

Design and Mentoring Partners in Improving the Sustainability of Sea Grape Products

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Abstract

Coastal communities have not been able to fully manage and utilize environmental resources in a sustainable and sustainable manner, as well as the lack of good and directed cooperation between stakeholders. The approach used in this activity includes Technology Transfer and active participation involving partners. The form of activities provided to partners is the design of sea grape cultivation media and regular and sustainable partner assistance. The results of this community service activity succeeded in making a significant contribution in increasing the empowerment of partners both through the design of ex-situ sea grape cultivation media designed in an appropriate manner. Other results obtained in mentoring the application of good sea grape cultivation techniques that provide additional knowledge and skills to partners in managing and producing high-quality sea grape products according to market standards and provide sustainable production increases.

Keywords: Designing; Mentoring; Product Sustainability; Sea Grapes;

1. INTRODUCTION

Coastal communities are a diverse group, generally consisting of fishermen, fish farmers, fish processors, traders, and other professions. They are often identified with poor economic conditions, inadequate environment, and low education levels. In addition, they are not yet fully capable of managing and utilizing environmental resources sustainably, and lack effective and purposeful cooperation among stakeholders.

One fishery commodity that has great potential to be developed in South Sulawesi is seaweed. The potential of seaweed in this area is very promising and has the

opportunity to become a commodity that can contribute to driving economic progress. (Abdullah, 2017). South Sulawesi is proven to be one of the producers of sea grapes (Caulerpa) which contributes to meeting local and export market demand. The potential of seaweed in Indonesia is very promising and can become a commodity that plays an important role in driving economic growth (Amar Sani, 2022).

In Sulawesi, sea grapes (caulerpa) were originally consumed fresh from the sea, but are now being turned into cultivation due to its potential profitability, especially for the local market. Good marketing prospects for fishery products are supported by an increase in fish consumption.(Setiyorini et al., 2018). Caulerpa recemosa is a type of seaweed that is commonly used as a snack in fresh form (Puspita et al., 2019). Apart from being a food ingredient, sea grapes are increasingly recognized for their medical uses due to their antioxidant content. Sea grape cultivation in South Sulawesi has high prospects and provides great benefits for farmers.

The utilization of science and technology in improving the competitiveness of the fisheries business provides various services to stakeholders and supports the implementation of sustainable development based on the principles of welfare, justice and environmental sustainability. According to (Car et al., 2014) The development of this technology has brought about changes in human life so that it brings many conveniences to our lives. This concept is very relevant to be applied in Indonesia, with an approach to the management and utilization of natural resources that considers the balance and stability of natural resources and the environment.

Each community group must receive special attention and treatment in their businesses, groups and economic activities. The potential of the waters has not been optimally utilised for the welfare of the fishing community. (Sjafari et al., 2018). The role of other institutions in this case science and technology through the results of coastal community empowerment research is needed so that it can be utilised optimally so as to increase the income of residents and provide added value. This will encourage the acceleration of regional development and minimise gaps in various parties from the Government, Universities, the business world and the community to support development. One form of strategy is to empower the community, by popularizing

science and technology, disseminating research results, and applying science and technology products for community empowerment. The existence of MSME actors cannot be avoided from today's society because their existence is very beneficial in distributing community income. (Abdullah et al., 2021).

Based on the situation analysis that has been carried out, the problems of each partner are identified as follows: For UPR Juku Sulawesi Group Partner 1). Product quality during the rainy season is not good, because it is constrained by water quality. 2) The production of sea grape cultivation carried out so far is still traditional. 3). The quality of sea grape products is still low. 4). Technology used in the production of seaweed cultivation that is not environmentally friendly.

2. METHOD

The approaches used in the implementation of this activity programme include:

1. **Participatory Rural Approach:** A participatory approach that involves the community at all stages of activities from planning to implementation to evaluation. The target community is placed as a subject so that the community is more proactive, the implementation team is only a motivator, facilitator and companion in the transfer of science and technology and science and technology engineering.
2. **Technology transfer:** In which problem solving relies on the transfer of appropriate technological innovations to the target community to improve the performance and productivity of community businesses (Lasmini et al., 2019). The service implementation methods used in this activity include training, making demonstrations, mentoring, namely regular and continuous coaching regarding the adoption / application of technology in direct practice at the community level; as well as the design of machinery and equipment, to improve the performance of partner businesses.

Table 1: Details of the Service Implementation Method

NO	PARTNER PROBLEM SOLUTIONS	IMPLEMENTATION METHOD	PARTNER PARTICIPATION	PROGRAMME EVALUATION
1	Introducing environmentally friendly seaweed farming technology	Design of Ex-Situ Cultivation Media	Participated in training activities and making Ex-Situ Cultivation Media	Trial use of Ex-Situ Cultivation Media
2	Applying Good Sea Grape Cultivation Practices	Mentoring on how to cultivate sea grapes	Participated in mentoring activities on how to cultivate sea grapes	Observation and demonstration

3. RESULTS AND DISCUSSION

The Pangkajene Islands State Agricultural Polytechnic Community Service Team carried out activities in the form of assistance to partners for 3 months starting on 28 September 2024 until 12 October 2024. This PKM activity was carried out at the PkM UPR partner location. Juku Sulawesi and KUB Samata, both of which are located in Samata Village, Somba Opu District, Gowa Regency. The following is the distance between the location of the College and the PKM Partner Location can be seen in Figure 1 below:

To provide solutions to the problems faced by partners as stated above, the Pangkajene Islands Agricultural Polytechnic Community Service Team carried out activities in the form of assistance to partners for 1 day, namely on Saturday 28 October 2024 at the UPR farm. Juku Sulawesi which is located in Samata Village, Somba Opu District, Gowa Regency. This activity was attended by group members who were members of the People's Fisheries Business (UPR) who were interested in. develop sea grape cultivation as a superior commodity. Reorient farmers' strategies in managing activities at the upstream level (on farm) through problem solving involving stakeholders (Busthanul et al, 2021).

1. Appropriate Technology Design

The activity began through the design of ex-situ sea grape cultivation media which is the Appropriate Technology (TTG) applied in this service. The dedication team from Polipangkep introduced innovations in sea grape cultivation through the use of artificial

circulation pond media. This applied technology allows the sea grape commodity which usually grows in its natural habitat, namely coastal sea waters and depends on coastal waters, which makes the cultivation process very dependent on environmental factors such as tides and sea water quality. However, with the latest innovation developed by the service team, farmers can cultivate sea grapes in artificial pond media equipped with an automatic water circulation system.

This fibre farming pond uses an artificial water circulation system that mimics the natural conditions of its natural habitat. Some equipment such as tubs, toren, pipes, water pumps, hoses, automatic timers, fruit baskets, and ozone generators. This sea grape growing medium was designed and assembled together by the service team with MBKM students and members of the partner group. The service team designed a new innovative sea grape cultivation technology system, this system is designed to keep water quality stable and similar to natural conditions, so that sea grapes can grow optimally without having to be exposed to the risk of erratic environmental changes. With this technology transfer, it is hoped that local farmers and fishermen can adopt better cultivation technologies and methods, so that they can contribute to regional economic development in a sustainable way.



Figure 2: Ex-Situ Cultivation Media Design Activity

2. Mentoring on How to Cultivate Sea Grapes

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that images be placed as close as possible to the explanation of the image or graphic. This is important because the images or graphs in the paper will be printed in gray scale or black and white.

After the design of the sea grape cultivation media was functioning properly, the activity continued with mentoring on how to cultivate sea grapes properly and correctly. Mentoring activities to improve individual skills to improve their competence according to what they need (Kisworo et al., 2022). This activity is expected to increase the capacity of partners by providing partners with knowledge and skills about procedures and standards for handling sea grapes starting from taking seeds from their natural habitat, treatment when they arrive at the cultivation site, namely the farm of the partner, how the optimal water depth needed for cultivation, optimal water temperature and salinity needed by sea grapes. According to (Puspita et al., 2019)



Figure 3: Mentoring Activity on How to Cultivate Sea Grapes Well

The mentoring activity on the application of good sea grape cultivation techniques was guided by members of the service team, namely Dr Andi Rusdi Walinono S.Pi. M.Si. The service team together with partners and MBKM students gave a direct demonstration of how to cultivate sea grapes according to good cultivation standards. Participants were guided from the preparation of cultivation media to the correct maintenance techniques to ensure optimal growth of sea grapes.

Table 1 below is the result of data analysis for community service activities related to the design of sea grape cultivation media and assistance in good sea grape cultivation methods:

Table 1. Data Analysis Result Table

DATA TYPE	INDIKATOR	BEFORE THE ACTIVITY	AFTER THE ACTIVITY	METODE ANALISIS	ANALYSIS RESULTS
Sea Wine Production	Production Volume (Kg/Month)	70 kg/month	150 kg/month	Comparative Analysis	There was a 140% increase in production from the beginning of the programme implementation Comparative Analysis
	Product Quality	Variations in size and texture	More uniform size, good texture	Descriptive Statistics	Improved product quality with textures and sizes that meet market standards
Partner Income	Average income per month	IDR 1,500,000	IDR 3,500,000	Cost-Benefit Analysis, Revenue Trend Analysis	A 150% increase in revenue, demonstrating the positive effect of technology on partner economies
Technology Implementation	Automatic circulation pool adoption rate (%)	0 %	80%	Adoption Rate Analysis	Adoption of Ex-itu Circulating Pond media technology reached 80%, indicating the success of the programme in improving aquaculture technology in the community.

Source: Data Processed (2024).

The table above shows that the community service programme through the design of cultivation media and assistance in sea grape cultivation techniques has succeeded in significantly increasing production, product quality, income, and technology adoption of partners, while overcoming technical constraints and supporting environmental sustainability. People will adopt innovations if they are considered capable of providing benefits.(Yuliaty et al., 2011)

4. CONCLUSION

This community service activity succeeded in making a significant contribution in increasing the empowerment of partners both through the design of ex-situ sea grape cultivation media designed in an appropriate manner. High enthusiasm was seen from the trainees, who felt that they benefited greatly from the whole programme (Harso Widagdo, 2024). With the facilities provided, it is hoped that partners can optimise production outside of their natural habitat and can continue to produce sustainably without worrying about environmental conditions or the rainy season where during the rainy season the growth of sea grapes can be slowed down due to low water salinity levels.

Assistance in the application of good sea grape cultivation techniques has provided additional knowledge and skills of partners in managing and producing high-quality sea grape products that can meet market standards and increase production productivity, which in turn increases income.

ACKNOWLEDGMENTS

Our gratitude also goes to each party that has helped and contributed to this activity including the Ministry of Education, Culture Research and Technology through the Academic Directorate of Vocational Higher Education which has funded this activity. Our thanks also go to the Centre for Research and Community Service (PPPM), especially to the Director of the Pangkajene Islands State Agricultural Polytechnic for facilitating this activity. To the partners of Usaha Perikanan Rakyat (UPR) Juku Sulawesi who have actively participated in this activity, as well as the high motivation that has been shown during the entire service activity. The real participation of students in MBKM activities is also highly appreciated in improving their soft skills, and all parties who have supported this activity both directly and indirectly we thank you.

NOVELTY

This technology allows sea grape commodities that normally grow in their natural habitat of coastal marine waters to be dependent on coastal waters, making their cultivation highly dependent on environmental factors such as tides and seawater quality.

However, with the latest innovation developed by the service team, farmers can cultivate sea grapes in artificial pond media equipped with an automatic water circulation system.

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