LANDSCAPE PLANNING OF CIPEUTEUY VILLAGE AS A BIOREGION-BASED CONSERVATION VILLAGE

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Landscape Planning of Cipeuteuy Village as a Bioregion-Based Conservation Village

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Abstract. Cipeuteuy Village is situated adjacent to the Gunung Halimun Salak National Park, specifically within the Halimun-Salak Corridor, which connects the ecosystems of Mount Halimun and Mount Salak. The village experiences ecological pressures, including forest degradation from agricultural expansion, habitat fragmentation, and limited community-based conservation efforts. As a part of the national park buffer zone, Cipeuteuy Village plays a crucial role in supporting restoration and conservation activities. A bioregion-based approach is needed to harmonize ecological priorities with local socio-cultural conditions. The term *bioregion*, derived from *bio* (life) and *region* (territory), refers to a living system with boundaries defined by natural features that sustain the unique activities of the biotic community within it. This study uses spatial and qualitative analyses to examine biophysical characteristics and community dynamics. The objectives of this study are: (1) to identify the landscape characteristics of Cipeuteuy Village based on bioregion units, landscape units, and place units; (2) to analyze the existing landscape zoning; and (3) to develop a landscape plan that positions Cipeuteuy as a bioregion-based conservation village. the study formulates an integrated landscape plan that prioritizes strengthened conservation zones and an agroforestry landscape plan designed to enhance ecological functions and support community-based conservation efforts. The bioregional framework guides these strategies toward improving ecological resilience and sustainable landscape development in Cipeuteuy Village.

Keywords: community-based conservation, conservation village, ecological corridor, landscape planning

1. Introduction

Cipeuteuy Village is situated along the boundary of Gunung Halimun Salak National Park (TNGHS), within the Halimun-Salak Corridor—a critical ecological corridor that connects the ecosystems of Mount Halimun and Mount Salak. The village community has long relied on agriculture as their primary livelihood, shaping their deep dependence on the surrounding natural landscape. Prior to the national park's expansion in 2003, local forests and lands were an integral part of daily life, serving as essential resources for the villagers. However, the reclassification of these areas as protected land under national park regulations introduced significant policy changes. These new regulations restricted community access to forest resources

and significantly impacted traditional land-use practices. While such changes have contributed to ecological preservation, they also introduced socio-economic challenges, particularly because community needs were not fully integrated into the conservation framework [1].

The Halimun-Salak Corridor plays a vital role in maintaining ecological connectivity between the ecosystems of Mount Halimun and Mount Salak, facilitating wildlife movement and vegetation dispersal across fragmented habitats. However, this corridor has been increasingly threatened by land conversion—particularly for agricultural purposes—resulting in forest degradation, habitat loss, and ecological fragmentation. Despite the implementation of rehabilitation and conservation programs, community involvement—especially that of the local population in Cipeuteuy Village—remains limited and has not yet reached a meaningful level of engagement [5].

Simultaneously, the community's dependence on agriculture continues to increase, leading to spatial conflicts between conservation objectives and livelihood needs. Given its strategic location within the corridor, Cipeuteuy Village has significant potential to support landscape-level ecological restoration [7]. An integrated and sustainable restoration approach is therefore essential—one that addresses both environmental degradation and socio-economic challenges. A bioregion-based landscape planning framework provides an integrated approach that balances biophysical restoration with the cultural and economic realities of local communities. This approach offers actionable strategies that are mutually beneficial for both national park management and the communities residing near protected areas.

This study applies a bioregion-based approach to landscape planning in Cipeuteuy Village by integrating ecological, cultural, and socio-economic considerations. Through the assessment of bioregion units, landscape units, and place units, the study evaluates existing zoning patterns, spatial potentials, and landscape constraints. The findings form the basis for a conservation village model designed to enhance ecological restoration and strengthen community well-being. The resulting planning framework presents an integrated landscape proposal that incorporates strengthened conservation zones and an agroforestry landscape plan, thereby providing strategic recommendations to support more sustainable, inclusive, and community-based conservation efforts within the national park landscape.

2. Research Methods

2.1 Site Study

This research was conducted in Cipeuteuy Village, located in Kabandungan Subdistrict, Sukabumi Regency, West Java, Indonesia. The village lies directly within the Halimun-Salak Corridor and falls under the management of the Gunung Kendeng Resort, a unit of the Gunung Halimun Salak National Park (TNGHS).

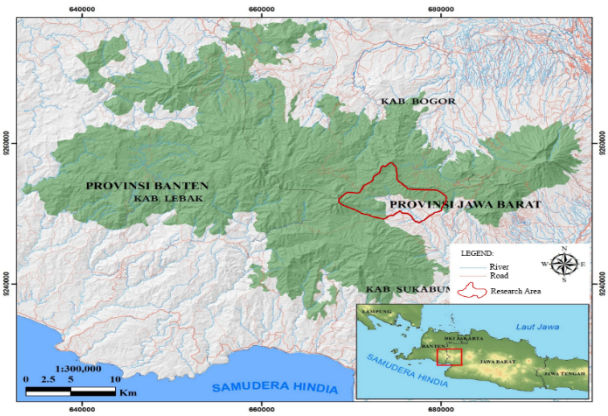

Figure 1. Study site location

2.2 Research Stages

Data for this study were collected through a combination of literature review, field surveys, and in-depth interviews. The research methodology was structured into five stages:

2.2.1 Preparation. This initial stage involved formulating the research objectives, preparing the research proposal and administrative requirements, and collecting preliminary data from relevant institutions. A comprehensive review of previous studies conducted in and around the study area was undertaken to contextualize the research framework and identify knowledge gaps.

2.2.2 Inventory. The inventory phase focused on compiling both textual and spatial data reflecting the site's physical, biophysical, and socio-cultural characteristics. Data were obtained from primary sources (field observations and interviews) and secondary sources (literature and official documents). Key information gathered included topography, climate and hydrology, vegetation types and wildlife distribution, land cover, demographics, socio-cultural aspects, and policy-related data.

*2.2.3 Analysis***.** The study area was analyzed using a bioregional classification framework comprising bioregion units, landscape units, and place-based units. Bioregion units are defined as ecological zones characterized by physical and biophysical attributes, such as climate, hydrology, topography, soil conditions, and biodiversity patterns. Landscape units are defined based on the configuration on landforms, land cover types, and the structural configuration of the landscape. In contrast, place-based units refer to areas defined primarily by community land-use practices, encompassing local patterns of resource use, livelihood activities, and socio-cultural interactions with the landscape. Spatial analysis was employed to identify protected areas and other key features within the site. The results were visualized through overlay maps generated from thematic spatial layers, revealing key landscape patterns and ecological interactions.

*2.2.4 Synthesis***.** This phase involved integrating the analytical results to develop a spatial zoning scheme for the study area. The synthesis process aimed to delineate spatial functions and identify site-specific constraints to inform strategic conservation and ecological restoration planning.

*2.2.5 Planning***.** The final stage translated the outputs of the analysis and synthesis into a set of landscape planning proposals. These included spatial zoning configurations, ecological green infrastructure planning, and circulation systems. These components were consolidated into a comprehensive bioregion-based landscape plan for Cipeuteuy Village, designed to support ecological restoration while promoting community participation and sustainable land-use practices.

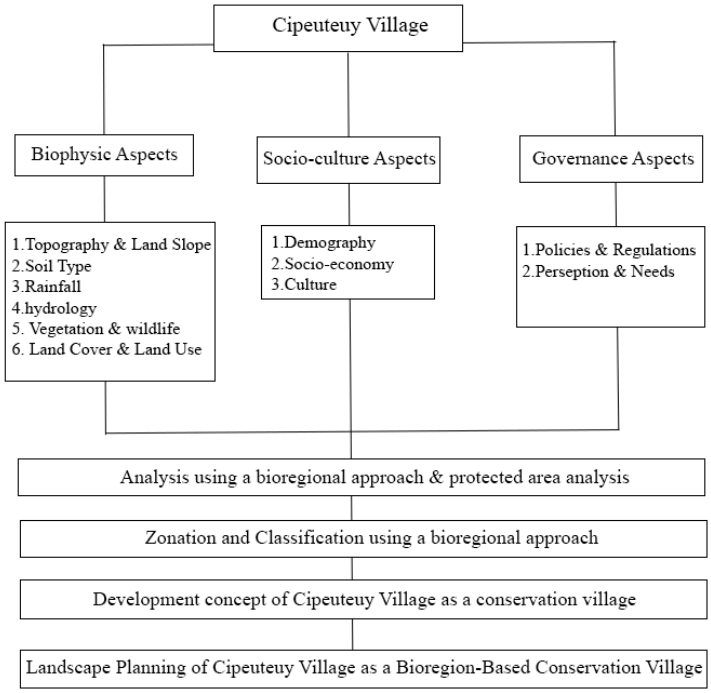

Diagram 1. Conceptual Framework

3. Results and Discussion

3.1 Site Condition

Cipeuteuy Village covers an area of approximately 3,776 hectares and is administratively bordered by Purwabakti Village to the north, Cimaherang to the south, Malasari to the west, and Kabandungan to the east. The village consists of six hamlets and historically known as an *ex-Erpacht* area under the Dutch colonial plantation system, which operated from 1881 until the transitional period of Indonesia's independence. The forested areas of Cipeuteuy, previously managed by the state forestry agency (Perhutani), were designated as part of the expanded Gunung Halimun Salak National Park (TNGHS) in 2003.

As of 2019, the village had a population of approximately 7,270 people, with around 4,717 individuals (64.88%) classified as being of productive age. The dominant livelihood is agriculture, with 40.65% of residents working as landowners and cultivators, 17.33% as cultivators without land ownership, and 21.85% as agricultural laborers (5). The village is accessible from both Bogor and Sukabumi via the Leuwiliang alternative route; however, inter-hamlet access within the village remains limited due to poor road conditions.

3.2 Site Inventory

3.2.1 Topography. The topography of Cipeuteuy Village reflects its highland setting, with elevations ranging from 731 to 1,060 meters above sea level (Figure 2). The western part of the village, bordering Mount Halimun, contains the highest elevation points, while the northeastern area forms part of the Halimun-Salak Corridor, serving as a critical ecological linkage between Mount Halimun and Mount Salak.

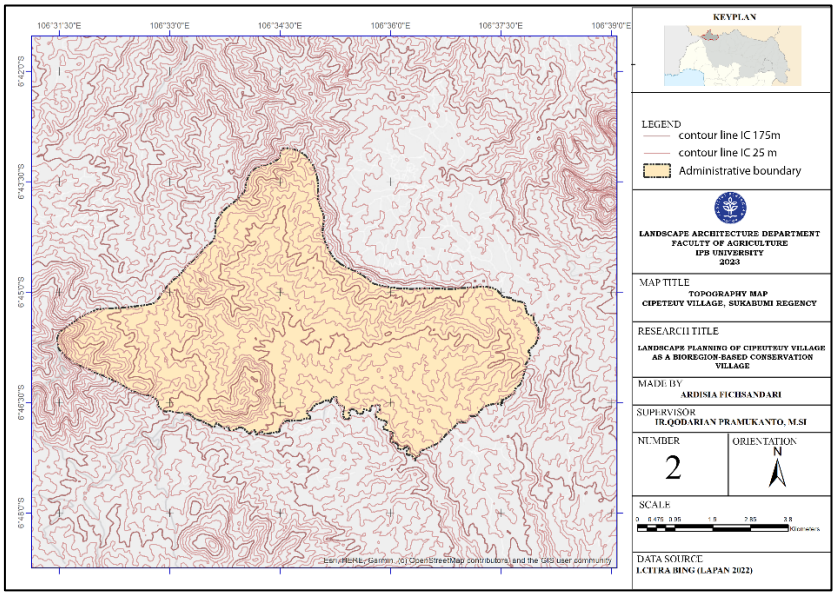

Figure 2. Site Topography

Based on the classification system outlined in the Indonesian Ministry of Agriculture Regulation No. 837/Kpts/Um/II/1980 [3], most of the village's terrain falls within slope classes III (moderately steep) and IV (steep), reflecting its proximity to mountainous regions. These slope conditions significantly influence agricultural practices, limiting land-use options and contributing to erosion risks, thereby requiring careful land management strategies.

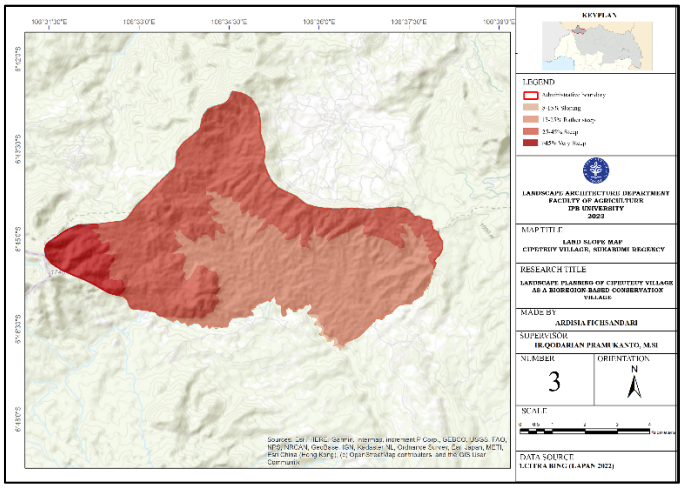

Figure 3. Land Slope Map

3.2.2 Soil Type. The dominant soil type in Cipeuteuy Village is classified as andosol, which is uniformly distributed across the area. Based on erosion susceptibility, this soil is categorized under class IV. Andosols are typically found in highland areas and are characterized by moderately acidic pH values (5.30–6.06), high organic matter content (11–20%), low bulk density, and strong water-holding capacity.

Despite these favorable properties, andosol soils are highly susceptible to erosion, particularly on steep slopes. Their vulnerability is largely due to their volcanic ash parent material, silty clay loam or silt textures, and crumbly structure, which becomes fragile when dry.

These characteristics make them prone to surface runoff and rainfall-induced erosion. Slope gradient is a critical factor in erosion intensity: the steeper the slope, the greater the erosion potential—especially in landscapes dominated by loose-structured andosols.

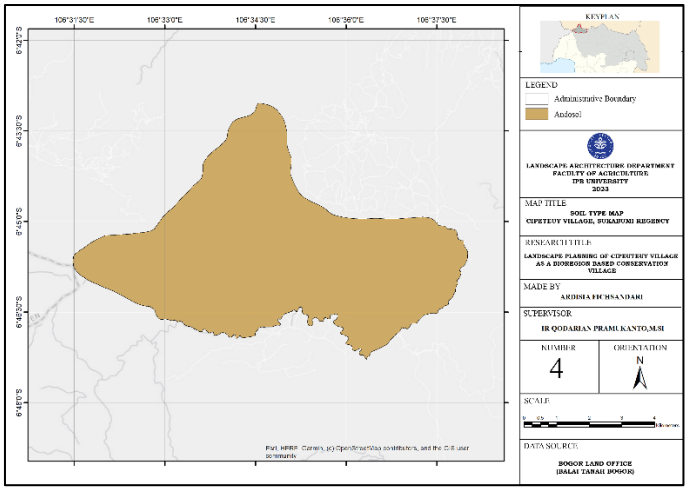

Figure 4. Soil Type Map

3.2.3 Climate and Rainfall. Rainfall data for Cipeuteuy Village were derived from a five-year average (2018–2022) for Sukabumi Regency, as reported by the West Java Meteorological, Climatological, and Geophysical Agency (BMKG) [9]. The area falls within rainfall class V, indicating a very high level of annual precipitation. The village receives an average of 3,500 to 4,000 mm of rainfall per year. This climatic condition significantly influences land-use patterns, agricultural activities, and the village's susceptibility to erosion (Figure 5).

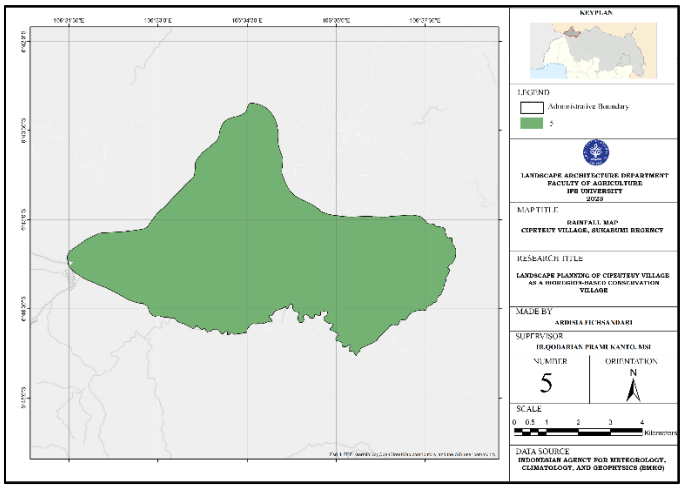

Figure 5. Rainfall Map

3.2.4 Hydrology. According to the Citarum-Ciliwung Watershed Management Agency (BPDAS), Cipeuteuy Village is located within the Cimandiri Watershed, specifically in the Citarik sub-watershed. Several rivers pass through the village, including the Cisalimar, Citamiang, Cipanas, Citarik, and Cipeuteuy rivers. These waterways play a vital role in the local hydrological system, supporting both irrigation and ecological functions across the village landscape.

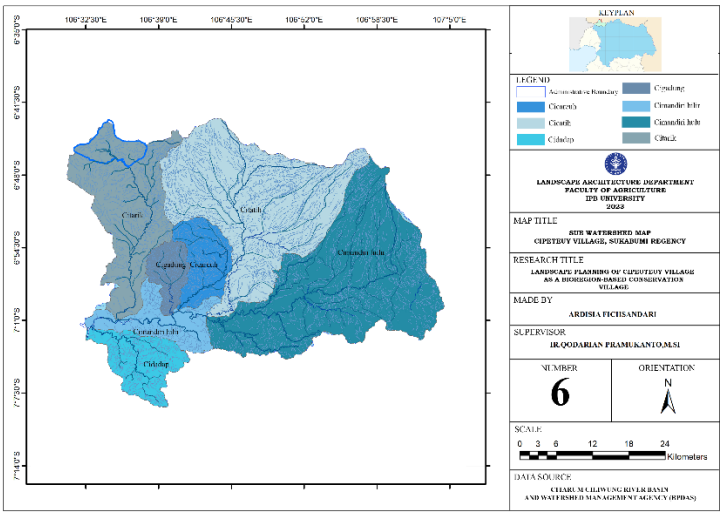

Figure 6. Cimandiri Watershed Map

3.2.5 Vegetation Types and Wildlife Distribution. The vegetation in Cipeuteuy Village is largely composed of native forest species found within Gunung Halimun Salak National Park (TNGHS) and the Halimun-Salak Corridor (KHS). In the national park area, species with the highest Importance Value Index (IVI) include Rasamala (*Altingia excelsa*), Tengkurung (*Blumeodendron elateriospermum*), and Marlberry Tree (*Ardisia zollingeri*). In the corridor area, dominant species with the highest IVI scores are Amboina pine (*Agathis dammara*) and Needlewood Tree (*Schima wallichii*). These species demonstrate strong potential as key components in reforestation and ecosystem rehabilitation efforts [10].

The Halimun-Salak Corridor also serves as a critical habitat for flagship and indicator species, including the Javan gibbon (*Hylobates moloch*) and the Javan hawk-eagle (*Nisaetus bartelsi*), both of which are classified as endangered. Habitat disturbance has been observed due to corridor thinning and the increasing proximity of human settlements [11]. In addition, movement patterns of other key species—such as the Javan leopard (*Panthera pardus melas*)—have been recorded less frequently, suggesting potential ecological stress.

Furthermore, the area supports high diversity among insect species, particularly dragonflies. A total of 13 species from four families and two suborders have been identified in a range of habitats throughout Cipeuteuy Village, including damar forests, nutmeg and jabon plantations, vegetable gardens, rice fields, scrublands, and riparian zones [8].

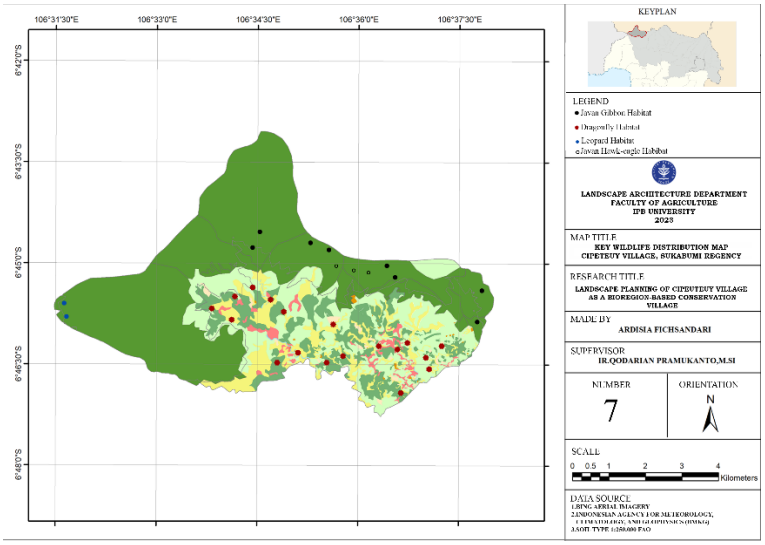

Figure 7. Vegetation and Wildlife Distribution Map

3.2.6 Land Cover. Land cover classification in Cipeuteuy Village was derived through visual interpretation of satellite imagery (BING Satellite Imagery), supported by ground-truthing surveys. Dominant land cover types include conservation forest (primary forest), mixed plantations and community forests, as well as dryland and wetland agricultural areas (Figure 8).

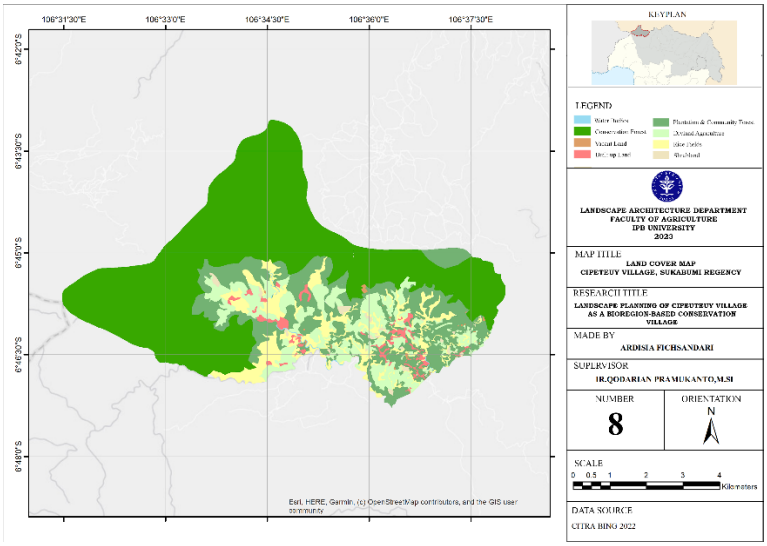

Figure 8. Land Cover Map

Some portions of community plantations and forests are located within the boundaries of the national park. In certain locations, local residents hold official permits to cultivate land within Gunung Halimun Salak National Park, with a maximum allocation of 2 hectares per farmer group. Agricultural activities within the park are permitted only in specific zones—namely, the rehabilitation zone and the wilderness zone—and are subject to strict regulation.

Table 1. Distribution of Land Cover Types in Cipeuteuy Village

Land Cover Type	Area (Ha)	Percentage (%)
Conservation Forest	2,225.27	58.92
Plantation & Community Forest	636.26	16.85
Dryland Agriculture	485.98	12.87
Rice Fields	341.50	9.04
Shrubland	10.77	0.29
Vacant Land	5.28	0.14
Developed Land	70.98	1.88
Water Bodies	0.56	0.01
TOTAL	**3,776.60**	**100.00**

3.3 Bioregion Analysis

Bioregion analysis is a landscape planning approach that classifies a territory based on naturally defined ecological boundaries—such as watersheds, topography, climate, soil, and biodiversity patterns. Unlike administrative or political boundaries, bioregions are shaped by dynamic interactions between biophysical and socio-cultural systems, making them particularly relevant for planning efforts that aim to integrate ecological sustainability with local community needs.

3.3.1 Bioregion Unit. Cipeuteuy Village is located within the Citarik sub-watershed, which forms part of the larger Cimandiri watershed. This hydrological unit serves as the foundational basis for delineating the village's bioregion unit, reflecting the natural boundaries that govern ecological and landscape processes.

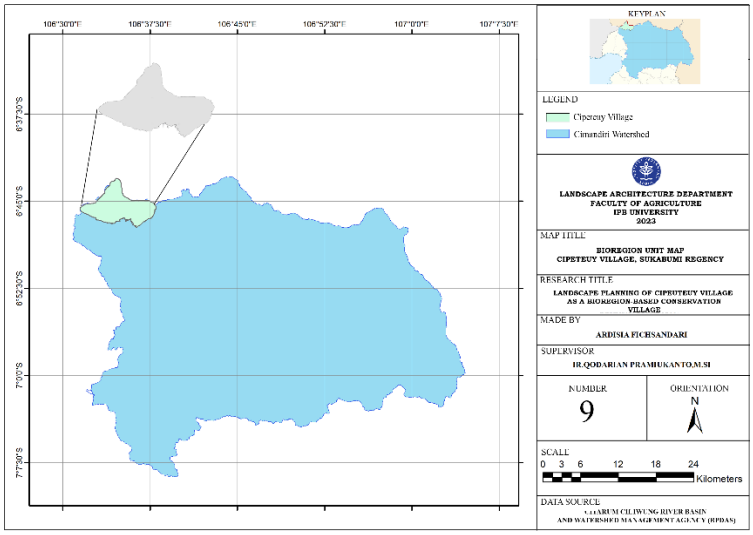

Figure 9. Bioregion Unit Map

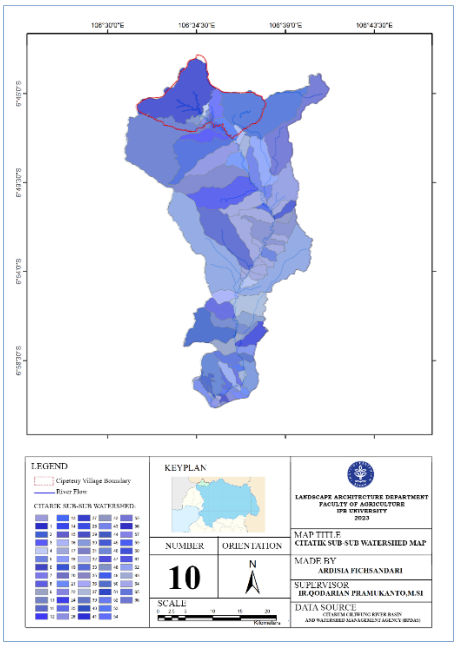

Figure 10. Citarik Sub-Sub Watershed Map

3.3.2 Landscape Unit. Based on the delineated bioregion unit, further subdivision was conducted to identify landscape units using key physical parameters: soil type, slope gradient, and rainfall intensity. Through spatial overlay analysis, seven polygons were identified, each representing a distinct and homogenous landscape unit.

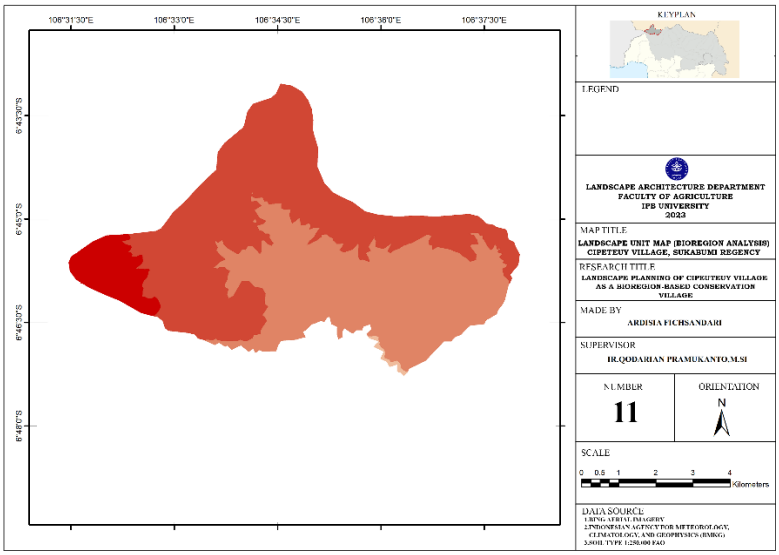

Figure 11. Landscape Unit Map

Table 2. Landscape Unit Matrix

LAND SLOPE	Sub-Watershed	1																
	Sub- sub -Watershed	1	2	3	4	5	6	7	8	9	10	11	12		13	14	15	
	Rainfall	d																
	Soil Type	AN																
0-8% Flat																		
8-15% Sloping													1	2	3			
15-25% Rather Steep		4	5	6	7	8	9	10	11	12	13	14	15			16		17	18
25-45% Steep		19		20	21						22	23							
>45% Very Steep		24					25												

3.3.3 Place Unit. Each landscape unit was further classified into *place units* based on land cover characteristics to represent the social, cultural, and local values of the area. Overlay analysis produced 78 distinct polygons, each reflecting homogenous land use patterns and culturally significant attributes identified through visual interpretation and spatial overlays.

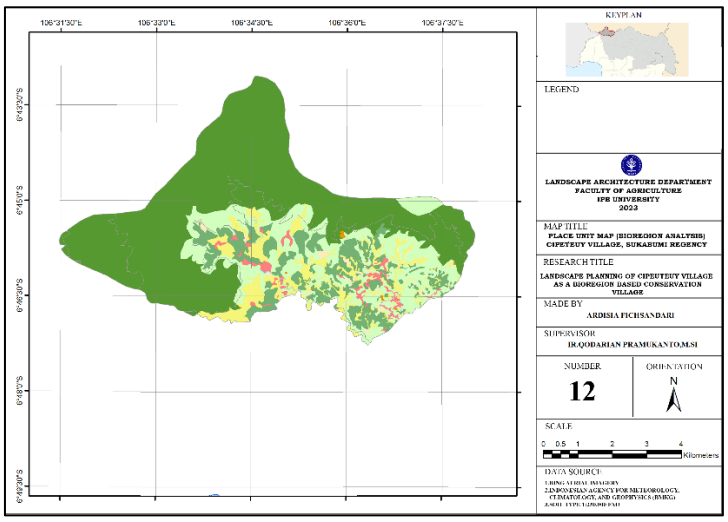

Figure 12. Place Unit Map

Table 3. Place Unit Matrix

LAND COVER																																						
	Sub - Watershed	1																																				
	Sub-Sub-Watershed	1										2											3										4	5	6	7	8		
	Soil Type	AN																																				
	Rainfall	d																																				
	land slope	AC						C			SC	AC					C		AC								C	AC	AC	AC	AC	AC						
Conservation Forest								1	2	3	4	5					6						7				8											
Plantation & Community Forest		11	12					13	14	15				16	17	18	19	20	21	22	23					24	25	26	27	28	29	30					
Dryland Agriculture		42	43	44				45	46			47	48	49	50	51			52	53	54	55	56	57	58		59	60		61	62	63					
Rice Fields		75	76					77				78	79	80			81		82	83	84	85	86	87	88		89		90	91	92					
Shrubland		107	108					109				110							111	112	113	114	115	116	117		118									
Vacant Land		124	125	126	127	128	129	130				131							132	133	134	135	136	137	138						139	140	141			
Water Bodies		153	154									155					156		157							158	159				160					

Table 4. Place Unit Matrix (continued)

LAND COVER																																						
	Sub - Watershed	1																																				
	Sub-Sub-Watershed	9								10		11			12							13								14	15								
	Soil Type	AN																																				
	Rainfall	d																																				
	land slope	AC						C	SC	AC	C	AC			L	AC						AC							C	AC								
Conservation Forest								9			10																											
Plantation & Community Forest		31								32		33			34	35	36	37			38	39			40	41												
Dryland Agriculture		64										65	66		67	68	69	70	71	72	72	73				74											
Rice Fields		93	94							95		96	97	98	99	100	101	102	103	104	105				106											
Shrubland												119				120	121	122			123																
Vacant Land		142	143	144	145	146	147					148				149					150	151	152														
Water Bodies		161	162					163		164					165	166					167					168											

3.3.4 Protected Area Analysis. The identification of protected areas in Cipeuteuy Village employed a scoring method based on the Indonesian Ministry of Agriculture Decree No. 837/Kpts/Um/II/1980 [3]. According to this regulation, land is categorized into three classes:

a. Protected zone: total score > 175
b. Buffer zone: total score between 125 and 175
c. Cultivation zone: total score < 125

The scoring system is derived from three parameters: slope, soil type, and rainfall intensity, which are combined to assess the ecological sensitivity of a given location. Based on the scoring results, the protected areas in Cipeuteuy Village correspond to the forest zones within the Gunung Halimun Salak National Park (TNGHS), while the surrounding areas are designated as buffer zones. These classifications serve as a basis for determining permissible land uses and form the foundation for spatial planning that balances ecological conservation with community development. Refer to Table 5 for the complete scoring results of the protected area analysis in Cipeuteuy Village.

Table 5. Scoring Results of the Protected Area Analysis

Area Type	Score			Total Score
	Slope	Soil	Rainfall	
Conservation Zone	100	60	50	210
Conservation Zone	80	60	50	190
Buffer Zone	60	60	50	170
Buffer Zone	40	60	50	150

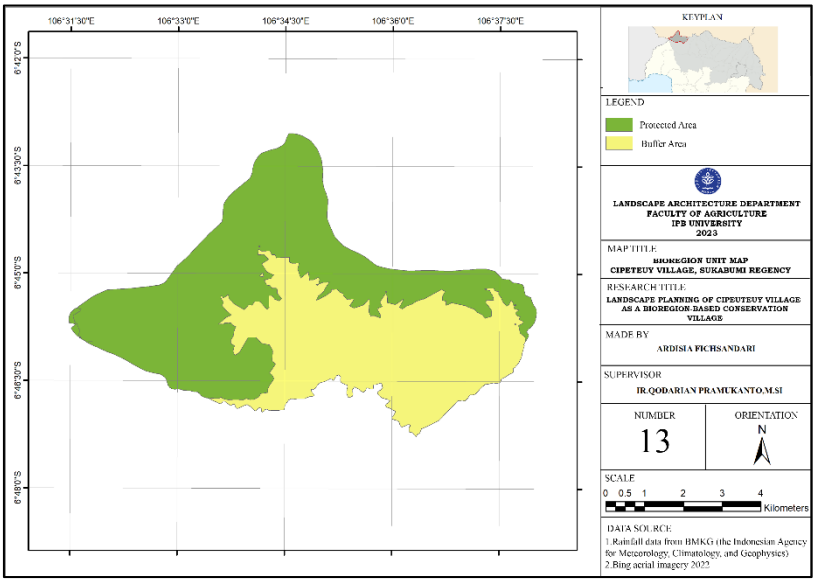

Figure 13. Protected Area Analysis Map

3.4 Synthesis

The synthesis stage involved overlaying various analytical maps to generate a comprehensive zoning plan for Cipeuteuy Village. The resulting zoning delineates the spatial relationship between the village and Gunung Halimun Salak National Park (TNGHS), aligning with the official zoning regulations of the park. The remaining areas are designated as buffer zones.

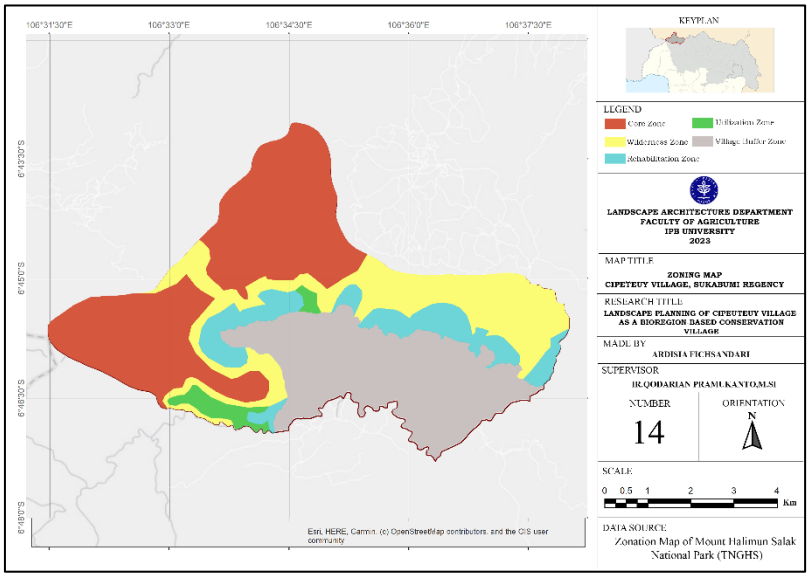

Figure 14. Synthetis Map

3.5 Concept

3.5.1 Fundamental Concept. This research adopts the conservation village concept, which functions as a buffer zone for protected areas. The objective is to develop a landscape plan that ecologically supports the conservation and rehabilitation of the Gunung Halimun Salak National Park, while accommodating the livelihoods of local communities reliant on agriculture. The plan emphasizes agroforestry as a strategic approach to address land-use conflict, soil erosion, and ecological degradation. The proposed system incorporates Talun agroforestry, which utilizes the traditional Sundanese multi-strata perennial system to restore ecological structure and support long-term vegetation succession; mixed-garden agroforestry, combining indigenous tree species with multifunctional understory crops to enchance biodiversity and landscape productivity; and intercropping agroforestry, integrating annual food crops within tree rows to optimize land use and maintain soil cover during early growth stages. Collectively, these approaches not only reinforce ecological restoration and the protection of conservation cores but also promote sustainable agricultural practices, diversify livelihoods, and enhance long-term soil stability.

3.5.2 Spatial Concept. The spatial concept follows the National Park zoning system, which divides the area into five main zones. Subzones are designated within the wilderness zone, rehabilitation zone, and community buffer zone.

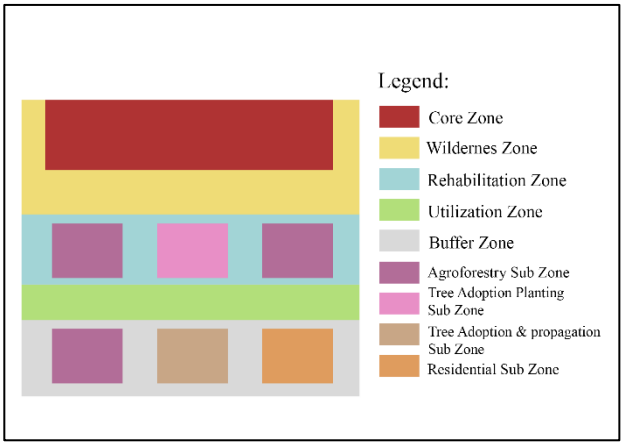

Figure 15. Spatial Concept Diagram

3.5.3 Circulation Concept. The circulation system within the village is categorized into three types: (1) *Primary circulation*, which serves as the main route across the area; (2) *Inter-zonal circulation*, facilitating access between zones for daily community activities; and (3) *Restricted circulation*, designated exclusively for the National Park Authority and related conservation activities.

3.5.4 Ecological Green Concept. The ecological green concept is formulated based on the ecological functions of existing vegetation, complemented by the strategic implementation of agroforestry models. Vegetation functions within the area are classified into four categories: (1) *Ecosystem-protecting vegetation*, which conserves natural ecological processes; (2) *Wilderness vegetation*, serving as habitat and movement corridors for wildlife and supporting biodiversity preservation; (3) *Rehabilitative vegetation*, comprising dominant native species selected for replanting in restoration zones; and (4) *Cultivated vegetation*, consisting of horticultural crops managed by the local community.

3.6 Landscape Planning

3.6.1 Spatial Plan. The spatial plan focuses on developing the area's potential while addressing its environmental constraints. One of the main potentials is agricultural productivity, supported by the area's fertile soils, which can be optimized to meet community needs. In addition, the tree adoption program initiated by the National Park Authority represents an opportunity that is accommodated within the spatial arrangement. To mitigate the challenges of soil erosion and forest degradation within the national park area, agroforestry zones are planned to support soil and water conservation.

Development Directions for Each Spatial Zone:

a. *Core Zone*. A conservation area dedicated to protecting primary forest ecological processes and preserving biodiversity. Human intervention should be strictly limited in this zone.
b. *Wilderness Zone*. Functions as a buffer designed to support the conservation of the core zone. This area is divided into two subzones: (1) *Tree Adoption Subzone*: designated for land conservation through a community-based tree planting program; (2) *Talun Agroforestry Subzone*: designed for the rehabilitation or restoration of encroached areas, minimizing erosion, and improving soil quality by integrating sustainable agroforestry systems.
c. *Rehabilitation Zone.* This zone also consists of two subzones: (1) *Mixed Garden Agroforestry Subzone*: integrates cultivated lands managed by the community within national park boundaries with natural forest, while reducing erosion and improving soil characteristics; (2) *Tree Adoption Subzone*: accommodates the implementation of the tree adoption program to restore degraded areas.
d. *Utilization Zone*. A designated area within the national park boundary where limited use by local communities is permitted under park regulations.
e. *Village Buffer Zone.* Divided into three subzones: (1) *Residential Subzone*: existing village settlements, maintained in their current form; (2) *Intercropped Agroforestry Subzone*: promotes the use of unused land and community forests adjacent to cultivated land to reduce erosion; (3) *Cultivation Subzone*: includes both dryland and wetland agricultural areas, retained according to their current usage to support community livelihoods.

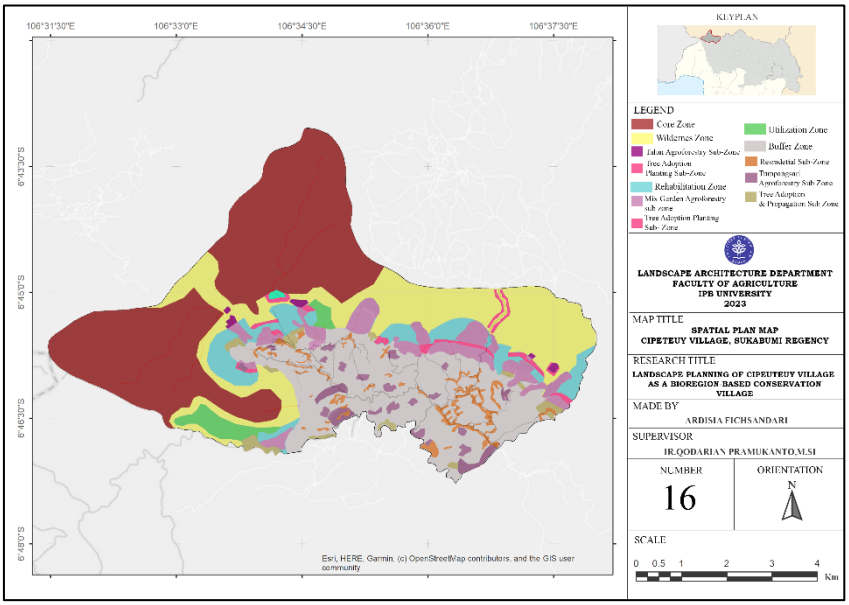

Figure 16. Spatial Plan

3.6.2 Ecological Green Plan. Vegetation designated for the core zone is based on the distribution of native species found in Gunung Halimun Salak National Park. The dominant species identified in this area is *Rasamala* (*Altingia excelsa*). For the wilderness zone, vegetation selection also refers to the existing composition within the Halimun-Salak Corridor, where Amboina Pine (*Agathis dammara*) and Needlewood Tree (*Schima wallichii*) are the dominant species.

The land management system within the study area adopts an ecological boundaries approach, particularly through watershed delineation. Watersheds provide clearly defined land units—upstream, midstream, and downstream—each with distinct biophysical characteristics. This approach ensures that land use and vegetation planning align with the area's ecological structure and functions.

The spatial placement of the proposed agroforestry systems is guided by the village's bioregional characteristics, zoning functions, and community land-use practices. The selection of species for each model is informed by **local plant species commonly cultivated by residents as identified through community interviews** and **dominant woody species found in the Gunung Halimun Salak National Park (TNGHS)**. This dual-source approach ensures ecological compatibility while maintaining cultural and economic relevance for the local community.

The agroforestry system is categorized based on complexity into *Simple Agroforestry Systems* and *Complex Agroforestry Systems*. The classification is guided by cultivation intensity and vegetation composition:

a. *Talun Agroforestry System*. Talun agroforestry is designated within the *wilderness zone*, particularly in areas adjacent to the conservation core, where its multi-strata perennial vegetation can reinforce ecological integrity, enhance habitat continuity, and function as a long-term regenerative system. Talun agroforestry is designed to minimize soil erosion while providing livelihood benefits to surrounding communities. This extensive cultivation technique prioritizes conservation. Vegetation in this system consists of approximately 96% woody tree species and around 5% complementary species offering additional economic value. Selected vegetation includes ecologically significant species

from the National Park, such as Rasamala (*Altingia excelsa*), Tengkurung (*Blumeodendron elateriospermum*), and Marlberry Tree (*Ardisia zollingeri*). Supportive species include Sweet chestnut (*Castanopsis argentea*), nutmeg, cinnamon, and coffee, which contribute to both ecological restoration and sustainable livelihoods.

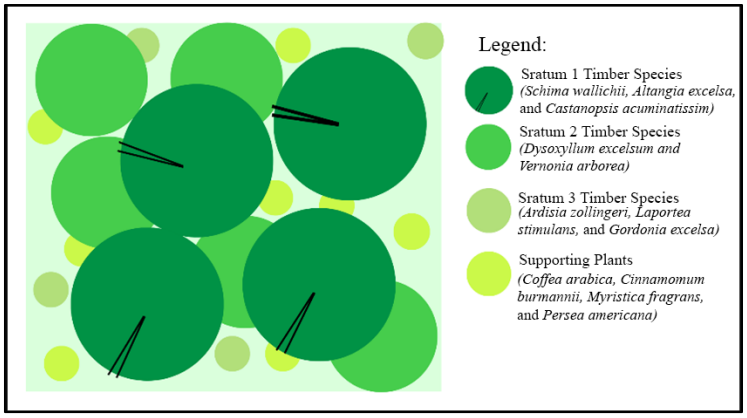

Figure 17. Talun Agroforestry Systems

b. *Mixed Garden Agroforestry System*. Mixed-garden agroforestry is positioned in the *rehabilitation zone*, aligning with areas requiring ecological recovery while still accommodating community-managed land uses – its flexible species composition enables both soil improvement and gradual landscape restoration. This system uses intensive cultivation methods by combining woody perennial trees, economically valuable species, and intercropped food crops to establish a multifunctional and sustainable land-use model. The primary tree species include Amboina Pine (*Agathis dammara*) and Needlewood Tree (*Schima wallichii*), both dominant and ecologically important within the Halimun-Salak Corridor. Supportive woody species include nutmeg, coffee, and avocado—hardwood trees that provide both conservation and economic benefits. These are integrated with horticultural crops such as red chili, green chili, bird's eye chili, Chinese cabbage, and cucumber, contributing to local food systems. Grasses and groundcover vegetation are also highly effective in minimizing surface runoff and erosion, complementing other biophysical factors. The presence of species such as *Mimosa pudica*, *Ageratum conyzoides*, and *Tridax procumbens*offers significant potential in soil and water conservation, helping to stabilize the soil and improve moisture retention (Wijayanie, 2019).

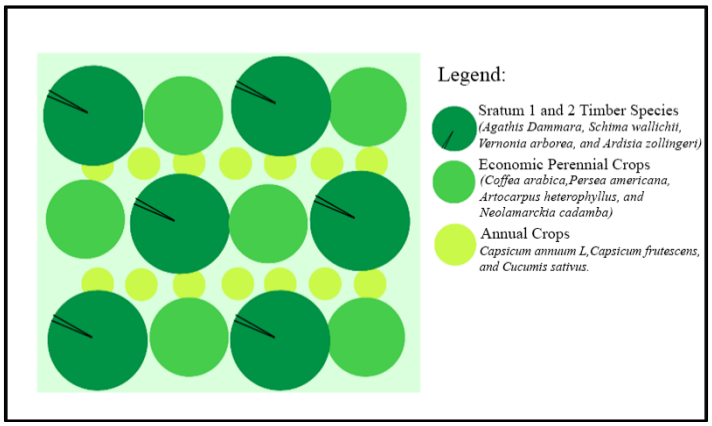

Figure 18. Mixed Garden Agroforestry Systems

The selected vegetation species are characterized by deep and strong root systems, which play a vital role in retaining water, preventing erosion and landslides, and supporting soil and water conservation functions.

c. *Intercropping Agroforestry (Tumpangsari).* Intercropping agroforestry is situated in the Village Buffer Zone, where agricultural activities are actively practiced. Its integration with existing farmlands offers a practical transition model, allowing farmers to maintain food production while gradually increasing tree cover. The intercropping agroforestry model is a form of simple agroforestry that primarily serves commercial purposes, combining economically valuable tree species with seasonal crops. This system is particularly suitable for areas with strong agricultural potential. The plant composition typically includes: (1) Economically valuable tree species such as clove (*Syzygium aromaticum*), rubber (*Hevea brasiliensis*), and teak (*Tectona grandis*); (2) Ecologically functional trees such as *Erythrina spp.* (dadap) and *Leucaena leucocephala* (petai cina), which contribute to soil fertility and nitrogen fixation; (3) Seasonal crops including rice and other horticultural plant species; and (4) Other economically valuable crops, such as coffee and avocado, both of which are well-suited to the site conditions and widely cultivated by local communities.

This system allows for the simultaneous cultivation of multiple crops in a shared space, optimizing land use for both conservation and income generation.

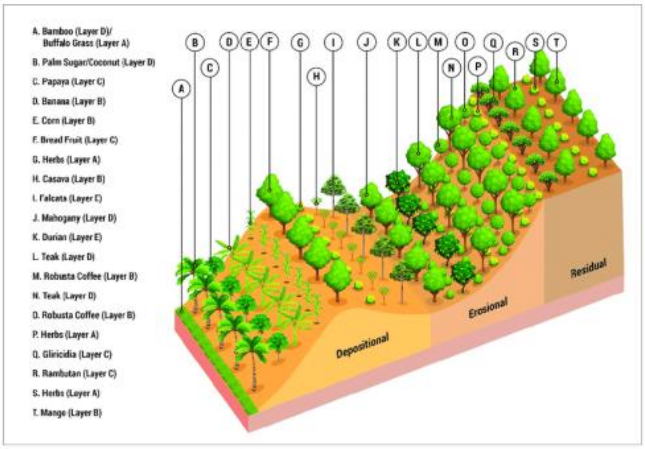

Figure 19. **The Planting Layout** in the Intercropping Agroforestry System
Source: Purwaningsih et al., 2020

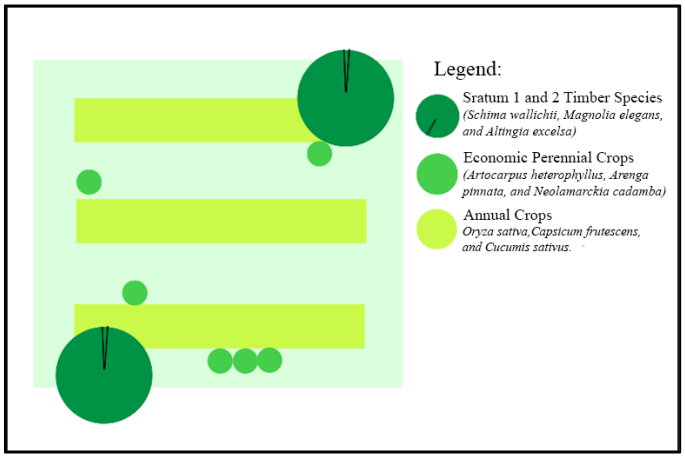

Figure 20. Intercropping Agroforestry Systems

This spatial arrangement ensures that each agroforestry model is aligned with ecological sensitivity, land-use dynamics, and community needs, providing a coherent and implementable framework within the village's bioregional landscape plan.

3.6.3 Circulation Plan. The circulation plan is developed in alignment with the spatial and green infrastructure concepts, serving as a framework for access and connectivity between functional zones. Circulation routes are designed based on their specific purposes and functions, ensuring efficient access while minimizing disturbance to ecologically sensitive areas. These pathways support movement across conservation zones, agricultural areas, and community settlements while promoting sustainable land use practices.

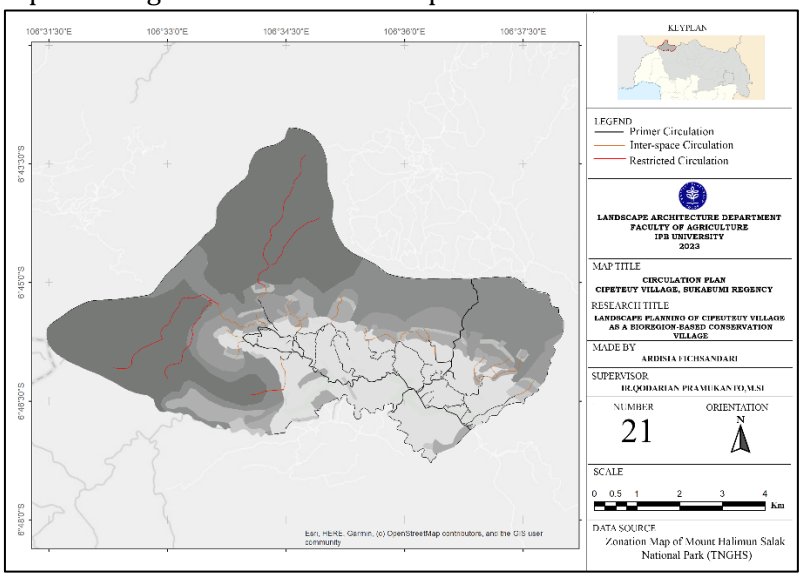

Figure 21. Circulation Plan

3.6.4 Landscape Plan. The landscape plan of Cipeuteuy Village is the result of integrating the spatial plan, green plan, and circulation plan, aiming to create a land use strategy that is both functional and appropriate to the ecological and social context.

To protect the core zone ecosystem, the buffer zone of Gunung Halimun Salak National Park accommodates designated areas for reforestation of degraded and damaged lands caused by encroachment. This is implemented through the Tree Adoption Program. Additionally, this zone supports the application of the complex *Talun* agroforestry system, which is well-suited for ecological conservation and plays a vital role in buffering and protecting the core zone.

Moreover, the buffer zone is designated for the implementation of complex agroforestry systems, particularly the *Talun* type, which is appropriate for conservation functions and contributes to maintaining the ecological integrity of the surrounding forest areas.

The rehabilitation zone, identified as the most significantly degraded area due to land conversion, road fragmentation, and proximity of settlements to the forest, is planned for the application of complex agroforestry systems of the Mixed Garden type. This system provides both ecological and economic functions, helping to restore habitat for key wildlife species and strengthen the Halimun-Salak Corridor. In this zone, community involvement is crucial to support national park conservation efforts.

The cultivation zone also accommodates the agricultural needs of the community, but it is still designed to maintain ecological functions through the application of the intercropping agroforestry system (*Tumpangsari*). This approach reduces soil erosion and supports soil and water conservation. Therefore, agricultural activities in Cipeuteuy Village can be conducted sustainably, particularly in light of the village's steep terrain and erosion-prone andosol soils.

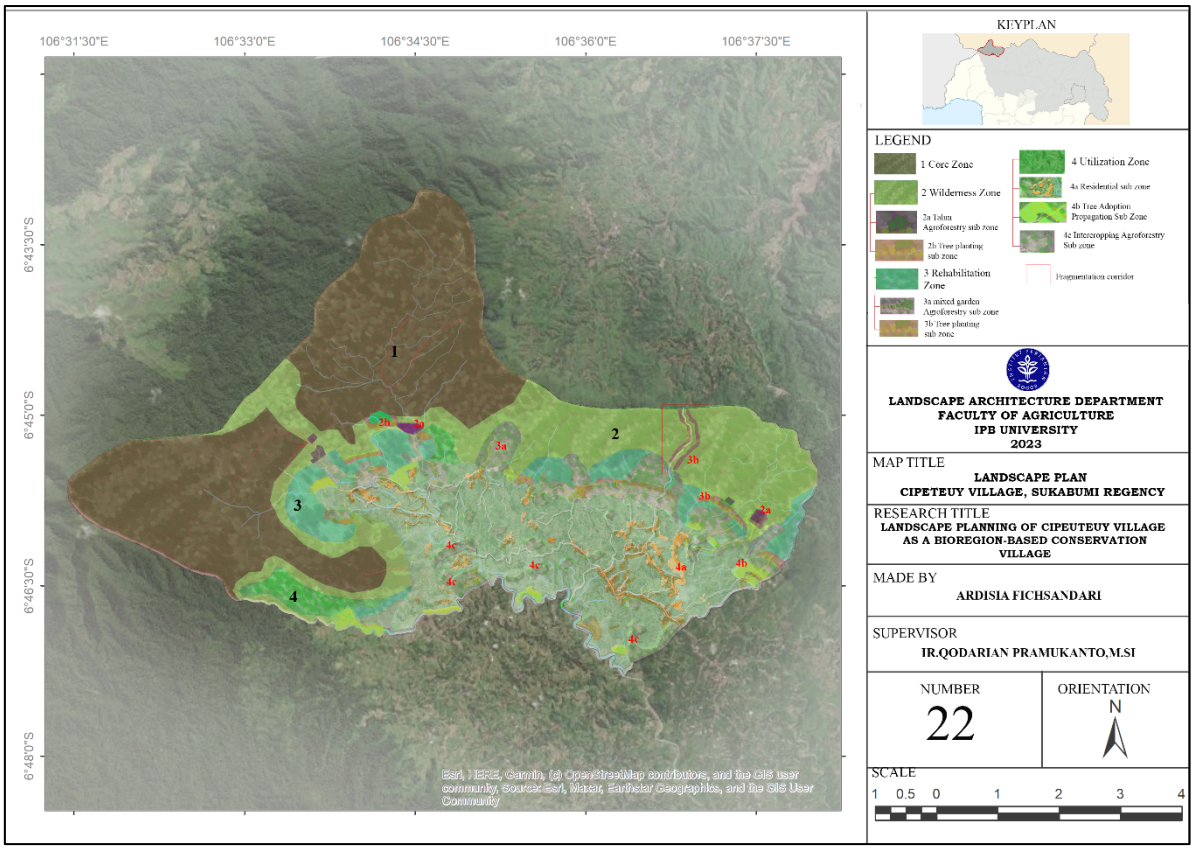

Figure 22. Landscape Plan – Cipeuteuy Village

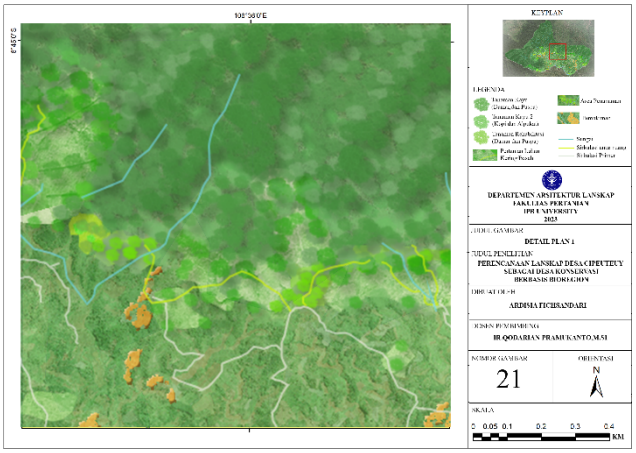

Figure 23. Detail Plan 1

Detail Plan 1 focuses on the spatial layout of the Mixed Garden Agroforestry Sub-zone and the Reforestation Sub-zone, showcasing how these components integrate ecological restoration with productive land use within the rehabilitation zone.

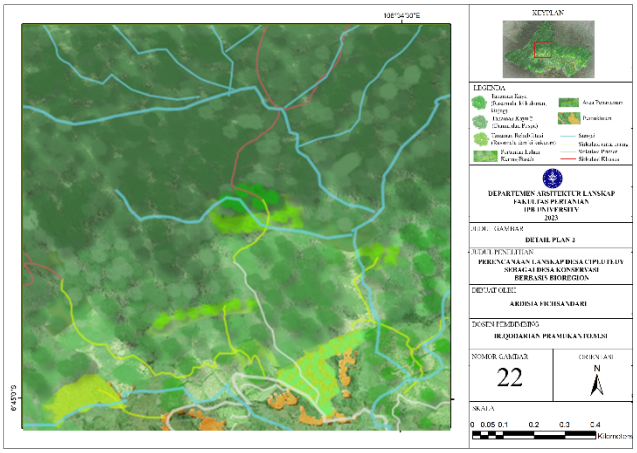

Figure 24. Detail Plan 2

Detail Plan 2 presents the *Talun* Agroforestry Sub-zone, located near the core conservation zone of the national park, as well as the Plant Propagation Sub-zone under the Tree Adoption Program. This plan illustrates efforts to reinforce forest regeneration near sensitive ecological boundaries.

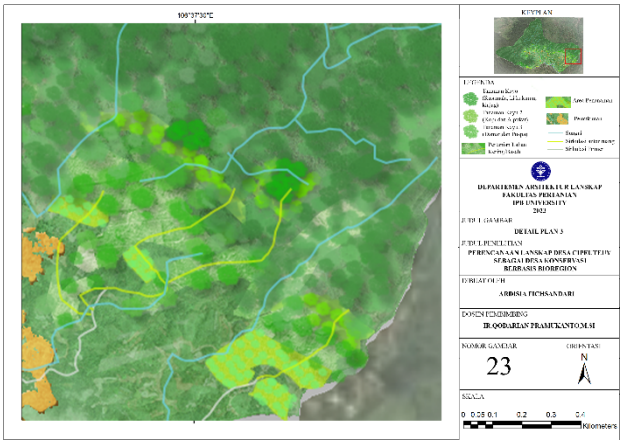

Figure 25. Detail Plan 3

Detail Plan 3 highlights a more integrated configuration, combining the *Talun* Agroforestry Sub-zone, Mixed Garden Agroforestry areas, and the Plant Propagation Sub-zone. This section demonstrates a multifaceted approach to landscape rehabilitation, balancing conservation, economic productivity, and community engagement.

3.7 Conclusion

Cipeuteuy Village possesses distinct physical and biophysical characteristics, along with relatively high biodiversity, due to its direct adjacency to the Gunung Halimun Salak National Park. Characterized by steep slopes, high rainfall, and erosion-prone soil types, the analysis categorizes Cipeuteuy Village 's role as a strategic buffer zone whose ecological stability directly influences the integrity of the Halimun-Salak Corridor. The rich biodiversity within this corridor highlights the importance of maintaining ecological connectivity and minimizing landscape degradation.

The socio-cultural characteristics of the community indicate that agriculture is the dominant livelihood. Rather than representing a constraint, this dependency presents as opportunity to introduce agroforestry systems incorporating both ecologically beneficial species and high value economic crops. Such combinations— demonstrated as successful in comparable buffer zones— can encourage a gradual shift in farming practices by aligning ecological restoration with tangible economic incentives. However, changes in land use within buffer zones are not solely driven by cultivation; emerging economic sectors, such as tourism, shifting livelihood priorities, and broader socio-economic pressures, also contribute to landscape transformation.

Local wisdom and long-standing stewardship practices within the community have also played a crucial role in maintaining landscape quality to date. Building upon these existing values is essential for ensuring that future interventions remain socially acceptable, economically viable, and culturally grounded.

Landscape planning for Cipeuteuy Village as a conservation village must therefore integrate its **bioregional characteristics, ecological functions, socio-economic drivers, and local knowledge systems**. The resulting plan combines spatial zoning, ecological green planning, circulation design, and integrated agroforestry strategies to support both conservation objectives and community well-being in a balanced and sustainability.

3.8 Recommendation

The landscape planning of Cipeuteuy Village as a conservation village should be supported by more comprehensive and in-depth studies of the area's ecological conditions, as well as a more nuanced understanding of the community's social and cultural contexts. This will ensure that the landscape planning process can be optimized by incorporating various dimensions not yet addressed in this study.

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