Vol 7 No 4, Desember 2023
ABDI DOSEN
Jurnal Pengabdian Pada Masyarakat
pISSN: 2614-6509
eISSN: 2620-5156

MANGROVE PLANTING AS AN EFFORT TO MITIGATE CLIMATE CHANGE ON SMALL ISLANDS

Merlin Renny Sitanala [1], Ludia Siahaya [2], Aryanto Boreel [3], Moda Talaohu [4]
Jurusan Kehutanan, Universitas Pattimura, Ambon
[1*] sitanalarenny@gmail.com, [2] ledysiahaya@gmail.com, [3] arielforst@gmail.com,
[4] talaohu.moda73@gmail.com

Abstract

Mangrove ecosystems have an important role in supporting the life of living things. The physical benefits of mangrove ecosystems are that they resist sea abrasion, withstand salt-laden storms and winds, and bind pollutant substances (poisons) in coastal waters. Climate change that occurs causes many problems, including extreme seasonal changes that cause abrasion, and rising sea levels due to melting polar ice. The problems that occur do not only affect the big islands but are also very much felt in the archipelago, especially Maluku which has many small islands. Efforts to conserve mangrove ecosystems are needed to minimize the impact caused by the effects of global warming. Conservation of mangrove ecosystems can reduce 10 to 31% of the estimated annual carbon emissions from the land use sector in Indonesia. This community service activity aims to realize climate change mitigation efforts on small islands, specifically in Negeri Suli, Maluku Province. Climate change mitigation efforts in Suli State, Maluku Province are carried out by providing socialization related to the role of mangrove ecosystems and then planting mangroves by existing youth and youth. in the village. Monitoring efforts are carried out by forming groups to monitor the success of mangrove growth. Replanting is carried out if mangrove seedlings are damaged or carried away by the current.

Keywords: Mangrove Ecosystem, Mitigate Climate Change

INTRODUCTION

An ecosystem is a system that carries out ecological functions from its constituent components, which are influenced by internal and external factors (Poedjirahajoe, 2019). In other words, an ecosystem is an ecological system. Richard, 1964 *in* Poedjirahajoe, 2019 states that ecosystems are an order of units of environmental and living elements (biotic and abiotic) as a whole and comprehensively, which constantly affect and are interdependent on one another. Ecosystems contain species diversity in a community with their environment that functions as a unit of interaction of life in nature. The ecosystem environment consists of 2, namely the biotic environment (components of living things) and the abiotic environment (components of inanimate matter). Odum (1979) stated that in terms of food, exosystems have 2 components that are usually separated in space and time, namely autotrophic components (can make their food) and heterotropic components (utilizing organic materials for food). The earth

Submitted: September-2023 Received: December-2023 Available online: December-2023

on which humans stand has various forms of ecosystems. One of them is the mangrove ecosystem.

Mangrove ecosystems are forest ecosystems that grow in tidal areas and are transitional between terrestrial and marine ecosystems. As a transitional ecosystem, mangrove has a large ecological function for its environment. Mangrove ecosystems are typical ecosystems that exist in tropical and subtropical regions, found in muddy coastal areas and calm water (sea waves are not large). Mangrove forest ecosystems are also called brackish forest ecosystems because they are found in brackish areas (*estuaries*), which are areas with salt/salinity levels between 0.5 ‰ to 30 ‰ are also called tidal exosystems because they are found in areas affected by tides (Duke, 1993 in Poedjirahajoe, 2019). As an ecosystem in the tropics, the mangrove ecosystem is one type of ecosystem that has an important role in Indonesia, which is an archipelagic country.

Indonesia as an archipelagic country has a rove ecosystem that is spread almost throughout the island, both large and small islands. Mangrove ecosystems on major islands in Indonesia are concentrated in coastal areas that have large river flows that form diverse delta types for mangroves to develop. This occurs as a result of material carried by river currents and tides from the sea. These conditions provide support for mangroves to grow and thrive on soft muddy beaches, deltas, large rivers, and sheltered bays. Meanwhile, on small islands or clusters of coral islands, mangroves look like thin moons and simple structures, and often even only in the form of a single strand, as found in several areas on Ambon Island, Tanimbar Islands, and Aru Islands, Southeast Maluku (Pramuji, 2020).

Mangrove ecosystems have an important role in supporting the life of living things. The physical benefits of mangrove ecosystems are resisting marine abrasion, resisting storms and salt-laden winds, and tethering pollutants (toxins) in coastal waters. In addition, the functions and roles of other roving ecosystems include: as a source of nutrition, where the litter produced by mangrove forests is a source of carbon and nitrogen for mangrove forests themselves and surrounding waters. It also acts as a provider of human needs, because mangroves have long been used and used by people living around mangrove forests, for local purposes (as building materials, construction, roofing, firewood, as a source of food, medicine, and other materials for household purposes) and as industrial materials (mangroves as producers of plywood, pulp industry materials, charcoal materials, and tannin producers. Especially for the type of Nypa fruticans known as an alcohol producer) (Pramuji, 2020).

The unique condition of the mangrove ecosystem makes this ecosystem one of the wetland resources in coastal areas and a buffer system for life and natural wealth of very high value, and has a high area and biodiversity. The area of mangrove ecosystems in Indonesia is 3,311,207.45 Ha. Mangroves in conservation areas are 2,533,488.01 Ha where the mangrove ecosystem in critical condition is 476,192.25 Ha and not critical 2,057,295.76 Ha. While the existing mangrove outside the area is 777,719.44 Ha with critical mangrove conditions being 161,432.06 Ha, and the non-critical mangrove is 616,287.38 Ha. So the total number of critical mangrove ecosystems is 673,624.31 Ha and 2,673,583.14 Ha (KLHK, 2020). This condition illustrates that mangrove ecosystems are degraded due to various things, one of which is due to climate change due to global warming.

Climate change that occurs causes many problems, including extreme seasonal changes causing abrasion, and rising sea levels due to melting polar ice. These problems not only affect

large islands but are also deeply felt in the archipelago, especially Maluku which has many small islands. This condition also occurs in mangrove ecosystems in Suli Country. For this reason, efforts to conserve mangrove ecosystems are needed to minimize the impact caused by the effects of global warming.

Conservation of mangrove ecosystems can reduce 10 to 31% of estimated annual carbon emissions from the land use sector in Indonesia. In addition, mangrove forest ecosystems can also store carbon of 800-1200 tons of C/Ha (4-5 times that of terrestrial forests), 80% of carbon is stored in the soil. The release of emissions in mangrove forests is smaller than in forests on land. This is because the decay of aquatic plant litter does not release carbon into the air. Mangrove ecosystem conservation can also protect land from rising sea levels, strong winds, and large waves due to climate change (KLHK, 2020).

IMPLEMENTATION METHOD

The implementation of PKM activities is carried out in 2 stages, with each stage consisting of several activities.

Activities carried out in stage 1 include a survey of the location of activities through Google Earth. This is done to see the distribution of mangrove ecosystems on Ambon Island. After that make an initial approach to the planting site, and contact the relevant parties in this case the youth in the village. After the community agrees to carry out PKM activities, then contact the partner in this case BPDAS-HL Wae Apu Batu Merah as a provider of mangrove seeds for later distribution of seeds for planting.

The activities carried out in stage 2 are socialization of the importance of mangrove ecosystems for climate change mitigation, planting, and then the formation of youth groups to monitor mangrove growth.

RESULTS AND DISCUSSION

In this PKM activity, the team carried out several activities to answer the problems faced by partners and was expected to be a solution to problems arising from climate change that occurred. The community is educated about the importance of mangrove ecosystems to mitigate climate change and support human life. Because human life depends on nature.

Broadly speaking, the solution offered is to carry out conservation activities on mangrove ecosystems on the coast. This is in line with the mandate of Law No. 5 of 1990 concerning the Conservation of Natural Resources and Ecosystems where article 5 states that the conservation of natural resources is carried out through activities to protect life support systems, preserve the diversity of plant and animal species and their ecosystems and the sustainable use of biological natural resources and ecosystems.

The work procedures for PKM activities carried out are as follows:

a. The initial approach began with preparation, where the PKM Team went directly to the Jama'at to discuss the PKM activity plan together with the Chairman of the Jama'at Council. After that, provide a letter of introduction to PKM activities from campus so that KMJ can discuss this with other servant devices

b. Contact community groups (youth and adolescents) to make approaches. Youth groups in this case AM-GPM are also groups of Sunday school children and communities living around the location of mangrove ecosystems, as executors or community groups who will plant
c. Socialization or counseling that will be carried out by delivering material to increase community understanding in this case the target group is youth, adolescents, and the community around the location. Socialization or counseling is carried out intimately through small groups.
d. Planting site surveys were carried out on coasts with mangrove ecosystems. This survey aims to see what types of mangroves exist, substrates, and the current condition of the ecosystem.
e. A literature study was conducted to determine whether the type to be planted is by the existing mangrove habitat in the planting target location. Because there are indications that the seeds in the nursery are only 1 type while mangroves consist of several types. Literature studies in addition to looking at the type, also know the substrate on which mangroves grow.
f. Mangrove seeds were obtained from BPDAS-HL UPT Kemen LHK. To get mangrove seeds, a request letter was first made. The content of the letter includes the type and number of seeds requested as well as the planting location.
g. After the seed request letter has been received and approved, the next thing to do is to coordinate with the coordinator/nursery head to determine the time of collection and removal of mangrove seedlings to the planting site. Seedlings are placed close to the planting site so that when planting is done it does not take a long time.
h. The right timing aims to optimize mangrove growth. For example, planting is done when the coastline is calm (not choppy) and in low tide conditions. So that mangrove seedlings can be stuck properly.
i. Planting is carried out at a predetermined location. Planting is carried out at a predetermined time. Planting is carried out by youth groups, youth groups as well as communities around the target location of planting sites.
j. The formation of a group for monitoring aims to monitor the growth of planted mangroves. It also aims to form a sense of care for the natural resources owned. Monitoring is carried out regularly to see the development of mangroves.
k. Replanting damaged or washed away seedlings is carried out so that the preservation of natural resources is maintained and the target of activities can be achieved properly.

Qualitatively the target achievement of PKM activities is as follows:

- The creation of sustainable mangrove ecosystems to mitigate climate change
- The emergence of awareness starting from the youngest community group, namely children, about the importance of maintaining natural resources and biodiversity in them to create a sense of ownership and desire to care for natural resources.
- Increase public understanding and knowledge about the importance of mangrove ecosystems for mitigation against climate change.

CONCLUSION

Community service activities in Suli State, Maluku Province, have a positive impact on the community and existing mangrove ecosystems. This activity increases public understanding of the importance of mangrove ecosystems and raises awareness of maintaining and caring for existing mangrove ecosystems. Furthermore, mangrove planting as an effort to mitigate climate change on small islands in Suli Country, Maluku Province, has an impact on the sustainability of existing mangrove ecosystems

REFERENCES

KLHK, 2020. Peta Mangrove Nasional dan Status Ekosistem Mangrove di Indonesia. Bagus Dwi Rahmanto. Direktorat Konservasi Tanah dan Air: Disampaikan pada Webinar *Development for Mangrove Monitoring Tools in Indonesia*. https://kkp.go.id/an-component/media/upload-gambar-pendukung/DitJaskel/publikasi-materi-2/perkembangan-perangkat/Peta%20mangrove%20nasional%20dan%20status%20ekosistem%20mangrove%20di%20Indonesia.pdf

Odum (1979). *Ecology: The Link Between the Natural and Social Sciences.* Holt Rinehart and Winston, London.

Poedjirahajoe, 2019. Ekosistem Mangrove Karakteristik, Fungsi, dan Dinamikanya. Gosyen Publishing. Yogyakarta

Pramuji, 2020: Hutan Mangrove di Indonesia: Peranan Permasalahan dan Pengelolaannya. Jurnal Oseana. Volume XXV, Nomor 1, 2000:13-20

Undang-undang No 5. Tahun 1990 tentang Konservasi Sumber Daya Alam Hayati dan Ekosistemnya.