



Assessment of Healing Forest Potential for Nature-Based Tourism in Bogor Botanical Gardens

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ARTICLE INFO

Article history:

Received May 10th, 2025

Revised August 22nd, 2025

Accepted December 24th, 2025

Available online February 28th, 2026

E-ISSN: 2622-5093

P-ISSN: 2622-5158

How to cite (IEEE):

A. P. Riswan, R. S. Hasibuan, and D. A. Sasongko, "Analysis of healing forest areas supporting tourism in Bogor Botanical Garden", *Journal of Sylva Indonesiana*, Vol. 09, No. 01, pp. 59-71, Feb. 2026, doi: 10.32734/jsi.v9i01.20693

ABSTRACT

Healing forest activities, as exemplified by the Bogor Botanical Gardens, are increasingly popular among urban communities seeking stress relief and mental well-being benefits. This study aimed to identify potential sites for healing forest development based on the standards outlined in the SNI 9006:2021. A mixed-methods approach combining field observations and descriptive analyses was employed to assess the physical and microclimatic characteristics. Eight purposively selected areas were evaluated for vegetation density and diversity, air quality, noise levels, accessibility, and overall comfort of the residents. The findings indicate that Area Six, characterized by gentle slopes, moderate vegetation density, and favorable microclimatic conditions (26°C, 50 dB noise level, and 0.3 m/s wind speed), holds strong potential for healing forest activities. The presence of natural sounds and accessible walking paths further enhances the comfort of visitors. Suitable activities for this site include yoga, forest walks, and tree hugging.

Keyword: Bogor Botanical Gardens, Forest-healing, Mixed-method, SNI 9006:2021, Tourism



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<http://doi.org/10.32734/jsi.v9i01.20693>

1. Introduction

Tourism is a key strategic sector that supports regional economic growth. When managed effectively, tourist destinations can become significant sources of revenue and generate foreign exchange more rapidly than traditional export activities. Beyond its economic benefits, the tourism sector plays a vital role in job creation and poverty reduction, thereby directly or indirectly contributing to the achievement of the Sustainable Development Goals (SDGs), particularly Goal 1—ending poverty [1], [2]. According to the World Travel and Tourism Council [2], tourism accounts for approximately 10.4% of the global Gross Domestic Product (GDP).

Global tourism trends have shifted significantly since the COVID-19 pandemic. Travelers now tend to favor nature-based destinations that offer tranquility, fresh air, and opportunities for small group experiences in less crowded settings [3]. Ecotherapy, a practice focused on mental and physical restoration through direct interaction with nature, has gained increasing relevance in this context. A specific type of ecotherapy that is attracting growing attention is the concept of healing forests, which utilize forest ecosystems as natural therapeutic environments to support human health. The "forest and human health" concept [4] highlights the deep interconnection between the environment and human well-being. Forests encompass various

environmental elements, including scenery, sounds, scents, natural volatile organic compounds (phytoncides), sunlight, microclimate, thermal environment, and topography [5].

A survey conducted by [6] found that nearly eight out of ten people (78.1%) expressed increased concern about their family's health since the pandemic. This heightened awareness was also reflected in spending behavior: Koreans allocated 57% of their recreational expenses to jogging and hiking, followed by home workouts (36%) and fitness activities (24%). As the pandemic progressed, health and well-being became top priorities, influencing lifestyle choices and financial decisions. In South Korea, interest in healing forests surged after COVID-19, with over 1.9 million visitors recorded in 2021 alone. Notably, the Seogwipo Healing Forest experienced a dramatic 260% increase in visitors compared to the previous year [7].

Several studies have demonstrated the physiological benefits of healing forest activities, including reductions in systolic and diastolic blood pressure, regulation of sympathetic nervous activity and amylase enzyme levels, decreased cortisol concentrations, and improved blood sugar control in patients with diabetes. Furthermore, research using the Profile of Mood States (POMS) instrument has shown that forest therapy can enhance positive emotions, reduce negative moods, and alleviate symptoms of anxiety and depression, thereby improving both mental and physical health [8]. The Stress Reduction Theory [9] explains the healing effects of time spent in forest environments on the mind and the body. Studies conducted in Japan in 2008 and 2011 revealed that regular visits to forest environments increased the activity of natural killer cells, which are key components of immune defense, and significantly reduced stress levels [10]. Walking and exercising in forest environments have also been associated with improved mood, lower blood pressure, and enhanced overall well-being. These diverse environmental factors stimulate human senses, producing psychological and physiological relaxation [11], [12] and triggering the release of natural chemicals that promote physiological activity [10], [13].

A notable application of this concept was carried out in Da'an Forest, Taiwan, in 2018, which involved 23 participants. This study measured physiological responses, including heart rate and blood pressure, and emotional states before and after the intervention. The Chinese Word Remote Associates Test (CWRAT) was used as an indicator of creativity in this study. The findings revealed that a three-day forest therapy program significantly enhanced participants' physical and mental health by regulating physiological responses, increasing positive emotions, reducing negative emotions, and improving creative performance by 27.74%, thereby underscoring the cognitive benefits of forest therapy [14].

Despite these well-documented benefits, the application of the healing forest concept remains limited in Indonesia, particularly in urban tropical environments like the Bogor Botanical Gardens. Nevertheless, gardens possess substantial ecological potential, characterized by high biodiversity and landscapes conducive to healing activities. Therefore, this study aimed to analyze potential areas within the Bogor Botanical Gardens that could be designated as healing forest zones.

This study introduces a novel approach by adapting the healing forest concept, which was traditionally developed in temperate regions, to the context of urban tropical environments. In tropical countries such as Indonesia, the implementation of healing forests in urban areas is limited. By integrating spatial analysis to identify and map potential healing zones, this study seeks to make practical contributions to the development of health-oriented nature tourism. Furthermore, it supports the achievement of Sustainable Development Goals (SDGs) by promoting sustainable tourism initiatives that harmonize ecological preservation with community well-being.

2. Research Method

2.1. Research Location

The analysis of potential healing forest areas within the Bogor Botanical Gardens was conducted from December 2023 to January 2024, covering approximately 87 hectares. This study employed a mixed-methods approach, combining qualitative and quantitative techniques. The research framework integrated the Indonesian National Standard (SNI) 9006:2021 [15] on forest tourism for health therapy, alongside the methodology proposed by [16]. Area selection within Bogor Botanical Gardens was conducted using a purposive sampling technique, with criteria including vegetation density and diversity, optimal air quality, accessibility, and comfort level, as presented in Table 1.

Table 1. Healing Forest areas to be analyzed in the Bogor Botanical Gardens

No	Area Healing Forest	Coordinate
1.	Area 1	6°35'52.7"S 106°48'14.9"E
2.	Area 2	6°35'57.5"S 106°48'09.0"E
3.	Area 3	6°36'03.9"S 106°48'14.4"E
4.	Area 4	6°36'01.7"S 106°47'57.0"E
5.	Area 5	6°36'00.0"S 106°47'48.6"E
6.	Area 6	6°35'58.6"S 106°47'46.1"E
7.	Area 7	6°35'42.2"S 106°47'56.2"E
8.	Area 8	6°35'42.0"S 106°48'06.3"E

2.2. Measurement of Physical Environmental Parameters

Measurements were carried out over seven days divided into three sessions, namely morning (08.00 - 10.00 WIB), afternoon (11.00 - 13.00 WIB), and evening (14.00 - 16.00 WIB), with three repetitions. The selection of this time was based on the active hours of the community in general, namely, morning, afternoon, and evening [17]. The collection of physical parameter data was performed using the following formula and criteria:

2.2.1. Slope

Land slope (Table 2) is identified using the DEM (Digital Elevation Model) image data collection method.

Table 2. Slope of the location

No.	Slope	Slope Level
1	0 – 8 %	Flat
2	8 – 15 %	Sloping
3	15 - 25 %	Somewhat Steep
4	25 – 45 %	Steep
5	>45 %	Very Steep

Source: [18]

2.2.2. Vegetation density

Vegetation density (Table 3) was identified by examining the density of a vegetation community obtained from satellite imagery using Landsat 8 data and then processed using QGIS software using the vegetation index method, or normalized. Difference Vegetation Index (NDVI), to obtain data in the form of vegetation density level values [19].

Table 3. Vegetation density based on Forestry Department criteria

Class	NDVI	Density Level
1	-1 s/d 0.32	Rarely density
2	0.32 s/d 0.42	medium density
3	0.42 s/d 1	Tight density

2.2.3. Air temperature and humidity

Temperature and humidity data were collected using a dry-wet thermometer. The tool was placed in an open and non-closed place. The data obtained will be recorded and then processed by adding and averaging using the formula and then the data will be compared with the temperature and humidity table from [20].

$$\text{Average Temperature Value(time)} = \frac{U_1 + U_2 + U_3}{3} \quad (1)$$

$$\text{Average Humidity Value(time)} = \frac{U_1 + U_2 + U_3}{3} \quad (2)$$

Then the data is compared with the temperature and humidity table based on [20] (Table 4).

Table 4. Standard Air Temperature and Humidity

No	Temperature Criteria	Effective Temperature (TE)	RH (%)
1	Cool Comfortable	20.5 °C - 22.8 °C	50 %
	Upper Threshold	24 °C	
2	Optimal Comfort	22.8 °C - 25.8 °C	70 %
	Upper Threshold	28 °C	
3	Warm Comfortable	25.8 °C - 27.1 °C	80 %
	Threshold	31 °C	

2.2.4. Noise

Noise level data is collected using a sound level meter. The data obtained is calculated using the formula

$$\text{Average Noise Value (time)} = \frac{U_1 + U_2 + U_3}{3} \quad (3)$$

Then the data obtained was compared with the noise level based on [21] (Table 5).

Table 5. Noise Standard Data Standard

No	Intensity	Db	Highest Hearing Limit
1	Very Quiet	0	Lower Hearing Limit
		10	Whisper
		20	Sound of Leaves – Leaves
		20	Auditorium, Conversation
2	Calm	30	Individual Office
		40	Peaceful Home
		40	Strong Conversation, Slow Radio
3	Currently	50	General Office
		60	Rowdy House
		60	Company, Radio
4	Strong	70	Roads in General
		80	Noisy Office
		80	Police Whistle
		90	Very Noisy Company
5	Very noisy	100	Busy Street
		100	Steam engine
		110	Cannon
6	Deafening	110	Cannon
		120	Lightning

2.2.5. Wind speed

Wind speed data were collected using an anemometer. The data obtained will be recorded and then processed by adding and averaging using a formula and then compared with the research results [22].

$$\text{Average value of Wind Speed (time)} = \frac{U_1 + U_2 + U_3}{3} \quad (4)$$

Furthermore, the data will be compared with the wind speed table [22] (Table 6).

Table 6. Standard Wind Speed Values

No	Description of Wind	Speed (m/s)	Description of Wind Effects
0	Calm	<0.4	No noticeable wind
1	Light airs	0.4 - 1.5	No noticeable wind
2	Light Breeze	1.6 - 3.3	Wind felt on face
3	Gentle Breeze	3.4 - 5.4	Wind extends light flag, Hair is disturbed, Clothing flaps
4	Moderate Breeze	1.5 - 7.9	Wind raises dust, dry soil, and loose paper, Hair disarranged
5	Fresh Breeze	8.0 – 10.7	Force of wind felt on body, Drifting snow becomes airborne, Limit of agreeable wind on land

No	Description of Wind	Speed (m/s)	Description of Wind Effects
6	Strong Breeze	10.8 – 13.8	Umbrellas used with difficulty, Hair blown straight, Difficulty to walk steadily, Wind noise on ears unpleasant, Windborne snow above head height (blizzard)
7	Moderate Gale	13.9 – 17.1	Inconvenience felt when walking
8	Fresh Gale	17.2 – 20.7	Generally impedes progress, Great difficulty with balance in gusts
9	Strong Gale	20.8 – 24.4	People blown over by gusts

2.2.6. Nature sound

Natural sounds that provide a relaxing effect are one of the main criteria for healing forests because the main benefit of healing forests is to provide a sense of comfort and relaxation to the human body. Therefore, natural sounds are used to identify the types of sounds produced by nature, such as the sound of flowing river water, animal sounds, and the sound of trees blown by the wind, which can provide a relaxing effect on the human body when heard [23].

2.2.7. Analysis

After measuring all locations for slope, vegetation density, air temperature, humidity, noise level, wind speed, natural sounds, and track conditions, the next step is evaluating compliance with the SNI 9006:2021 standard. Locations exceeding the standard are given a score of 0, while locations meeting the standard are given a score of 1. Locations that meet all parameters are considered potential healing forest sites.

3. Results and discussions

3.1. Results

Based on the results of the study, vegetation density in Area One was classified as sparse, while temperature, humidity, and noise levels exceeded the established thresholds (Table 7). Area One is located in an open field near the Grand Garden Resto & Café, and its vegetation is dominated by grass.

Table 7. Presents the measurement results of each parameter in Area one

No	Parameter	Standard	Results	Score
1	Slope	Flat-sloping	Sloping	1
2	Vegetation Density	Medium-tight density	Open space	0
3	Air temperature	20-26°C	26.33	0
4	Humidity	40-80%	84.87	0
5	Noise level	30-50 dB	54.33	0
6	Wind speed	< 1 m/s	0.47	1
7	Natural Sound	Available of natural sounds	-	0
8	Track	Available	Available	1
Total Score				3

Area Two, as shown in Table 8, received a score of 5. It is located near Gate Three of the Bogor Botanical Gardens and consists of two vegetation structures: one dominated by pine trees and the other by grass. This area features an open landscape with medium canopy cover, allowing sufficient sunlight penetration. The combination of tall pine trees and open grassland contributes to the formation of a distinctive microclimate.

Table 8. Presents the measurement results of each parameter in Area two

No	Parameter	Standard	Results	Score
1	Slope	Flat-sloping	Sloping	1
2	Vegetation Density	Medium-tight density	Medium	1
3	Air temperature	20-26°C	25.33	1
4	Humidity	40-80%	84.51	0
5	Noise level	30-50 dB	60.33	0
6	Wind speed	< 1 m/s	0.80	1
7	Natural Sound	Available of natural sounds	-	0
8	Track	Available	Available	1
Total Score				5

Table 9 presents Area Three, which received a score of 6. Area Three is located in the Fern Garden and is characterized by lush fern vegetation surrounding a central fountain. The fountain not only enhances the area's aesthetic value but also contributes to a cooler, more humid microclimate. This environment provides a calm

and refreshing atmosphere, making it ideal for relaxation and healing activities. Unfortunately, the area is noisy, and the humidity exceeds the standard.

Table 9. Presents the measurement results of each parameter in Area three

No	Parameter	Standard	Results	Score
1	Slope	Flat-sloping	Sloping	1
2	Vegetation Density	Medium-tight density	Tight density	1
3	Air temperature	20-26°C	25.67	1
4	Humidity	40-80%	84.623	0
5	Noise level	30-50 dB	52.67	0
6	Wind speed	< 1 m/s	0.46	1
7	Natural Sound	Available of natural sounds	Available	1
8	Track	Available	Available	1
Total Score				6

Area Four is located on the right side of Gunting Lake in the Bogor Botanical Gardens. This area is dominated by tree vegetation, with relatively close spacing between trees. Measurements show that the slope of Area Four is relatively flat, but the area is humid (84.85% humidity) and noisy (53.00 dB) due to its proximity to Gunting Lake, which is frequently visited by tourists (Table 10).

Table 10. Presents the measurement results of each parameter in Area Four

No	Parameter	Standard	Results	Score
1	Slope	Flat-sloping	Sloping	1
2	Vegetation Density	Medium-tight density	Tight density	1
3	Air temperature	20-26°C	26.50	0
4	Humidity	40-80%	84.85	0
5	Noise level	30-50 dB	53.00	0
6	Wind speed	< 1 m/s	0.47	1
7	Natural Sound	Available of natural sounds	Available	1
8	Track	Available	Available	1
Total Score				5

Area Five is located on the shores of Lake Gunting in the Bogor Botanical Gardens. Its vegetation is dominated by trees, and it borders the Dutch Cemetery. Similar to Area Four, Area Five has dense vegetation with closely spaced trees (Table 11). This area received a score of 4, with humidity and noise levels exceeding the established standards.

Table 11. Presents the measurement results of each parameter in Area five

No	Parameter	Standard	Results	Score
1	Slope	Flat-sloping	Flat	1
2	Vegetation Density	Medium-tight density	Medium	1
3	Air temperature	20-26°C	26.50	0
4	Humidity	40-80%	84.85	0
5	Noise level	30-50 dB	55.67	0
6	Wind speed	< 1 m/s	0.30	1
7	Natural Sound	Available of natural sounds	-	
8	Track	Available	Available	1
Total Score				4

Area Six is located near the Dutch Cemetery, with bamboo as the dominant vegetation. This location lies opposite the Presidential Palace and borders Gunting Lake in the Bogor Botanical Gardens. The dense bamboo stands provide significant shade and a distinctive visual character, creating a tranquil and secluded atmosphere accompanied by the gentle rustling of bamboo leaves. Proximity to the lake enhances the microclimate, resulting in cooler temperatures and higher humidity, which supports a comfortable habitat for various bird

species (Table 12). Scoring 7 out of 8 criteria assessed based on the SNI 9006:2021 standard, this area demonstrates strong potential to be developed as a healing forest.

Table 12. Presents the measurement results of each parameter in Area six

No	Parameter	Standard	Results	Score
1	Slope	Flat-sloping	Flat	1
2	Vegetation Density	Medium-tight density	Medium	1
3	Air temperature	20-26°C	26.00	1
4	Humidity	40-80%	84.85	0
5	Noise level	30-50 dB	50.00	1
6	Wind speed	< 1 m/s	0.30	1
7	Natural Sound	Available of natural sounds	Available	1
8	Track	Available	Available	1
Total Score				7

Table 13 presents Area Seven, which is dominated by centuries-old trees with dense crowns. The extensive canopy cover provides substantial shade, reduces direct sunlight, and creates a cooler and more stable microclimate. The presence of mature trees also supports rich biodiversity by providing habitat for various bird and insect species. While this area has strong potential to be developed as a healing forest, the age of the existing trees raises concerns that falling branches could pose a safety risk to visitors.

Table 13. Presents the measurement results of each parameter in Area seven

No	Parameter	Standard	Results	Score
1	Slope	Flat-sloping	Sloping1	1
2	Vegetation Density	Medium-tight density	Tight density	1
3	Air temperature	20-26°C	26.5	0
4	Humidity	40-80%	84.85	0
5	Noise level	30-50 dB	50.00	1
6	Wind speed	< 1 m/s	0.60	1
7	Natural Sound	Available of natural sounds	Available	1
8	Track	Available	Available	1
Total Score				6

Area Eight is located in the medicinal plant collection garden of the Bogor Botanical Gardens. This area is dominated by vegetation consisting of trees and various medicinal plants (Table 14). It has a moderate level of vegetation density, with plant spacing distributed sporadically. The diversity of species in this area not only holds ecological significance but also provides educational value, as visitors can learn about traditional medicinal plants and their uses. The combination of shade-providing trees and understory medicinal flora contributes to the formation of a distinctive microclimate.

Table 14. Presents the measurement results of each parameter in Area Eight

No	Parameter	Standard	Results	Score
1	Slope	Flat-sloping	Flat	1
2	Vegetation Density	Medium-tight density	Tight density	1
3	Air temperature	20-26°C	26.50	0
4	Humidity	40-80%	85.15	0
5	Noise level	30-50 dB	54.33	0
6	Wind speed	< 1 m/s	0.433	1
7	Natural Sound	Available of natural sounds	Available	1
8	Track	Available	Available	1
Total Score				5

3.2. Discussion

The healing forest tourism sector encompasses a wide range of health, economic, social, and environmental dimensions. Healing forests offer a unique experience compared to conventional tourism, as visitors come not

only to enjoy the natural beauty but also to seek tranquility, reduce stress, and improve their quality of life. This aligns with Sustainable Development Goal (SDG) 3: Good Health and Well-Being.

Based on the results of the study, vegetation density in Area One (Figure 1) was classified as sparse, while temperature, humidity, and noise levels exceeded the established thresholds (Table 7). According to [20], areas suitable for green open spaces and healing forests should have sufficiently dense vegetation to regulate the microclimate, provide adequate shade, and enhance environmental comfort. Sparse vegetation results in excessive light exposure, reduced shading, and diminished natural relaxation effects, thereby lowering the restorative potential of the forest environment. This condition can also contribute to higher surface temperatures and increased glare, which may discourage prolonged outdoor activity. Previous research has shown that forest structure significantly influences human perceptions of comfort and aesthetics and that structural characteristics—particularly low vegetation density (fewer than 500 trees per hectare)—can weaken the therapeutic effects of forests [24]. Consequently, increasing vegetation density and canopy coverage in Area One would be essential for optimizing its potential as a healing forest.



Figure 1. The location of the first area within the Bogor Botanical Gardens, indicating its spatial position and surrounding landscape

Area Two recorded the highest average daily noise level among the eight potential healing forest areas, at 60.33 dB. The noise in this area is primarily generated by vehicular traffic and community activities, as it is located closest to the main road (Figure 2). This value exceeds the threshold set by the Minister of Environment Regulation No. 48 of 1996, which stipulates a maximum limit of 50 dB for parks and green open spaces. Excessive noise disrupts tranquility and undermines the primary objective of forest restoration. Moreover, prolonged exposure to noise above the permissible limit can negatively affect human health, thereby reducing the ecological and psychological benefits expected from a healing forest environment.

Humidity levels across Areas One to Eight were found to be above the established average. According to [20] and [5], the optimal humidity range for comfort is between 60% and 80%. Excessive humidity can cause discomfort and contribute to both physical and mental fatigue. As noted by Szokolay in *Introduction to Architectural Science*, comfort levels are influenced by temperature, humidity, and wind speed. When humidity exceeds 80%, even under moderate temperature conditions, it can create a sense of stuffiness and discomfort, which is not conducive to healing forest activities [25].

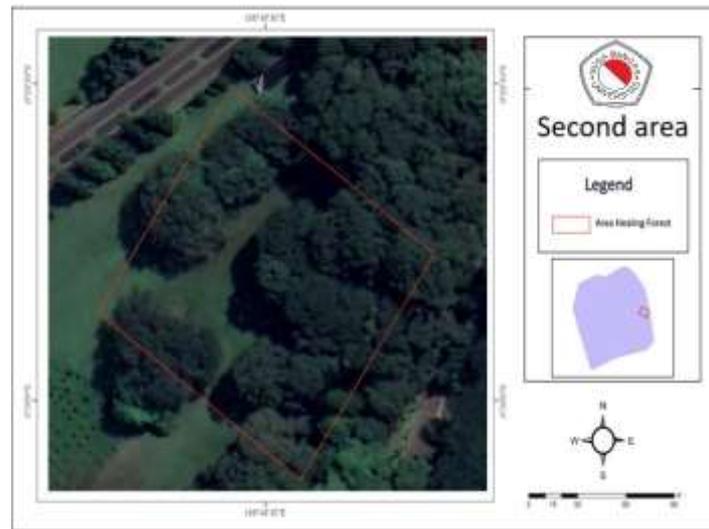


Figure 2. The location of the second area within the Bogor Botanical Gardens, indicating its spatial position and surrounding landscape

Area Three actually has the potential to be used as a healing forest area supported by easy accessibility. According to [26], easy access is one of the main factors in the development of sustainable tourism areas because it affects the comfort and perception of visitors to tourist attractions, but other parameters in area three exceed the threshold to be used as a healing forest (Figure 3).



Figure 3. The location of the third area within the Bogor Botanical Gardens, indicating its spatial position and surrounding landscape

Area Four achieved a total score of 5 based on the eight assessed parameters (see Table 10). Its slope is classified as sloping, which still meets the standard range of flat to sloping terrain, making it suitable for comfortable accessibility. The vegetation density is dense, providing ample shade and supporting a cooler microclimate, in line with the requirements of the medium-to-dense density standard (Figure 4). However, the air temperature of 26.50°C slightly exceeds the upper limit of the standard range ($20\text{--}26^{\circ}\text{C}$), which may reduce thermal comfort during peak daytime hours (see Table 10). Humidity in this area is 84.85% , exceeding the standard limit of 80% , potentially causing a damp sensation and affecting comfort. The noise level of 53.00 dB exceeds the permissible limit of 50 dB , possibly due to nearby human activity due to the location's proximity to Gunting Lake, which may disrupt the healing experience intended for the healing forest area.

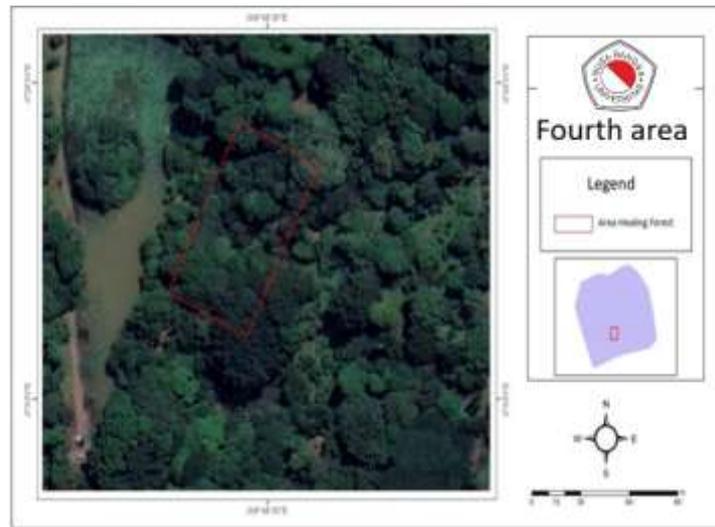


Figure 4. The location of the fourth area within the Bogor Botanical Gardens, indicating its spatial position and surrounding landscape

Based on the assessment results, Area Five received a total score of 4 out of 8. The slope parameter meets the standard (flat-sloping), reflecting good accessibility and ease of movement for visitors. Vegetation density is moderate, providing shade and regulating the microclimate (Figure 5).

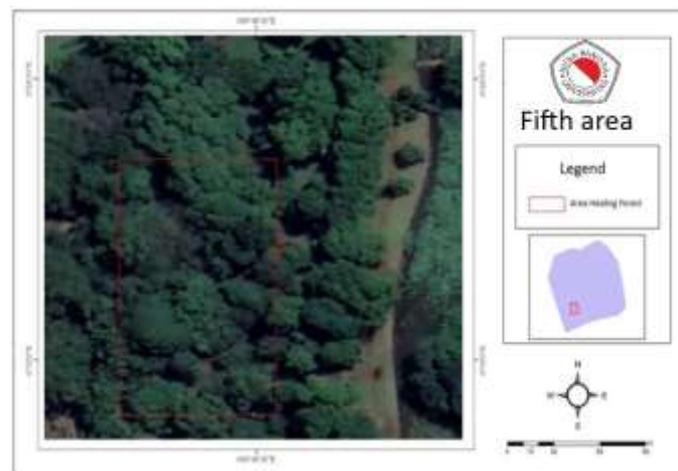


Figure 5. The location of the fifth area within the Bogor Botanical Gardens, indicating its spatial position and surrounding landscape

Area Six is suitable for use as a healing forest based on the SNI 9006:2021 standard (Figure 6). This area has a moderate level of vegetation density, with a distance between vegetation that is not too small. The same was stated by [16] from the results of his research in Kampung Pasundan Cisamaya Ciremai National Park. The results of the study showed that the air temperature in Ciremai ranged from 25.8 to 27.8°C, which is in accordance with the results of research at Bogor Botanical Gardens, where the air temperature 26°C (See Table 12). The presence of vegetation also significantly influenced the formation of a microclimate at the research location. According to [16], the denser the vegetation, the more stable the microclimate. Based on the results of this study, air humidity exceeded the predetermined threshold of 84.85%. To reduce humidity, it can be done by pruning unnecessary tree branches or twigs so as to create air circulation and sunlight paths or reduce undergrowth. Undergrowth that is too close can keep humidity high because it blocks air circulation and reduces evaporation [27].

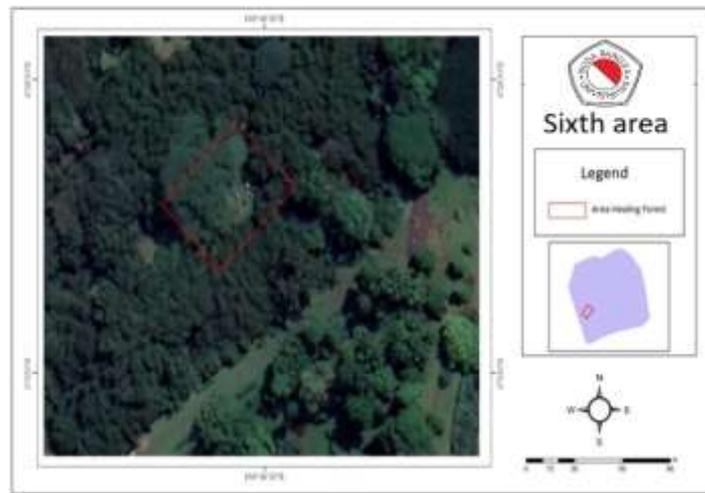


Figure 6. The location of the third area within the Bogor Botanical Gardens, indicating its spatial position and surrounding landscape

Area Seven is located on the left side of the Bogor Palace and is dominated by centuries-old trees with dense canopies. It is also situated far from the main visitor activities within Bogor Botanical Gardens (Figure 7). Similar to Area Three, Area Seven showed potential for development as a healing forest area (see Table 9 and 13). At the time of the study, the temperature and humidity levels in this area still exceeded the thresholds set by [15]; however, these parameters could be brought within acceptable limits through canopy management to optimize microclimatic conditions for healing purposes.



Figure 7. The location of the third area within the Bogor Botanical Gardens, indicating its spatial position and surrounding landscape

According to [28] emphasized the importance of maintaining balanced microclimate conditions, such as temperature and humidity, within forest areas to support healing functions and ensure user comfort. Area Eight is located within the Medicinal Plant Collection Garden of Bogor Botanical Gardens. This area was dominated by trees and medicinal plants (Figure 8). Despite its vegetation, Area Eight was not suitable for healing forest development because of its high noise level, recorded at 54.33 db. This excessive noise was attributed to the area's proximity to Gate 3 of the Bogor Botanical Gardens, which serves as the main entry and exit point for visitors, resulting in constant tourist traffic.

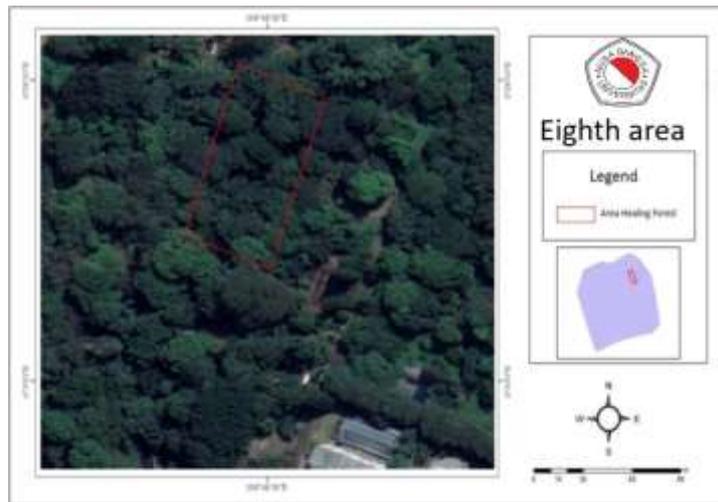


Figure 8. Location eight area

In Indonesia, research and development of healing forest tourism remains limited, despite the availability of SNI 9006:2021. Government policies are needed to support the development of this sector, such as developing technical guidelines for implementing SNI 9006:2021, providing incentives for area managers developing healing forest tourism, integrating the healing forest concept into regional spatial planning, and implementing public education programs on its benefits. These policies are crucial given the significant benefits of healing forest tourism in addressing high levels of air pollution, work-related stress, traffic congestion, and the demands of a modern lifestyle. Furthermore, healing forest activities can increase regional income.

In Indonesia, a feasibility study on the establishment of a healing forest in the Cibodas Botanical Gardens, West Java, concluded that the initiative was both financially and non-financially viable. The project reported a Net Present Value (NPV) of over IDR 33 billion and an Internal Rate of Return (IRR) of 66.65%, indicating strong financial feasibility and long-term sustainability. Healing forests prioritize environmental sustainability, aligning with the core principles of sustainable tourism, which aims to preserve ecosystems while delivering social and economic benefits to local communities [29]. In South Korea, visitors are willing to pay entrance fees for healing forest experiences and generate income for forest management. According to [24] in 2012 the Jangseong Healing Forest was visited by 4,124 people, paying fees ranging from KRW 40,000 to KRW 120,000. A survey indicated that 400 visitors paid an average of KRW 35,010 for forest therapy. This proves that healing forests can increase the income of a tourist area.

4. Conclusion

Of the eight areas with the potential to be developed as a healing forest in the Bogor Botanical Gardens, area six best meets SNI 9006:2021 criteria. This area boasts favorable physical characteristics, such as flat slopes and moderate vegetation density. The microclimate in area six is recorded at a temperature of 26°C, a noise level of 50 dB, and a wind speed of 0.3 m/s. Furthermore, the presence of natural sounds and available paths provide added value in terms of visitor comfort and accessibility. However, area six still has one indicator that does not meet standards: relatively high humidity levels. This problem can be addressed through vegetation management efforts, such as pruning unnecessary tree branches to improve air circulation and natural lighting. Furthermore, reducing excessively dense undergrowth is also necessary, as excessively dense undergrowth can impede air flow and slow evaporation, thus maintaining high humidity. To ensure this area complies with SNI 9006:2021 standards, monitor temperature, humidity, and air quality regularly. Also, install information boards about the benefits of healing forests and how to maintain ecosystem balance so that visitors are also involved in conservation.

Acknowledgments

Thanks to the Management of Bogor Botanical Gardens which is the location of the research.

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