

STRENGTHENING VILLAGE EQUIPMENT CAPACITY THROUGH AQUAPONIC CATFISH CULTIVATION IN LAMGAPANG VILLAGE, ACEH BESAR

Wahyu Ario Pratomo¹, Chenny Seftaria², Inggrita Gusti Sari Nasution³, Monika Andrasari⁴

^{1,3,4}Universitas Sumatera Utara, Indonesia.

²Universitas Syiah Kuala, Indonesia

Corresponding E-mail: wahyuario@yahoo.com, chenny@unsyiah.ac.id, inggritagusti@gmail.com, andramonika@usu.ac.id

Abstract

Lamgapang Village in Krueng Barona Jaya District, Aceh Besar Regency, faces economic challenges due to the conversion of agricultural land into residential areas. Many local residents have lost their jobs in the agricultural sector, with only a few continuing small-scale businesses. The COVID-19 pandemic has further worsened their economic conditions. To help improve the community's welfare, this community service program aims to develop catfish farming using an aquaponic system. Catfish was chosen because it is the most popular fish and widely sold in traditional markets, including in Aceh, as well as being affordable and easily accessible to the public. This aquaponic system not only optimizes catfish production but also provides additional yields in the form of fresh vegetables that can be consumed or sold to generate extra income. Through this program, it is hoped that the economy of the residents of Lamgapang Village will improve significantly.

Keywords: *Village Apparatus, Aquaponics, Catfish*

Introduction

Aceh Province is one of the areas that has been severely impacted by the spread of COVID-19, with the economic aspect being one of the main concerns because the pandemic has worsened the economic conditions of the people in Aceh. In the midst of this economic instability, entrepreneurship is an attractive option to take. Entrepreneurial activities not only have the potential to improve the economy, but are also able to absorb labor and provide support for the surrounding community.

Gampong Lamgapang in Krueng Barona Jaya District, Aceh Besar Regency, is experiencing difficulties in life, especially because agricultural land has been converted into settlements. Indigenous people who previously worked in rice fields and gardens have lost their livelihoods, and only a small number are involved in independent businesses. Community empowerment is a solution that can help reduce poverty. One form of potential empowerment is catfish cultivation, which has bright prospects both in seeding and rearing. The demand for catfish continues to increase, and with the right cultivation techniques, the results obtained can be satisfactory and in demand by consumers (Sudaryati et al, 2017).

Although catfish are known as fish that are resistant to various water conditions, cultivation without special treatment often results in less than optimal productivity (Mokolensang & Manu, 2021). Therefore, a more effective method is needed to increase cultivation results. One solution that has emerged is the use of an aquaponic system. Aquaponics is a fish farming system that combines soil-free plant cultivation (hydroponics), which is mutually beneficial to each other. This system developed because the availability of land and water for fish farming is increasingly limited due to the increasing need for housing, rice fields, and industry (Nugroho & Sutrisno, 2008). With the aquaponic system, it is hoped that it can remain productive without requiring a large area of land and using water efficiently (Supendi & Maulana, 2015). This technology not only increases fish yields but also increases income

STRENGTHENING VILLAGE EQUIPMENT CAPACITY THROUGH AQUAPONIC CATFISH CULTIVATION IN LAMGAPANG VILLAGE, ACEH BESAR

Wahyu Ario Pratomo¹, Chenny Seftaria², Inggrita Gusti Sari³, Monika Andrasari⁴

from fresh vegetables that can be produced. In Gampong Lamgapang, residents still use traditional methods to raise catfish, namely with ponds made of cement or tarpaulin. Unfortunately, the results of catfish cultivation are still far from optimal. Some of the main obstacles faced include poor seeding, lack of water circulation technology, and lack of knowledge about modern cultivation techniques, which have a direct impact on the low income of local communities.

To overcome this problem, an aquaponics-based empowerment program is proposed with several main steps as a solution. First, the community will be given a complete set of aquaponics tools, including catfish ponds and hydroponic media for vegetable plants. Second, catfish seeds and vegetable seeds will also be provided to support cultivation. Third, socialization and training will be carried out on how to use aquaponics devices effectively, so that the community understands its operation thoroughly. Finally, the community will be taught how to make aquaponics devices independently, using easily accessible materials, so that this technology can be developed and replicated in the future without relying on external assistance. With the implementation of this aquaponics system, it is not only expected to increase catfish production significantly, but also increase the yield of fresh vegetables that can be consumed by themselves or sold to increase income. This empowerment has the potential to improve the welfare of the Gampong Lamgapang community in a sustainable manner.

Implementation Method

This community service activity (PKM) was carried out in Gampong Lamgapang, Aceh Besar District. This activity was carried out for 6 (six) months starting from June - November 2023, through the USU Talenta PKM Program with the 2023 National Collaboration scheme implemented by the University of North Sumatra as the Head of the Implementation Team and collaborating with Syiah Kuala University and the Lamgapang Village Apparatus as Partners. The beneficiaries of this National Collaboration PKM program are village officials and the community in Gampong Lamgapang. The method of implementing this PKM is carried out in several stages, namely: a) Pre-activity preparation by conducting a pre-survey. This field pre-survey aims to determine important aspects in evaluating partner problems and needs. With the assistance of Pak Keuchik (Village Head) and village officials, the team can obtain comprehensive information regarding the condition of economic activities Gampong Lamgapang community. b) Initial socialization related to the problems experienced by partners related to how to cultivate catfish and the needs required. c) Preparation of activity schedule, The preparation of the schedule is intended so that the implementation of activities is carried out in an orderly and directed manner. And d) Implementation of PKM activities in the form of providing capital assistance in the form of aquaponic equipment, catfish seeds and vegetable seeds to socialization and training for village officials and the surrounding community.



Figure 1. Handover of Aquaponics Equipment to Village Officials

Aquaponics technology enables optimal fish production even in narrow land and with limited water sources, including in urban environments. This system is able to save water usage up to 97% in fish farming and maintain the quality of the water in the cultivation media. This happens because of the interaction between fish and plants that creates a more productive environment than conventional cultivation methods (Zidni et al., 2013). Aquaponics is a mutually beneficial system for plants and fish, where the nutrients needed by plants are obtained from fish waste and food waste that settles at the bottom of the pond. As a result, the filtered water will meet the quality standards for fish farming (Dauhan et al., 2014).



Figure 2. Socialization of the Use of Aquaponic Equipment

STRENGTHENING VILLAGE EQUIPMENT CAPACITY THROUGH AQUAPONIC CATFISH CULTIVATION IN LAMGAPANG VILLAGE, ACEH BESAR

Wahyu Ario Pratomo¹, Chenny Seftaria², Inggrita Gusti Sari³, Monika Andrasari⁴

Results and Discussion

Prior to the implementation of the PKM activity, a field survey was conducted to review the location and needs of partners related to the Strengthening of the Capacity of Village Devices through Aquaponic catfish cultivation. The survey was conducted by direct review and discussion with the local community regarding the facilities and infrastructure that will be provided by the community service team to the Village apparatus, as well as the contribution of the surrounding community in utilizing and maintaining the facilities that will be provided.

Then at the appointed time, the community service team from the University of North Sumatra and Syiah Kuala University along with a team of students came to Gampong Lamgapang, Krueng Barona Jaya District, which is part of Aceh Besar Regency, to realize aquaponic catfish cultivation to Strengthen the Capacity of Village Apparatus in Managing BUMDEs.



Figure 4. Community Service Location

The facilities provided in this service include: 1) Catfish seeds and plant seeds (Kangkung and Pokcoy), 2) Aquaponic devices that can be used for catfish farming and planting hydroponic plants. And 3) Water pumps as a means of water circulation in the Aquaponic device.



Figure 5. Aquaponics Device

In addition, village officials and local communities are also taught to make aquaponic equipment devices, namely by providing tarpaulins, various sizes of PVC pipes, and water pumps, as well as providing an estimate of the costs required if the community wants to make this aquaponic device again. The community is also taught how to care for and manage the facilities provided and supervise their use so that they remain durable and well-maintained. Then the impacts that can be felt by the community through Aquaponic Catfish Cultivation are as follows:

1. Get double the yield of catfish and aquaponic plants such as kale or lettuce.
2. Healthy Plants and Fish, Plants minimize the risk of disease in fish ponds by extracting excess nutrients from the water, and this results in healthier fish.
3. Aquaponics uses less water than conventional fish farming. It creates a closed environment where water can be reused, whereas in traditional fish farming, water must be changed frequently.
4. Aquaponics cultivation can be done in limited space, even in urban areas, because it does not require a lot of land. This makes it suitable for use in areas with limited land.
5. Catfish farming with an aquaponic system can be a good source of income, both for personal needs and for sale to the local market. Catfish products and crop harvests can generate extra money.

Closing

Conclusion

The community service team consisting of lecturers from the Faculty of Economics and Business, University of North Sumatra and the Faculty of Economics, University of Syiah Kuala along with students have carried out community service activities in Gampong Lamgapang. The community service carried out was strengthening the Capacity of Village Apparatus Through Aquaponic Catfish Cultivation in Gampong Lamgapang, Aceh Besar. The important points of the results of this activity include

1. The community and village officials can use the Aquaponics equipment provided properly.
2. Community activities are more positive with catfish farming and hydroponic farming.
3. The capacity of the community and BUMDes through aquaponic catfish cultivation has increased.

STRENGTHENING VILLAGE EQUIPMENT CAPACITY THROUGH AQUAPONIC CATFISH CULTIVATION IN LAMGAPANG VILLAGE, ACEH BESAR

Wahyu Ario Pratomo¹, Chenny Seftaria², Inggrita Gusti Sari³, Monika Andrasari⁴

Suggestion

Attention and awareness are needed from the community in using the aquaponic equipment that has been provided, so that the equipment can be used for a longer period of time. In addition, the community is also expected to be able to expand catfish cultivation by replicating the aquaponic equipment, so that community empowerment in the surrounding area can be increased.

Thank-you note

We would like to express our deepest appreciation and gratitude to the various parties who have played a role in supporting the implementation of this activity. First, to the University of North Sumatra which has provided funding support through the 2023 Talenta PKM Program with the National Collaboration scheme, which enabled the implementation of PKM activities in Gampong Lamgapan, Aceh Besar District. Second, to Syiah Kuala University as the Community Service Collaboration Partner who has made a significant contribution to the implementation of this program. Third, to the Keuchik (Village Head) and the Gampong apparatus who have given permission and support for the implementation of this PKM activity. Fourth, to the community of Gampong Lamgapan who have participated and supported the implementation of the activity. Finally, to the students of the University of North Sumatra and Syiah Kuala University who have actively played a role in various stages of this PKM activity.

REFERENCES

- Dauhan, R. E. S., & Efendi, E. (2014). Efektifitas sistem akuaponik dalam mereduksi konsentrasi amonia pada sistem budidaya ikan. *E-Jurnal rekayasa dan teknologi budidaya perairan*, 3(1), 297-302.
- Mokolensang, J. F., & Manu, L. (2021). Budidaya ikan lele (*Clarias gariepinus*) sistim bioflok skala rumah tangga. *e-Journal BUDIDAYA PERAIRAN*, 9(1).
- Nugroho. E., & Sutrisno. (2008). Budidaya ikan dan sayuran dengan sistem akuaponik. *Penebar Swadaya*. Jakarta, 67 hlm.
- Sudaryati, D., Heriningsih, S., & Ruserlistyani, R. (2017). Peningkatan Produktivitas Kelompok Tani Ikan Lele dengan Teknik Bioflok. *JPPM (Jurnal Pengabdian dan Pemberdayaan Masyarakat)*, 1(2), 109-115.
- Supendi, S., & Maulana, M. R. (2015). Teknik Pembesaran Ikan Lele dengan sistem akuaponik. *Buletin Teknik Litkayasa Akuakultur*, 13(2), 101-106.
- Zidni, I., Herawati, T., & Liviawaty, E. (2013). Pengaruh padat tebar terhadap pertumbuhan benih lele sangkuriang (*Clarias gariepinus*) dalam sistem akuaponik. *Jurnal perikanan dan kelautan*, 4(4), 315-324.