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Utilization of the Potential of Mangrove Forest Areas to Increase the Income of Coastal Communities in Kipai Village, Patani District

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Abstract

Mangrove forests in Kipai Village provide significant benefits in terms of economy, ecology, and social aspects. However, the local community has limited awareness of these forests' direct and indirect benefits, particularly regarding the economic potential of mangrove-based commodities they have unknowingly utilized. This activity aims to provide training and assistance to the community, specifically to partners, on maximizing the potential of mangrove forest areas to improve the income of coastal communities in Kipai Village. Implementing this Community Service activity follows a structured approach to address partner challenges, including socialization, training, technology application, assistance, evaluation, and program sustainability. The evaluation involves interviewing several partner groups to gather feedback and impressions of the activities. The community members, particularly those who participated, have reported feeling the positive impact of the activity, as it has enhanced their knowledge and skills in utilizing the mangrove area's potential, thus enabling them to process it into products with higher economic value.

Keywords Increasing Coastal Community Income; Mangrove Forest Area; Utilization of Potential.

1. INTRODUCTION

The mangrove forest in Kipai Village has great economic, ecological, and societal benefits. This ecosystem not only acts as a natural protector from abrasion and natural disasters but also has great potential to support the economy of coastal communities. However, the knowledge of the people of Kipai Village about the direct and indirect benefits of mangrove forests is still relatively low, especially related to its economic potential. This is reflected in the use of mangrove forest commodities carried out unconsciously by local communities (Setiawan, 2021).

Economically, the direct benefits of mangrove forests in Kipai Village, Patani District, Central Halmahera Regency have been calculated with a total economic value of Rp. 55,590,000, or 11% of the total value. Meanwhile, indirect benefits are associated with the cost savings in constructing a 300-meter breakwater, estimated to reach Rp: 489,000,000 or 89%. Thus, this region's total economic potential of mangrove forests reaches Rp. 544,590,000 per year. This potential shows that mangrove forest ecosystems are important assets that can be optimized to improve the welfare of coastal communities (Budiarto, 2020).

However, several fundamental problems have arisen, such as the lack of public knowledge about sustainable mangrove management, the lack of innovation in the use of mangrove products, and limited access to technology that can increase the added value of mangrove products. Therefore, training and assistance efforts are needed for the people of Kipai Village to optimize the utilization of the potential of mangrove forest areas.

As a development resource, Mangrove forests have important economic, ecological, and social functions. However, the lack of optimal management in Kipai Village causes this potential not to be fully exploited. Previous research shows that more than 50% of the food needs of coastal communities depend on the surrounding natural resources (Suryani, 2019). With the majority of the people of Kipai Village working as fishermen, good mangrove forest management can be a solution to increase their income.

In comparison, similar service programs in other areas, such as Panjang Village, North Sulawesi, have succeeded in increasing the income of coastal communities by up to 30% through training in making mangrove-based processed products (Pratama & Wiratama, 2022). However, in Kipai Village, no similar program has had a similar impact. This creates a gap or "gap," which is the main reason for the need for service in this region.

This service activity aims to provide training and assistance to the people of Kipai Village regarding utilizing the potential of mangrove forest areas. The focus of the activity includes increasing public understanding of mangrove management, introducing simple technology to increase the added value of mangrove products, and integrating a creative economy based on the mangrove ecosystem. The expected impact of this service includes Increasing the income of coastal communities through diversifying processed mangrove products such as food, handicrafts, and other products; Forming independent mangrove-based business groups; and Increasing public awareness of the importance of mangrove forest preservation for ecosystem sustainability. With this approach, it is hoped that Kipai Village can become an example of sustainable mangrove management while improving the welfare of coastal communities.

2. METHODS

Implementing this Community Service activity uses the Participatory Action Research (PAR) approach. This method was chosen because it involves the active participation of the people of Kipai Village as partners in every stage of the activity, from planning and implementation to evaluation. With this approach, it is hoped that sustainable and relevant solutions will be created for coastal communities. The service partners in this activity are coastal community groups in Kipai Village, most of whom work as fishermen. The partners are 30 participants selected based on their active involvement in mangrove-based economic activities. The location of the activity is Kipai Village, Patani District, Central Halmahera Regency, an area with great potential for mangrove forests. The mentoring begins in July 2024 and lasts two months, with evaluations every two weeks.

This service activity began with socialization, which provided an initial understanding of the importance of utilizing the potential of mangrove forest areas to increase the income of coastal communities. This socialization aims to build public awareness and enthusiasm for the economic potential of mangrove forests. The next stage is the training which aims to equip participants with knowledge and skills in utilizing mangrove forests. Participants are trained in entrepreneurship, focusing on processing mangrove forest products into value-added products, such as food, handicrafts, and other products. Experts and facilitators from the PKM Team guided this training. After the training, a simple technology designed to support sustainable management of mangrove forests is carried out. The PKM team assists partners

directly in implementing this technology, such as using mangrove processing tools and mangrove-based cultivation techniques.

The assistance was carried out intensively for two months. Evaluations are conducted every two weeks to monitor the development of skills and the use of technology by partners. The service team monitors and provides feedback to ensure the activity runs as planned. The results of the evaluation are used to develop the necessary improvement steps.

Based on the monitoring and evaluation results, if the activity is considered successful, the community is urged to continue developing the potential of mangrove forest areas independently. If there are obstacles, the PKM Team will hold a Focus Group Discussion (FGD) to find a solution more in line with local conditions. The program's sustainability is expected to encourage the empowerment of coastal communities productively and create a positive synergy between the community and the local government.

3. FINDINGS AND DISCUSSION

The result achieved from this activity is an increase in the understanding of the Sifkam Fishermen Group on how to utilize the potential of mangrove forests to increase the income of coastal communities. This can be seen from the enthusiasm of the Sifkam fishermen group in Kipai Village in maintaining and managing mangrove forest areas as an economic source. The improvement of the insight and skills of the Sifkam fishermen group is carried out through assistance to process mangrove fruits and biota that live in the mangrove ecosystem as an alternative source of additional income. One form of utilization is processing mangrove fruits into coffee and using abundant marine life at the activity site. Public knowledge also increased through mentoring activities regarding financial analysis, product marketing, product hygiene, business licenses, and business legality. Mangrove fruit processing activities and the resulting fishery products have added value so that they become an alternative business that can increase family income.

Socialization This socialization was carried out in the first week, on October 3 and 4, 2024, for three hours. This activity explained the importance of mastering technology to utilize the potential of mangrove forest areas, which was held at the Sipkam Meeting Hall. The event began with a presentation of the objectives of the partnership community empowerment program, followed by remarks from the Acting Head of Saukani Hi Village Shame. In his remarks, he hoped this program

could educate the Sipkam fishermen group. The accompanying lecturer, Dr. Abd. Rasyid Umaternate, M.Si, also conveyed the importance of utilizing the potential of mangrove forests. Next, the team asked partners to complete a questionnaire to measure the extent of their technology mastery before the activity began. The team then presented the rapid development of technology and how technology has become an important part of daily life, especially for fishermen in this digital era. The team also played a video showing how to utilize the technology to motivate the partners.

Figure 1. Socialization with Partners

The activity continued with a question and answer session and sharing partner experiences. In this activity, the team received much input from partners for the community partnership empowerment program. The input is about the difference between making floating cages, making processed facilities for fishermen's catches, and marketing facilities for fishermen's catches. The socialization continued with the introduction of technological equipment that was spent according to the needs and needs of the Sipkam fishermen group. The equipment is basic equipment that fishermen groups often use in utilizing the potential in mangrove forest areas. In addition, the equipment can also be used to make it easier for fishermen to track and identify the presence of fish at a depth of 300 m.

The results of this socialization align with the theory of community empowerment, according to Suharto (2021), which emphasizes the importance of increasing community capacity through education and technology. The initial knowledge of the partner group about technology is still low. Still, an informative outreach approach has succeeded in raising awareness of the importance of technology to increase productivity and revenue.

The team also received input from partners related to the manufacture of floating cages, means of processing catches, and product marketing. Technological equipment

such as Germin 350 plus was introduced to help fishermen track fish to a depth of 300 meters. This input is the basis for developing more relevant programs to partners' needs.

This training was held in the second to sixth weeks, on October 9-15, 2024, at the Sipkam Hall. The team provided training on the technological equipment used by partner groups to utilize the potential of mangrove forest areas to increase the income of coastal communities. This training includes using Germin 350 Plus and Joram devices and other tools around partners to track and identify the presence of fish in the mangrove forest area of Kipai Village, Patani District.

After the theory session, the team allowed the partner group to directly practice using Germin 350 Plus and Joram in real conditions. This activity evaluates how far the partner can operate the technology equipment after participating in the training.

However, in this training, many members of the Sifkam fishing group found it difficult when using Germin 350 Plus to track fish. The Chairman of the Partner Group, Rajak Asis, revealed that this training provided new insights into technology in fisheries and marine. In addition, partners also realize the importance of mastering technology as fishermen because it can increase their income through the positive impact of technological advancements.

Figure 2. Training Documentation

Coffee-making activities from mangrove beans began after mangrove conservation activities on the coast involving Sifkam fishermen groups and local village governments. This activity invites the community to preserve the mangrove ecosystem and introduce new potential that can be used economically. After the preservation activities, the process of making mangrove coffee began.

The process of making mangrove coffee itself is quite simple. First, mangrove seeds are taken from the fruit and dried in the sun to dry them. After the mangrove seeds are dry, the seeds are then cut into small pieces or grated using a coconut grater or a polishing tool. This step is done to prepare mangrove seeds before roasting.

After being grated and dried, mangrove seeds are roasted until cooked and then mixed with coffee beans. The two ingredients are ground to produce mangrove coffee ready to be served. This mangrove coffee can be enjoyed as an alternative drink, which can also be an additional source of income for coastal communities.

Figure 3. Mangrove Forest Area, Kipai Village, Patani District

The main ingredient in making fish skin chips is the fish skin itself, a type of fish widely found by Sifkam fishermen in mangrove forest areas. The abundant fish in the region have great potential to be developed through proper processing. In this way, fish skin that is not usually used can be turned into products with higher economic value.

The first step in making fish skin chips is to clean the fish skin. After cleaning, the fish skin is left to dry out slightly. This is important so the fish skin is not too wet during the next processing process. Add a little lemon juice to give the fish skin a fresh taste if desired.

Once the fish skin is dry, the next step is to season it by applying a little salt to the fish skin. This salt gives flavor to the fish chips that will be produced. This process needs to be done carefully so that the salt taste is evenly distributed over the entire surface of the fish skin.

Then, the fish skin is added to the cornstarch. Cornstarch is evenly spread over the entire surface of the fish skin. This flour-coating process aims to make fish chips crispier and have an attractive texture when fried. After that, the fish skin is ready to be fried.

The frying process uses low heat so the fish skin cooks evenly and the inside is dry. Fish chips are fried until browned and crispy. After frying, the fish skin is drained to remove excess oil that sticks to the surface.

Once the fish chips are cooked and grilled, the chips are ready to be served. At this stage, flavorings such as chili powder or other flavorings can be added to taste to provide a more diverse flavor. Fish skin chips that are ready and dried are packaged in plastic containers to maintain the product's durability.

Once packaged, the fish skin chips are ready to be marketed. This process allows coastal communities to produce processed products that are not only economically valuable but also help them earn additional income. Fish skin chips can be marketed to the local market and more broadly.

This training supports the theory of experiential learning (Kolb, 1984), which emphasizes that hands-on practice can accelerate the mastery of skills. Through this training, the community learns how to make fish skin chips and the importance of developing processed products from local resources. Despite the obstacles, such as difficulties in using technology tools such as Germin 350 Plus, this training still provides useful new knowledge to improve their skills in managing existing resources.

Figure 4. Processing process of fish chips

In this process, the team provides opportunities for partner groups to demonstrate their abilities using the technology equipment. This activity allows teams and partners to see the shortcomings and effectiveness of the already-running program. The results are then discussed with partners and related stakeholders for improvement. As a follow-up, the team will continue to communicate with partners regularly to discuss obstacles encountered and add knowledge and other skills that can be used to empower partners further.

This community partnership empowerment program is expected to develop even more, forming a literacy center for the community. The center covers human literacy, data, and technology relevant to the times' needs. This aims to allow the community to access a wider range of knowledge and skills, which will help them optimize local resources' potential.

The evaluation process was carried out by interviewing several residents to get information and impressions of the activities that had been carried out. The community, especially those who participated in the activity, felt the positive impact of this program. They feel that their skills in cultivating the potential of mangrove forest areas have increased by producing products with higher economic value.

The partner group hopes this training can be continued with a focus on product packaging and marketing. They want the ability to produce and market products on a larger scale. However, this requires more modern and efficient production tools because the tools used during training are still basic. In addition, digital marketing training is also necessary so that partners can market their products more effectively in this digital era.

The evaluation is in line with the program evaluation approach, according to Stufflebeam (2003), which emphasizes the importance of feedback from beneficiaries for continuous improvement. Input on digital marketing is very relevant to the needs of the industry 4.0 era, where technology-based marketing is the key to the success of small businesses and increasing product competitiveness in a wider market.

4. CONCLUSION

Community service activities carried out by the Kie Raha Institute of Science and Education in North Maluku have succeeded in increasing the knowledge and skills of the Sifkam fishermen group in Kipai Village, Patani District, in utilizing the potential of mangrove forest areas to support the increase in income of coastal communities. Through a participatory approach, the community received training in processing mangrove fruits into products of economic value, such as mangrove coffee, and processing fishery products into fish skin chips. This assistance also succeeded in introducing simple technology that supports efficient resource management so that people are better prepared to face the challenges of the digital era. The activity results show that the processing of mangrove forest products and fisheries provides significant added value, both ecologically and economically, and encourages the formation of sustainable business alternatives in the region.

The recommendation for the next service team is to focus on increasing the scale of production and marketing of products through packaging, branding, and digital marketing training. In addition, more modern production tools are needed to support the effectiveness and efficiency of the production process. Closer collaboration with local governments and the private sector can also expand the reach of this empowerment program so that the wider community can feel the benefits.

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