

## HEALING FOREST DEVELOPMENT DESIGN IN TAMAN HUTAN KAMPUS, IPB DARMAGA BOGOR

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### ABSTRACT

University students are susceptible to experiencing psychological problems due to various problems, both academic and non-academic problems. These various types of problems will mainly have an impact on individual stress levels. This study aims to develop a design for the development of a healing forest in Taman Hutan Kampus IPB Darmaga Bogor. The steps involved in designing a landscape are inventory, data analysis, ideas and concepts, and the design process. Accessibility to Taman Hutan Kampus is relatively easy because of the position of Taman Hutan Kampus which is directly adjacent to the main road. The average of LAI value is 0,480-1,548 which belongs to the low canopy density. Respondents showed a positive response to Taman Hutan Kampus as healing forest. The design is made to accommodate spaces that create activities based on the needs of visitors, namely the induction area, active area, and therapy area. Activities that can be done to support healing activities are enjoying the beauty of nature by walking, speaking positively, using all the senses to feel tree textures, and relaxing the mind.

Key words: healing recovery, stress, urban area

### INTRODUCTION

University students are susceptible to experiencing psychological problems due to various problems, both academic and non-academic problems. Various problems experienced by university students from the academic aspect, mostly not being able to adapt to the demands or tough coursework, differences in learning methods while in high school including the way lecturers teach, not being able to complete their final assignments, and anxiety about future careers (von Keyserlingk *et al.* 2022). While problems from non-academic aspects are related to student's problems, mostly negative self-concept and lack of confidence, relationships with parents, not being able to adapt to the environment including difficulties establishing positive relationships with peers, coming from different cultural backgrounds, and so on (Asif *et al.* 2020).

These various types of problems can have an impact on individual psychological conditions so that they can cause mild stress to severe stress and even depression. Stress occurs because of an imbalance between the pressure experienced by a person and the ability to deal with the pressure (Leuwol and Sabarani 2020). Stress if left for a long time without recovery will have an impact on dysfunctional systems in the body, such as coronary heart disease, diabetes, and depression. Stress is further considered a risk factor for death (Corazon *et al.* 2010).

Someone who is stressed needs a place or environment that can support health recovery, a place that provides calm, and comfort. The concept of healing forest offers healing and stress relief activities by presenting natural attractions as the main support for the therapeutic process (Leuwol and Sabarani 2020). Healing forest has a positive impact on human health, which can reduce the hormone cortisol which plays a role in the activation of stress in the body. In addition, healing forests can reduce blood pressure and heart rate (Hansen *et al.* 2017).

Wahyudi (2021) states that three locations are suitable to be used as healing forests in IPB Darmaga, namely Taman Konservasi, bamboo forest, and Taman Hutan Kampus. Healing forest needs to be designed so that it can support people's needs in health recovery. (Stigsdotter and Grahn 2003) states that in Sweden and several other countries, city parks are referred as healing garden, but they don't cause a healing effect on the community. One of the reasons is the lack of knowledge regarding park provisions to provide community needs for healing. The study aimed to develop a design for the development of healing forest in Taman Hutan Kampus, IPB Darmaga Bogor. There are several stages of research: a) exploring physical and biophysical potentials; b) arranging the site plan of Taman Hutan Kampus; c) identifying activities that support healing.

**RESEARCH METHOD**

The research was conducted at Taman Hutan Kampus, IPB Darmaga, Bogor, in Januari-Juli 2022. The tools and materials used are stationery, binoculars, voice recorder, DSLR camera, fisheye lens, Microsoft office, AutoCAD 2020, Sketch Up 2020, and Hemiview 2.1.

The steps in landscape design research are inventory, data analysis, ideas and concepts, and the design process (Hakim dan Utomo 2012). The data collection method is listed in Table 1.

Leaf-Area Indeks (LAI) was calculated for the canopy cover data. Leaf-Area Indeks (LAI) is a

variable that shows the relationship between leaf area and area covered. LAI measurements using Hemispherical photograph method at five points in the observation plot measuring 40 x 40 meters (Figure 1). The time of taking photos is in the morning, afternoon, or during cloudy conditions to avoid sun diffraction which creates shadows on the photo so that bias occurs and the value becomes inaccurate. The camera tripod is set to a height of ±1 meter, the position of the camera is facing the sky and facing north (Al-Reza *et al.* 2017).

Photos of the canopy cover were analyzed using software Hemiview 2.1. The LAI values were obtained and then matched with the tree shade canopy classification (Table 2).

Table 1 Inventory of general, physical and biophysical, and site visual data

No.	Data Type	Data Collection Method	Usability Analysis
1.	General Data		
	Taman Hutan Kampus profile and facilities	Field observation and literature study	Obtaining research site condition
	Taman Hutan Kampus location and boundaries	Field observation	
2.	Physical and Biophysical Data		
	Site accessibility	Field observation	Obtaining the physical and biophysical conditions of the research site
	Macro and microclimate	Literature study	
	Tree canopy cover	Field observation	
3.	Site Visual Data		
	Good view	Field observation	Obtaining visual potential of the site
	Bad view	Field observation	
4.	Social Data		
	General data of respondents	Questionnaire	Obtain general data on respondents and their needs for healing forest
	Perceptions and preferences of respondents	Questionnaire	

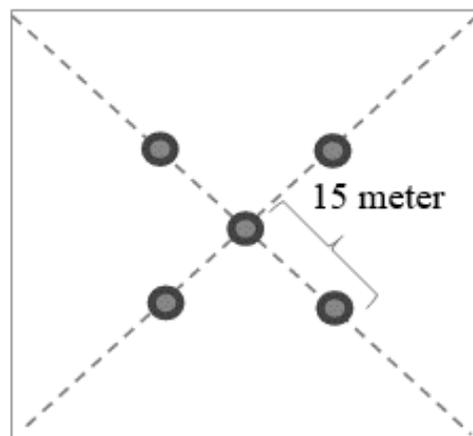


Figure 1 Leaf-Area Index (LAI) plot size

Table 2 Classification of shade tree canopy (Ratnasih 2012)

No.	Type of Tree Shade Canopy	LAI Value
1.	High dense	>2,3
2.	dense	1,7-2,3
3.	Low dense	0,1-1,6

Questionnaire data were obtained from a minimum of 30 visitors. The sample size is based on the central limit theorem that statistical means have a normal distribution for sample sizes that approach infinity. But in practice, the central limit theorem can be applied to a minimum of 30 sample sizes (Alwi 2015). Determination of target respondents using purposive sampling technique. Purposive sampling is a sampling technique using certain considerations (Sugiyono 2018). Respondent considerations or criteria needed are people who have visited the Campus Forest Park in the last 3 years and are  $\geq 18$  years old.

The design process is the application of ideas and concepts combined with art (Angwarmas dan Setyabudi 2020). The development design concept consists of the concept of space, the concept of circulation, and the concept of elements. The concept of space is the concept of dividing the area based on features and activities. The concepts of circulation are the application of concepts related to movement by users within the site. The concept of elements is divided into hard and soft elements. The hard element is element that supports tread comfort, such as benches, tables, and trash cans. While the soft element is the application of the presence of plants (Laksito 2014).

## .RESULT AND DISCUSSION

Taman Hutan Kampus is located behind IPB Darmaga campus and has a total area of 0,42 hectares. Taman Hutan Kampus is surrounded by forest and the north side is bordered by Cisadane River. The feasibility of Taman Hutan Kampus as a place for healing forest through biophysical potential analysis is listed in Table 3.

Taman Hutan Kampus is considered a potential place for healing forest because it has a total score of more than 7. The score of 7 is a potential standard because it fulfilled more than half of the parameters (Wahyudi 2021). Parameters that have not been fulfilled are sunlight intensity, air temperature, humidity, and aromatic plants. These parameters can be fulfilled by designing the site using addition of plant species, increasing the number of plants, and plant layouting. According to Zulfa *et al.* (2022), uncomfortable environmental temperatures can be handled by adding plants and adjusting planting distance to reduce heat, temperature, and humidity. Taman Hutan Kampus is directly adjacent to the main road (Figure 2A). However, the main road is rarely passed by people so the noise does not have a direct impact on the site. There is one entrance to Taman Hutan Kampus which can be passed by the side of one car. The existing circulation in Taman Hutan Kampus is primary circulation which is almost obscured by shrubs (Figure 2B) and secondary circulation in the form of free circulation in the bushes.

Table 3 Taman Hutan Kampus assessment (Wahyudi 2021)

Parameter	Result	Standard	Value*
Noise	48,66 dB	30-50 dB	1
Sunlight intensity	1.028,47 lux	300-500 lux	0
Wind velocity	0,14 m/s	$\leq 1$ m/s	1
Air temperature	26,74 °C	22-23 °C	0
Humidity	88,59%	40-60%	0
Vegetation density	Dense	Dense-high dense	1
Slope	Sloping	Sloping-level	1
Aromatic plant	-	The presence of aromatic plants on site	0
Sound of nature	The sound of birds, wind, and river	The sound of nature on site	1
Location security	Safe	Safe	1
Activities to do	Walk, sit, and enjoy the nature	Some activities can be done	1
Track	Exist	Exist	1
<b>Total score</b>			<b>8</b>

\*The number 1 indicates the points for the parameter are fulfilled, while the number 0 indicates the points for the parameter are not fulfilled



Figure 2 Accessibility and site circulation. (A) Taman Hutan Kampus borders the main road. (B) Primary circulation at the site.

The average temperature in Taman Hutan Kampus is 26,74°C and the average humidity in Taman Hutan Kampus is 88,59%. Temperature and humidity which are included in the comfortable category according to SNI (2021) for Health Therapy purposes are 22-23°C and 40-60% respectively, hence Taman Hutan Kampus is categorized as uncomfortable. The LAI value in Taman Hutan Kampus was between 0,480-1,548. The vegetation type is categorized as a forest with low canopy density.

Taman Hutan Kampus has several visual potentials that can increase the interest of visitors to visit the site. This potential is the view that can be seen to the north from the site, where visitors can enjoy views of green trees. In addition, the sound of water from Cisadane River can be heard clearly which will increase a sense of comfort and calm. Visuals that are classified as bad views are polybag plastic waste scattered, fallen trees, and grass that grows very tall.

Taman Hutan Kampus does not have many facilities and utilities that can be used to support healing forest. Facilities such as open fields, benches, and so on do not exist in Taman Hutan Kampus so it is considered less efficient to attract people to visit.

There is not much activity for visitors at Taman Hutan Kampus. Based on observations, the location tends to be quiet throughout the day, the visible activity is that several people are exercising through the location in the morning and several vehicles pass through the location in the morning, afternoon, and evening. People's response to Taman Hutan Kampus as a place for healing forest showed a positive response. People are interested in doing healing forest at Taman Hutan Kampus because they will feel the positive impact of healing forest, including feeling calmer, more comfortable, improving health, and reducing stress levels.

The site used for healing forest requires temperature and humidity conditions that are comfortable for humans. Humidity that is too high can cause discomfort. This can be overcome by handling the structure and placement of vegetation. The selection of vegetation that is not too dense/massive allows sunlight to enter the forest floor.

The vegetation on the site is still natural because it grows wild without intensive management. Vegetation problems on the site are grass that grows very high which reduces the aesthetics of the site and visitors will find it difficult to walk in the area. Taman Hutan Kampus needs to add a lot of vegetation that can add aesthetic value to improve the quality of the site. Animals in Taman Hutan Kampus, especially birds, can create a comfortable environment from their voices and body colors. Therefore, the plants that are designed must be following the habitat of birds and other animals.

Taman Hutan Kampus has visual potential. The good view of the trees is supported by the existence of birds and river which provides calm and comfort. However, Taman Hutan Kampus does not have facilities that can support healing forest. Provision and maintenance of facilities need to be carried out to support healing forest, starting from benches, trash cans, and tree canopy. The grass needs to be cut so that there is a social area available.

The criteria for public open space generally have a strategic location, ecological functions, aesthetic value, and facilities (Faizah 2017). These criteria are already owned by Taman Hutan Kampus but are not yet optimal. Other criteria need to be added to support Taman Hutan Kampus so that it does not only function as a green open space but can provide health benefits for its users. The following are the design criteria for healing forest that need to be considered in Table 4.

The concept of Taman Hutan Kampus intends to increase the healing of physiological and psychological user conditions by utilizing forest elements. The application of the healing forest concept can be in the form of space functions that are accepted to activities, creating a natural environment, and easy and safe accessibility. According to Setyabudi *et al.* (2016), a natural impression must be seen in the landscape formation, circulation on the site, and any materials used.

The space formed is an active area, a healing area, and an induction area. An active area is a space that provides opportunities for visitors to carry out active

movement activities and socialize (social interaction) (Setyabudi *et al.* 2016). The space used is a grass field and some shade to maintain a comfortable environment. An overview of the active space can be seen in Figure 3.

The therapy area is a space to enjoy the greenery and relaxing activities. The therapy area is more personal because it is used for visitors who want to be alone to get peace of mind (meditation). The therapy area has facilities in the form of a reflection path, a seat, and a trash can. The overviews of the therapy area are shown in Figure 4.

Table 4 Functional design criteria

Criteria	Aspect	Element
Space diversity	Space division based on user activity	Determination of activity type, access, and space
Design	Evenly green element	Simple design dominated by vegetation, facilities with comfortable materials
Natural element	Materials that are in harmony with nature	Vegetation with arrangement and color combination
Safety	Safety and comfort, noise minimization	Vegetation as a noise breaker



Figure 3 Taman Hutan Kampus active area



Figure 4 Taman Hutan Kampus therapy area

Activities that can be done when doing a healing forest are, first, walking slowly while paying attention to the surroundings, for example, the leaves of the trees moving in the wind, birds flying, and so on. Second, feel the texture of the tree. While feeling the tree, we can say “outside I see ...; inside I feel ...”. for example, “outside I saw a tree moving in the wind; inside I feel my body getting better”, or “outside I feel the bark; inside I feel a little nervous”. This is repeated with the smell, sound, and taste of fruit if existing trees contain fruit (Clifford 2018). The induction area is a gathering place and conditioning for visitors. In this area, management provides instructions for health therapy activities. An overview of the induction area is shown in Figure 5.

The area concept refers to Corazon *et al.* (2010) which divides the forest into four areas, namely the therapy area, horticulture area, social area, and sward. According to SNI (2021), the forest is divided into two areas, namely the induction area and the therapy area. The induction area in Corazon *et al.* (2010) was placed near the site entrance. The active area is placed in the center of the site, which is an area for social

interaction. While the therapy area is placed at the north of the site.

Vegetation is a soft element that does not have a fixed shape and always develops according to its growth period which causes its shape and size to always change (Hakim dan Utomo 2012). The vegetation plan used is a combination of existing vegetation on the site and the addition of plants for display, shade plants, and therapeutic plants.

The circulation concept in Taman Hutan Kampus includes primary circulation in a specified pattern and secondary circulation for other accesses around the site. The result of the space concept, vegetation concept, and circulation concept are then combined into a block plan. The block plan can be seen in Figure 6.

Plants that are planned to be planted on the site are selected based on their shade function, therapeutic function, and aesthetic function. Therapeutic plants require vegetation that has an aromatic scent and a variety of colors and harmony. The placement of therapeutic plants is arranged around the existing circulation on the site. The list of vegetation to be used in Taman Hutan Kampus is shown in Figure 7.



Figure 5 Taman Hutan Kampus induction area

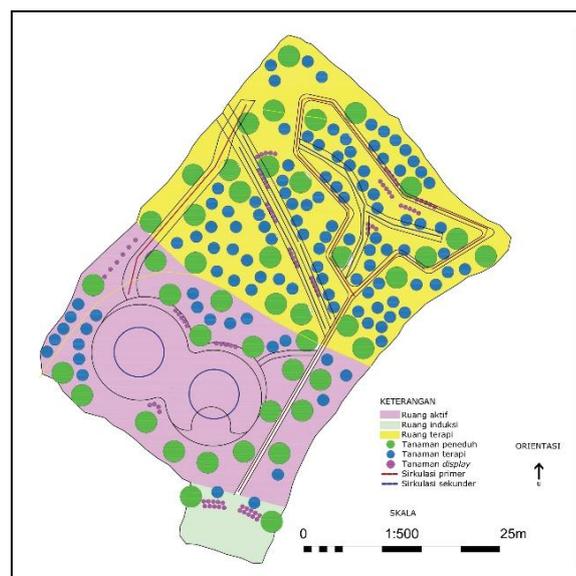


Figure 6 Taman Hutan Kampus block plan

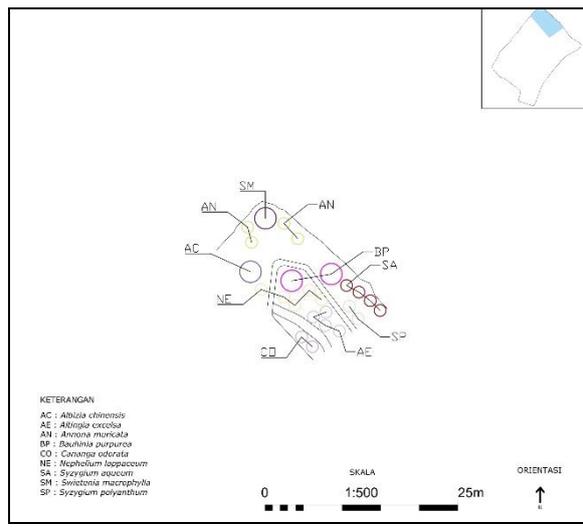
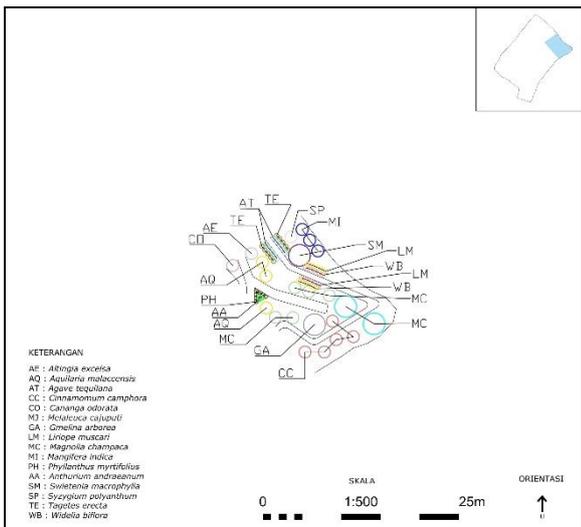
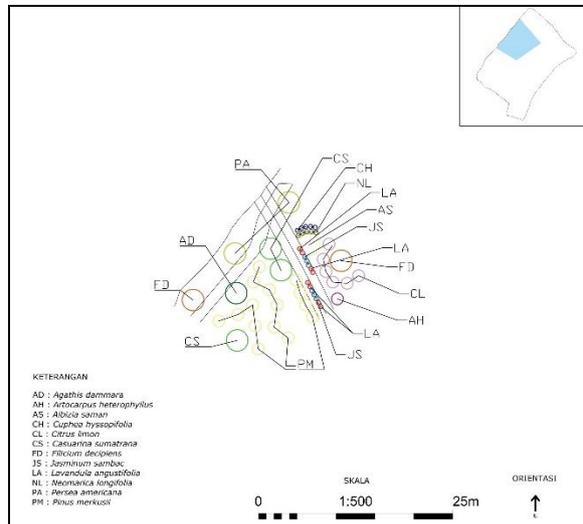
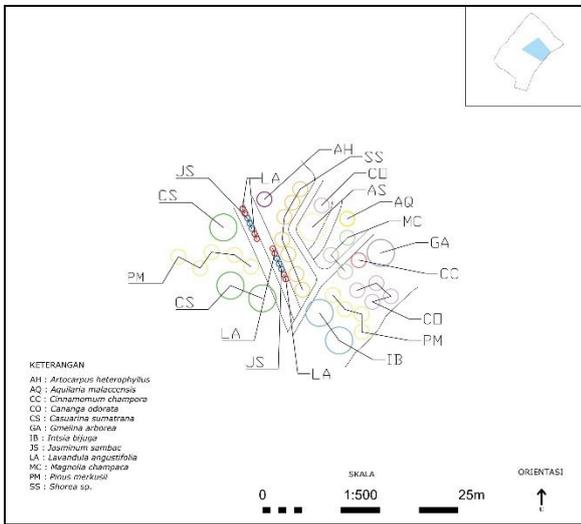
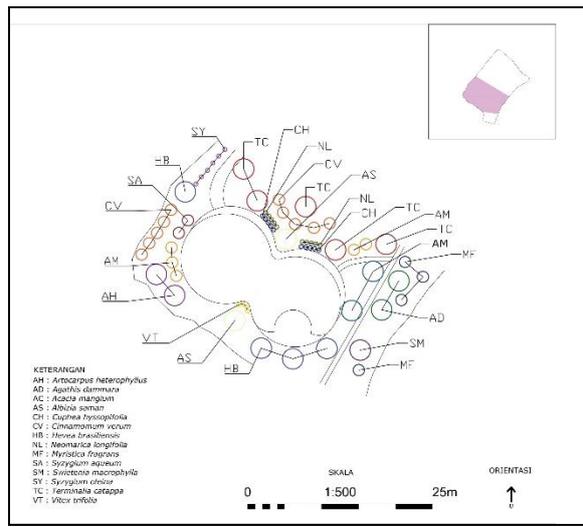
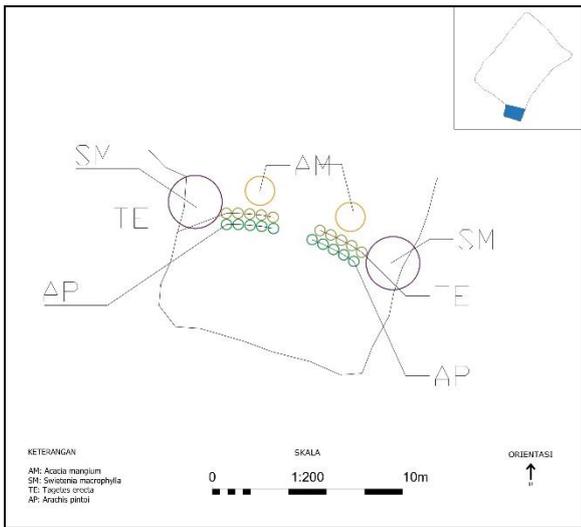


Figure 7 Taman Hutan Kampus planting plan

## CONCLUSION

Accessibility at Taman Hutan Kampus is quite easy because it is adjacent to the main road. The canopy cover is categorized as low canopy density and the temperature and humidity are in the uncomfortable category. There is also polybag plastic waste and fallen trees which is a bad view in the analysis of landscape views. So, it is necessary to add soft elements, specifically plants with therapeutic, canopy shade, and display functions, as well as add hard elements such as trash cans, benches, and tables to maximize the healing potential of the forest.

The people's response to Taman Hutan Kampus as healing forest place showed positive responses. People choose green open spaces to do activities that can relieve fatigue and refresh. The design is made to accommodate the division of space that supports healing forest activities. These areas are induction area, active area, and therapy area. Activities that can be done to support healing activities are enjoying the beauty of nature by walking, speaking positively, using all the senses to feel the texture of trees, and relaxing the mind.

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