

Case-based Article

Socialization of aquaponics utilization technology and aricultural waste as growing media for food security in Limporilau Village, Wajo Regency

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ARTICLE INFO	ABSTRACT
<i>Keywords:</i> Aquaponics Community Empowerment Food Security	The community service activity in Limporilau Village revealed that there is a problem regarding the low level of knowledge among the community about the utilization of aquaponics technology. Many people are still unaware that aquaponics can be implemented in limited spaces such as home gardens. The method used to address this issue includes socialization, lectures, discussions, and training on aquaponics system construction. The results obtained from these activities showed an improvement in the community's knowledge of aquaponics. This initiative aims to enhance food security and the self-reliance of the community. By utilizing aquaponics, which combines plant cultivation and fish farming, the community can benefit from a single system. Aquaponics also offers an alternative business opportunity for the community, as it yields high-value organic plants and fresh fish.

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1. INTRODUCTION

The increasing population at a rapid pace will result in strong pressure on natural resources, one of which is the growing demand for quality food (Akhirul et al., 2020). Factors such as expensive land, water scarcity, large-scale land conversion, and extreme climate change due to global warming have impacted the decline in agricultural production. Additionally, farmers, especially those residing in rural areas, have limited knowledge about emerging innovations. Furthermore, the younger generation often perceives agriculture and fisheries as occupations for the older generation, which is consistent with the statement from the Ministry of Maritime Affairs and Fisheries that millennials are not interested in the fisheries sector (Victoria, 2019).

According to Romdiyati (2015), the lack of interest among young people in engaging in the fields of agriculture and fisheries is a concerning issue as it could threaten national food security. In the field of agriculture and fisheries, the younger generation is expected to create new systems, technologies, and concepts that can maximize crop productivity.

Aquaponics technology is a suitable solution for cultivating food crops. Besides enhancing the wise utilization of natural resources, aquaponics systems can also serve as a local food innovation for community empowerment in rural areas. Due to the limited knowledge of farming communities in Limporilau Village regarding aquaponics technology, the author, who is involved in community service, aims to empower the people of Limporilau Village through the dissemination of aquaponics technology and the utilization of agricultural waste as a planting medium to enhance food security.

2. METHODS

The community service activity utilized the method of counseling by providing direct information to the community regarding the utilization of aquaponics technology and agricultural waste as a planting medium. The activity took place at the Office of Limporilau Village, Belawa District, Wajo Regency, on March 7, 2023, involving the target participants, specifically farmers and fishermen from Limporilau Village.

The method involved several stages, including:

2.1 Socialization

The socialization was conducted by delivering presentations using PowerPoint and educational videos. The presentation material included information on "Utilization of Aquaponics" and provided step-by-step guidance on the simple construction of aquaponics systems. Additionally, videos showcasing the utilization of agricultural waste, such as rice husks, as a planting medium were shown.

2.2 Education

Education about aquaponics was carried out by demonstrating the process directly using the prepared equipment, followed by the introduction of plants and fish. The demonstration and teaching process were conducted directly to the participants who attended the socialization session, providing them with knowledge on how to construct a simple aquaponics system that could benefit the community of Limporilau Village. This socialization serves as a symbol in the village, illustrating the potential benefits of aquaponics when utilized effectively and creating a positive impact on the community.

3. RESULTS AND DISCUSSIONS

The community service activity revolved around the theme of "Utilization of Aquaponics Technology and Agricultural Waste as a Planting Medium for Food Security." During the implementation, socialization was conducted by delivering the material to participants who were

housewives, farmers, and fishermen in Limporilau Village. The presentation was given by the agricultural lecturer, as shown in Figure 1:



Figure. 1 (a) Presentation of material by the community service team; (b) Group photo with the participants and students
(Source: Primary Data. 2023)

The material provided to the group members was presented by the agricultural lecturer. The topics covered suitable plants for aquaponics and the management of production. The aim was to demonstrate that engaging in aquaponics activities could reduce kitchen expenses, allowing funds to be saved. The participants showed great enthusiasm for the training as it involved hands-on practice. According to the participants, they found the training to be highly beneficial, as the knowledge about aquaponics could be utilized to improve their economic livelihoods. It is hoped that further development will lead to increased productivity, resulting in higher income for families through vegetable sales.

Aquaponics Cultivation Practice

The aquaponics practice aimed to apply the knowledge and skills regarding aquaponics system techniques that the participants had learned. After the socialization and understanding of the real conditions in the field, albeit through videos and training, the group members attempted to apply the knowledge directly in the field. The construction of the aquaponics system was assisted by agricultural students from Puangrimaggalatung University (Figure 2). The practice activities for setting up the aquaponics system include 1) Creating a medium for storing planting media, and 2) Preparing water spinach as the plant to be grown.

With the assistance of agricultural students, an alternative solution was proposed, which involved using catfish or carp that can symbiotically coexist with water spinach. Catfish are more suitable for small tanks. The process of preparing the plant seedlings and fish was explained to the participants, including the types of plants that can be cultivated in the aquaponic system. Before transferring the seedlings to the aquaponics container, the plant seeds were soaked to enhance germination. According to Sahroni et al. (2018), soaked seeds have a higher germination percentage compared to non-soaked seeds because the soaking process helps provide the necessary water for germination and accelerates imbibition.

The selection of fish species suitable for aquaponics systems includes those that can tolerate low oxygen levels, such as catfish, carp, and tilapia. To prevent stress in the fish due to the new environment, an adaptation process using the new water is necessary. Masjudi et al. (2016) stated that fish experience stress due to fluctuations in temperature.



Figure. 2 Aquaphonic technology
(Source: Data Primer. 2023)

Routine aquaponics maintenance involves monitoring water quality parameters such as temperature and acidity (pH). If the plants grow larger, they require more water to reach the roots (Mas'udah et al., 2022). Controlling the amount of fish feed is important as excessive feeding can lead to the accumulation of leftover food and affect the growth of the fish (Rusanti et al., 2020). An imbalance between fish and plant growth can result in suboptimal growth, nutrient deficiencies, increased waste production, and inefficient decomposition processes (Putra et al., 2021). Regular checks on the sustainability of the aquaponics system, including recirculation systems, are necessary to anticipate any leakage in the cultivation containers.

4. CONCLUSION

Aquaponic technology through community empowerment provides knowledge and skills to the community of Limporilau Village. The community's understanding of aquaponics has increased through the dissemination of aquaponic technology, aiming to enhance food security and the self-reliance of the community by utilizing small land areas, such as home gardens. With aquaponics serving dual purposes of cultivating plants and raising fish, the community can obtain additional benefits from a single system. Aquaponics can also serve as an alternative business for the community, generating high-value organic crops and fresh fish.

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