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Community Empowerment Through Aquaponics: Sustainable Innovation For Environmental Welfare And Local Economy

Pemberdayaan Masyarakat Melalui Akuaponik: Inovasi Berkelanjutan Untuk Kesejahteraan Lingkungan Dan Ekonomi Lokal

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Abstract

This abstract summarizes the scope, objectives, methods, data, results and main conclusions of research on community empowerment through the implementation of the Aquaponics Program. This research aims to evaluate the impact of the program on the welfare of the environment and local economy. The research methodology includes data collection through field observations, interviews, and data analysis to assess program effectiveness. The research results show that the Aquaponics Program has succeeded in empowering the community by providing efficient and sustainable agricultural alternatives. This system not only increases local food production but also reduces negative impacts on the environment. In addition, this program makes a positive contribution to the local economy by increasing market access and diversifying income sources. The main conclusion is that the Aquaponics Program is not only an agricultural innovation, but also a model of sustainable community empowerment. The implications of this research can be used as a basis for the development of supporting policies and the expansion of similar programs to achieve sustainable development goals.

Keywords: Community Empowerment, Aquaponics, SustainableInnovation, Environmental Welfare, Local Economy.

Abstrak

Abstrak ini merangkum ruang lingkup, tujuan, metode, data, hasil dan kesimpulan utama penelitian tentang pemberdayaan masyarakat

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melalui pelaksanaan Program Akuaponik. Penelitian ini bertujuan untuk mengevaluasi dampak program terhadap kesejahteraan lingkungan dan ekonomi lokal. Metodologi penelitian meliputi pengumpulan data melalui observasi lapangan, wawancara, dan analisis data untuk menilai efektivitas program. Hasil penelitian menunjukkan bahwa Program Aquaponics telah berhasil memberdayakan masyarakat dengan memberikan alternatif pertanian yang efisien dan berkelanjutan. Sistem ini tidak hanya meningkatkan produksi pangan lokal tetapi juga mengurangi dampak negatif terhadap lingkungan. Selain itu, program ini memberikan kontribusi positif bagi perekonomian lokal dengan meningkatkan akses pasar dan mendiversifikasi sumber pendapatan. Kesimpulan utamanya adalah bahwa Program Akuaponik bukan hanya inovasi pertanian, tetapi juga model pemberdayaan masyarakat yang berkelanjutan. Implikasi dari penelitian ini dapat dijadikan dasar pengembangan kebijakan pendukung dan perluasan program serupa untuk mencapai tujuan pembangunan berkelanjutan.

Kata kunci: Pemberdayaan Masyarakat, Akuaponik, Inovasi Berkelanjutan, Kesejahteraan Lingkungan, Ekonomi Lokal

INTRODUCTION

Community service is a concrete manifestation of efforts to apply knowledge and innovation to improve community welfare. In this context, this service is focused on implementing the Aquaponics Program as an innovative solution to overcome challenges in the agricultural sector, especially in the local environment. Conventional agriculture faces a variety of problems, including increasingly limited land and increasing environmental impacts. The Aquaponics program has emerged as a promising alternative by integrating fish and plant cultivation, creating a sustainable system that can increase productivity and reduce negative impacts. Despite the positive potential of the Aquaponics Program, there are still many people who do not have adequate access or understanding regarding its implementation. Therefore, community empowerment efforts are needed through outreach, training and direct implementation of this program.

The main objective of this service is to increase the community's understanding and skills regarding the Aquaponics Program and encourage its implementation as a sustainable agricultural model. It is hoped that the benefits can be felt through increasing local food production and the community economy. A brief literature review shows that the aquaponics approach has been proven to be effective in various contexts, making a positive contribution to food production, environmental well-being, and the local economy. This service was held to fill the gap in community knowledge and skills related to the Aquaponics Program, with service objective questions involving the extent of the community's understanding of aquaponics, the

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extent of implementation of the program, and how much impact it has on the welfare of the environment and the local economy. With this introduction, it is hoped that we can create a

solid foundation for the implementation of this service, make a positive contribution, and stimulate sustainable growth in the local agricultural sector.

METHODS OF DEVOTION

2.1 Location of Activities

The location where this PKM is implemented is in the Graha Anggrek Complex, Jalan Bungarente, Simpang Selayang, kec. Medan Tuntungan, Medan City, North Sumatra.

2.2 Activity Objectives

Through this research, we seek to empower communities to face agricultural challenges through sustainable solutions. This community service program has a number of crucial objectives. The main objective of this research is to provide the community with a better understanding of the benefits, principles and techniques of implementing the Aquaponics Program to encourage their active participation. In addition, we want to empower communities to independently design, build and manage Aquaponic systems, making them agents of change in the development of sustainable agriculture. This research is also intended to increase local food production through the implementation of the Aquaponics Program, with the hope of meeting the community's food needs in a more sustainable manner. We are trying to improve community skills and expertise in managing aquaponics-based agriculture, creating reliable human resources in this field. This program helps encourage diversification of community income sources through business development in the aquaponics sector, with the aim of improving the local economy. Lastly, we are trying to disseminate the model of successful implementation of the Aquaponics Program to the wider community so that it can be adopted in other regions, supporting the development of sustainable agriculture nationally.

2.3 Implementation Method

The method of implementing this activity contains a series of strategic stages. First, a preliminary study is carried out to understand the context and needs of the community. Identification of problems and opportunities that can be addressed by PKM becomes the basis for planning and implementation strategies. Next, the PKM team detailed the steps, targets and implementation methods in preparing the program design, based on the results of the preliminary study. The next stage involves outreach to the public regarding the aims and benefits of PKM, with promotion carried out through various media and other activities to increase participation and understanding.

The community was then involved in a series of training and workshops aimed at increasing their skills, knowledge and participation in the development and implementation of solutions offered by PKM. After that, the main program is implemented, either in the form of technical demonstrations, counseling, or other activities according to the needs and characteristics of the community. Regular monitoring and evaluation is carried out on program

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implementation. Evaluation aims to assess the effectiveness of the program, correct weaknesses, and determine changes that may be needed during implementation. During the implementation of PKM, the team involved collaboration with related parties such as educational institutions, local governments and other agencies to increase support, resources and networks. Each stage of activity is recorded in detail, including making periodic reports and documenting the results of activities, learning and changes that occur in society. The positive results of PKM will be disseminated through various means, including scientific publications, seminars and local media, with the aim of inspiring and providing knowledge to the wider community. At the end of the implementation, a comprehensive evaluation was carried out to evaluate the achievement of PKM objectives and learn valuable lessons for the development of similar activities in the future.

RESULTS AND DISCUSSION

This community service is designed with a series of stages that involve active participation from the local community. The following is an overview of the stages:

1. Pre-Activity

Before starting the implementation of aquaponics, the service team was involved in the pre-activity stage. This involves outreach and education to the public about the concept of aquaponics, its benefits, and its impact on the environment and local economy.

2. Training

The training stage is the core of this service. The service team provides intensive training to the community on how to set up and manage an aquaponics system. This includes basic knowledge about the combination of fish and plant cultivation, water management, system maintenance, and implementation of sustainable practices.Training participants are given the opportunity to be directly involved in the creation and management of mini aquaponic systems at the training location.

3. Mentoring

After training, the service team continues to the mentoring stage. They provide direct support to communities in implementing the aquaponics concept at the local level. This includes guidance in selecting the right types of fish and plants, daily maintenance, and solving problems that may arise. Assistance aims to ensure that the implementation of aquaponics runs successfully and provides maximum benefits for the community.

4. Post-Activity

The post-activity phase focuses on long-term monitoring and evaluation. The service team will make periodic visits to evaluate the sustainability of the aquaponics system, identify potential improvements, and involve the community in future planning. In addition, this stage includes the formation of community groups or networks to support the exchange of knowledge and experience between program participants.

3.1. Benefits of Activities

Implementation of this Community Service program produces various benefits for the communities involved. Through the aquaponics system, the community gets access to more diverse and nutritious food sources. Furthermore, this program encourages the development of

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new business opportunities related to aquaponics, motivating the community to be actively involved in the local economic sector. The successful implementation of community service not only creates a direct impact, but also stimulates innovation and creativity at the community level. Active involvement of the community in training and mentoring activities not only strengthens their participation, but also increases their ability in decision making and implementation. Aquaponic systems also contribute to reducing the risk of dependence on unsustainable natural resources. This program not only creates material impacts, but also supports the formation of a caring attitude towards environmental sustainability among the community.

Community involvement in collaborative activities such as group meetings and regular discussions not only builds close relationships between residents, but also helps build solidarity and togetherness at the local level. In addition, through the application of aquaponics, communities become part of a sustainable and environmentally friendly agricultural model, making a positive contribution to sustainable development at the local level. By adopting this approach, the community participates in efforts to maintain ecosystem balance and supports sustainable agriculture as a whole.

3.2. Evaluation of Success

Through a community service journey entitled "Community Empowerment Through Aquaponics: Sustainable Innovation for Environmental and Local Economic Welfare," a story has been formed that depicts a significant transformation in a community. Initially, society was faced with economic and environmental challenges that required innovative solutions. With enthusiasm and enthusiasm, the service team started with the pre-activity stage, holding outreach to introduce the concept of aquaponics to the community. In an interactive setting, they share their vision of the potential of this innovation to improve well-being. Then, through intensive training, people learn not only the basic theory of aquaponics but also practical skills in building and managing systems. This training sparked the community's desire to be actively involved, and ongoing assistance ensures the sustainability and implementation of aquaponic practices in everyday life. The economic impact is felt as fish and crop yields increase, providing significant additional income and new business opportunities for the community.

The success of this program is also reflected in improving the welfare of society as a whole. Food diversification resulting from aquaponics has a positive impact on health and access to nutritious food. In addition, environmental awareness is growing, and people are starting to apply sustainability principles in their daily lives. Close relationships with external parties, including support from government and non-governmental organizations, provide a strong foundation for the continuity of this program. Over time, this community has become not only recipients of aquaponic innovation but also agents of change. Communities continue to collaborate, share knowledge, and strengthen solidarity. This community service program not only creates immediate change within the local area but also leaves a sustainable legacy for the future. Aquaponic innovation is not just an agricultural method, but a life philosophy that creates a balance between economic prosperity and environmental conservation

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3.3. Activity Documentation

The implementation of this PKM activity can be said to have gone well and smoothly, this can be seen from the enthusiasm of the Santriwan/Wati in participating in the socialization and training as well as the support from the management and local parties. Apart from that, as documentary evidence of this activity, you can see the photos during the activity.

Figure 1. Photos with the Community

Figure 2. Aquaponics activities with Community Leaders

Figure 3. Photo of Community Leaders, Students and PKM Advisors

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CONCLUSION

Through the PKM "Community Empowerment Through Aquaponics," it was concluded that this program had succeeded in providing a significant positive impact. Economic improvement through additional income from fish harvests and aquaponic plants proves the program's success in achieving local economic goals. The application of sustainability principles in aquaponics has also succeeded in increasing people's environmental awareness. Diet diversification through aquaponics provides better access to nutritious food sources, with a positive impact on their health. Increased awareness and skills in aquaponics management also lead to community empowerment, making them more independent in managing this system. These positive implications create changes in economic aspects, health, and build the foundation for a more sustainable community. This program can be expanded to other communities with similar conditions, increasing the positive impact at a regional or national level. Adoption of the aquaponics concept as a sustainable agricultural model has the potential to make a greater contribution to food and environmental security. For further community service, it is recommended to continue to strengthen the training and mentoring aspects to ensure continuity and increase community participation in aquaponics management. Thus, it is hoped that this concept can continue to develop and provide sustainable positive benefits for local communities and at a wider level.

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