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Participatory mangrove planting as a coast abration disaster mitigation effort in Pasimarannu Village, Sinjai Regency

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ABSTRACT

Pasimarannu village as one of the villages experiencing coastal abrasion and threatening the settlements of residents living in coastal areas. During the high tide, several houses were submerged by sea water, and during the east and west seasons the wind was strong enough so that the high waves had reached under the houses. Attention and effort are needed in anticipating the level of damage that will occur. The community service program is carried out by providing awareness and active participation of the community in protecting the coast through participatory mangrove planting. The method of implementing the activities consists of socialization and FGD on the implementation of the activity plan, Formation of Forest Farmer Groups (KTH), mangrove nurseries, participatory mangrove planting, embroidery and maintenance, as well as program monitoring and evaluation. Technical activities involve extension workers and forestry technical personnel. The key to the success of this participatory planting is the right planting time to avoid the strong currents and waves in the east monsoon. Routine maintenance activities to anticipate and eradicate oyster pests that damage plants during the vulnerable phase, which is up to 4 months of planting.

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1. INTRODUCTION

Pasimarannu Village is one of the coastal villages in Sinjai Timur District, Sinjai Regency, South Sulawesi. Pasimarannu is about 7 km from downtown Sinjai Regency, approximately 180 km from Makassar City with good and smooth transportation access. Most of the village area is located in the lowlands, with a village area of 3.4 km2. The total population is 1,993 people, 964 men and 1,029 women and generally live in coastal areas (Badan Pusat Statistik Kabupaten Sinjai, 2020). Some heads of families choose to live near the beach to make it easier for fishermen to access.

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The geographical location of Pasimarannu Village, East Sinjai District, extends from north to south, on the coast of Bone Bay. In addition to the potential for agriculture, plantations and animal husbandry, the main potential of this village is the fisheries sector with a total of 330 Fishery Households (*Rumah Tangga Perikanan;* RTP). Fish production of 100 tons/year from aquaculture and fishing activities (Badan Pusat Statistik Kabupaten Sinjai, 2020). The high level of dependence on the fisheries sector causes people to generally choose to live near the coast. However, several parts of the Pasimarannu Village area are experiencing a serious threat of abrasion, especially densely populated areas in fishing settlements.

Abrasion that occurs in coastal areas is erosion caused by destructive currents and sea waves. The erosion has an impact on the reduction of land area. Besides being able to cause physical damage, abrasion also has an impact on ecosystem imbalances and changes in the landscape of coastal areas. If such conditions do not receive attention and anticipation, sea water will inundate the land and have the potential to damage settlements close to the coast.

The threat of abrasion that has occurred in Pasimarannu Village has previously been anticipated by the community by placing an arrangement of stones to dispel and break the waves. However, this breakwater is only temporary due to the strength of the waves which tend to get bigger at certain times. The impact is that the stone structure has been dismantled and is no longer able to withstand the waves. The results of the survey conducted show a lack of public understanding of the solution to this abrasion (Wahyuni et al., 2021). Building a breakwater using piles of rocks requires a high budget. Therefore, this condition cannot last long, so it is necessary to make efforts to understand and raise public awareness regarding prevention and mitigation of increasingly severe abrasion threats. The alternative solution offered is a wave barrier using mangrove plants which have many benefits and can improve the welfare of people in areas affected by abrasion (Maksum & Boekoesoe, 2022; Ramadhani, 2020; Rinjani et al., 2022).

Prior to planting, an FGD was carried out involving various components of the community. FGD which discussed the importance of mangroves as a breakwater. Form a mangrove conservation group that will become the pioneers and maintainers of mangroves. In addition to coordinating with relevant government agencies, in this case the Environment and Forestry Office *(Dinas Lingkungan Hidup dan Kehutanan)*, the Fisheries Office *(Dinas Perikanan)*, Settlement and Spatial Planning Office *(Dinas Pemukiman dan Tataruang)*, as well as Community and Village Empowerment Agencies *(Badan Pemberdayaan Masyarakat dan Desa)*. Thus it will align the programs that are carried out and can be sustainable. The purpose of this community service activity is to provide awareness in the form of active community participation to prevent and protect the beach from the threat of increasingly severe abrasion.

2. METHODS

Community service in the form of empowerment is carried out in Passahakue Hamlet, Pasimarannu Village, East Sinjai District, Sinjai Regency. It was carried out by the Water Resources Management Study Program at Muhammadiyah University Sinjai by involving partners from the community, village government, the Environment and Forestry Service, and the Sinjai District Fisheries Service. The program implementation method consists of preparation and implementation of activities. Preparation includes: (1) Location survey and preparation for service implementation; (2) Coordinate with the Village Head and the Head of the Passahakue Hamlet of Pasimarannu Village; (3) Socialization and FGD of activity implementation plans; and (4) Formation of Forest Farmers Group (*Kelompok Tani Hutan;* KTH). While the implementation of activities includes: (1) Nurseries of *Rhizophora mucronata* and *Avicennia marina*

mangroves. The nursery method uses polybags, with a period of three months; (2) Participatory planting of mangroves with community involvement using the dense planting method, with a spacing of 1 x 1 meter. Each plant is assisted with ajr so that it is not carried away by currents during high and low tides; (3) Stitching and maintenance. A week after planting, stitching is done to replace dead plants and clean the plants from trash and oysters that have started to stick. Stitching and maintenance are then carried out routinely every two weeks for four months; (4) Program monitoring and evaluation, carried out routinely after planting to ensure that there is no disturbance to mangrove plants, as well as identify potential disturbances, especially during the difficult first four months. Technical activities involve extension workers and forestry technical personnel.

Table 1. Stages of activity implementation

Implementation date	Activities	Goals	Implementer
10 July 2021	Location survey and preparation for service implementation	Reviewing the location and ascertaining the real condition of the people affected by coastal abrasion	Community service team
14 July 2021	Coordination with the village government	Coordinate and check the condition of the people of Passahakue Village, and submit plans for community service activities to be carried out	Community service team
24 August 2021	Socialization and FGD implementation of activities	Presentation of activities to the community and stakeholders, as well as FGDs regarding the technical implementation of the mangrove planting activities that will be carried out	Community service team
2 September 2021	Establishment of Forest Farmers Groups (*Kelompok Tani Hutan;* KTH)	Forming an official community group by the village head, which will continue the mangrove planting and rehabilitation program in Pasimarannu Village	Community service team and technical forestry team
9-13 September 2021	Mangrove nurseries	Conducting mangrove nurseries of *Rhizophora mucronata* and *Avicennia marina* types which will be planted at the location of community service activities	Community service team and technical forestry team
21-23 November 2021	Participatory mangrove plantation	Planting as well as educating the public about the importance of mangroves in coastal areas, namely for abrasion protection as well as various other benefits	Community service team and technical forestry team
1 December 2021 – 30 April 2022	Stitching and maintenance	Aims to replace dead plants	Community service team + the community
23 - 25 January 2022	Monitoring and evaluation	Monitor and evaluate all programs that have been carried out for future improvements	Community service team and technical forestry team

3. RESULTS AND DISCUSSION

The form of community service activities in Passahakue Hamlet, Pasimarannu Village is Community Empowerment through participatory mangrove planting. This is done as an effort to prevent and overcome beach abrasion. Activities that are part of the Holistic Village Development and Empowerment Program carried out by the Water Resources Management Student Association. This activity lasted for ten months with various series of activities.

Figure 1. The condition of the residents houses on the beach experiencing abrasion.

The first activity was socialization accompanied by a Focus Group Discussion (FGD). FGDs are conducted as a data collection technique that emphasizes the involvement and active role of the community through; discussion and interviews in groups (Hartono et al., 2021; Tawiah & Thusi-Sefatsa, 2022). This technique is a brainstorming that can be done by all participants using the Participatory Rural Appraisal (PRA) method. The use of the PRA method is done to make it easier to increase the role and participation of the community to obtain, collect, and dig up information on the problems faced. Including alternative solutions to problems related to problems faced in rural areas (Kementerian PUPR, 2019).

Figure 2. FGD implementation of participatory mangrove planting

The FGDs that have been conducted involve the Village Government, Forestry Extension and Technical staff, Village Heads, Community Leaders, and RT and RW Representatives from Passahakue Hamlet. The FGD discussed the importance of the existence of mangroves on the coast of Passahakue Hamlet with the various benefits that will be obtained. Suggestions and input from various parties become the basis for making decisions related to mangrove planting plans. The agreement is reached to carry out participatory mangrove planting actions with the main actor being the community and

involving various parties. Management of an ecosystem such as mangroves requires the involvement of various stakeholders. Formation of well-organized work groups. The purpose of this involvement is to create co-management such as commitment, good cooperation mechanisms, commitment and division of roles and responsibilities. The result of this involvement is a high level of trust and the decision-making process is carried out jointly (Danarto et al., 2019).

Efforts to tackle beach abrasion have previously been carried out by affected communities by installing piles of stones on the beach as a breakwater. However, this effort did not last long due to the fact that during the east monsoon, when the waves were quite large, the pile of stones was damaged by the waves. Therefore, a more permanent and long-lasting wave barrier is needed. The FGD agreement was finally carried out to plant mangroves as a long-term wave barrier. Efforts to reduce the risk of abrasion disasters that can be carried out by the community include making simple embankments, building breakwaters, preserving coral reefs, preserving mangroves and not taking sand around the beach (Mahdalena et al., 2021).

The next step after the FGD was conducted was the establishment of a Forest Farmers Group (KTH), bearing in mind that Pasimarranu Village does not yet have community groups engaged in forest protection. The group formation was assisted by forestry extension officers to fulfill the procedures and requirements of a KTH. The formation of the KTH was carried out by deliberation, carried out on the terrace of the mosque and had elected the Head of Passahakue Village as the chairman of the Forest Farmers Group. The legality of KTH through the Decree of the Village Head of Pasimarannu.

Figure 3. Deliberation on the formation of the Forest Farmers Group (KTH) which was held at the mosque

The existence of KTH is expected to be able to educate and become a driving force for the Pasimaraanu village community in protecting and maintaining mangroves which have various benefits. According to study by Wahyuni et al. (2021), the level of public understanding of the existence of mangroves is in the "good" category but the level of participation is still very low, this can be seen from the low level of public concern for mangrove planting activities. This is related to the perception of the community. Some aspects that affect people's perceptions are the low knowledge, level of education, awareness and availability of time for the community, and the lack of information about mangroves due to the government's not optimal role in providing education (counseling). The government is expected to be able to facilitate and participate in providing education and making policies to increase public awareness of the importance of forest sustainability (Nanlohy & Masniar, 2020; Permata et al., 2021).

The next series of activities is conducting mangrove nurseries. Nurseries are carried out by students with the help of KTH group members. Nurseries implementation techniques receive directions from forestry technical staff from the Environment and Forestry Service of South Sulawesi Province. There are

two types of mangroves being bred, namely *Rhizophora mucronata* or mangroves and *Avicennia marina* or Apiapi. Both types were chosen because they matched the characteristics of the planting location, which has a sandy substrate that tends to be muddy. In addition, the two types of mangroves are quite easy to find on the coast of Sinjai Regency. In order to obtain good seeds, this activity was also assisted by technical officers from the Sinjai Regency Environment and Forestry Service.

Figure 4. Mangrove nursery

Nursery process takes about three months until ready to be planted. While waiting the seeds to be ready for planting, several preparations were made including the location to be planted. By coordinating with the Village Government and with the help of extension workers and forestry technical personnel, it was finally agreed to plant in November 2021 in a location that is not too close to residential areas. The planting location also considers boat lanes and boat moorings.

The planting action was carried out by involving several student organizations within Muhammadiyah University Sinjai and inviting several other university students who were temporarily carrying out KKN in Pasimarannu Village. Community involvement in mangrove planting is a determining factor for the success of a mangrove rehabilitation program. Therefore, stakeholders should actively involve the community to carry out mangrove rehabilitation activities with a high success rate. In addition, community involvement is necessary because they have an interest in the utilization of coastal resources, especially mangroves (Fatimatuzzahroh et al., 2021). Community participation in maintaining mangrove conservation will also increase people's welfare. Collaboration between the tourism sector, local government and the community in mangrove conservation is also important (Qadrini, 2022; Turisno et al., 2018).

Figure 5. Mangrove planting action at Pasimarannu Village Beach

After planting, it is continued with stitching for a month with an interval of once a week. Cleaning of oyster pests that attack and inhibit the growth of mangroves is also carried out. Based on the information obtained, mangrove planting activities are often carried out in the same location, but because there is no stitching and maintenance activities for the planted seeds, they die due to oyster pests. The environmental sustainability of mangrove areas provides many benefits for people who live in coastal areas who work as fishermen. Fishing is the main livelihood of coastal residents. Therefore, the manrove area can be the most suitable place for fish, shrimp and various other potential marine habitats. In addition, mangrove areas also help maintain the availability of fish resources in the sea which will not run out and can be used by fishermen as a source of livelihood (Astuti et al., 2022; Sari & Saidah, 2021; Syafruddin et al., 2022).

Figure 6. Mangrove stitching activity (left) and condition of mangrove plants 4 months after planting (right)

4. CONCLUSION AND RECOMMENDATIONS

The community service series starts with FGD activities to get details on the problem of beach abrasion. The result of the agreement was in the form of a mangrove planting program as an effort to mitigate abrasion and raise public awareness of the importance of mangroves. Formation of Forest Farmers Groups as pioneers and community mobilizers to plant, maintain and utilize mangroves wisely and sustainably. Carry out participatory planting at the right time for a high survival rate, bearing in mind that at the location planting was often done before but failed due to the wrong planting time and the strength of the currents and sea waves which were quite high. Routine maintenance activities during the vulnerable phase, namely until the age of planting 4 months. This community service provides awareness to the community in the form of active participation in a whole series of mangrove planting activities to prevent abrasion.

The participatory mangrove planting program encountered various obstacles due to existing limitations. Suggestions for program sustainability are: (1) Schedule a sustainable mangrove planting program initiated by the Forest Farmers Group that has been formed; (2) Guidance support from related Government Agencies and Village Governments; (3) Participation from the Muhammadiyah University Sinjai must continue to be pursued, and make Pasimarannu Village a fostered village for the Study Program in Water Resources Management, Faculty of Agriculture, Muhammadiyah University Sinjai.

REFERENCES

Astuti, D. F., Syukur, M., Gani, H. A., Sakka, A. R. A., & Najamuddin, N. (2022). Ekowisata mangrove lantebung di permukiman nelayan Kelurahan Bira Kecamatan Tamalanrea Kota Makassar. *Phinisi Integration Review*, *5*(2), 433–443.

Badan Pusat Statistik Kabupaten Sinjai. (2020). *Kabupaten Sinjai dalam Angka 2020: Penyediaan Data untuk Perencanaan Pembangunan*.

Badan Pusat Statistik Kabupaten Sinjai. (2020). *Kecamatan Sinjai Timur Dalam Angka Tahun 2020*.

Danarto, W. P., Rijanta, R., & Marfai, M. A. (2019). Kajian pengelolaan ekosistem mangrove sebagai sarana pengurangan resiko bencana di Kota Semarang. *Prosiding Seminar Geotik*, 23–35. Retrieved from http://hdl.handle.net/11617/10786

Fatimatuzzahroh, F., Hadi, S. P., & Purnaweni, H. (2021). Tingkat partisipasi masyarakat dan analisis aktor pada rehabilitasi mangrove di Desa Karangsong, Kabupaten Indramayu, Jawa barat. *Jurnal Sosek Kelautan Dan Perikanan*, *16*(2), 257–269. http://dx.doi.org/10.15578/jsekp.v16i2.9420

Hartono, Y., Soemardiono, B., & Soebijantoro, S. (2021). Community-Based Tourism in Kresek Village, Madiun, East Java. *International Journal of Applied Sciences in Tourism and Events*, *5*(1), 22–31. http://dx.doi.org/10.31940/ijaste.v5i1.2366

Pemerintahan Republik Indonesia. (2019). *Modul Diskusi Kelompok Terarah Focus Group Discussion (FGD)*. Direktorat Jenderal Sumber Daya Air Kementerian Pekerjaan Umum dan Perumahan Rakyat.

Mahdalena, T. Z., Rachmalia, & Ridwan, A. (2021). Upaya pengurangan risiko bencana abrasi pantai berbasis komunitas. *Jurnal Ilmiah Mahasiswa Fakultas Keperawatan*, *5*(2), 67–73.

Maksum, T. S., & Boekoesoe, L. (2022). Pembudidayaan ekosistem mangrove sebagai kawasan ekowisata dan pencegahan abrasi pantai. *Jurnal Sibermas (Sinergi Pemberdayaan Masyarakat)*, *11*(1), 219–225.

Nanlohy, L. H., & Masniar, M. (2020). Manfaat ekosistem mangrove dalam meningkatkan kualitas lingkungan masyarakat pesisir. *Abdimas: Papua Journal of Community Service*, *2*(1), 1–4. https://doi.org/10.33506/pjcs.v2i1.804

Permata, C. O., Iswandaru, D., Hilmanto, R., & Febryano, I. G. (2021). Persepsi masyarakat pesisir Kota Bandar Lampung terhadap hutan mangrove. *Journal of Tropical Marine Science*, *4*(1), 40–48. https://doi.org/10.33019/jour.trop.mar.sci.v4i1.2078

Qadrini, L. (2022). Penyuluhan manfaat bakau kepada masyarakat pesisir Desa Panyampa. *Jurnal Abdi Masyarakat Indonesia*, *2*(2), 719–726. https://doi.org/10.54082/jamsi.316

Ramadhani, S. (2020). Pencegahan abrasi Pantai Timur Surabaya melalui desain ekowisata hutan mangrove Wonorejo Surabaya. *Jurnal Sumberdaya Bumi Berkelanjutan (SEMITAN)*, *2*(1), 535–541.

Rinjani, E. K., Panbriani, S., Auliya'Amalina, U., & Artayasa, I. P. (2022). Mitigasi bencana abrasi pantai melalui penanaman mangrove di Desa Seriwe, Jerowaru Lombok Timur. *Jurnal Pengabdian Magister Pendidikan IPA*, *5*(1), 226–230. https://doi.org/10.29303/jpmpi.v5i1.1419

Sari, D. M., & Saidah, S. (2021). Dampak degradasi hutan mangrove terhadap kehidupan nelayan Di Desa Secanggang Kabupaten Langkat, Sumatera Utara. *Seminar Nasional Peningkatan Mutu Pendidikan*, *2*(1), 54–59.

Syafruddin, Y. S., Yurike, Y., Mahdi, M., & Yuerlita, Y. (2022). Tingkat kesejahteraan nelayan pada dua cluster kondisi hutan mangrove di Mandah Indragiri Hilir, Provinsi Riau, Indonesia. *Jurnal Enggano*, *7*(1), 121–135.

Tawiah, S., & Thusi-Sefatsa, Z. (2022). The value of adult and community education and training to the empowerment of rural women in South Africa. *Universal Journal of Educational Research*, *10*(1), 14–21. https://doi.org/10.13189/ujer.2022.100102

Turisno, B. E., Suharto, R., & Priyono, E. A. (2018). Peran serta masyarakat dan kewenangan pemerintah dalam konservasi mangrove sebagai upaya mencegah rob dan banjir serta sebagai tempat wisata. *Masalah-Masalah Hukum*, *47*(4), 479-497. https://doi.org/10.14710/mmh.47.4.2018.479-497

Wahyuni, A., Tenriawaruwaty, A., Alamsyah, R., Uspar, U., & Wijayanti, N. E. (2021). Pemahaman Masyarakat Terhadap Keberadaan Mangrove Sebagai Upaya Mitigasi bencana Abrasi Pantai (Studi Desa Pasimarannu Kecamatan Sinjai Timur Kabupaten Sinjai). *Al Qisthi/ : Jurnal Sosial Dan Politik*, *11*(2), 45–53.