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Neighborhood Association (RT)-Based Training Education on Hydroponic Melon Cultivation for Communities Without Experience in Modern Agriculture

Bambang Agus Sumantri[1], Sekar Widyasari Putri [2], Muhammad Dwi Hariyanto[3], Titus kristanto[4] , Agoes Windarto[5]
[1,2,3,4,5] Prodi Bisnis Digital Kampus Surabaya, Universitas Telkom, Indonesia

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Abstract

This community service training not only introduces hydroponic technology for melons as an alternative agricultural solution, but also raises public awareness of the importance of sustainable use of local resources. By involving the community in every stage—from outreach to cultivation practices—it is hoped that independence in managing productive small-scale agricultural businesses will grow. This could be the starting point for the birth of hydroponic farmer groups or community-based agricultural entrepreneurs at the neighborhood level. The participants, consisting of 10 residents of neighborhood associations (RT) 01 and neighborhood associations (RW) 03, are expected to be able to improve local food security and family income.

Corresponding Author:
Bambang Agus Sumantri
Universitas Telkom
Email Coresspondent: agussumantribambang@gmail.com

1. INTRODUCTION

Hydroponics offers land efficiency and faster yields, but it still carries risks. While risks cannot be eliminated, they can be minimized through the use of technology, intensive management, and the use of quality inputs such as superior seeds and pesticides [1]. The technology used in hydroponics is a fertigation system with nutrient management that can shorten the growing season from 70 days to 54 days (2 months) [2].

Agriculture plays a vital role in human life as it provides food, animal feed, and bioenergy [3]. The problem of vast areas of agricultural land that have not been optimally utilized remains a common phenomenon in various rural areas of Indonesia. This not only reflects a lack of land productivity but also illustrates the untapped economic potential and food security that should be developed by local communities.

Based on the results of the activities, it can be concluded that yard land has quite extensive potential to be developed as a farming business location. If this potential is utilized, the community shows high participation in supporting the development of yard farming businesses [4]. The prospect of utilizing the potential of idle land has long-term benefits as market transactions that result in the circulation of money in the community, so that farming activities can be accepted by the local community and also utilize the available workforce in reducing unemployment, impacting the safety and health of the local community [5].

One area facing similar problems is RT 001 RW 003, Senden Hamlet, Senden Village, Kayen Kidul District, Kediri Regency. In this area, residents' land has been neglected or used only

for limited purposes, despite its significant potential for development as an alternative source of food and income.

The results of this activity are expected to demonstrate that hydroponic vegetable cultivation is more efficient than conventional vegetable cultivation, as can be seen from the use of land area and its productivity [6]. Along with the development of agricultural technology, modern cultivation methods such as hydroponic systems offer innovative solutions that can be applied in narrow or less fertile land. Millennial farmers are increasingly entering partnerships for premium hydroponic melons [7]. One of the horticultural commodities that is promising for hydroponic cultivation is melon. Hydroponic melons have a high selling value and relatively stable market demand, making them suitable for development as a household-scale agribusiness. However, limited community knowledge and skills in the field of modern agriculture are the main obstacles to implementing this system.

Hydroponic melon farming is profitable and feasible [8]. Through adequate training and education, the potential of hydroponics as a sustainable agricultural method can be maximized to meet global food needs [9]. The results of these activities show a positive response from the community, as evidenced by their increasing interest in cultivating melons after understanding their benefits and the economic opportunities it offers. This makes melon cultivation a promising business opportunity for the community [10].

The community of RT 001 RW 003, Senden Hamlet, Senden Village, Kayen Kidul District, Kediri Regency, has great potential to be empowered through modern agricultural approaches, particularly hydroponic melon cultivation. One of the community's main potentials is the existence of a fairly large area of agricultural land, which has not been optimally utilized. This land can be developed into a source of economically valuable food production if managed with appropriate and efficient methods.

In addition to land potential, local communities have also shown enthusiasm for agricultural innovation, despite currently limited knowledge and experience in this field. This situation presents significant opportunities for technology and skills transfer through training and mentoring programs. Education on simple hydroponic systems, plant nutrient management, pest control, and harvest marketing strategies will equip residents with practical knowledge that can be immediately applied.

This community service activity not only introduces hydroponic technology as an alternative agricultural solution but also raises public awareness of the importance of sustainably utilizing local resources. By involving the community in every stage—from outreach to cultivation practices—it is hoped that independence in managing productive small-scale agricultural enterprises will grow. This can be the starting point for the birth of hydroponic farmer groups or community-based agricultural entrepreneurs at the neighborhood level, which in turn can improve local food security and family incomes. Thus, community empowerment through this activity has the potential to provide sustainable social and economic impacts, while creating a technology-based agricultural empowerment model that can be replicated in other rural areas.

2. PROPOSED METHOD

This service method is based on the formulation of problems and activity objectives, as follows:

Problem Formulation

1. How do you provide education and training on hydroponic melon cultivation to people who have no experience in modern agriculture?
2. How can implementing a simple hydroponic system help communities optimally utilize unproductive land?

Activity Objectives

1. Providing counseling and training to the community on the basics of melon cultivation using a hydroponic system.

2. Encourage the use of unproductive land owned by residents for agricultural activities that have economic value.
3. Raising community awareness and skills in applying modern agricultural technology sustainably.
4. Opening up agricultural-based business opportunities in the RT 001 RW 003 Senden Hamlet and surrounding areas

3 METHODS OF DEVOTION

3.1 The methods used include:

1. Counseling and Education

   This activity provides participants with a basic understanding of hydroponic melon cultivation, including its benefits, working systems, and economic potential. This activity will consist of presentations, interactive discussions, and case studies.

2. Training and Hands-on Practice

   Participants were involved in hands-on practice in constructing a hydroponic installation and cultivating melons. This hands-on training was hands-on and conducted in groups to encourage collaboration and collaborative learning. The practical sessions included building a greenhouse and operating a hydroponic melon farm.

3.2 Partner Participation

From the community service activities, it can be concluded that there was a 25% increase in partner knowledge and skills in cultivating melon plants, as indicated by the results of the pre-test and post-test [11]. Furthermore, the partners in this community service activity were the community of RT 001 RW 003 Senden Hamlet, Senden Village, Kayen Kidul District, Kediri Regency, who had unproductive land but did not yet have knowledge and experience in modern agriculture, especially hydroponic systems. Partner participation was carried out actively and gradually throughout the activity, with the following details:

1. Initial Identification and Preparation
   - Partners are involved in the process of identifying land that will be used as a hydroponic demonstration location.
   - Together with the implementation team, partners participate in preparing the activity schedule and determining the need for available local tools and materials.
2. Counseling and Training
   - The community attended a live outreach session to understand the basics of hydroponics, including the benefits and economic potential of melon cultivation.
   - Partners actively participate in question-and-answer sessions and discussions to gain understanding and convey local needs or challenges they face.
3. Installation and Planting
   - Partners are directly involved in creating simple hydroponic installations using materials that are easily obtained in the surrounding environment.
   - Partners also participated in the planting and care process of 60 superior melon varieties selected for the trial.
4. Plant Care and Monitoring
   - Partners are responsible for taking turns caring for the plants, monitoring growth, and recording plant conditions during the planting period.
   - Partners also receive direct guidance from the implementation team in nutrition management and regular pest control.
5. Management and Marketing Training
   - Partners participate in advanced training on harvest marketing strategies, agricultural product management, and hydroponic business profit calculation simulations.
   - Partners are encouraged to start designing small agricultural-based business plans that can be run independently or in groups.
6. Reflection and Sustainability Plan

- At the end of the activity, partners participated in an evaluation session to provide input, impressions, and ideas for further development. The community also demonstrated their commitment to forming a hydroponic farmer group as the first step towards program sustainability. With the active participation of partners at every stage, this community service activity is not only a one-way knowledge transfer process but also an empowerment process that builds a sense of ownership and community independence. The direct involvement of partners is expected to foster program sustainability and expand its socio-economic impact on the surrounding community.

4. RESULTS AND DISCUSSION

Community service activities offer solutions that are systematically designed through educational, practical, and applicable approaches. The following are the results and discussion of the community service implementation:

1. Basic Education and Counseling on Hydroponics

As a first step, the community is provided with an understanding of the basic concepts of hydroponics, specifically related to melon cultivation. The training materials include:

a) Definition and working principles of hydroponic systems.
b) The advantages and economic potential of hydroponics compared to conventional planting systems.
c) Introduction to the tools and materials used in simple hydroponic installations.

The goal is to build a foundation of knowledge for communities that have no prior experience in modern agriculture. Below is Photo 1 of Basic Hydroponic Extension and Education.

Photo 1 Basic Education and Counseling on Hydroponics

2. Training on Making Simple Hydroponic Installations

After gaining a basic understanding, participants are directly involved in the process of building a hydroponic installation. This training includes:

a. Assembly of a simple hydroponic system installation.
b. Placement and arrangement of installations according to the available land conditions.
c. Use of readily available and affordable materials so that they can be replicated independently.

This solution provides technical skills to communities so they can build and manage hydroponic systems sustainably.

The structure of a greenhouse is divided into three parts, namely the roof structure, wall structure, and foundation structure. The roof structure consists of a frame and cover structure, which serves to protect the building from the outside climate. The wall structure serves to protect the inside of the greenhouse from external factors that directly affect plants, such as wind, rain, pests, and plant diseases. The floor structure serves as a base, and the foundation serves to support the top of the greenhouse [12]. This devotion is related to the ideal planting

distance pattern for hydroponic melons in a greenhouse, which is around 40 cm x 20 cm or 50 cm for each plant. The size of the greenhouse is 3 x 6 meters. The number of melon plants is 60. The following is Photo 2.

Photo 2 Simple Hydroponic Installation Training

3. Melon Cultivation Practices
   The introduction of PT Tunas Agro Persada, one of the companies that has 13 types of melon seeds, both netted and non-netted, and several types of packaging [13]. Furthermore, as a form of application of the extension and training materials, 60 superior melon varieties were planted in a hydroponic installation. In this stage, participants were involved in:
   a. The process of cultivating, transplanting, and caring for plants.
   b. Monitoring plant growth, nutrient management, and pest control.
   This activity aims to provide direct experience to residents while fostering a sense of self-confidence and responsibility in modern plant cultivation.
4. Introduction to Nutrition Management and Pest Control
   a. Advanced knowledge is provided regarding:
   b. The correct composition and dosage of nutrients for melon plants.
   c. Natural and efficient ways to control plant pests and diseases.
   d. This solution supports successful cultivation and ensures the quality of the harvest.
5. Marketing Strategy and Harvest Management Training
   To ensure business sustainability, the community is equipped with insight regarding:
   Local market analysis and potential demand for hydroponic melons.
   a. Direct sales strategies, collaboration with local traders, or online marketing.
   b. Simulation of calculating production costs and potential profits.
   c. This solution aims to open up business opportunities and increase the economic independence of the community.
6. Formation of Farmer Groups or Hydroponic Communities
   a. As a sustainability effort, this activity is also directed at:
   b. Encourage the formation of hydroponic farmer groups in the RT 001 RW 003 area.
   c. Prepare a long-term plan for the collective use of unproductive land.

With the establishment of farming communities or groups, it is hoped that this program will not stop at the training stage but will develop into a community movement to independently manage modern agriculture. Below is Photo 3 of the formation of a hydroponic community within the neighborhood unit (RT).

Photo 3: Deliberation on the Formation of the Hydroponic Community within the Neighborhood Unit

5. CONCLUSION

Community service activities involving hydroponic melon cultivation in greenhouses based on neighborhood associations (RTs) have yielded positive results in strengthening community participation at the smallest neighborhood level. The RT-based approach was chosen to encourage active citizen participation, strengthen social cooperation, and enhance local economic independence.

5.1. Results of the Implementation of Cultivation Education

The implementation of hydroponic melon cultivation education in a greenhouse managed jointly by neighborhood residents is expected to produce optimal results. Melon plants grow well and relatively uniformly, with healthy leaves and good flowering and fruiting rates. The greenhouse system can reduce weather and pest disturbances, allowing for a more stable cultivation process. The use of a hydroponic system allows for efficient and controlled nutrient and water management. This impacts the quality of the melons produced, in terms of size, flavor, and appearance, resulting in a higher selling price.

5.2. Participation and Empowerment of Neighborhood Unit Residents

The neighborhood unit-based approach has proven effective in increasing community participation. Residents are directly involved in every stage of the activity, from greenhouse preparation and planting to maintenance and harvest. This activity fosters a sense of ownership of the facilities and the resulting crops. Through training and mentoring, neighborhood unit residents gain knowledge and skills in hydroponic melon cultivation techniques, nutrient management, plant maintenance, and simple farming management. Interaction between residents has also intensified, strengthening solidarity and social cooperation within the neighborhood unit.

5.3. Social and Economic Impacts

Socially, this activity serves as a medium for education and collaboration among neighborhood association (RT) residents. The greenhouse serves not only as a production site but also as a collaborative learning platform and an example of innovative urban farming practices. Economically, the hydroponic melon harvest has the potential to increase neighborhood incomes. Collective management allows for equitable distribution of yields and opens up opportunities for joint venture development. Furthermore, efficient water and land use make this system suitable for neighborhood associations with limited space.

5.4. Program Sustainability

A training program for hydroponic melon processing into melon mochi has proven effective in empowering communities through a participatory approach that encourages active community involvement in every stage, from raw material selection to product marketing [14]. The neighborhood unit-based hydroponic melon cultivation program is expected to be sustainable through strengthening community institutions and clear role allocation. With a shared commitment and continued mentoring support, this activity has the potential to become a model for community empowerment that can be replicated in other neighborhood units.

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