Development of Ecotherapy Healing Forest in the Mountain Kelam Sintang Natural Tourism Park Area, West Kalimantan

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Abstract. The increasingly busy routines of urban communities, especially students with high levels of activity, can cause a person to experience stress, anxiety and depression. Ecotherapy Healing Forest is a form of tourism that is responsible for preserving natural areas with the aim of healing and relieving stress, by presenting natural attractions as the main component supporting therapy. In this research, 44 student participants from the class of 2018 - class of 2021 at Kapuas Sintang University were used. Participants will have their physical and psychological conditions measured by medical personnel and psychologists, where for psychics they will use DASS 42 to measure participants' stress levels. Measurements were carried out 5 times in repetition of the Ecotherapy healing forest treatment at different times. The aim of this research is to examine the potential for developing an ecotherapy healing forest in the Gunung Kelam Nature Tourism Park conservation area. The descriptive method of qualitative analysis is carried out by describing the entire series of research activities starting from the data search stage, data analysis, and drawing conclusions. The results obtained are a source of recommendations for policy makers, especially the government, for the future development of Healing Forests Ecotherapy. Medical teams or counselors can utilize ecotherapy healing forests as a form of healing activity and overcoming stressful conditions.
1 Introduction

ECOTHERAPY HEALING FOREST is currently one of the choices in promoting a unique environment so that its authenticity is maintained, as well as being a tourist visit area that is beneficial for the health of visitors. In Indonesia, ECOTHERAPY HEALING FOREST is an alternative to reduce stress by utilizing forest resources for health, while increasing the value of forest ecosystems.

In forest environmental services, ECOTHERAPY HEALING FOREST is a part of the cultural category that can be used as an idea to develop the Indonesian economy, at a time when Indonesia is incessantly developing its economy [1]. ECOTHERAPY HEALING FOREST also helps maintain environmental conditions, thus improving the health and welfare of the community. In line with the Sustainable Development Goals (SDGs), goal 1 (end all forms of poverty), goal 3 (ensure healthy lives and promote well-being for all in the age spectrum), goal 15 (protect, restore and promote sustainable development of land, oceans, and forests), and goal 8 (promote inclusive and sustainable economic growth, full and productive employment opportunity and decent work for all).

In the basic assumption, ECOTHERAPY HEALING FOREST in the Gunung Kelam Natural Tourism Park conservation area, with healthy weather and beautiful scenery are psychological factors that can heal someone, medically has the potential as a form of therapy. This therapy can heal, calm, refresh, and nourish physical, mental, and social relationships in the environment.

Mount Kelam Sintang Nature Tourism Park, West Kalimantan is one of Indonesia's conservation areas which has great potential in the utilization of natural tourism because it has exotic natural attractions, namely mountains that have stunning natural panoramas in the form of views of waterfalls, natural caves inhabited by thousands of bats, and a steep cliff approximately 600 meters high overgrown with trees at the foot and peak. At the peak location, there are exotic and magical natural caves in which there are many swiftlets, and from the top of the peak, you can see the dense and green tropical forest around it, the Kapuas River which is the longest river in Indonesia and the Melawi River which is flanking Sintang City, the beauty of Sintang City from a distance, and the vast expanse of rice fields below. When the rainy season arrives, you can also see a stunning waterfall from this place.

In implementing ECOTHERAPY HEALING FOREST activities, there are arrangements for the types of activities and the number of participants to minimize the impact caused by human activities in forest areas. ECOTHERAPY HEALING FOREST is part of nature therapy which utilizes the potential of forest ecosystems (healing services) for human health. One of the forest orientations for health therapy is for maintaining health and fitness (preservative healing forest). Apart from this, ECOTHERAPY HEALING FOREST has various benefits. According to [3] in his book states that healing forests have an impact on reducing human stress levels as evaluated by human psychological and physiological reactions. Forest healing programs that have been developed in various studies include healing activities in the form of walking in forest areas, enjoying views or forest landscapes, meditation, sitting on forest areas, body stretching and exercise, breathing free air and aromatherapy, drinking herbal drinks, listening to birdsong, spending time in the forest. Each of these therapeutic ingredients cannot stand alone and is usually in the form of a series of activities so that the healing effect can be increased.

ECOTHERAPY HEALING FOREST is a forest area with certain environmental biophysical characteristics that can provide healing services. Biophysical parameters are used to identify healing forest locations because of their significant impact on the provision of healing services. Forest vegetation with a predominance of natural green color, minimal air pollution, cool temperatures, light intensity which is blocked by tree crowns, and vegetation associations that can reduce noise will have a calming effect and are good for physical and mental health. Based on the above criteria, it is necessary to examine the suitability and sustainability of the development of ECOTHERAPY HEALING FOREST in the Gunung Kelam Natural Tourism Park conservation area.

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2 Method

The research methodology used in this study consisted of field research, observation, interviews, and library research. The type of research used in this research is descriptive qualitative research and includes the category of pure research.

All participants totaled 44 people, who were students of the 2018-2021 class from the Kapuas Sintang University forestry study program, with an age range of 18-35 years (Table 1). The selected participants were students of the forestry study program at Kapuas Sintang University, Batch 2018–2021, totaling 44 people, with an age range of 18-35 years, with the assumption that this age range is at an age that is vulnerable to psychological health conditions.

Participant recruitment was carried out by sampling using a purposive sampling technique. The confidentiality of students as research participants will be maintained and all information obtained will only be used in the context of this research. They were also instructed to carry out daily personal duties and responsibilities like any other student, to confirm that their daily stressors did not change during the study (Song et al., 2016). Participants are students from 4 different levels (2018–2021), taking into account that they have different levels of stress and depression, according to their level of study.

The ecotherapy healing forest treatment was carried out in 6 different locations, in 5 repetitions at different times. Measurements are carried out directly by medical personnel and supervised directly by psychologists and psychiatric specialists.

Data analysis was carried out by processing raw data from field observations. The physical and mental conditions of the respondents (students) were measured using the Psychometric Properties of The Depression Anxiety Stress Scale (DASS)
Ecotherapy Healing Forest is one of nature's earliest and most simple forms, so that it is easy to read and interpret. The process of data analysis in this study uses qualitative data analysis to produce descriptive data analysis. Respondents' statements, both written and verbal, were then studied and observed as a whole. This qualitative analysis provides an interpretation of the existing data, after the data is collected, it can then provide a clear picture of the study of the potential for developing Ecotherapy Healing Forest in the Mount Kelam Sintang Nature Tourism Park conservation area, West Kalimantan.

3 Results and discussion

When the body responds negatively to its environment, humans experience stress. Therefore, the healing concept offered by this research is that through the development of the Ecotherapy Healing Forest, humans and their environment can be connected to one another. Therefore, for an ecosystem to be a means of healing and not just a tourist spot, several requirements must be met. A type of therapy called jungle therapy is used to reduce stress. The Ecotherapy Healing Forest here is a stress relief action performed recreationally, so it's not as complex as the therapies available in hospitals or general therapy centers. Ecotherapy Healing Forest which utilizes the potential of the existing environment and according to the facilities. The outdoors, the sound of water, tree stands, and forest ecosystems can restore physical and mental health. Nature can help reduce stress and negative feelings. Nature's coolness stabilizes blood pressure and relieves stress. Green trees can provide more energy to humans, this forest therapy can also reduce negative emotions because it makes depressed people feel their environment as positive, so that their negative emotions will usually decrease [13].

Nature is able to calm, invites us to stop from the hustle and bustle of the city, enjoy every second, and feel like time is running so slowly. We can breathe fresh air to our heart's content in nature. Occasionally closing your eyes, sitting cross-legged, and letting the wind flow through your body, screaming as loud as possible to release the feeling of freedom in your heart. It seems nature has a magic spell that can cure our problems instantly. We will feel more positive if we enjoy the calm atmosphere that comes from nature. In nature, contemplating, understanding, and exploring human beings will be easier. By letting the forest connect(s) our senses, such as smell, taste, sight, hearing, touch, and movement, forest therapy is carried out.

3.1 Health response

Ecotherapy Healing Forest has been associated with multiple physiological and neuropsychological benefits. The immune, cardiovascular, and respiratory systems can be boosted by spending time in nature. Ecotherapy Healing Forest can lower blood pressure, lower blood pressure, improve sleep-wake cycles, increase the ability to form relationships, reduce stress, and reduce aggression. Ecotherapy Healing Forest is one of nature's earliest and most studied forms of therapy, and plays an important role in stress prevention and management for all age groups [14].

3.2 Ecotherapy Healing Forest

If the forest ecosystem remains healthy, it is very beneficial for humans and the environment as a whole, one of which is their ability to improve human mental and physical health. The European research network on forests, trees and human health and well-being (Cost action E39) conducted research from 2004-2008 to identify natural venues for the health and well-being of people in European countries and to examine the links between forests, trees, and human health. man. Previous research has shown that forest ecosystems play a role in restoring human physical and mental health [13]. Research [15] shows the results that the forest has a healing effect through its role in the five human senses, namely sight, hearing, smell, taste, and touch. Research in Japan shows the results that forests that have certain criteria such as air temperature, air humidity, light, radiant heat, sound, wind speed, organic content produced by trees and other physical factors provide environmental services in the form of healing services which are then known as the concept of healing forests [16]. Indonesia, which has many forests, has many health benefits. The air temperature is comfortable, the sound of birds, the flow of river water, and the wind is calm [17]. The use of natural sounds in medicine is used as a pain and stress management tool that has been proven to be used as a relaxation therapy for patients [18]. Meditation using natural sounds with student respondents shows good results and is proven to reduce stress on students [19], so that it can be used as an alternative complementary therapy for the soul in dealing with stress problems in students. Aromatherapy that comes from plants and trees also contributes to a relaxing effect on the body [20]. In addition to higher oxygen concentrations, evergreen forests (evergreens) produce more phytoestrogens than forests with deciduous vegetation [15].

There are three main components used to develop the Ecotherapy Healing Forest. First, reduce or eliminate sources of environmental stressors. Second, give a positive impression on the environment (positive distractions). Third, giving visitors the opportunity to participate in environmental control (sense of control). Ecotherapy Healing Forest is a health restoration effort that uses natural elements as a natural therapeutic substance by utilizing the natural forces around it.

Ecotherapy Healing Forest offers forest tranquility as something that doesn't exist in other tourist spots. The Ecotherapy Healing Forest Program is a series of tourism activities in a forest environment whose sites, facilities, and implementation are systematically designed to improve the health of tourists. With their unique biophysical characteristics, forests can offer healing benefits by connecting people with nature. One way to stay healthy and fit is to adopt a healthy lifestyle and control stress and engage in physical activity. One way to maintain mental health and manage stress is to sit or walk in an open space with fresh air, meditate, say thank you, and motivate yourself.

Ecotherapy Healing Forest needs to do a number of things, namely reservations by writing what will be done. For example, if you want to walk a lot or just walk a little on the
edge of a river or lake, sometimes you can follow the flow of water that appears with your eyes, hear the gurgling of the stream and look for the origin of the sound by placing your hand behind your ear; then, taking a break and sitting down to breathe deeply, sharpen the senses by smelling the forest, picking a leaf or a small tree branch; or just sitting and taking a deep breath, after bringing your nose to a leaf, will enjoy the subtle fragrance emanating from it; it is truly a natural fragrance one can only get in the forest. Every movement we make sharpens our senses. This can help stabilize the autonomic nerves, calm the heart, restore the five senses, relax the body, produce positive energy in the body, and nourish the body and mind.

3.3 Response analysis of Ecotherapy Healing Forest

The effectiveness of the Ecotherapy Healing Forest was measured through the physical and mental state of 44 students (4 different batches) at Kapuas Sintang University who were willing to serve as respondents. At the beginning of the visit, health tests and conditions of physical stress and mental stress were carried out in the body. After undergoing several series of treatments at 6 different sites, enjoying the typical Sintang herbal drink (yellow root tea and bajakah root), enjoying the Gunung Kelam Natural Tourism Park Forest, in about 30-45 minutes each site, enjoying the trees and the wind, streams river, arrangement of natural beauty, after enjoying the forest tour, the respondents were measured again the condition of physical stress, mental stress, in their bodies. Activities at site 1 – site 6 are shown in Figure 1.

Based on DASS 42 class of 2018, initial values for moderate depression and severe stress were obtained. After undergoing ecotherapy healing forest treatment 5 times, slowly there was a change towards normal. However, significant new changes appeared at the start of the 3rd treatment. This may be due to very high levels of stress, because most of them face problems related to the future, including worries about the opportunity to get a job after graduation.

Based on DASS 42 class of 2019, the initial scores for depression and stress were classified as severe. After undergoing ecotherapy healing forest treatment 5 times, slowly there was a change towards normal. However, significant changes only appeared at the end of the 3rd time, this could be caused by severe Depression and Stress values. According to the results of observations and interviews, some of the problems they faced were field practice (applying theory in the world of work); report and present field practice activities; prepare the submission of the title or theme; and take into account the costs of research and preparation of thesis.

Based on DASS 42 class of 2020 and 2021, initial values for depression and mild stress. After undergoing ecotherapy healing forest treatment 5 times, slowly there was a change towards normal. Significant changes were seen in the 2nd ecotherapy healing forest treatment, this could be caused by mild depression and stress scores. They usually only have one obstacle, namely anxiety to adapt because it is the first time they have interacted directly with lecturers, fellow students, and the campus environment. DASS 42 is shown in Figure 2.
The results of the research show that ecotherapy forest therapy is very suitable for improving students' health and overcoming stress and even depression. In addition, the majority of them also felt more comfortable doing activities on campus again after undergoing the ecotherapy healing forest, they felt they could express their emotions more and let go of all the burdens of thoughts, depression, anxiety, and stress they were experiencing. The results of this study are consistent with previous research [21] [22] which states that contact with nature has a positive impact on healing health, especially mental health.

In addition, this research location is also very easily accessible by students and other members of the community in the future, so it is very feasible to be developed and managed in a sustainable manner. With the existence of ecotherapy healing forest activities, it is hoped that it will further increase our love for nature, and a greater desire to protect nature.

### 3.4 Multi-Dimensional Scaling (MDS) RAPTForest Sustainability Analysis

The sustainability status of Ecotherapy Healing Forest management in the Gunung Kelam Nature Park area is studied through the Multi Dimensional Scaling (MDS) method approach, based on four dimensions of sustainability, namely the socio-economic dimension, ecological dimension, institutional or institutional dimension and health dimension. Based on the results of the MDS Rap-TForest analysis in terms of Stress and R-square values for the four dimensions used to assess sustainability as shown in Table 1.

**Table 1. Summary of Feasibility/Goodness Analysis of MDS Rap-TForest at Research Sites.**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Stress (S)</th>
<th>R-Square (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socioeconomic</td>
<td>0.20684</td>
<td>0.9561499</td>
</tr>
<tr>
<td>Ecology</td>
<td>0.20707</td>
<td>0.9556416</td>
</tr>
<tr>
<td>Institutional</td>
<td>0.21666</td>
<td>0.9517841</td>
</tr>
</tbody>
</table>

Source: Primary data analysis, 2023

The reference value as the basis for determining the goodness-of-fit in the MDS is the value of Stress less than 0.25 and R-square more than 0.90. Based on Table 5.12, it can be seen that the Stress values of the four dimensions, namely the socio-economic dimension, the ecological dimension, the institutional or institutional dimension and the health dimension show a value of less than 0.25. On the other hand, the fifth R-Square value for each dimension also shows a value above 0.90. Therefore, it can be said that the MDS analysis meets the criteria of goodness-of-fit so that it can be said to be quite accurate and accountable. The results of the analysis are quite accurate and can be accounted for if the stress value is less than 0.25 and the coefficient of determination (R2) is close to 1.

The sustainability status of the socio-economic dimension is influenced by several attributes which form the basis of the assessment. These attributes include obtaining income from managing ecotherapy healing forests, income earned (trade, services) is additional income, economic institutions around ecotourism areas (KUD, CU, Micro Finance, Banks, service cooperatives and others) and other attributes. Overall there are 30 attributes, as shown in Figure 3.
The management of ecotherapy healing forest in terms of the ecological dimension supports sustainability based on the attributes used as an assessment. The sustainability status of the ecological dimension is influenced by several attributes which form the basis of the assessment. There are 29 attributes of the ecological dimension, including the existence of the Gunung Kelam TWA research location included in the national spatial plan, the involvement of the community around the area to protect the area from various threats (fire, poaching), protecting and caring for plants and animals in tourist areas and so on, which is denoted by \( x_1 \) (X2.1.1; X2.1.2; X2.1.3; ... X2.8.3), as shown in Figure 3.

The sustainability status of the institutional dimension is influenced by several attributes which are used as assessment indicators. There are 18 of these attributes, including policy making that always involves the community around the area and various stakeholders related to the management of the Mount Kelam Nature Tourism Area, Conducting counseling on the importance of protecting and preserving flora and animals in the Mount Kelam Nature Tourism Area, especially in locations ecotherapy healing forest tours, local supervisory agencies work based on the guidelines set by the West Kalimantan KSDA Office, and the following attributes, as denoted by \( x_2 \) (X3.1.1; X3.1.2; X3.2.1; ... X3.6.3), as Figure 3.

The sustainability status of the health dimension is influenced by several attributes which are used as assessment indicators. There are 21 of these attributes, including Acute Nasopharyngitis (common cold) ISPA has dominated the last 6 years in Sintang District, and has an effect on the community, Hypertension is ranked second as a disease that dominates the last 6 years, Environmental factors are the cause of high disease Acute nasopharyngitis (common cold) ARI, including the physical condition of the house, the density of housing, air pollution such as cigarette smoke, household combustion smoke, indiscriminate burning of garbage, exhaust gases from transportation facilities, exhaust gases from industry, forest fires, hypertension can due to the level of saturation, the level of depression/anxiety/stress, a healthy environment, will be able to donate oxygen which is very influential for public health and the following attributes, as denoted by \( x_3 \) (X3.1.1; X3.1.2; X3.2.1; ... X3.6.3, as Figure 3.

### 3.5 Ecotherapy Healing Forest Kite Diagram Model

The sustainability status index of Ecotherapy Healing Forest management in the Gunung Kelam TWA area is represented by a kite diagram model based on people's perceptions of various attributes from the socioeconomic, ecological, institutional and health dimensions, as shown in Figure 4.

Figure 4 shows the combination of the four dimensions used to measure the sustainability of Ecotherapy Healing Forest. The average sustainability index value of the four dimensions is 82.27 or is in the interval 75.00 – 100.00 with a good category (very sustainable). The dimension with the most excellence is the ecological dimension, while the dimension with the lowest sustainability index is socio-economic. Therefore, socio-economic problems in particular need to receive more serious attention so that the management of Ecotherapy Healing Forests in the Gunung Kelam Natural Tourism Park Area can be sustainable.
and place the community as the subject of the activity. Participation of the local community or local residents who are in and around the conservation area needs to develop their potential and participation to obtain benefits in order to create incentives and motivation to participate in conserving their environment. Community participation will arise when nature/culture provides direct/indirect benefits to the community. In order to provide benefits, nature/culture must be managed and preserved. Community participation is a key factor for the success of Ecotherapy Healing Forest in a sustainable manner. The principles and criteria for managing the Ecotherapy Healing Forest, the economy and the participation of the local community have not been maximized, so that along with the development of Ecotherapy Healing Forest management in the Gunung Kelam TWA area in the future, these principles must be strengthened, so that the management of the Ecotherapy Healing Forest can truly be sustainable and can provide many benefits to the local community and regional development.

4 Conclusion

From the data above it can be concluded that; 1) when the body responds negatively to its environment, humans experience stress. Taking into account the results of observations, interviews and data analysis, in order to benefit from the Ecotherapy Healing Forest in the Gunung Kelam Natural Tourism Park conservation area, there are five things that visitors must do; one with nature, relax, be optimistic, and enjoy the natural beauty of Gunung Kelam Natural Tourism Park by walking and talking slowly, thanking nature and its creator. 2) Further arrangement of the Ecotherapy Healing Forest area in the Gunung Kelam Nature Tourism Park conservation area, especially in planned infrastructure development, will greatly assist the process of ecotherapy healing forest as the best stress management.

Acknowledgement

This research was approved by the Ethics Committee with an ethical commission approval decision letter No: KE/UGM/053/EC/2022 for research involving human subjects. This research is classified as low risk because it only measures the psychological condition of the respondents. We would like to thank the Doctoral Study Program in Environmental Sciences at the Graduate School of Gadjah Mada University for supporting the research process. We kindly acknowledge the support of RTA Program Universitas Gadjah Mada with Grant Number 5075/UN1.P.II/Dit-Lit/PT.01.01/2023.

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