

# TRAINING AND PLANTING OF RHIZOPHORA SPECIES IN GULUDAN TECHNIQUES AS AN EFFORT TO MANAGE BEACH EROSION AND EMPOWERMENT OF COMMUNITIES IN THE ENVIRONMENT

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## Abstrak

Kegiatan pengabdian masyarakat merupakan salah satu unsur yang harus dipenuhi oleh tenaga pengajar yang berprofesi sebagai dosen. Pengetahuan dan teknologi yang dihantarkan kepada publik atau sekelompok masyarakat binaan adalah wujud pengabdian bidang tridarma pendidikan, disamping sebagai penguatan kelompok masyarakat kegiatan ini juga menunjang peran institusi pendidikan dalam akses informasi dan teknologi yang dibutuhkan oleh masyarakat dalam mengatasi masalah sosial, ekonomi dan lingkungan yang ada dimasyarakat. Tim kegiatan pengabdian masyarakat Universitas Terbuka yang terdiri dari sekelompok keahlian bidang lingkungan dan intervensi sosial pada penanganan pencegahan intursi air laut yang masuk pada lingkungan masyarakat di Rumah Susun Marunda Jakarta Utara. Pada kegiatan abdimas ini, pelaksanaan kegiatan dibagi menjadi tiga tahap yakni, observasi dan ceramah umum, pelaksanaan dan penanaman dengan teknik guludan pada rhizopra yang ditanam untuk lahan mangrove di Marunda dan tahap tiga yakni kegiatan pengawasan dan evaluasi. Pada kegiatan tahap pertama ini tujuan kegiatan difokuskan pada dorongan kepada masyarakat untuk dapat mengetahui peran dan fungsi hutan mangrove di sekitar kawasan pesisir, sebagai fenomena tahunan bahwa warga rumah susun dan warga marunda pada umumnya menghadapi kenaikan air laut. Hasil kegiatan tahap satu memperlihatkan bahwa masyarakat memiliki pengetahuan yang tinggi tentang fungsi dan peran ekosistem mangrove. Kegiatan akan berlangsung pada tahap dan tahap tiga dengan teknis yang sudah disepakati dan dirancang bersama oleh masyarakat ditempat sasaran pengabdian masyarakat Universitas Terbuka di Marunda Jakarta Utara.

Kata Kunci: Mangrove, Rhizophora, Kualitas Air, Terknik Guludan

## Abstract

*Community service activities are one of the elements that must be fulfilled by teaching staff who work as lecturers. Knowledge and technology delivered to the public or a group of assisted communities is a form of dedication to the tridarma of education, as well as strengthening community groups this activity also supports the role of educational institutions in accessing information and technology needed by the community in overcoming social, economic and environmental problems in society. The Open University community service activity team consists of a group of experts in the field of environment and social intervention in handling the prevention of seawater intrusion that enters the community at Marunda Flats, North Jakarta. In this community service activity, the implementation of the activity was divided into three stages namely, observation and public lecture, implementation and planting with the mound technique on rhizopra planted for mangrove land in Marunda and stage three namely monitoring and evaluation activities. In this first phase of activity, the aim of the activity is focused on encouraging the community to be able to know the role and function of mangrove forests around the coastal area, as an annual phenomenon that residents of flats and Marunda residents in general face rising sea levels. The results of the first phase of activities show that the community has high knowledge about the function and role of the mangrove ecosystem. The activities will take place in phases and stages three with a technique that has been agreed upon and jointly designed by the community at the target location of the Open University community service in Marunda, North Jakarta*

Keywords: Mangrove, Rhizophora, Water Quality, Bunds Technique

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## **INTRODUCTION**

Community service activities are one of the functions of lecturers in carrying out the tri dharma of higher education and also as a form of scientific contribution that the community can benefit from. One of the roles of lecturers in the Master of Environmental Studies study program is bridging knowledge and technology for environmental sustainability, community participation in the environment and using an ecological approach in changing environmentally conscious behavior where people live. Conditions of natural environmental damage are influenced by natural cycles and modern ones are influenced by human negligence in paying attention to environmental resilience, one of which is the coastal area (Hamzah et al., 2021). Coastal areas are locations that are prone to disasters originating from sea water and pollution that are detrimental to humans. The quality of coastal resilience tends to decrease due to many factors. These factors, among others, originate from development contributions that exceed the carrying capacity and capacity of the environment. Extraction of wood in mangrove areas without replanting as well as the use and contamination of chemicals that damage the water quality in the environment. These activities result in disruption of public health, the spread of smog and an increase in temperature on the earth's surface, as well as changes in sea water temperature which have an impact on underwater ecosystems (Sumar, 2021).

There are many things that can be done to minimize the decline in water quality and improve the condition of the precision ecosystem, including planting mangroves in coastal areas. Besides playing a role in protecting coastal ecosystems, mangroves also play a role in helping improve water quality by producing oxygen through the process of photosynthesis (Wibowo, 2023). Mangroves can absorb four times more carbon than tropical rain forests. The condition of mangrove forests at this time tends to change its function into ponds, housing, industry and is also not maintained for various reasons and interests. As for this planting activity, there are many techniques, one of which is using the mound technique, namely the planting technique with waterlogged land so that the plants do not rot quickly or the plant growth rate is higher (Kundori et al., 2022).

In this stage one activity the activity is focused on providing material related to the importance of mangroves in coastal areas which is carried out using a lecture approach and a Javanese question session, this activity aims to convey understanding to the community about types, functions and uses as well as various actions that can be taken by the community in efforts to manage the area beach. As for the planting activity in stage two, it will be carried out after the community has received exposure and understanding of the techniques of tools and materials as well as the community's ability to see environmental conditions and types of rhizophora to be planted in the community environment area in Marunda Flats, North Jakarta (Aminudidin Mane, 2020). The condition of water and flooding that enters the community's living environment causes tidal flooding during the high tide season, environmental conditions that do not have natural defenses will result in poor coastal quality so that it causes harm to humans both materially and non-materially (Tamsil et al., 2022). One form of water quality management in the coastal environment that can be done is to promote mangrove planting. The current condition of mangroves in North Jakarta tends to deteriorate because they are not maintained or have changed their function (Jaya et al., 2022). Therefore, the Team of Lecturers across majors in community service at the Open University carried out community service activities in the form of planting mangrove seedlings on the coast of

Marunda, North Jakarta. This is in addition to aiming to improve coastal ecosystems, it also plays a role in improving water quality in coastal areas.

## **IMPLEMENTATION METHOD**

Community service activities are carried out using lectures, discussions, field actions, consultations and work evaluation approaches, at this stage the activities are carried out with the goal to be achieved is to increase people's understanding of the importance and ways in the process of planting the Marunda coast with the end of the community will contribute in planting for the improvement and maintenance of water quality and coastal ecosystems (Haki et al., 2023). The activities will be carried out throughout 2023, but in the first stage yesterday in May, the first stage of activities was carried out at the Marunda Flats, North Jakarta, using teaching aids and sample pictures in the process of providing class material which was carried out at the homes of Marunda residents.

### **1. Outputs**

The expected results of this first phase of community service activities are:

- a. Adding coastal land planted with mangrove seedlings in Marunda;
- b. The Marunda community takes care of the mangrove seedlings that have been planted;
- c. Marunda community. Pinang can participate in inviting and motivating families and people around them to plant, maintain and care for mangroves;
- d. The level of community understanding has increased about the importance and use of mangrove areas on the coast

### **2. Outcome**

Through this activity the expected achievements are:

- a. Communities in Marunda understand the importance of planting and caring for mangroves to maintain air quality;
- b. The Marunda community maintains the continuation of the area and does not damage the mangroves along the Marunda coast, especially the Marunda flat housing area

### **3. Implementation Stages**

The stages of community service activities include:

- a. Observation of activity locations in the Marunda Flats Area;
- b. Meetings with the community and apartment management figures to establish cooperation in community service activities;
- c. Dissemination of the importance of planting, maintaining and caring for mangroves on the coast to maintain water quality;
- d. Handover of mangrove seedlings from the UT Community Service Team and the community in symbolic form before the second and third phases of activities;
- e. Planting mangrove seedlings in coastal locations that have been determined in stages two and three

## RESULTS AND DISCUSSION



Figure 1. Types and varieties of rhizophoras

The community service activities carried out in May are related to increasing competence and understanding of the Marunda Flats community in the knowledge of the types of rhizophora as typical coastal plants and their uses and functions, while these activities are carried out using the technique of giving lectures and question and answer sessions as well as mentoring in group discussions carried out by the facilitator of the open university lecturer team, in this case the activities include related material such as the following:

Table 1. exposure material related to rhizopra and mangroves

Material	Description of the material
Provide nutrition	Mangrove plants have good nutrition for the surrounding environment. Where the existence of this plant does not disturb the balance of the ecosystem on the beach. Besides that, mangrove plants actually provide nutrients in the form of soil fertility around them, because the place where mangrove plants grow is between the plains and the ocean. At high tide, this plant will be seen in the sea. Meanwhile, at low tide, this plant will be seen on the plains. The location of the mangrove plants is affected by the distance between the plains and the sea
As a food chain	The next function of mangrove plants is as one of the food chains, where these plants act as producers. Mangrove plants are much liked by small fish and also crabs. Not a few fish depend for their lives by eating the leaves of this mangrove plant for their survival.
The clean water	Mangrove plants that grow around the edge of the beach will make the water clear. Try to compare the shores that have mangroves around them and those that don't have mangroves. There will definitely be a difference, that the beach water overgrown with mangroves is clearer than one that is not overgrown with mangroves. Therefore, socialization is encouraged a lot about the benefits of planting mangrove trees on the beach.
Protecting the beach	mangrove plants are also useful for protecting the beach from erosion. Mangrove plants that grow on the beach can protect the plains from direct waves. So that the waves do not directly hit the plains which will cause erosion and landslides, because they are protected by mangrove plants
Preventing Beach Erosion	Mangrove forests are one of the places that can guard the border between land and sea areas. Coastal erosion will continue to erode the earth's surface thereby threatening the human environment. Even serious conditions can become major natural disasters. Mangrove forests are one of the most important means of saving the coastline from sea waters
Becoming a Soil Catalyst from Seawater Soil	because that part of the soil is in direct contact with seawater. To prevent this, the ecological benefits of mangrove forests are a very clear source of protecting the land around the sea. The soil will become a denser layer with

	the presence of mangrove trees, so this will save the soil from being eroded by sea water
Protecting Climate and Weather	Changes in climate and weather can occur due to various factors, one of which is damage to natural systems. Mangrove forests are a very clear source for maintaining aquatic ecosystems between the sea, coast and land. Mangrove forests will also help humans get the most comfortable climate and weather to prevent natural disaster

The community service activity which was attended by the community also aimed to measure the level of community knowledge after the material debriefing activities that the team had carried out, it was hoped that this would be able to see the level of readiness of the community in planting activities carried out at the target location (Nurmadi et al., 2021). Furthermore, in this report we also describe the level of public understanding of the material aspects that the open university community service team has given to the community who are the target of the activity, namely flat residents with a vulnerable age of 20-40 years.



Figure 2. planting location and orientation

As for the results of measuring the level of understanding of the community during the activity of providing material, the following results were obtained with the number of participants 40 attending the socialization activity.

Table 2. Community knowledge about mangrove forests in Marunda Flats

No.	Indicator	Total Score	Rate Score	Category
1.	Get to know and know the forest mangroves	119	2,97	High
2.	Knowing which areas there are mangrove forests	118	2,95	High
3.	Know the benefits of mangrove forests for the environment, especially the coast	114	2,85	High
4.	Knowing the benefits of mangrove forests that can prevent abrasion and sea waves	115	2,87	High
<b>Jumlah</b>		<b>446</b>	<b>11,15</b>	<b>High</b>
<b>Rata – rata</b>		<b>2.78</b>		

Source: Primary Data After processing ,2023

Table 2. Explains that the level of community knowledge about mangrove forests in Marunda Jakarta Utara, belongs to the high category, with an average score of 2.78. The highest indicator is knowing and knowing about mangrove forests with a score of

2.95. This is because the respondents have received education, although at different levels, and are present and active when counseling is held about mangrove forests. then the second high indicator knows which areas have mangrove forests with a score of 2.95, this is because the mangrove forests are in the vicinity of the residents who are the respondents. Furthermore, the third height is an indicator of knowing the benefits of mangrove forests which can prevent abrasion and sea waves with a score of 2.87, this can be seen from the seriousness of the community in planting and maintaining damaged mangrove forests with the aim of preventing abrasion and sea waves on ponds and community settlements. then the lowest with the indicator of knowing the benefits of mangrove forests for the environment, especially the coast with a score of 2.85, this is because there has been counseling and training on mangrove forests to the community, but over all this shows that the level of community knowledge.

Table 3. Community knowledge about mangrove forest conservation at Marunda Flats, North Jakarta

No.	Indicator	Total Score	Rate Score	Category
1.	Knowing by doing Mangrove forest preservation can prevent abrasion and sea waves	118	2,95	High
2.	Knowing that by preserving mangrove forests, replanting is carried out in areas that are not having damaged	117	2,92	High
3.	Know how to do seeding and planting of mangrove fruit	104	2,60	High
4.	Knowing the functions and benefits both ecologically and economically in plants mangroves, so it needs to be preserved	118	2,95	High
5.	Knowing by making mangrove groups will make it easier preservation of mangrove debt	109	2,72	High
6.	Knowing by carrying out routine and scheduled maintenance in maintaining forest sustainability mangroves	112	2,80	High
<b>Total</b>		<b>680</b>	<b>17,00</b>	<b>High</b>
<b>Rate</b>		<b>2,83</b>		

Source: Primary Data After processing ,2023

Table 3. Explains that the level of public knowledge about mangrove forest conservation in in Marunda Jakarta Utara, is classified as in the high category, with an average total score of 2.83. There are two highest indicators, namely knowing that by preserving mangrove forests it can prevent abrasion and sea waves and knowing the functions and benefits both ecologically and economically in mangrove plants, so it needs to be preserved with a score of 2.95 each, this is because the community already have a high awareness of preserving mangrove forests which can prevent abrasion and sea waves as well as ecological functions where ecosystems are maintained so as to increase crab

and fish populations and function economically the community uses mangrove forest wood to make charcoal and then sells it to meet household needs (Kundori et al., 2022) . then the second high indicator, knowing that by preserving mangrove forests, replanting is carried out in damaged areas with a score of 2.92, this is a concern for the community in damaged mangrove areas to replant with the aim of preserving mangrove forests. Furthermore, the third height with the indicator of knowing by carrying out regular and scheduled maintenance in preserving mangrove forests with a score of 2.80, in this case the efforts made by the community by embroidering plant seeds that do not grow. Furthermore, the height of four with the indicator knows that by creating mangrove groups it will make it easier to preserve debty mangroves with a score of 2.72, this can be seen from the people who are members of mangrove groups who always participate in counseling about mangrove forest preservation, and are present to take part when training and coaching is carried out on mangrove forest conservation. then the lowest with the indicator Know how to do seeding and planting of mangrove fruit with a score of 2.60, this is because nurseries and planting are very easy to do. The results of community service activities carried out by the Open University team will continue in stages two and three, follow-up activities will focus on planting techniques and efforts to evaluate activities carried out for one year in 2023.

## **CONCLUSION**

Based on the results of the discussion, the first phase of community service activities carried out by the Open University team obtained results regarding the level of knowledge and community participation in forest conservation on the Marunda coast, North Jakarta as follows:

1. The level of community knowledge about mangrove forests is in the high category as well as the level of knowledge about mangrove forest conservation, this is because the respondents have received education, are present when counseling is held, the community already has a high awareness of preserving sustainability and taking part when it is carried out training and coaching on mangrove forest conservation.
2. The level of community participation regarding the preservation of mangrove forests is in the moderate category, which means that the community has begun to raise awareness about the preservation of mangrove forests. This awareness must be increased so that the mangrove forest ecosystem is not damaged in the future.

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