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From Bucket To Plate: Training On Making Budikdamber Media For Youth

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Abstract
This activity was to give training for youth about how to make an innovative and sustainable method for integrating fish and vegetable cultivation using minimal space. The training aimed to enhance participants' understanding and skills in material selection, installation making, waste utilization, and aquaponic farming techniques. The training covered essential aspects such as selecting durable and cost-effective materials, constructing efficient Budikdamber installations, repurposing plastic cup waste for hydroponic plant cultivation, and balancing the aquatic ecosystem for optimal fish and vegetable growth. Initially, participants had a poor comprehension of these concepts, with an understanding score of 52.5 (Category E). However, after completing hands-on training, their scores improved to the 52-63 range (Category B), demonstrating significant progress. The results highlight the effectiveness of practical education in fostering sustainable agricultural practices and reducing environmental impact. These findings emphasize the potential of Budikdamber systems in enhancing food security, resource efficiency, and economic opportunities for communities.

Keywords*: fish,budikdamber, aquaponics, instalation*

1. INTRODUCTION

Budikdamber technology is a fish and vegetable cultivation carried out in a bucket simultaneously on a narrow land with little water use, relatively small capital, and easy to do by the community in order to meet nutritional needs. Aquaponics is a method that combines fish farming (aquaculture) with planting plants in water (hydroponics) (Andhikawati et al., 2021). This technology is an integrated planting system that utilizes the results of the decomposition of organic materials from fish farming as nutrients in plant cultivation. The advantage of the aquaponic system is that it can utilize organic waste from fish farming as a food source for plant cultivation (Suprapti & Prasetyowati, 2024). In addition, aquaponics uses a plant cultivation system to clean and purify the water used in fish farming (Irawan et al., 2023). The advantage of the aquaponic farming system when compared to the land farming system is the efficiency of agricultural and fishery land use (Pamungkas et al., 2024). The aquaponic farming system is very suitable to be applied in the environment around the yard. The aquaponic system generally combines freshwater fisheries and horticulture (Harahap et al., 2023; Nugroho & Iskandar, 2024). One type of fish that can be raised with the budikdamber technology system is catfish while the types of vegetables are kale and mustard greens.

Tawangmangu District is one of 17 districts in Karanganyar Regency, located in the eastern part, approximately 27 km from the district capital. This district is located at an altitude of approximately 1,200 meters above sea level (masl), making it an area with cool air and suitable for the agricultural and tourism sectors. The area of Tawangmangu District is approximately 87.14 km², most of which consists of agricultural land and protected forest areas. The agricultural sector in Tawangmangu is dominated by horticultural crops, such as vegetables (carrots, potatoes, cabbage, and tomatoes), as well as fruits such as strawberries. Agricultural land in this district largely relies on natural irrigation systems and rainfed, with good soil fertility due to the influence of the mountain slopes (Badan Pusat Statistik, 2024).

In addition to the agricultural sector, tourism is also a leading sector in Tawangmangu District. This area is famous for its various natural tourist destinations, such as Grojogan Sewu Waterfall, Sekipan Hill, and Mount Lawu. Many people work in the tourism sector as

tourism managers, inn owners, souvenir traders, and regional culinary businesses. The livelihoods of the population in Tawangmangu District are quite diverse, including farmers, traders, tourism business actors, and workers in the service and government sectors. However, the development of the economic sector was affected by the Covid-19 pandemic, especially in the fields of tourism and trade. Therefore, efforts are needed to encourage diversification of the economic sector, one of which is by increasing the interest of the younger generation in the fisheries sector.

The freshwater fisheries sector has great potential to be developed in Tawangmangu, given the abundant availability of water and supportive environmental conditions. Freshwater fish production in Tawangmangu is indeed the smallest in Karanganyar Regency. Data shows that freshwater fish production in 2022 was only 52,630 quintals, but continued to increase from 2021 (51,152 quintals) and 2019 (49,122 quintals). However, the interest of the younger generation in this field is still relatively low. Therefore, an educational and innovative approach is needed to attract their attention, such as through training in modern fisheries technology, fisheries-based entrepreneurship, and the use of social media in marketing fisheries products (Badan Pusat Statistik, 2024).

The community service activities that will be carried out involve the youth of Banjarsari Village, Tawangmangu Subdistrict as partners. The training aimed to enhance participants' understanding and skills in material selection, installation making, waste utilization, and aquaponic farming techniques. Empowerment through this community service program will be carried out through productive activities to maximize the potential of the village through human resources. The training activities for making budikdamber installations by village youth will have a positive impact, in addition to supporting the hobby of raising fish for young people but also practicing making their own media that will be used for cultivation. Even the media can also be sold to provide economic growth. With optimal utilization of natural resource potential and increasing the interest of the younger generation in the fisheries sector, it is hoped that Tawangmangu can continue to develop as a region with a sustainable and highly competitive economy.

2. METHODS

The method of implementing the activity is training for the youth of Banjarsari Village, Tawangmangu District, Karanganyar Regency. The training was carried out on the youth of RT 05 Banjarsari Village. The activity was divided into several stages. In the preparation stage, an initial survey began in Banjarsari Village, which is an urban area where settlements are quite densely populated. Information from the village officers obtained that Banjarsari Village is a tourist area where there are many villas and densely populated areas around Tawangmangu District. The survey team conducted data collection, after an agreement was reached, the training activity was carried out on October 13, 2024 at 19.30 WIB. The activity was continued with coordination with the youth leader for the implementation of the training. The team then prepared extension materials, demonstrations using props. The youth partners are expected to provide a positive response and provide a conducive place for training. The evaluation that can be carried out is to see the number of training participants and the results of the training participants' cultivation. Evaluation of the implementation of this community service is a survey system between before and after the activity using a Likert scale with the highest score priority in all questions starting with 5 and the lowest is 1. The score range is determined based on the frequency of answers to a number of 4 questions related to the benefits, skills, interests and installation of the budikdamber system. The socialization was then continued with training in tips and tricks for catfish cultivation.

Table 1. character score criteria

Character Code	Score Range	Average Score Value
E	Very poor	15 - 27
D	Poor	28 - 39
C	Sufficient	40 - 51
B	Good	52 - 63
A	Very good	64 - 75

Figure 1. Training session

3. RESULT AND DISCUSSION

At the beginning and end of the training, a questionnaire was given in the form of handwritten HVS paper and completed with the participant's name. Table 2 below shows the frequency results for each participant.

Table 2. Results of scoring the answers

No	Question	Frequency of answers					Number of participants	Total score
		1	2	3	4	5		
	Before Training							
1	Installation material selection skills	15	0	0	0	0	15	15
2	Installation making	15	0	0	0	0	15	15
3	Utilization of plastic cup waste	15	0	0	0	0	15	15
4	Fish and vegetable cultivation in buckets	10	4	1	0	0	15	21
	Average Score							16,5
	After training							
1	Installation material selection skills	0	0	10	2	3	15	53
2	Installation making	3	4	5	2	1	15	41
3	Utilization of plastic cup waste	0	0	0	4	11	15	71
4	Fish and vegetable cultivation in buckets	0	3	10	1	1	15	45
	Average Score							52,5

The level of understanding of the benefits of waste materials and hydroponic cultivation skills was very poor at the beginning of the training, as shown in Table 2 above. Able to improve the knowledge and skills of partners on how to make budikdamber installations and fish and vegetable cultivation in buckets. The understanding value reached 52.5, which is category E in Table 1, but after the training was completed, the value was between 52 and 63 according to the results of the study in category B.

Initially, the level of understanding among participants regarding the benefits of waste materials and hydroponic cultivation skills was very poor, as shown in Table 2. The training aimed to improve their knowledge and skills in selecting materials, constructing Budikdamber

installations, and utilizing plastic waste efficiently. At the beginning of the training, the understanding score was 52.5, categorized as E in Table 1, indicating poor knowledge. However, by the end of the training, their scores improved to the 52-63 range, classified as B, signifying a significant enhancement in comprehension and practical skills. This improvement highlights the effectiveness of the training in fostering sustainable agricultural and aquacultural practices.

Selecting the right materials is fundamental to the success of a Budikdamber system. After training participants have 53 on total score increase sigfcant from 15 poin. The materials must be durable, cost-effective, and environmentally friendly (Kuswanto et al., 2022; Zulkifli et al., 2023). Participants were trained on key factors to consider when choosing materials, such as: Durability and Safety: The primary material for Budikdamber is a sturdy plastic bucket, typically 20-25 liters in capacity, which can withstand prolonged exposure to water and environmental conditions. The selection of non-toxic, BPA-free plastic ensures the safety of both fish and plants. Water-Resistant Components: The system requires PVC pipes, hoses, and nets that do not degrade easily in water. Participants were taught to choose high-quality pipes to prevent leaks and system failures. Filtration Materials: The effectiveness of the system depends on proper filtration to keep the water clean. Participants learned about using materials like gravel, activated carbon, and sponge filters to maintain a balanced aquatic environment. Cost-Effective Alternatives: Instead of purchasing new materials, reusing available items such as used buckets, repurposed pipes, and mesh screens was encouraged to promote sustainability and reduce costs. By equipping participants with material selection skills, they were able to make informed choices, leading to more efficient and long-lasting Budikdamber installations.

After understanding material selection, participants moved on to the construction phase. The installation process involves several key steps preparing the bucket (Kuswanto et al., 2022; Nugraheni & Fardhani, 2022). A hole is drilled near the bottom of the bucket to attach an outlet pipe for water drainage and aeration. Proper sealing is necessary to prevent leaks. Assembling the Aeration System, an aeration system using small air pumps ensures sufficient oxygen supply for fish. Participants were taught how to position the pump correctly for optimal circulation. Setting Up the Planting Medium. Net pots or plastic cups with holes are used to hold the plants above the water surface. Hydroponic media like sponge, cocopeat, or pebbles are placed inside these containers to support plant roots. Water and Nutrient Management. Training included guidelines on maintaining the correct pH and ammonia levels in water to ensure a balanced environment for both fish and plants. Before introducing fish and plants, the setup is tested to check for leaks, proper aeration, and structural stability.

Waste management is an integral part of sustainable agriculture. One of the key aspects of the training was teaching participants how to repurpose plastic cup waste for hydroponic plant cultivation. Instead of purchasing expensive net pots, used plastic cups were modified by creating holes for root growth and proper drainage. This simple innovation significantly reduced waste while making the system more cost-effective. Participants were introduced to methods of arranging plastic cups on vertical frames to maximize space utilization. This approach is particularly beneficial in urban settings where land is limited. Used cups were also adapted into self-watering containers, utilizing capillary action techniques to provide consistent moisture to plants. The training emphasized the environmental impact of plastic waste and encouraged participants to explore creative ways of repurposing disposable items in agriculture.

4. CONCLUSION

The training significantly improved participants' understanding and skills in material selection, installation making, waste utilization, and integrated cultivation techniques.

Initially, their comprehension level was low, with an understanding score of 52.5 (Category E). However, after hands-on practice and knowledge reinforcement, their scores increased to the 52-63 range (Category B), demonstrating a substantial improvement.

This progress underscores the importance of practical education in sustainable agriculture, especially in promoting waste utilization and resource efficiency. By continuing to refine these skills, participants can contribute to a more resilient and environmentally friendly food production system, benefiting both their communities and the broader ecosystem.

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