JURNAL ABDI INSANI

Volume 12, Nomor 5, Mei 2025

http://abdiinsani.unram.ac.id. e-ISSN : 2828-3155. p-ISSN : 2828-4321

SOSIALISASI BUDIDAYA TANAMAN HIDROPONIK UNTUK MENINGKATKAN KEMANDIRIAN PANGAN DI KOMUNITAS PERUMAHAN SUBSIDI

Socialization of Hydroponic Vegetable Cultivation to Enhance Food Independence in Subsidized Housing Communities

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(Tanggal Submission: 10 Januari 2025, Tanggal Accepted : 20 Mei 2025)

Kata Kunci :

Budidaya Sayur, Pak Choi, Sistem Wick

Abstrak :

Permasalahan keluarga berpenghasilan rendah dalam hal mendapatkan hunian yang layak telah teratasi dengan program rumah bersubsidi, namun demikian masalah ketahanan pangan rumah tangga tetap menjadi tantangan yang perlu dicari solusinya. Budidaya tanaman secara hidroponik yang dikenal secara efisien dalam penggunaan ruang dan air dapat menjadi solusi efektif untuk mengatasi masalah tersebut. Namun, keterbatasan pengetahuan dan akses mengharuskan adanya upaya edukasi yang intensif untuk mendorong adopsi hidroponik serta memperkenalkan manfaat jangka panjangnya. Program pengabdian masyarakat ini bertujuan untuk meningkatkan kemandirian pangan di kalangan ibu rumah tangga penghuni perumahan bersubsidi melalui program pelatihan dan praktik langsung budidaya sayuran bok choy metode hidroponik sederhana menggunakan sistem *wick*. Program dilakukan di komplek perumahan bersubsidi GPBN Blok California-I, Kecamatan Sumbersari, Kabupaten Jember. Waktu pelaksanaan adalah bulan November 2024 sampai Januari 2025. Metode yang digunakan dalam program meliputi ceramah atau presentasi, demonstrasi atau praktik, serta pendampingan untuk menerapkan budidaya hidroponik di rumah masing-masing. Hasil kegiatan ini menunjukkan bahwa mayoritas peserta mampu memahami materi dan langsung mempraktikkan pertanian hidroponik di halaman mereka sendiri. Peserta berhasil menumbuhkan tanaman pak choi dengan baik dan tertarik untuk mencoba menanam tanaman sayur lainnya. Program ini memberikan dampak positif dengan meningkatkan kesadaran masyarakat tentang manfaat budidaya sayuran mandiri untuk meningkatkan ketahanan pangan keluarga. Diharapkan

kegiatan ini dapat menjadi model untuk program pemberdayaan masyarakat di masa depan yang berbasis pertanian perkotaan. Meskipun belum mampu membuat peserta mandiri pangan seutuhnya, namun terdapat peningkatan dalam hal kemampuan menyediakan sayuran pak choi yang cukup untuk kebutuhan rumah tangga.

Key word :

Vegetable Cultivation, Bok Choy, Wick System

Abstract :

The issue of obtaining adequate housing for low-income families has been largely addressed by government-subsidized housing program. However, household food security remains a critical challenge that still requires effective solutions. Hydroponic cultivation, widely recognized for its efficiency in space and water usage, offers a promising strategy to address this concern. Nevertheless, limited knowledge and access among residents necessitate intensive educational efforts to encourage hydroponic adoption and demonstrate its long-term advantages. This community service initiative aims to strengthen food self-sufficiency among housewives residing in subsidized housing by conducting practical training on cultivating bok choy using a simple wick hydroponic system. The program took place in the GPBN subsidized housing complex, Block California-I, Sumbersari District, Jember Regency, from November 2024 to January 2025. Activities include presentation, hand-on demonstrations, and personalized assistance to help participants implement hydroponic methods in their own homes. The results indicated that most participants effectively grasped the material and successfully practiced hydroponic cultivation in their yards. They grew bok choy successfully and expressed interested in expanding their gardening efforts to other vegetable varieties. Overall, the program positively impacted community awareness regarding the benefits of cultivating vegetables independently to improve household food security. Although complete food independence was not yet achieved, there was a notable improvement in participants capacity to grow sufficient bok choy for household consumption. It is hoped that this initiative can serve as a practical model for future urban agriculture-based community empowerment programs.

Panduan sitasi / citation guidance (APPA 7th edition) :

Alfiah, N. A. A., Sabiku, D. F. S., Anindita, D. C., Arisandi, D. P., Fadilah, A. R., Adnyani, N. N. P., & Nur, F. M. (2025). Sosialisasi Budidaya Tanaman Hidroponik Untuk Meningkatkan Kemandirian Pangan di Komunitas Perumahan Subsidi. *Jurnal Abdi Insani*, 12(5), 1844-1852. https://doi.org/10.29303/abdiinsani.v12i5.2404

INTRODUCTION

Subsidized housing complexes are part of a government initiative designed to assist low-income communities in owning homes through a mortgage system known as 'Kredit Pemilikan Rumah (KPR)'. The goal of this program is to provide affordable, decent housing to those in need. However, aside from securing a house, there are still two other essential needs that households must address: clothing and food. When it comes to food, residents of subsidized housing can explore the option of growing some of their food, particularly vegetables, by using the limited land available around their homes. But this practice doesn't have to be limited to fulfilling household dietary needs, it also holds the potential to be developed into small-scale businesses, creating an additional source of income. By

cultivating vegetables not only for personal consumption but also for sale within their community or at local markets, residents can further improve their economic stability, thus enhancing the overall purpose and impact of this housing initiative.

Growing vegetables in the yard can be done using a variety of simple methods, one of which is hydroponics. Hydroponics is a soil-free gardening technique that uses nutrient-rich water as a growing medium for plants. This method is ideal for small spaces, and it allows plants to grow optimally as long as they are provided with the right nutrients (Khatri *et al*., 2024). Additionally, hydroponics is more water-efficient compared to traditional farming methods. Hydroponics recycles nutrient-rich water within a closed system, significantly reducing water loss through evaporation and runoff compared to traditional farming. This closed-loop approach can save up to 70-90% more water, making it highly efficient and suitable for environments with limited water resources (Barbosa *et al*., 2015). For this reason, it presents a practical solution for residents of subsidized housing, enabling them to grow vegetables independently, even with limited space.

While hydroponics offers numerous benefits, many residents of subsidized housing are still hesitant to adopt it. As noted by Wiyanto (2024), this reluctance is often due to a lack of knowledge, uncertainty about trying something new, and limited access to information and resources. Another key concern is the perceived cost of setting up a hydroponic system. Although advanced system can be expensive, a simple wick-based hydroponic setup using recycled bottles or containers, sponges, and a basic nutrient solution can be built for as little as Rp50,000 – Rp100,000 per unit making it relatively affordable and scalable for household use. Therefore, it's important to conduct a well-organized outreach program to increase awareness, educate the community, and show them the long-term advantages of hydroponic gardening, such as food security, economic saving, and better health outcomes.

The objectives of this initiative include raising awareness among subsidized housing residents about hydroponic vegetable cultivation, encouraging them to implement it in their own homes, providing alternative solutions for meeting food needs—especially for household vegetables—helping to reduce spending on vegetables, and ultimately improving the overall nutrition of families.

METHOD

The socialization activity took place in one of the subsidized housing complexes in Jember, East Java, specifically in the GPBN Blok California-i neighborhood, from November 2024 to January 2025. The session was led by a team of lecturers acting as extension workers and was attended by 10 participants, all of whom were housewives. The socialization was carried out using a combination of three methods: initially, through a lecture or presentation, followed by a demonstration and hands-on practice, and finally, through monitoring and evaluation.

Presentation

The presentation stage aimed to provide participants with a theoretical understanding of the basics of hydroponic farming. This was done through a lecture or seminar that covered topics such as what hydroponics is, its benefits, and how it works. During this session, participants were introduced to various of hydroponic systems that could be applied at home. However, the primary focus was on one particular system: the Wick System, which is ideal for small spaces in the participants' homes. In addition, the benefits of hydroponics were emphasized, such as its water and space efficiency and its potential to improve family food security. Wibowo *et al*. (2023) mention that presentations using media in agricultural extension programs can have a positive impact on their success, making it easier for participants to grasp the material and enhance their knowledge.

However, there is something more important about hydroponics that is the basis for why participants should choose this system, namely in terms of cost; besides, according to (Hartus, 2008) hydroponic systems can overcome land scarcity, problematic soil conditions, controlled pests and

diseases, limited irrigation supplies, unpredictable seasons, and inconsistent quality. Hydroponics can be cultivated all year round regardless of the season or weather at the planting time. So, there is no worry that the selling price of crops will fall. The planting room is quite clean, the planting medium is sterile, the plants are protected from rain, there are relatively few pests and diseases, the plants are healthier and more productive, and the hydroponic plants are easier to maintain for these housewife participants.

Demonstration

After gaining theoretical knowledge through the presentation, the next step was the demonstration phase, where participants gained hands-on experience. In this phase, facilitators showed participants how to set up and manage a hydroponic system. The demonstration used pre-prepared materials, including all the components needed for the Wick System setup, such as basins, support boards, net pots, flannel fabric, rock wool, bok choy seeds, AB Mix nutrient solution, and measuring cups. Participants did not just watch the demonstration; they also had the chance to actively participate in the process. Dewi *et al*. (2024) highlight that the demonstration method can positively influence participants' knowledge and interest in the topic. Sagemba *et al*. (2021) declare that demonstration method is able to deliver material clearly and easily understood by participants. Thus, the use of demonstration method can convey messages that can stimulate the thoughts, feelings, and will of participants.

Monitoring and Evaluation

The final stage of the program involved monitoring and evaluation. After the demonstration, participants received regular monitoring to ensure they could successfully apply hydroponic farming at home. This was done through either in-person visits to participants' homes or through a WhatsApp group for ongoing discussions and support. Facilitators provided technical guidance on managing the hydroponic system and monitored the growth of the plants. This stage also included helping participants address any challenges they faced, such as water management, nutrient levels, or plant diseases. Continuous monitoring is key to ensuring that the hydroponic technology is not only understood but also successfully implemented in the long term. Additionally, an evaluation was conducted to assess the success of the program. This involved observing the hydroponic vegetable harvests produced by the participants and evaluating their understanding of the cultivation process. The evaluation also aimed to assess the long-term impact on family food security, cost savings, and improved family nutrition.

RESULT AND DISCUSSION

The results of this activity can be observed in the implementation of the 3 methods mentioned earlier. Below is a detailed explanation:

Presentation

The presentation phase was designed to give participants a solid understanding of the basics of hydroponic farming. During this stage, participants were introduced to the concept of hydroponics, its benefits, and how it works. The session focused on the Wick System, which is particularly suited to the limited spaces typically available in subsidized housing. Participants responded positively to the presentation, showing genuine interest, especially in the advantages of hydroponics, such as efficient use of water and space and its potential to improve family food security. Feedback from participants indicated that the material was both relevant and engaging, sparking curiosity and a willingness to learn more.

According to Izzany *et al*. (2023) from small to large plants, hydroponic systems can be used to grow various plants. However, hydroponic farming techniques are more commonly used to cultivate

various green vegetable crops, including pakcoy, mustard greens, lettuce, kale, and other leafy vegetables. Although it is fun to grow vegetables without soil media, the hydroponic system is also not too difficult because the vegetables produced can thrive without worms and, of course, are cleaner and healthier. However, to get the best results, caution is needed from the participants of these mothers, especially since often the plant has broken stems and lacks nutrients.

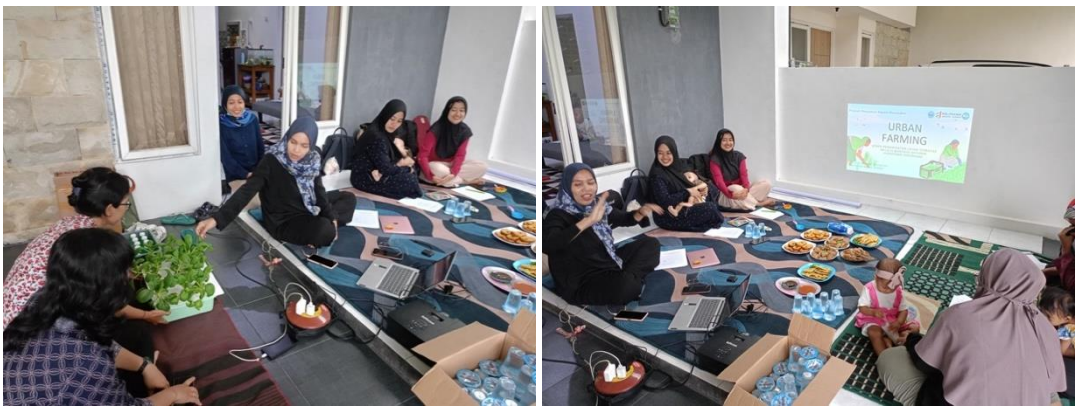

Figure 1. Presentation on Simple Hydroponics

The presentation phase of the program aimed to provide participants with a thorough understanding of hydroponic farming, particularly focusing on its potential in urban settings where space and resources are often limited. By introducing the basic principles of hydroponics—such as its reliance on nutrient solutions instead of soil, its capacity to save water, and its potential to grow a variety of plants in confined spaces—the session highlighted the significant advantages this method offers. The choice to focus on the Wick System was intentional, as it is both affordable and easy to set up, making it an ideal option for participants living in subsidized housing.

The positive reception from the participants further underscored the relevance of hydroponic farming as a viable solution for urban food production. Many participants expressed enthusiasm about the system's ability to optimize the use of water and space, two critical resources in densely populated housing areas. Additionally, the potential for hydroponics to improve food security by enabling participants to grow their own vegetables was a central point that resonated with the audience. The engaging nature of the session, which encouraged questions and feedback, contributed to a high level of interest and sparked curiosity about how they could incorporate these practices into their daily lives. This response from the participants highlights the growing interest in sustainable farming practices that can be adapted to urban environments, where traditional farming methods are often not feasible.

By emphasizing practical benefits such as reducing grocery expenses and increasing access to fresh produce, the presentation phase effectively laid the foundation for further exploration of hydroponics. The active engagement of participants during the session is an encouraging indicator that the concept of hydroponic farming is not only understood but also welcomed by the community, creating a solid basis for the next phases of the program.

Demonstration

In the hands-on demonstration phase, participants were guided step by step in setting up their own Wick System hydroponic setups. Using materials such as basins, support boards, net pots, flannel cloth, rock wool, bok choy seeds, AB Mix nutrient solutions, and measuring cups, the facilitators demonstrated the entire process. The participants were actively involved, asking questions about nutrient management and plant care, which showed their eagerness to apply this method at home.

Observations revealed that their understanding improved significantly after the practical session, and many expressed newfound confidence in trying hydroponic gardening themselves.

Figure 2. Bok choy Seed Sowing Practice

Building on the theoretical understanding gained during the presentation, the hands-on demonstration phase was a crucial step in ensuring that participants were equipped with the practical knowledge required to implement hydroponics in their own homes. This phase allowed participants to directly engage with the materials and tools necessary for setting up the Wick System, providing them with a step-by-step walkthrough of the process. By physically setting up the system with basins, support boards, net pots, and other materials, participants were able to see the practicality and simplicity of the method in action.

The interactive nature of this demonstration was key to ensuring that participants felt confident in replicating the system on their own. Questions about nutrient management, water levels, and plant care were raised throughout the session, highlighting the participants' desire to fully understand the nuances of hydroponic gardening. This exchange of knowledge helped reinforce their theoretical learning and clarified any uncertainties, making the learning process more effective and hands-on. Moreover, by actively participating in the setup, participants could better visualize how the Wick System would fit into their home environments, which is particularly important for those living in spaces with limited room for traditional gardening methods.

As a result of this phase, many participants reported feeling more confident about applying the knowledge they had gained to start their own hydroponic systems at home. This happens because participants have gained knowledge through the demonstration method that has been delivered. The application of demonstration learning methods has a positive influence, namely it can increase learning motivation as shown by the results of the interview. The demonstration method is one of the teaching methods using demonstrations to clarify a concept or to show how to do something by demonstrating it first to the participants (Putri *et al*., 2017).

The improvement in their understanding was evident, as they not only grasped the concept of hydroponics but also developed a sense of ownership and agency over the process. This shift from theoretical knowledge to practical application is essential for ensuring that the benefits of hydroponic farming can be sustained in the long term. In terms of plant maintenance, bok choy typically requires about 30 to 40 days from transplanting to harvest under hydroponic conditions, making it a relatively fast-growing crop that allows participants to see result quickly and stay motivated.

Monitoring and Evaluation

The monitoring phase provided ongoing support through home visits and a WhatsApp group where participants could ask questions and share progress. This support system helped address common challenges, such as maintaining proper water levels, ensuring sufficient nutrients, and managing plant health. By the end of the program, several participants successfully harvested their

first crop of bok choy, and the plants were thriving. The evaluation revealed that participants had gained a solid understanding of hydroponic farming and were already experiencing its benefits, such as reduced grocery expenses and better access to fresh vegetables for their families.

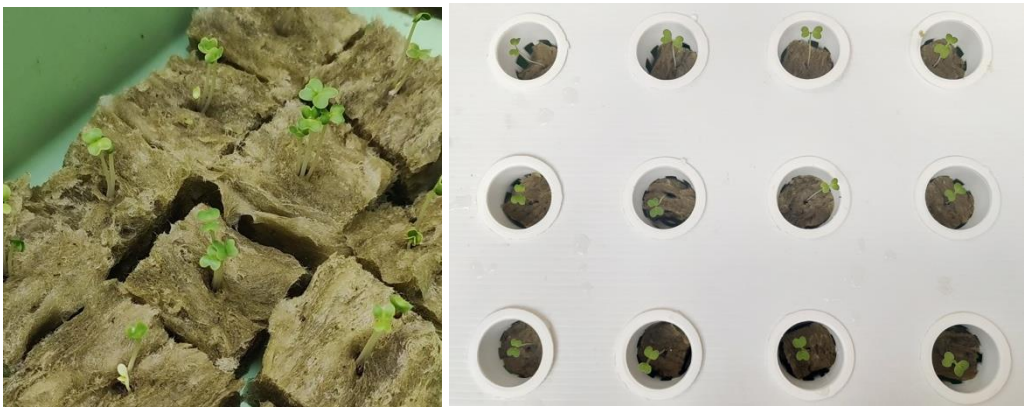

Figure 3. Bok choy Plant 1 Week After Sowing

The final phase of the program, monitoring, played a vital role in reinforcing the concepts learned during the presentation and demonstration. This phase provided participants with continuous support and guidance, enabling them to troubleshoot any challenges that arose while setting up their systems at home. Home visits allowed facilitators to offer personalized advice, helping participants maintain the correct water and nutrient levels, and addressing plant health issues as they emerged. The use of a WhatsApp group further facilitated communication, providing a platform for participants to share their progress, ask questions, and receive feedback from both peers and facilitators (Mellisa *et al*., 2024) This ongoing support system was essential in creating a sense of community and ensuring that participants felt supported throughout their hydroponic journey.

The monitoring phase also helped to identify and address common obstacles faced by participants, such as difficulties in managing water and nutrients. By offering practical solutions and guidance, the facilitators ensured that participants were able to overcome these challenges and successfully implement hydroponic farming in their homes. At the end of the program, several participants had successfully harvested their first crops of bok choy, a clear indicator of the program's success in teaching participants the necessary skills to grow their own food.

Figure 4. Bok Choy Plant 3 Weeks (Left) and 6 Weeks (Right) After Sowing

The evaluation of the program revealed that participants had gained a solid understanding of hydroponic farming and were already seeing tangible benefits. Not only had they reduced their grocery

expenses, but they also reported having better access to fresh, nutritious vegetables, which is a significant outcome for families in subsidized housing with limited access to fresh produce. The evaluation further indicated that participants felt empowered by the knowledge and skills they had gained, and many expressed interest in continuing hydroponic farming beyond the program. This outcome highlights the potential of hydroponic systems to improve food security, particularly in urban areas where traditional farming is not always a viable option (Kushawaha *et al*., 2024).

Various studies have demonstrated that hydroponics offers a highly promising and sustainable agricultural solution, particularly in urban areas where space and resource are limited. Rajedran *et al.* (2024), emphasize that hydroponic systems can optimize the use of water and space while producing high-quality crops. Similarly, bOLAND highlights hydroponics' vital role in improving food security in densely populated communities by enabling individual to grow their own food locally. Furthermore, research by Arifin & Sari (2024), specifically underscores that effectiveness of the wick system as a low-cot, simple method well-suited for small-scale farming in restricted areas, such as subsidized housing environments. Additionally, a study by the Srivani & Manjula (2019) notes that hydroponics systems can be produce higher yields per square foot than traditional field production, making them particularly advantageous for urban agriculture where land is scarce. Together, these sources affirm the potential of hydroponics especially the wick system as an accessible and efficient approach to promoting sustainable urban agriculture.

CONCLUSSION

In conclusion, this program successfully achieved its objectives of introducing hydroponic farming to residents of subsidized housing, providing them with the knowledge and tools to implement it at home, and ultimately improving their food security and access to fresh produce. The combination of presentation, demonstration, and monitoring phases ensured that participants were not only informed but also equipped with the practical skills necessary for successful implementation. The positive outcomes of the program, including reduced grocery expenses and increased vegetable harvests, demonstrate the potential of hydroponic farming as a sustainable and effective solution for urban food production. However, the long-term sustainability of these systems will require continued support, and further research is needed to explore ways to scale hydroponic farming for broader adoption in similar urban settings.

To ensure lasting impact, future programs should incorporate structured follow-up session and ongoing mentorship. These can help participants troubleshoot issues, stay motivated, and continue refining their hydroponic practice over time. Building community-based support networks among participants can also foster knowledge-sharing and strengthen the adoption of hydroponic farming on a broader scale.

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