

# Mangrove Forest Health Monitoring Training at KTH Lestari Indah as a Disaster Mitigation Effort

Rahmat Safe'i<sup>1\*</sup>, Aristoteles<sup>2</sup>, Unang Mulkhan<sup>3</sup>, M. Rizky Pratama<sup>4</sup>, Lis Nur Ajijah<sup>4</sup>,  
A. Nizam Syahiib<sup>4</sup>, Selvira Selvira<sup>4</sup>, Annisa Putri Nabila<sup>4</sup>, Risna Damayanti<sup>4</sup>

<sup>1</sup>Master of Forestry Study Program, Department of Forestry, Faculty of Agriculture, Universitas Lampung, Lampung, Indonesia

<sup>2</sup>Department of Computer Science, Faculty of Mathematics and Natural Sciences, Universitas Lampung, Lampung, Indonesia

<sup>3</sup>Department of Business Administration, Faculty of Social Science and Political Science, Universitas Lampung, Indonesia,

<sup>4</sup>Department of Forestry, Faculty of Agriculture, Universitas Lampung, Lampung, Indonesia

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## Abstract

The importance of monitoring forest health is needed to support a sustainable forest management system. A healthy forest can be said to be still carrying out its functions. Monitoring the health of mangrove forests is helpful in an effort to mitigate coastal disasters. The purpose of this service was to provide knowledge and understanding to members of KTH Lestari Indah regarding forest health. This activity was carried out on Sunday, October 24, 2021, at the mangrove forest tour, Margasari Village, Labuhan Maringgai sub-district, East Lampung Regency. The methods used in this activity were lectures and practices. Based on the evaluation results with pre-test and post-test instruments given to participants regarding the material in service activities, participants experienced an increase in knowledge of 7.13%. This increase shows a reasonably good understanding of the training participants, so this training is expected to help the community increase knowledge and participation in mangrove forest management and discovery of sustainable mangrove forests.

## 1. INTRODUCTION

Ecosystems that have uniqueness and diversity of benefits and uses are mangrove forest ecosystems (Riwayati, 2014). Benefits and role of mangrove forests, among others: preventing the intrusion of seawater; protecting the coast from waves, winds, storms, erosion, and abrasions; as a shade and habitat for various wildlife, such as birds; and resist sediment flow to protect corals on the coast and serve as a green belt (Riwayati, 2014). Therefore, mangrove forests have become an option for disaster mitigation that still pays attention to the surrounding environment. One of them is how forest management is carried out to support

the sustainability of mangrove forest disaster mitigation.

The preservation of a forest area can be seen with the health condition of the forest. A forest area can be categorized as healthy if the forest is still carrying out the essential functions that have been previously identified (Nuhamara, 2001), so that forest health becomes one of the indicators of sustainable forest management (Safe'i et al., 2021a). Based on its function, one type of forest is a protected forest that serves as a regulator of the hydrological cycle, prevents flooding, maintains soil fertility and others that show the importance of forest health for preserving

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\*Corresponding author: Rahmat Safe'i

Master of Forestry Study Program, Faculty of Agriculture, University of Lampung, Jl. Prof. Dr. Ir. Soemantri Brojonegoro, No. 1, Bandar Lampung 35145, Indonesia

Email: rahmat.safei@fp.unila.ac.id

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protected forests (Sinery & Mahmud, 2014). To measure the health value of forests, it can be used forest health monitoring (FHM) techniques or forest health monitoring (Safe'i et al., 2022). FHM is a monitoring method, assessing and reporting the condition of current forests and determining changes and trends in forest health status in the long term with measurements using measurable indicators (Safe'i & Tsani, 2016).

One of the villages in coastal areas that has potential and mangrove forest areas is Margasari Village. Margasari Village is located on the coast of Labuhan Maringgai District of East Lampung Regency. In the beginning, the mangrove forest area in this village was only as large as 100 ha in 1995-1996, which then increased to 700 ha in 2012 (Margasari Village Monograph, 2012). The location map can be seen in Figure 1.

The mangrove forest of Margasari Village is used as an ecotourism area. The community has an active role in the management of mangrove forest ecotourism, this is because there are concerns that arise in the community if there are no mangrove forests that could allow for some threats such as natural disasters. This tourism management is carried out by the community who are members of the Forest Farmers Group (KTH), Fishermen's Group, Nature Lovers Group, Tani Cinta Bahari Women's Group, and Pamswakarsa. One of the community groups that play an active role is KTH Lestari Indah.

KTH Lestari Indah is one of the KTH active in

managing mangrove forest tourism areas. Some of the activities or empowerment that KTH has done are planting activities and care of mangrove seedlings. However, this is still not enough to support healthy forests to sustain the forest.

Through seminars and training activities, appropriate technology use, and a government that protects the community, the production budget can be minimized (Hakim et al., 2022). In addition, the current Covid-19 outbreak can be avoided or reduced by the community; its spread and can be used as a source of livelihood for the community (Safe'i et al., 2021b).

However, there are limitations experienced by the community internally and externally in managing mangrove forest tourism areas. For example, the health condition of mangrove forests is getting worse, and regular monitoring is absent. This is influenced by the lack of understanding of the community, especially the management in monitoring forest health. Therefore, it is necessary to add knowledge and practices to the community to know the health status or not of mangrove forests.

Based on the background above, this community service activity has the following purposes.

1. Provides education for the community related to forest health monitoring.
2. Provides direct practice in the field related to measuring and monitoring forest health.

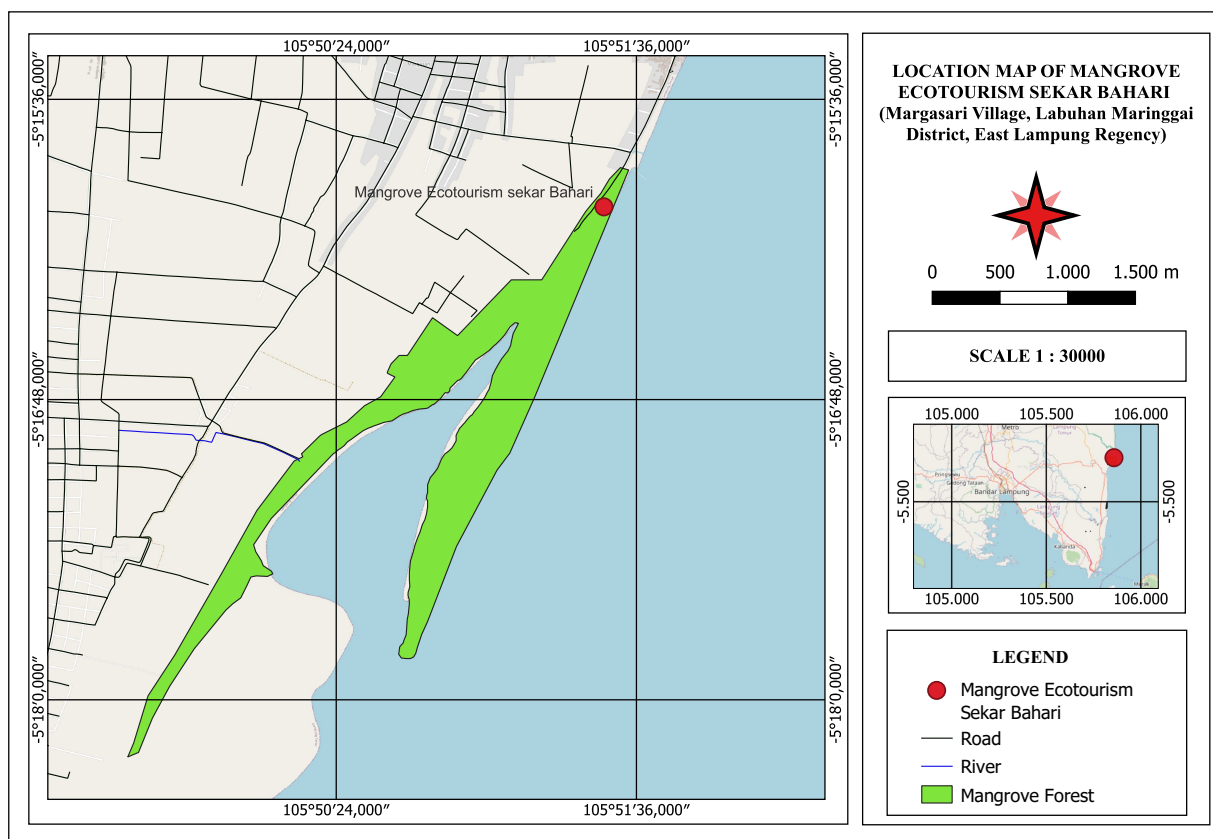


Figure 1 . Location map

## 2. METHOD

This community service activity was carried out on Sunday, October 24, 2021, in Mangrove Forest Tourism, Margasari Village, Labuhan Maringgai District, East Lampung Regency. This community service activity targeted KTH Lestari Indah's members; as many as 20 participants. The method of implementation of these community service activities were in the forms of (1) the provision of materials about monitoring mangrove forests by lecture method, (2) discussions related to materials that have been delivered, and (3) direct practice in the field with forest health monitoring (FHM) methods. Forest Health Monitoring (FHM) is a method of monitoring, assessing, and reporting forest health's long-term status, changes, and trends using measurable ecological indicators (Ajjjah et al., 2022).



Figure 2 . Preliminary explanation related to Tallysheet's measurement of forest health



Figure 3 . Forest health monitoring practice

After the community service activity, an understanding level analysis of participants was carried out using a comparison of the initial evaluation (pre-test) and final evaluation stage(post-test) and observation to observe the condition of the target object. Ten questions were used in the test in the activity evaluation and answered by participants. These ten questions consisted of topics on mangrove forests, forest health, and forest health monitoring. During the training, participants were introduced to tally sheets for forest health data collection, which can be seen in Figure 2. This was to make it easier for participants in the future to identify or directly observe forest health.

The evaluation was carried out before the material delivery activities (Pre-Test) and after the delivery of the material (Post-Test). This evaluation was carried out using questionnaire instruments before the delivery of forest health monitoring materials and after. Afterwards, the comparison/range of results and the average for all participants were calculated from both evaluation results. According to Effendy (2016), evaluation using pre-test and post-test methods served to assess and see how much effectiveness of the training that had been done by comparing the results of both evaluations. This was to discover the success rate of the training, whether or not the participants effectively learned the materials.

Furthermore, based on health monitoring training activities that had been carried out (Figure 3), to find out whether the activity was carried out successfully or not, an analysis of understanding to participants or members of KTH Lestari Indah was carried out. The success of this training activity could be determined based on the results of pre-tests and post-tests that participants had done. The pre-test and post-test results were used to determine the level of change in the trainees' understanding before and after participating in this activity. The questions in the pre-test and post-test comprise extension materials and practices conducted by the participants during the forest health monitoring.

## 3. RESULT AND DISCUSSION

Mangroves are transitional forest ecosystems between land and sea with many advantages and unique functions (Ariftia et al., 2014). One of the coastal areas of East Lampung that has ecosystems is in East Lampung Regency, Labuhan Maringgai District, especially Margasari Village. Margasari Village is one of the villages with the characteristics of a coastal or coastal village, with a mangrove forest area of about 700 hectares in 2012 (Margasari Village Monograph, 2012). The potential of ecotourism is a major component in improving the socio-economic conditions of the local community. The danger of damage is one of them guilty of natural factors, namely disasters. Thus, it is necessary to strive for the preservation of the Margasari mangrove forest, considering the existing threats of damage.

A community empowerment program is one of the efforts to overcome the threats of natural disasters. The

community can be creative and innovative in managing mangrove forest area activities with qualified knowledge. Stakeholders are external components that can help in this regard. One of the efforts that external parties can make is to conduct training and mentoring activities for the community, especially the management community. The UNILA PKM team carried out training activities in Mangrove Forest Tourism, Margasari Village, Labuhan Maringgai District of East Lampung Regency. The targets of this activity were members of KTH Lestari Indah. This activity was attended by the Community Service TEAM, Village Head, Chairman of KTH Lestari Indah, and 20 members of KTH Lestari Indah.



Figure 4 . Participant absenteeism filling



Figure 5 . Pre-test of training done by trainees

This activity began with the registration of the participants at 09:30. The first thing the participants did was to fill out the attendance list serving as a recapitulation of the participants, which can be seen in Figure 4. Afterwards, the implementation of PKM WIB activities began at 10:00, beginning with the initial evaluation work (pre-test), which the delivery of materials was carried. The pre-test activity can be seen in Figure 5. The material delivered by the PKM TEAM is closely related to forest health monitoring. After the delivery of the material, it was continued with a discussion session. This discussion session lasted for about 30 minutes. Subsequently, the activity proceeded with the final evaluation (post-test). To find out and describe changes in the trainees' understanding of forest health monitoring materials and practices, the team used a comparison between the average percentage of participants and the pre-test and post-test scores (Suci & Jamil, 2019).



Figure 6 . Delivery of training materials

Figure 6 shows the ongoing activity, namely the delivery of the material on forest health. Forest health monitoring practice activities were carried out directly in the field, in the mangrove forest tourism area of Margasari Village. This practice lasted for about one hour. The practice of forest health that was done began with the creation of plots. Subsequently, the activity continued with measuring or observing forest health indicators. Some indicators of forest health that could be observed were productivity indicators with variables of LBDs and volume, vitality indicators with variables of header conditions and tree damage, biodiversity indicators with flora and fauna biodiversity variables, and tread quality indicators with variables of pH values and soil KTK (Safe'i et al., 2019). Based on the observations in forest health training activities, one of the diseases found in mangrove trees was open wound disease; it can be seen in Figure 7.



Figure 7 . Example of damage to trees *Avicennia*



Figure 8 . Average percentage of trainee evaluation results

There were ten questions in each evaluation questionnaire. The results of the pre-test and post-test of forest health monitoring trainees can be seen in Figure 8.

The participants' high and low levels of knowledge made the training process run dynamically (Santoso, 2022). Based on the evaluation results in Figure 8, there was an increase in the understanding of forest health monitoring trainees by 7.13%, with an average value of the pre-test result of 76.00% and in post-test result of 83.13%. This increase in percentage indicated an increase in the level of understanding that was fairly good for the training participants. This showed that the participants already had a fairly good understanding of forest health monitoring before this training was held. This is in line with the community service activity carried out by Safe'i et al. (2021b) which there was an increase of 34.5% by the end of the activities that were carried out based on the evaluation results obtained using the pre-test and post-test. This shows that the training activity conducted through the extension method could significantly increase the participants's knowledge even though this knowledge increase did not reach 50% (Harianto et al., 2022). This community service activity has proven to have benefited the participants (local communities), especially in supporting the sustainability of the mangrove forest area. In addition, the benefits given through this training activity increased the target community's knowledge about mangrove forests, ecosystem conditions, and other matters related to their ecological conditions. However, due to some limitations in the are, such as the lack of facilities that can support the community in terms of measuring and monitoring forest health, the knowledge they had could not be applied. Therefore, this training activity was carried out in order to provide facilities for the target community to start a good forest management given the importance of the usefulness and functions of the forest.

The benefits of forest health monitoring training activities were expected to enable the participants and generally the community of Margasari Village to apply knowledge and practice directly in the field related to monitoring forest health as well as knowing the status and value of the forest area. This activity can be a reference for similar activities and decision-making and policies that must be made for effective management and conservation of forests, especially mangrove forests (Safe'i, Aristoteles,

et al., 2021). It was also hoped that this activity was able to facilitate the members of KTH Lestari Indah in the way that they would be able to share their knowledge with other communities to discover sustainable mangrove forest areas. Therefore, finally, this training activity was expected to encourage and facilitate increased productivity and welfare of the people of Margasari Village, Labuhan Maringgai Subdistrict, East Lampung Regency.

## 4. CONCLUSION

The implementation of forest monitoring training support is expected to preserve the mangrove forest in Margasari Village. The condition of the mangrove forest is decreasing with various functions that can be utilized. Based on this, the existence of these activities can be a capital of knowledge in making forest management decisions. From the training activities that had been carried out, the knowledge of KTH Lestari Indah members increased by 7.13%, from an initial of 76.00% to 83.13%. This shows that members' knowledge is pretty good, judging from the results of the evaluation. This can support and increase knowledge and monitoring of mangrove forest health. Therefore, this forest health monitoring training can allow the community to participate more actively in managing mangrove forests in Margasari.

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## CONFLICT OF INTERESTS

The authors state that there is no conflict of interests.

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