

## Community Economic Empowerment Using Urban Farming in Pontianak

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### ABSTRACT

Urban farming has emerged as a viable strategy to address limited land availability, food insecurity, and economic vulnerability in urban areas. In Southeast Pontianak District, West Kalimantan, high population density and limited green space pose significant barriers to community-based agricultural initiatives. This community service initiative aims to enhance the community's understanding of how to manage agricultural practices in small-scale areas. This program empowered 48 local residents, especially housewives and unemployed youth, through participatory training in hydroponics and verticulture techniques. The program utilized workshops, counseling sessions, and hands-on practice in household waste recycling for plant cultivation and fertilizer production. Post-training evaluation revealed impressive implementation rates, with 77.1% of participants (n=37) actively practicing urban farming within three months. Among implementers, adoption patterns demonstrated program flexibility: 40.5% adopted hydroponics exclusively, 21.6% focused on verticulture, while 37.8% integrated both techniques. Cultivation diversity was substantial, with 48.7% growing 1-3 plant varieties and 37.8% managing 4-6 species. Timeline analysis showed 62.2% began implementation within 1-3 months, while 37.8% sustained practices for 4-6 months, indicating long-term behavioral change. Results demonstrate increased community awareness, technical capacity, and sustainable practice adoption. The high implementation rates and diverse patterns suggest program success in creating adaptable solutions for varied household conditions, with strong potential for scalability to similar urban contexts.

Keywords: food security, household waste recycling, hydroponic methods

### INTRODUCTION

The Southeast Pontianak District functions as a prime economic hub within Pontianak City, West Kalimantan. Its strategic location characterized by high accessibility and integration with the city's main commercial arteries has made it a focal point for significant investment and rapid development. This advantageous position has directly catalyzed a proliferation of business activities, ranging from dense commercial zones and retail sectors to key educational institutions. This concentration of economic drivers establishes the area as a vital source of income and employment, attracting a continuous influx of new residents. However, this very economic vibrancy and demographic growth have created intense competition for land. Almost all areas are populated and developed for housing and business purposes, leaving little space available for green areas. Urban farming has emerged as a critical solution to address these specific land limitations within densely populated urban environments ([Orsini et al., 2020](#); [Specht et](#)

[al., 2014](#)). This approach directly addresses the challenge of realizing household food security and provides opportunities for economic empowerment in communities facing land scarcity ([Rini et al., 2022](#)). The challenge in Southeast Pontianak reflects a broader global issue: conventional agriculture is under increasing pressure from a rising world population, rapid urbanization, decreasing arable land, and weather extremes due to climate change ([Eigenbrod & Gruda, 2015](#)). Therefore, urban farming presents a viable strategy to address the multifaceted challenges posed by limited agricultural land in this urban context.

Typically, residents focus on growing ornamental plants in their yards primarily for visual enjoyment. Although they are aware that food crops can be grown, many consider the cultivation of medicinal or food crops too challenging due to limited land ([Sukunora, 2022](#)). However, urban agriculture fundamentally shifts the primary goal from mere aesthetics to achieving various important and multidimensional objectives. These objectives go far beyond simply providing additional food. At the immediate

household level, the goal is to increase food security by providing direct and consistent access to fresh and nutritious products, as well as to improve economic stability through income from the sale of surplus crops. More broadly, urban agriculture aims to build urban resilience, so that cities are less dependent on fragile and distant food supply chains. Urban agriculture also serves crucial environmental purposes by greening the urban landscape, reducing the city's carbon footprint (through food miles), and creating opportunities for organic waste recycling. Finally, urban agriculture plays a vital social and educational role, strengthening community bonds and teaching sustainable living practices. This comprehensive approach goes beyond traditional gardening concepts by utilizing high-efficiency agricultural techniques designed for urban environments. Methods such as hydroponics (soilless cultivation) and vertical farming have proven to be highly effective in maximizing the use of limited space ([Shamshiri et al., 2018](#)). These techniques demonstrate how small urban yards can be highly productive. In fact, research shows that urban agriculture can increase land productivity up to 10 times compared to conventional agriculture ([Benke & Tomkins, 2017](#); [Kalantari et al., 2018](#)). With persistent and sustainable efforts, yard land management in Southeast Pontianak Regency can be transformed to effectively achieve these various goals for its residents.

The current issue faced by partners is their lack of knowledge on how to implement urban farming (hydroponic) methods. Until now, many have left the small plots of land surrounding their homes unused and neglected. Additionally, some residents merely grow ornamental plants in these spaces for aesthetic purposes. This situation indicates a strong need for the community in the Southeast Pontianak District to gain more understanding about utilizing unsecured narrow areas to practice urban farming techniques, thereby enhancing their income to meet everyday expenses. From the outlined problems, it is evident that the constraints include insufficient usage of the limited land available for urban farming projects, poor knowledge about environmental-friendly hydroponic farming in small areas, lack of technical knowledge about hydroponic systems is a major challenge in the implementation of urban farming in developing countries ([Hayden, 2015](#)) and inadequate skills to transform those neglected spaces into self-sustaining household enterprises that could improve financial earnings.

To enhance the efficiency and productivity of land use in small regions and boost people's

income while addressing unemployment in Southeast Pontianak District, it is essential to have adequate knowledge and understanding for land management to achieve optimal results. One effective approach is to impart knowledge and skills related to urban farming techniques, allowing individuals to engage in it as a side business or even a larger-scale enterprise by organizing unemployed youth and housewives into groups. Not only can this initiative help lower unemployment rates, but it can also augment the household income of the local community through the appropriation of small plots of land for urban farming.

According to the given description, there is a need to conduct community service activities focusing on community economic empowerment through Urban Farming in Pontianak City within the Southeast Pontianak District. This community service initiative aims to enhance the community's understanding of how to manage agricultural practices in small-scale areas.

## SOLUTIONS AND TARGETS

Based on the constraints identified in the community specifically the lack of knowledge regarding hydroponic methods, the underutilization of available land, and the need to enhance household income a Community Partnership Program was formulated as a direct intervention. This program, focusing on "Community Economic Empowerment through Urban Farming," aims to provide a structured solution by transferring practical knowledge and technical skills to address these challenges head-on. To implement this, the community service team from the Department of Agricultural Socioeconomics at the Faculty of Agriculture partnered with the family welfare and empowerment organization (PKK) group in the Southeast Pontianak District. The approach involves outreach initiatives and training in managing urban farming techniques, specifically targeting local residents, particularly housewives and unemployed youth. Essentially, this initiative aims to enhance the community's knowledge, skills, and insight into leveraging the local environment's resources and potentials. This undertaking is crucial for boosting public understanding of turning limited residential spaces into productive land to elevate household economies. Furthermore, it is anticipated that these residents will be empowered to disseminate this knowledge throughout the broader

community. The team initiating the community partnership program community service activities seeks to provide remedies for the challenges faced by touch of science and technology partners through the mentioned activities:

1. Enhance understanding and abilities regarding different urban farming methods that can be implemented.
2. Enhancing abilities in managing small plots of land through hydroponics or verticulture techniques.
3. Enhancing community skills to perform basic farming evaluations to gain insight into their business profits.

The technology developed and enhanced by partners is straightforward, so it is expected that they will successfully implement and share it with other communities.

## METHODS

The community service team within the Department of Agricultural Socioeconomics at the Faculty of Agriculture aims to offer practical and easily applicable knowledge to both partners and the broader community. The effectiveness of this initiative significantly relies on the commitment of those executing it and the collaboration of various stakeholders. Participatory approaches in community development programs show more sustainable results than top-down approaches (Thomaier et al., 2015). The planned activities will focus on outreach efforts, with counseling provided to partners through direct engagement and hands-on practices facilitated by the community service team. Essentially, these activities encompass:

1. A session of socialization and advice on implementing different urban farming techniques will be provided by Dr. Ir. Purwaningsih, M.Si as an expert speakers.
2. Describe the process of growing plants using urban farming methods, specifically hydroponics and verticulture techniques.
3. Guidance and community support for calculating profits from household farming.
4. Assessment of the extension activities that have been executed.

Evaluation of urban farming programs should include technical, economic, and social aspects to ensure long-term sustainability (Poulsen et al., 2015). Evaluation criteria include the partners' strong eagerness to engage in extension activities, an enhancement in partners' understanding of the provided content, and both the desire and capability of partners to apply the information that has been shared.

## RESULTS AND DISCUSSION

To address the issues encountered by partners, workshops and practical field activities are designed to enhance knowledge and skills related to community economic empowerment via urban farming in Pontianak. The primary objective is to maximize the use of limited land for urban residents to boost land productivity and ensure food security for households through urban farming, specifically by repurposing household waste. This includes cultivating horticultural plants like vegetables, herbs, and fruits, as well as utilizing organic waste, such as leftover food, to create liquid fertilizer, aiming to generate economic benefits and maintain family food security. Urban agriculture is gaining global recognition as a strategic approach to promising creating sustainable and reliable food sources, enhancing food security (Gunapala et al., 2025). Scenario analysis indicates that some high-income countries in Europe and North America could produce more vegetables than they need by using less than 3% of urban land for food production (Badami & Ramankutty, 2015). The utilization of household waste for hydroponic growing media has been shown to reduce production costs by up to 40% (Sanyé-Mengual et al., 2015). The planning and extension stages of these activities are illustrated in Figure 1.



Figure 1. Community service activities at planning and extension stages

The implementation of growing horticultural plants at home utilizing hydroponic and verticulture systems involves repurposing household waste materials as planting mediums, like plastic bottles and cleaning product containers. This approach aims not only to minimize plastic waste at home but also to enhance the visual appeal of residents' gardens in the Southeast Pontianak District through their creativity. The integration of aesthetics in urban farm design increases community acceptance and property value (Kalantari et al., 2018; Orsini et al., 2020). Furthermore, utilizing household organic waste to create liquid fertilizer is anticipated to positively contribute to improved economic conditions and

environmental sustainability. The hands-on practice and technical assistance provided during these activities are documented in [Figure 2](#).



Figure 2. Community service practice assistance activities

The hands-on practice and technical assistance provided during these activities are documented in [Figure 2](#). Furthermore, the comprehensive nature of the initiative, visually summarizing the activities from planning to post-training evaluations, is presented in [Figure 3](#).



Figure 3. Community service activities

The primary actions in carrying out the community service program focused on urban agriculture techniques, particularly maximizing limited spaces to grow horticultural crops via hydroponic systems using plastic waste. This method was especially suitable for constrained urban residential settings. The success of this initiative was reflected in the participants' strong engagement and enthusiasm, which indicated their readiness to adopt the technology. This willingness was further observed through the high participation rate and the active feedback and suggestions provided by community members during discussions. The subsequent impact of these activities on participants' technical knowledge and skills was measured through pre and post-program assessments, detailed in [Table 1](#), which shows significant improvements in their capabilities to adopt urban farming as a household enterprise.

The various phases of action, from planning to counseling and training, alongside support in implementing vegetable cultivation through a hydroponic system, can be effectively executed

and managed. Leveraging the creativity of the local community by repurposing unused plastic waste not only promotes environmental sustainability but also adds economic worth and enhances the visual appeal of residential yards.

The initiative "Boosting Community Economics through Urban Agriculture in Pontianak City" is deemed a success. This is evident from the participants' strong enthusiasm for taking part in the program. There has been a noticeable rise in awareness among residents concerning economic empowerment via urban agriculture. This growth in understanding is reflected in the feedback received during discussions. Numerous suggestions emerged from community members about enhancing the use of home gardens, articulated during these interactions. Among these suggestions were various models for cultivating different vegetable types utilizing hydroponic methods. Accordingly, the insights gained by partners from the ongoing activity of "Community Economic Empowerment Through Urban Agriculture in Pontianak City" are detailed in the table below.

Table 1. Findings on the aims of community service community service activities

Activities	Pre-activity	Post-activity
Guidance Session	<ul style="list-style-type: none"> <li>Partners are unfamiliar with the different cultivation methods that can be used in the limited spaces of urban farming.</li> <li>Partners are unfamiliar with the methods of cultivating through hydroponics.</li> <li>Partners are uncertain about how to assess the profits derived from horticultural farming after adopting urban farming practices.</li> </ul>	<ul style="list-style-type: none"> <li>Partners can identify different methods of urban farming practices.</li> <li>Partners have the capability to establish and oversee the cultivation of plants using hydroponics.</li> <li>Partners are able to determine their farming profits once they adopt urban farming methods.</li> </ul>

Activities	Pre-activity	Post-activity
Evaluation	Partners have not succeeded in establishing a farming venture centered around urban agriculture.	Partners have the opportunity to establish agricultural enterprises centered around urban farming.

A key indicator of the program's success was the high post-training implementation rate: 77.1% of participants (n=37) were actively practicing urban farming at their homes within three months of program completion. The diversity of plant cultivation was also encouraging, with 48.7% of implementers growing 1-3 plant varieties and 37.8% managing 4-6 different species, indicating successful scaling of production beyond basic subsistence levels. The temporal pattern of adoption showed strong immediate engagement, with 62.2% of implementers beginning their urban farming activities within 1-3 months post-training. This rapid adoption suggests that participants found the techniques practically feasible and economically attractive. Furthermore, the sustained engagement observed in 37.8% of participants who continued practices for 4-6 months demonstrates the program's success in creating long-term behavioral change rather than short-term enthusiasm.

## CONCLUSION

The community partnership program community service was met with great enthusiasm from the family welfare and empowerment organization group in the Southeast Pontianak District. This was evident in the high participation rate and strong engagement throughout the events. Partners expressed optimism that similar activities would continue in the future, with an emphasis on sustainability. The comprehensive nature of the initiative, from planning to post-training evaluations.

This community service activity targeted households in the Southeast Pontianak District particularly PKK members with the goal of fostering long-term empowerment. It involved the utilization of small plots of land for horticultural cultivation using hydroponic systems, the repurposing of plastic household waste as planting media, and the transformation of organic kitchen waste into liquid fertilizer to provide economic

value. The continuation of the program will focus on advanced training in marketing strategies for hydroponically grown produce, enabling partners to convert household-scale efforts into sustainable economic ventures.

The continuation of the implemented community service focuses on offering further training and guidance related to marketing strategies for hydroponically grown plants produced by partners. This initiative seeks to foster local capabilities by promoting the use of limited land space for urban agriculture while also enhancing the household economy by creatively utilizing hydroponic plants and transforming unused materials in the vicinity into economic opportunities.

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