were made (20 m x 100 m each).

Vegetation sampling was carried out using the plot method in stripes, by recording all existing vegetation in the form of understory vegetation, seedling, sapling, pole and tree [13-14]. The observations were made in sub-plots with dimensions of 2 m x 2 m to identify seedling stage species, 5 x 5 m for sapling species, 10 m x 10 m for pole stage species, and 20 m x 20 m for tree stage species.

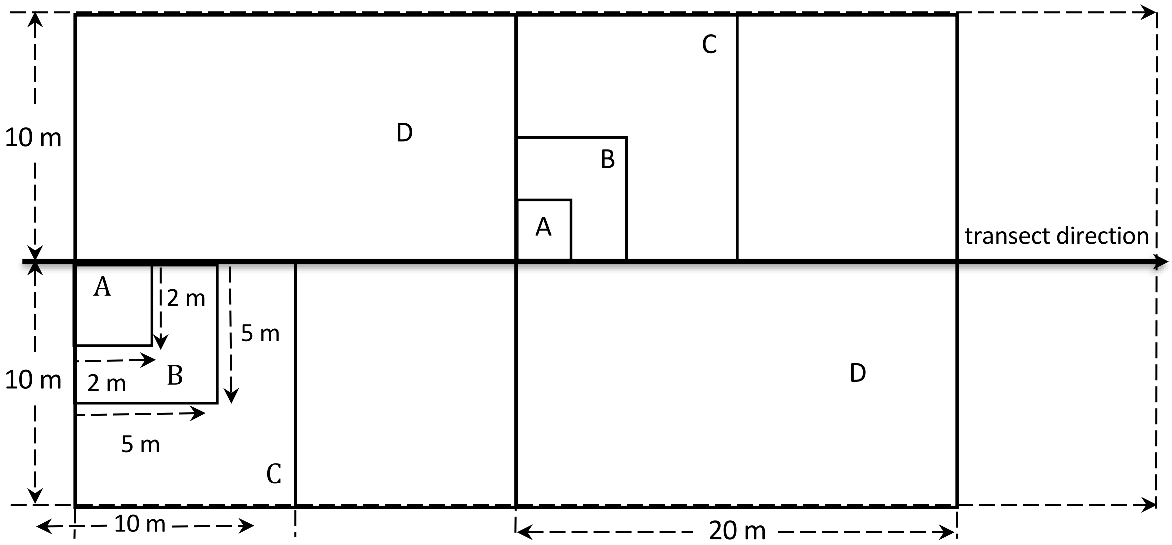


**Figure 1.** Sketch of transect form (nested sampling)

Data was analyzed qualitatively and quantitatively. A quantitative analysis was performed to determine the diversity index and Important Value Index (IVI) in order to describe different types of plants according to the level of regeneration stage (seedling, sapling, pole, and tree level). According to the specifications in Ministry of the Environment Regulation Republic of Indonesia Number 3 of 2012 about Biodiversity Park, recommendations for plant enrichment are made qualitatively on the basis of expert assessment and analysis.

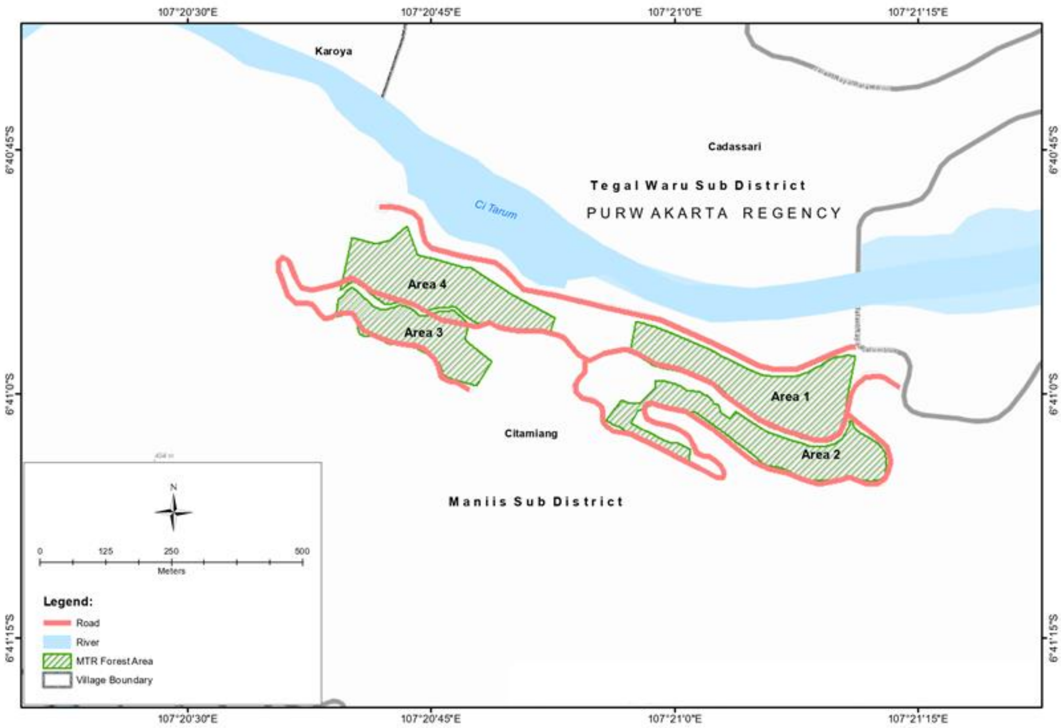


**Figure 2.** Research site map Main Transformer (MTR) Forest Area

## 3. Results and Discussion

The findings indicate that various species of plants, from seedlings to trees, exist in the MTR area. A list of plant species is in Table 1. Based on Table 1. There are 59 species in 23 groups, a total of 407 individuals scattered at 4 observation locations, and categorized as seedling, sapling, poles, and trees. The recommendation species for enrichment planting in biodiversity park are 26 species.

**Table 1.** Species of plant found in the MTR area

| No. | Scientific Names | Family |
|---|---|---|
| 1 | Sengon (*Albizia chinensis* (Osbeck.) Merr.) | Fabaceae |
| 2 | Weru (*Albizia procera* (Roxb.) Benth.) | Fabaceae |
| 3 | Trembesi ((Jacq.) Merr.) | Fabaceae |
| 4 | *Alchornea rugosa* (Lour.) Muell. Arg. | Euphorbiaceae |
| 5 | Kemiri (*Aleurites moluccanus* (L.) Wild.) | Euphorbiaceae |
| 6 | Buni (*Antidesma bunius* (L.) Spreng.) | Euphorbiaceae |
| 7 | Matan Undang (*Antidesma montanum* Blume) | Euphorbiaceae |
| 8 | Kayu Terap (*Artocarpus elasticus* Reinw. ex Blume) | Moraceae |
| 9 | Blume (*Beilschmiedia madang* Blume) | Lauraceae |
| 10 | Kadri (*Bridelia insulana* Decne) | Phyllanthaceae |
| 11 | Tumbuhan berbunga (*Bridelia ovata* (Hook.f.) Airy Shaw Syn: Bridelia curtisii) | Phyllanthaceae |
| 12 | Ki Renghas (Buchanania arborescens (Blume) Blume) | Anacardiaceae |
| 13 | Kaliandra (Calliandra calothyrsus Meissn.) | Fabaceae |
| 14 | Johar (*Cassia siamea* Lamk.) | Fabaceae |
| 15 | Kopi robusta (*Coffea canephora* Pierre ex A.Froehner) | Rubiaceae |
| 16 | Ki Harumpat (*Diospyros truncata* Zoll. & Moritzi) | Ebenaceae |
| 17 | Dahu (*Dracontomelon dao* (Blanco) Merr. & Rolfe) | Anacardiaceae |
| 18 | Pingku (*Dysoxylum densiflorum* (Blume) Miq.) | Meliaceae |
| 19 | *Elattostachys verrucosa* (Blume) Radlk. | Sapindaceae |
| 20 | *Erioglossum rubuinosum* (Roxb.) Blume | Sapindaceae |
| 21 | Ki Hampelas (*Ficus ampelas* Burm.f.) | Moraceae |
| 22 | Bisoro (*Ficus hispida* L.f.) | Moraceae |
| 23 | Beringin Kimeng (*Ficus microcarpa* Blume) | Moraceae |
| 24 | Ki Ciat (*Ficus septica* Burm.f.) | Moraceae |
| 25 | Kondang, Loa (*Ficus variegata* Blume) | Moraceae |
| 26 | Ki Mareme (*Glochidion rubrum* Blume) | Euphorbiaceae |
| 27 | Darewak (*Grewia acuminata* Juss) | Ulmaceae |
| 28 | Soka (*Ixora havilandii* Ridl.) | Rubiaceae |
| 29 | Soka (*Ixora javanica* (Bl.) DC.) | Rubiaceae |
| 30 | Tangkele (*Kleinhovia hospita* L.) | Malvaceae |
| 31 | Ki buaya (*Leea aquelata* Blume ex Spreng.) | Leeaceae |
| 32 | Lamtoro (*Leucaena leucocephala* (Lam.) de Wit) | Fabaceae |
| 33 | Huru Koneng (*Litsea angulata* Bl.) | Lauraceae |
| 34 | Medang (*Litsea elliptica* Blume) | Lauraceae |
| 35 | Sinangkala (*Litsea mappacea* (Blume) Boerl.) | Lauraceae |
| 36 | Mahang, Mara (*Macaranga pruinosa* (Miq.) Müll. Arg.) | Euphorbiaceae |
| 37 | Kamala (*Mallotus floribundus* (Blume) Müll.Arg.) | Euphorbiaceae |
| 38 | Ki Meong (*Mallotus philippinensis* (Lam.) Muell. Arg.) | Euphorbiaceae |
| 39 | Daun Kapur (*Melanolepis multiglandulosa* (Reinw.ex Blume) Rchb. & Zoll.) | Euphorbiaceae |
| 40 | Pisang (*Musa paradisiaca* L.) | Musaceae |
| 41 | Bangkal (*Nauclea subdita* (Korth.) Steud) | Rubiaceae |
| 42 | Rambutan (*Nephelium lappaceum* L.) | Sapindaceae |
| 43 | Seuseureuhan (*Piper aduncum* L.) | Piperaceae |
| 44 | Waru putih (*Pipturus argenteus* (G. Forst.) Wedd.) | Urticaceae |
| 45 | Glodokan tiang (*Polyalthia longifolia* (Sonn.) Thwaites) | Annonaceae |
| 46 | Daun tenggulun (*Protium javanicum* Burm.f.) | Burseraceae |
| 47 | Bendo (*Pterospermum diversifolium* Blume) | Sterculiaceae |
| 48 | Indigoberry (*Randia longiflora* (Salisb.) T.Durand & Schinz) | Rubiaceae |
| 49 | Walikunkun (*Schoutenia ovata* Korth.) | Malvaceae |

| No. | Scientific Names | Family |
|---|---|---|
| 50 | Kosambi (*Scleichera oleosa* (Lour.) Merr.) | Sapindaceae |
| 51 | Kacang malaka (*Semecarpus glaucus* Engl.) | Anacardiaceae |
| 52 | Khoi, pohon sikat gigi (*Streblus asper* Lour) | Moraceae |
| 53 | Tempinis (*Streblus elongatus* (Miq.) Corner) | Moraceae |
| 54 | Mahoni (*Swietenia mahagoni* L.) | Meliaceae |
| 55 | Salam (*Syzygium polyanthum* (Wight.) Walp.) | Myrtaceae |
| 56 | Jati (*Tectona grandis* L.f.) | Verbenaceae |
| 57 | Ketapang (*Terminalia catappa* L.) | Combretaceae |
| 58 | Nangsi (*Villebrunea rubescens* (Blume) Blume Syn:Oreocnide rubescens) | Urticaceae |
| 59 | Bentawas (*Wrightia javanica* A. DC. syn: Wrightia pubescens R. Br.) | Apocynaceae |

### 3.1 Important Value Index (IVI) MTR Area

The Important Value Index (IVI) is a measure of the level of the dominance of a species, where the plot sample is located. The higher the IVI value, the higher level of domination and egion control. Maximum values for the seedling and sapling rate are 200%, whereas for the pillar and tree level are 300%.

The Kidahu (*Dracontomelon dao*) type and the Peuteuy selong (*Leucaena leucocephla*) type both had the greatest IVI throughout the seedling growth period of the plant (Table 2). The highest percentage of *seedlings for IVI was* found in mountain vine (*Antidesma montanum*) at 44.23% and robusta coffee (*Caffea canaephora*) at 58.6% (Table 3). The mahogany type (*Swietenia mahagony*) and the Villebrunea rubescens type had the greatest IVI levels for poles, respectively, of 300% and 172.32% (Table 4). Mahogany (*Swietenia mahagony*) and nangsi (*Villebrunea rubescens*) both achieved the greatest IVI at the tree level, with 174.7% and 85.29%, respectively.

**Table 2.** Important Value Index (IVI) at the seedling level

| No | Scientific Name | Highest Important Value Index Seedling Regeneration Stage (%) | | | |
|---|---|---|---|---|---|
| | | Area 1 | Area 2 | Area 3 | Area 4 |
| 1 | Alchornea (*Alchornea rugosa* (Lour.) Muell. Arg.) | 30.95 | | | 26.05 |
| 2 | Buni (*Antidesma bunius* (L.) Spreng.) | | | 30.68 | |
| 3 | Kadri (*Bridelia ovata* (Hook.f.)) | 30.95 | | | |
| 4 | Dahu (*Dracontomelon dao* (Blanco) Merr. & Rolfe) | | | 82.95 | |
| 5 | Ki ciat (*Ficus septica* Burm.f.) | | 28.6 | | |
| 6 | Soka (*Ixora havilandii* Ridl.) | | | | 26.05 |
| 7 | Tangkele (*Kleinhovia hospita* L.) | | | 21.59 | |
| 8 | Lamtoro (*Leucaena leucocephala* (Lam.) de Wit) | 59.52 | | | |
| 9 | Sinangkala (*Litsea mappacea* (Blume) Boerl.) | | 23.8 | | |
| 10 | Seuseureuhan (*Piper aduncum* L.) | | 26.2 | | |
| 11 | Tempinis (*Streblus asper* Lour) | | | | 26.05 |

**Table 3.** Important Value Index (IVI) at the sapling level

| No. | Scientific Name | Highest Important Value Index Sapling Regeneration Stage (%) | | | |
|---|---|---|---|---|---|
| | | Area 1 | Area 2 | Area 3 | Area 4 |
| 1 | Alchornea (*Alchornea rugosa* (Lour.) Muell. Arg.) | 43.59 | | | 34.42 |
| 2 | Buni (*Antidesma montanum* Blume) | 44.23 | | 16.5 | 18.97 |
| 3 | Kopi robusta (*Coffea canephora* Pierre ex A.Froehner) | | 58.6 | | |

| No. | Scientific Name | Highest Important Value Index Sapling Regeneration Stage (%) | | | |
|---|---|---|---|---|---|
| | | Area 1 | Area 2 | Area 3 | Area 4 |
| 4 | Pingku (*Dysoxylum densiflorum* (Blume) Miq.) | | | | 22.69 |
| 5 | Tangkele (*Kleinhovia hospita* L.) | | | 22.9 | |
| 6 | Ki Meong (*Mallotus philippinensis* (Lam.) Muell. Arg.) | 43.59 | | | |
| 7 | Waru putih (*Pipturus argenteus* (G. Forst.) Wedd.) | | 34.3 | | |
| 8 | Mahoni (*Swietenia mahogany* L.) | | 34.3 | | |
| 9 | Nangsi (*Villebrunea rubescens* (Blume)) Blume | | | 26.1 | |

**Table 4.** Important Value Index (IVI) at the pole level

| No. | Scientific Name | Highest Important Value Index Pole Regeneration Stage (%) | | | |
|---|---|---|---|---|---|
| | | Area 1 | Area 2 | Area 3 | Area 4 |
| 1 | Pingku (*Dysoxylum densiflorum* (Blume) Miq.) | | | | 115.61 |
| 2 | *Elatostachys verrucose* (Blume) Radlk. | | | 41.63 | |
| 3 | Tangkele (*Kleinhovia hospita* L.) | 42.27 | | | |
| 4 | Pisang (*Musa paradisiaca* L.) | 117.27 | | | |
| 5 | Kosambi (*Scleichera oleosa* (Lour.) Merr.) | | | 48.20 | 26.21 |
| 6 | Tempinis (*Streblus asper* Lour) | | | | 49.44 |
| 7 | Mahoni (*Swietenia mahogany* L.) | | 300 | | |
| 8 | Jati (*Tectona grandis* L.f.) | 49.24 | | | |
| 9 | Nangsi (*Villebrunea rubescens* (Blume) Blume) | | | 172.32 | |

**Table 5.** Important Value Index (IVI) at the tree level

| No. | Scientific Name | Highest Important Value Index Tree Regeneration Stage (%) | | | |
|---|---|---|---|---|---|
| | | Area 1 | Area 2 | Area 3 | Area 4 |
| 1 | Sengon (*Albizia chineensis* (Osbeck.) Merr.) | | 26.30 | | |
| 2 | Trembesi (*Albizia saman* (Jacq.) Merr) | 47.94 | | | |
| 3 | Kayu terap (*Artocarpus elasticus* Reinw. Ex Blum | | | 44.59 | 32.95 |
| 4 | Johar (*Cassia siamea* Lamk.) | 67.17 | | | |
| 5 | Pingku (*Dysoxylum densiflorum* (Blume) Miq.) | | | | 57.50 |
| 6 | Ki hampelas (*Ficus ampelas* Burm.f.) | | | | 17.40 |
| 7 | Kondang (*Ficus variegata* Blume) | | | 28.33 | |
| 8 | Mahoni (*Swietenia mahogany* L.) | | 174.73 | | |
| 9 | Jati (*Tectona grandis* L.f.) | 38.65 | | | |
| 10 | Ketapang (*Terminalia catappa* L.) | | 67.43 | | |
| 11 | Nangsi (*Villebrunea rubescens* (Blume) Blume ) | | | 85.29 | |

The species combination of Pingku (*Dysoxylum densiflorum*) (Blume) Miq., Tangkele (*Kleinhovia hospita*), Kosambi (*Scleichera oleosa*), Loa (*Ficus variegata*) and Nangsi (*Villebrunea rubescens*) has the potential to become the dominating plant species in the future. These variation can be found everywhere and at all stages of regeneration. Despite the fact that it is not always high, these varieties are common in lowland locations with rocky soil, lower fertility and the climate generally dry/high temperature (hot).

The future prediction is that forest stands in area 3 and area 4 will progressively becoming "primary" lowland forest if they are consistently preserved and remain undisturbed, both naturally and due to human activities. There will be dynamics in the structure and species composition after the stands from now on and in the future. Species diversity is a measure of a community's resilience to disturbances in its component parts and its capacity to remain stable.

The seedling level is revealed by data analysis utilizing the Shannon-Wiener [15], algorithm based on the results of Table 6. Area 4 has a moderate index score of 2.72 and has 28 persons and 12 species. about sapling level. Area 4 has the highest index value, 3.34, with a total of 78 individuals and 20 species present. At the pole, region 1 has the highest index value, 3.40, which includes height with 30 individuals and 8 species. Tree level in the meantime. Area 4 has the highest index value, 4.08, which is extremely high compared to other areas and the overall degree of regeneration. There are 59 individuals and 13 different species present. This region is rather diverse overall.

**3.2. Diversity of Plant Species of Structure and Floristic Composition of the MTR Forest Area**
The species richness, which includes the number of species and individuals, determines whether a plant community has a high or low diversity index. Community organizations are diverse in type [16]. Based on the diversity index and its criteria, diversity is said to be high if a community has a value of >3, moderate if a community has a value of 1-3, and low if a community has a value of <1 [17]. A community is said to have high species diversity, if the community is composed of many types with reports of each type being the same or almost the same. On the other hand, if the community is composed of very few species or only a few dominant species, then species diversity is low [18].

The seedling level is revealed by data analysis utilizing the Shannon-Wiener algorithm based on the results of table 6. Area 4 has a moderate index score of 2.72 and has 28 persons and 12 species. about sapling level. Area 4 has the highest index value, 3.34, with a total of 78 individuals and 20 species present. At the pole, region 1 has the highest index value, 3.40, which includes height with 30 individuals and 8 species. Tree level in the meantime. Area 4 has the highest index value, 4.08, which is extremely high compared to other areas and the overall degree of regeneration. There are 59 individuals and 13 different species present. This region is rather diverse overall.

**Table 6.** Floristic structure and compositions of transect plot area 1-4 MTR

| Regeneration Rate | Description | Transect Plots in the Area | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| Seedling | Species Diversity Index (H') | 1.6 | 2.52 | 1.97 | 2.72 |
| | Number of Individuals | 14 | 21 | 11 | 28 |
| | Number of Species | 6 | 12 | 6 | 12 |
| Sapling | Species Diversity Index (H') | 2.65 | 2.1 | 2.85 | 3.34 |
| | Number of Individuals | 26 | 10 | 31 | 78 |
| | Number of Species | 8 | 6 | 17 | 20 |
| Pole | Species Diversity Index (H') | 3.4 | 0.69 | 2.2 | 2.71 |
| | Number of Individuals | 30 | 2 | 9 | 15 |
| | Number of Species | 8 | 1 | 4 | 8 |
| Tree | Species Diversity Index (H') | 3.47 | 3.43 | 3.77 | 4.08 |
| | Number of Individuals | 32 | 31 | 37 | 59 |
| | Number of Species | 13 | 4 | 11 | 13 |

**3.3 Recommendation of Plant Species for Enrichment Towards Sustainable Development**
To conserve numerous flora and wildlife species, both in-situ and ex-situ species conservation measures have been established by the Indonesian government. to protect different species and genetic resources. In order to conserve its various species and genetic resources, the

Government of the Republic of Indonesia, through the Ministry of Environment, issued by Ministerial Regulation of the Republic of Indonesia Number 03 of 2012 on the Development of Biodiversity Parks. The term "biodiversity parks" can be defined as natural reserves for local biological resources and act as in-situ and/or ex-situ conservation sites, particularly for the pollination and/or dissemination of plant seeds [19].

Because of human activity, the vegetation's health in the MTR forest has been compromised. Therefore, improvements must be made by assisting in replanting (restoration, revegetation, enrichment planting) with suitable species (site specific matching species) and accounting for a number of biogeophysical conditions (climate/weather, soil, land configuration, light requirements, tolerance to shade, availability of seeds, and planting time). Table 7 lists the priority plant species that can be planted to improve the MTR area and promote sustainable development.

**Table 7.** Plant species for enrichment planting in the Cirata MTR forest biodiversity park

| No. | Common/scientific name | Family | No. | Common/scientific name | Family |
|---|---|---|---|---|---|
| 1 | Salam: *Syzygium polyanthum* (Wight.) Walp | Myrtaceae | 14 | Ki Hampelas (Ficus ampelas Burm.F.) | Moraceae |
| 2 | Angsana, Sono kembang (*Pterocarpus indicus* Willd.) | Fabaceae | 15 | Kondang (Ficus racemosa L.) | Moraceae |
| 3 | Aren/Kawung (*Arenga pinnata* (Wurmb.) Merr.) | Areacaceae | 16 | Beringin laut (Ficus tinctoria G. Forst) | Moraceae |
| 4 | Pingkul, Majegau (*Dysoxylum densiflorum* (Blume) Miq.) | Meliaceae | 17 | Awi buluh (*Schizostachyum brachydadum* (Kurz)) | Poaceae |
| 5 | Matoa (*Pometia pinnata* J.R. Forst. & G. Forst.) | Sapindaceae | 18 | Awi tali (*Gigantochloa apus* Schult. & Schult. F.) | Poaceae |
| 6 | Katimaga. Tangkolo (*Kleinhovia hospita* L.) | Malvaceae | 19 | Awi haur. Awl koneng (*Bambusa vulgaris* Schard.) | Poaceae |
| 7 | Jeungjing beureum (*Albizza chinensis* (Osbeck.) Merr.) | Fabaceae | 20 | Huni. Buni (*Andidesma bunius* (L) Spreng). | Phyllanthaceae |
| 8 | Lowa (*Ficus variegata* Blume) | Moraceae | 21 | Huni gunung (*Antidesma montanum* Blume) | Euphorblaceae |
| 9 | Bisoro (*Ficus hispida* Lf.) | Moraceae | 22 | Kosambi (*Schleichera oleosa* (Lour.) Merr.) | Sapindaceae |
| 10 | Johar (*Cassia siamea* Lamk.) | Fabaceae | 23 | Kacapi (*Sandoricum koetjape* (Burm.f.) Merr.) | Meliaceae |
| 11 | Kihiyang (*Albizzia procera* (Roxb.) Benth | Fabaceae | 24 | Asem jawa (*Tamarindus indica* L) | Fabaceae |

| No. | Common/scientific name | Family | No. | Common/scientific name | Family |
|---|---|---|---|---|---|
| 12 | Lam, pule (*Alstnoa scholaris* (L.) R. Br.) | Apocynaceae | 25 | Menteng (*Baccaurea racemosa* (Relnw.) Muell. Arg). | Euphorblaceae |
| 13 | Ki Dahu (*Dracontomelon dao* (Blanco) Merr. & Rolfe) | Anacardiaceae | 26 | Peundeuy (*Parkia timoriana* (DC.) Merr.) | Fabaceae |

In enhancing the species and population of vegetation in the biodiversity park for sustainable development, it is important to consider the number of species planted, the distance from seed sources, and planting density [20]. Activities for restoring biodiversity may be postponed if we just rely on natural regeneration. The best outcomes will be seen in planting areas close to natural forests as a source of seeds by planting different species at a high density. This will help to restore biodiversity and mitigate the effects of climate change over the long run. Due to the existing plants' increasing stem diameter, these carbon reserves will keep growing over time. In addition, a program of planting to multiply plant species will continue to enhance the total number of individual plants in the Biodiversity Park region. In order to bridge research-implementation in enriching biodiversity parks, this needs to be a focus for MTR area managers.

## 4. Conclusions

Plants vegetation analysis in the MTR forest area found 407 individuals representing 59 species in 23 groups. In the MTR area 2 at the pole level, the Important Value Index (IVI) of the Swietenia mahogany kind produced the highest IVI result of 300%. This value is a high categorization value. At the sapling stage, Antidesma montanum has the lowest Importance Value Index (16.5%). Area 4 has the greatest species diversity index score of 4.08, which is quite high when compared to other areas and the overall level of regeneration. The addition of 26 species is advised to promote the sustainability of the biodiversity park's function and benefits as a recommendation for plant types to enhance the MTR forest as a biodiversity park toward sustainable development.

## Author Contributions

**EP**: Writing - Review & Editing, Supervision; **AY**: Conceptualization, Methodology, Software, Investigation, Writing - Review & Editing; **IR**: Writing; **RP**: Review; **TAR**: Review; and **GR**: Review.

## Conflicts of interest

There are no conflicts to declare.

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