



Practical Urban Farming: Utilizing Used Drinking Water Gallons into a Simple Hydroponic Installation at SMK Asy' Ariyah, Ibru Village

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Abstract

Urban farming is one innovative solution to address land limitations and environmental issues, especially in utilizing the yard of SMK Asy' Ariyah in Ibru Village. This community service project aims to examine the practical application of urban farming by using used water gallons as simple hydroponic installations at SMK Asy' Ariyah. The community service method used five stages of community service principles, with a hands-on approach that involved students as the subjects of the service. The simple hydroponic process involved installing hydroponic systems, planting vegetables, and performing maintenance. The results showed that using used drinking water gallons as a simple hydroponic medium could increase students' knowledge, skills, and concern for the school environment. This activity also fostered students' interest in urban agriculture and environmentally friendly agriculture-based entrepreneurship.

Keywords: *gallons; simple hydroponics; urban farming; vocational school*

Urban Farming Praktis: Pemanfaatan Galon Air Minum Bekas Menjadi Instalasi Hidroponik Sederhana Di SMK Asy' Ariyah Desa Ibru

Abstract

Utilizing yard space as a source of food and family income has become a growing practice within the IKBI (Ikatan Keluarga Besar Istri/Wives Association) of PTPN 1 Regional 2 Kebun Cisaruni, Garut Regency. Although IKBI members have been able to produce fresh vegetables from their yards, the products' market value remains relatively low due to limited packaging design and conventional marketing practices. This Community Service (PKM) activity aims to increase the capacity of IKBI members in packaging yard vegetable products and utilizing digital marketing as a marketing strategy. The implementation method uses a participatory approach through interactive counseling, group discussions, and demonstrations of packaging and digital marketing practices. The results of the activity show an increase in participants' understanding of the strategic function of packaging in building product image, improved practical skills in creating simple packaging and labels, and increased ability to utilize WhatsApp Business as a marketing medium. This activity increases IKBI members' readiness to market products more professionally and competitively, while strengthening households' economic potential through yard space utilization.

Kata kunci: *galon; hidroponik sederhana; pertanian perkotaan; SMK*

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INTRODUCTION

Asy'Ariyah Vocational High School (SMK Asy'Ariyah), located in Ibru Village, is a boarding school that offers vocational education specializing in agriculture. Practical activities related to agriculture have been conducted from upstream to downstream. The 2013 curriculum at this vocational school integrates the pesantren education model with the national education framework developed by the Ministry of Education and Culture (Zurhalena et al., 2021). The pesantren educational model is not extensively used in secondary schools, particularly in agricultural secondary schools. Therefore, SMK Asy'Ariyah prioritizes agricultural activities. SMK Asy'Ariyah has land allocated for farming activities and a large schoolyard that can serve as a small agricultural area for producing vegetables.

The problem is that students at SMK Asy'Ariyah in Ibru Village lack interest in agriculture, and their mindset toward it remains low. Because agriculture is synonymous with fatigue, heat, and backwardness, students continue to believe that it is a job to be avoided in the future (Kurniasih et al., 2025). SMK Asy'Ariyah, Ibru Village, has a yard planted exclusively with flowers and an increasing amount of plastic waste, specifically used mineral water gallons. Utilizing used gallons as a hydroponic installation is a creative solution to support agricultural learning, increase environmental awareness, and enhance the entrepreneurial skills of SMK Asy'Ariyah students in Ibru Village. A relevant approach to addressing the challenge of limited productive agricultural land is urban farming, a practice carried out on limited land that is environmentally friendly and uses simple technology.

The purpose of utilizing the school yard and garden is to improve students' practical skills in simple farming, optimize school space as a learning laboratory, and foster a culture of environmentalism, independence, and entrepreneurship. This activity offers students practical farming experience, teaches easy-to-apply plant production techniques, encourages creativity with smaller plots, and fosters an entrepreneurial spirit (Kurniasih et al., 2025).

Used plastic gallon jugs are a type of inorganic waste commonly found around us. Some plastic gallon jugs may not be recommended for reuse, as this can have health consequences, even over the long term. However, used drinking water gallon jugs can still be used as a base material for simple hydroponic systems and other crafts (Khalil et al., 2021). Hydroponics is an agricultural technology for urban areas with limited land or yards. Organic hydroponic systems are still widely used in urban environments. Given health considerations, yields can be comparable to those of conventional hydroponic systems. For children and adolescents, providing knowledge and skills in agribusiness-oriented agricultural techniques can be very beneficial. They may have social, economic, and environmental benefits (Prihatin et al., 2023).

A simple hydroponic system is not only capable of producing healthy, nutritious vegetables but also serves as an effective, practical learning medium for female students. Through this activity, female students can understand the concept of sustainable agriculture, waste management, and the potential for urban agriculture-based entrepreneurship. The results of community service activities by Faizah et al. (2020) on using yards with hydroponic planting methods from used bottles have provided additional

insight and knowledge, as well as skills in processing using hydroponic methods. According to Nuryadi et al. (2024), activities related to introducing hydroponic systems are unfamiliar to the community, and some people are also not interested in them.

This community service activity is expected to increase students' knowledge, skills, and awareness at SMK Asy'Ariyah in Ibru Village about the importance of environmentally friendly agricultural innovations. Furthermore, this activity is also expected to serve as a model for practical urban farming that can be replicated in other schools and the surrounding community to support food security and environmental preservation.

METHOD

This community service program was implemented by involving key partners, namely SMK Asy'Ariyah students and productive teachers, through a participatory and collaborative approach that emphasizes the active involvement of participants in every stage of the activity. The participatory approach has proven effective in increasing participants' involvement and capacity by encouraging a learning process grounded in direct experience (Chambers, 1994). The community service implementation was carried out at SMK Asy'Ariyah, Ibru Village, from September to November 2025, with a distance of approximately 50.3 km from Jambi University, or approximately 1 hour and 6 minutes by land. The main target of this activity was 40 eighth-grade female students, given that the education system at the Islamic boarding school separates male and female students. This target selection is expected to improve the skills of female students in using used drinking water gallons as a medium for simple hydroponic installations, which aligns with the concept of urban agriculture and waste utilization for sustainable food production (Resh, 2022).

The community service implementation procedure is divided into three main stages: preparation, implementation, and discussion. In the preparation stage, the tools and materials needed to design a simple hydroponic installation are prepared, such as used drinking water gallons, used cloth, scissors, cutters, water, gravel, buckets, ready-to-plant plant seeds, and AB-mix nutrient solution. The used gallons have been cut in half, with the tops serving as planting containers when inverted. Next, in the implementation stage, students make holes in the top of the gallon, then prepare the nutrient solution by mixing AB-mix into the water placed in the bottom of the gallon. After installation is complete, the seeds are planted in the prepared media. The final stage is a discussion that aims to evaluate the activity process while providing space for students to share their experiences, understanding, and obstacles encountered during the practice.

The instrument used in this community service activity was a hands-on practice of creating a simple hydroponic installation using used drinking water gallons, so that participants could learn in an applied manner. Data collection techniques were carried out through interactive discussions at the end of the activity, which allowed for information on participants' level of understanding and responses to the activities. The data analysis technique used was descriptive analysis supported by activity

documentation. Evaluation of the program's success was conducted through a question-and-answer session with students, focusing on participants' understanding and responses to the activities. Ibru Village, after the activity was completed, to determine the extent of the increase in participants' knowledge and skills.

RESULT AND DISCUSSION

The community service activity at SMK Asy'Ariyah aimed to utilize used drinking water gallons and create a simple hydroponic installation for placement in the schoolyard. This activity directly involved eighth-grade students from SMK Asy'Ariyah, from preparation to implementation and discussion. All participants were actively involved in the process. The students prepared the gallons, scissors, cloth, cutter, plants, gravel, and water, with the community service team and several teachers present (Figure 1). The activity began by dividing the students into groups so that each student could complete the steps of building the simple hydroponic installation individually.



Figure 1. Preparation Stages for Making a Simple Hydroponic Installation
Source: personal documentation

A simple hydroponic installation that has been assembled is then filled with water at the bottom, which has been mixed with AB-mix at a certain concentration, and at the top, sufficient soil is added (Figure 2). The water and soil added to the simple hydroponic system are then ready for planting with prepared plants, such as chili peppers, tomatoes, and eggplants (Figure 3). These plants were chosen because they have a relatively short harvest period, are easy to cultivate, and are suitable for simple hydroponic systems.

Several eighth-grade students at SMK Asy'Ariyah who had completed a simple hydroponic installation were very enthusiastic about this activity. This aligns with the community service results of Rahmah et al. (2023), which found that participants were very enthusiastic and eager to practice the hydroponic installation process firsthand. Used drinking water gallons are easy to obtain, relatively strong, waterproof, and the right size for a planting container. Furthermore, using used gallons helps reduce plastic waste and lowers the cost of constructing a hydroponic installation. The hydroponic system used is the wick system because it is simple, inexpensive, requires no electricity, and is easy for

students to understand (Figure 4). This system is ideal for learning and practicing basic hydroponics in schools.



Figure 2. Filling Water and Soil in a Simple Hydroponic Installation

Source: personal documentation



Figure 3. Planting Chili, Eggplant and Tomato Plants

Source: personal documentation

Students of SMK Asy' Ariyah, Ibru Village, showed a very positive response. They enthusiastically participated in the process of making installations, planting, and caring for plants. This activity was considered interesting because it was hands-on, creative, and different from conventional learning methods. In line with Sariwati et al. (2019), indicators of the success of community service activities include the level of participation, participants' understanding of the activity, the activity's impact, and its suitability to participants' needs. Furthermore, according to Mu'ah et al. (2023), the success of this community service activity was measured by assessing participants' responses to their participation in the event, which were obtained through direct observation and analyzed descriptively. Through direct observation, the community service team evaluators can see the activities and interactions that occur during the community service, providing insight into how the activity is carried out and how it impacts the training participants. It is also evident from the results of the hydroponic plant harvest.



Figure 4. Several Simple Hydroponic Installations by Students of SMK Asy' Ariyah

Source: personal documentation

Obstacles encountered included limited supporting equipment, students' limited prior knowledge of hydroponics, and the need for routine plant care. However, these obstacles were overcome through mentoring and collaboration between the implementation team and the school. Kurniasih et al. (2025) explained that using used gallon jugs as a simple hydroponic medium demonstrates that agricultural technology is not always expensive but can be adapted to existing conditions and resources. Utilizing

waste, optimizing limited land, and producing agricultural products in an environmentally friendly and sustainable manner are all skills taught to participants in this practical.

This activity could be developed into a school business or student entrepreneurship unit. The hydroponic vegetable harvest can be marketed to the school and surrounding communities as a healthy, environmentally friendly product. It is hoped that this activity will be sustainable, become part of the school's practical curriculum, and be expanded to include a wider range of hydroponic systems. Furthermore, this activity is expected to serve as an example for other schools in implementing environmentally friendly, recycling-based agriculture. Based on the findings of Teoh et al. (2024), urban farming has great potential as a sustainable solution to address food insecurity, stimulate economic development, and enhance community resilience in cities.

CONCLUSION

The activity of using used drinking water gallons for a simple hydroponic installation at SMK Asy' Ariyah, Ibru Village, was concluded as running well and achieving the set goals. Used drinking water gallons have proven effective as a medium for simple, easy-to-implement hydroponic installations that are low-cost and suitable for the limited land conditions in the school environment. The use of used drinking water gallons as a simple hydroponic medium at SMK Asy'Ariyah, Ibru Village, can improve students' knowledge, skills, and concern for the school environment. This activity also fosters students' interest in urban agriculture and environmentally friendly agricultural-based entrepreneurship. Meanwhile, the follow-up plan for this community service activity is to create a management team, modules, SOPs, and a school business model.

SUGGESTION

This activity has the potential to be developed into a formal school venture, such as a School Hydroponic Business Unit, by establishing a management structure and creating clear Standard Operating Procedures (SOPs). Then, the curriculum can be integrated with learning projects in related subjects, such as crafts and entrepreneurship.

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