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Increasing the Capacity of KWT Barokah Through Agricultural Cultivation Innovation in Banjardowo Village, Semarang

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Abstract
The coastal city of Semarang faces serious challenges in the form of limited land and the threat of flooding, which reduce agricultural productivity. These conditions have prompted the implementation of urban farming-based cultivation innovations as an adaptation strategy. This community service research aims to increase the capacity of the Barokah Women Farmers Group (KWT) in Banjardowo Village. The activities were carried out participatively through six main stages, namely socialisation, construction of urban farming installations, training in planting media production, training in seedling planting, mentoring, and evaluation. The results of the activities showed an increase in the knowledge and skills of members in horticultural cultivation relevant to limited urban land. In addition, these activities strengthened the social cohesion of the group through a spirit of mutual cooperation and collaboration. The urban farming programme at KWT Barokah has proven effective in enhancing technical capacity, empowering women, and strengthening local food security. This programme also supports the achievement of the Sustainable Development Goals (SDGs), particularly points 2, 11, and 12.

Keywords: women farmer group, innovation, cultivation, urban farming

INTRODUCTION

Semarang is a coastal city with problems and challenges, particularly in areas prone to flooding (Setiyono et al. 2020) . This situation impacts productive agricultural land, which is at risk of being inundated. Limited land and the threat of flooding, particularly in urban areas, support the implementation of the Urban Farming concept (Nurdayati et al. 2021) . This concept is a form of adaptation that allows for safe cultivation during flooding (Rinawati et al. 2023) .

The concept of urban farming has created various cultivation innovations. One such innovation is planting with planter bags. The use of planter bags with vertical cultivation methods is effective in areas frequently flooded (Syafira 2024) . In addition to innovations in planting media, innovations in irrigation systems are also crucial for increasing effectiveness. One approach to implementing irrigation innovations can be a drip irrigation system. The application of a drip irrigation system ensures even watering for each plant, while also saving time and energy (Amananti 2024) . Drip irrigation systems have significant potential for water and nutrient conservation for plants, with the primary goal of reducing water scarcity near the root zone and reducing evaporation (Bansal 2021).

The Barokah Women's Farmers Group (KWT) is located in RT 02/RW V, Banjardowo Village, Genuk District, Semarang City. With 300 m2 of land used for agricultural cultivation managed by 20 members of the Barokah Women's Farmers Group, chaired by Nailis Sa'adah. The Barokah Women's Farmers Group is one of the groups that has the potential to implement planter bags and drip irrigation systems due to its geographical conditions which are often flooded and the relatively limited land with the characteristics of the urban outskirts (Sroka et al. 2023) .

The potential of the Barokah KWT is land used for vegetable and horticultural cultivation, including chili peppers, rosella flowers, red ginger, and bok choy (Chand 2019) . The land is managed

collaboratively by group members, so that each cultivation process becomes an opportunity for mutual learning and strengthening togetherness.

Cultivation activities utilize the concept of urban farming, a farming technique adapted to urban environments with limited land and frequent challenges such as waterlogging during the rainy season. In practice, KWT members develop their land using a raised *bed system* to reduce the risk of waterlogging and simplify plant care. Plants are arranged in such a way as to maximize sunlight and facilitate pest control.

One planting technique used is intercropping, which involves planting more than one type of crop in the same area. This system not only increases land productivity but also helps reduce certain pests and improve soil quality. For example, chilies can be planted in combination with eggplant or tomatoes, while leafy vegetables like kale and lettuce can be planted in separate but adjacent areas, making maintenance more efficient.

In addition to focusing on planting, plant care is also a crucial part of this urban farming activity. KWT members routinely apply organic fertilizer, weed control, and monitor for pests and plant diseases. Maintenance activities are carried out on a schedule and involve all members, allowing the knowledge gained to be directly applied on their respective plots. This empowers women in the local community, strengthens group solidarity, and provides valuable skills to support food security in urban areas.

METHOD

This activity method is implemented in a participatory manner through six main stages: outreach and coordination, construction of urban farming installations, training in planting media, seedling planting training, mentoring, and evaluation. Each stage is designed to improve the skills of KWT Barokah members, strengthen partner engagement, and ensure program sustainability through monitoring, mentoring, and measuring participant capacity building.

RESULTS AND DISCUSSION

Coordination and Socialization with KWT Barokah

A coordination meeting for the activity was held on Monday, May 26, 2025, attended by five members of the Banjardowo KWT (Farmers Group) and a representative from Semarang State University (UNNES). The meeting resulted in a shared understanding regarding the implementation of the *urban farming program,* which will combine outreach sessions, theory, and hands-on field practice. Participants agreed that the training will focus on creating growing media, planting techniques, and plant care in accordance with sustainable agriculture principles.

Further coordination revealed three key points of agreement. First, an *urban farming outreach session* would be held first to introduce the material and explain the program's objectives. Second, hands-on training would be scheduled after the outreach session, focusing on cultivating growing media and cultivating vegetables such as chilies, tomatoes, and eggplants. Third, land preparation and supporting equipment would be carried out collaboratively by KWT members prior to the training. This agreement served as a crucial foundation for the smooth running of subsequent activities and demonstrated the partners' active involvement from the planning stage.

Figure 1. Coordination and Socialization with KET Barokah

Construction of Urban Farming Installation

On Saturday, May 31, 2025, construction of an *urban farming plot was completed* in the yard

of the Barokah Community Farmers Group (KWT Barokah). The construction work was carried out manually by two workers, including land measurement, stake installation, and installation of hebel bricks using cement adhesive. The resulting plot structure is rectangular, approximately 30 cm deep, and serves as a horizontal planting medium that will later be integrated with a vertical farming system.

During the construction process, a representative from Semarang State University (UNNES) was present to provide academic support, as well as a representative from the Barokah Women's Group (KWT Barokah) who monitored the activity. The lemongrass plants that had previously grown on the site were maintained and integrated into the *urban farming design* to utilize local resources. The results of this activity demonstrate the collaboration between workers, academics, and community partners in realizing basic *urban farming infrastructure* that adheres to the principles of space efficiency and environmental sustainability.

Figure 2. Construction of Urban Farming Installation

Planting Media Making Training

The training on planting media preparation was held on Friday, July 18, 2025, at 9:00 a.m. WIB (Western Indonesian Time) at the Barokah KWT (Farmers Group) in Banjardowo. This activity was part of a series of horticultural training sessions facilitated by Semarang State University (UNNES) with support from the local Department of Agriculture. Fourteen participants attended, consisting of 10 active KWT members, three UNNES representatives, and one representative from the Department of Agriculture's Field Agricultural Extension Worker (PPL).

The composition of the growing media used in the training, namely soil, rice husks, and manure, reflects basic horticultural practices. The combination of organic materials such as rice husks and manure serves to increase porosity, nutrient availability, and water retention capacity in the growing media, thereby supporting optimal horticultural plant growth. The application of this simple yet effective composition is a strategic first step for KWT Barokah in developing a sustainable *urban farming system*.

Furthermore, the participants' active involvement in the mixing process demonstrates a participatory approach that not only strengthens technical understanding but also fosters a sense of ownership of the program. The success of a community farming program is largely determined by the level of participation and sense of community among members. Thus, this training has a dual impact: enhancing technical capacity while strengthening the group's social cohesion, both of which are crucial for maintaining the sustainability of farming practices at the community level.

Figure 3. Facilitation of Materials and Training for Making Planting Media

Seedling Planting Training

The seedling planting training was held on Tuesday, August 5, 2025, at 09.00 WIB at the KWT Barokah. This activity was facilitated by Semarang State University (UNNES) with full support from the local Agriculture Service as part of a series of community-based horticultural training programs. The number of participants in attendance was 14 people, consisting of 10 active members of KWT Barokah, three representatives from UNNES, and one representative of the Agricultural Extension Officer (PPL) from the Agriculture Service. All participants participated enthusiastically, bringing simple equipment such as gloves, small hoes, and buckets to support the planting process. The training atmosphere was friendly with a spirit of mutual cooperation.

The training began with a brief explanation from the resource person regarding good planting techniques, including seed selection, determining plant spacing, and initial maintenance methods. Afterward, participants were directed to a planting area that had been prepared using the media from the previous training. Chili, kale, and eggplant seedlings were planted using an intercropping system to maximize land utilization while reducing the risk of pest infestation. Each participant had the opportunity to plant at least one type of seedling to gain hands-on experience. In addition, lettuce seedlings were planted in a wooden *vertical garden* as an example of utilizing limited space through vertical farming.

During the activity, the resource person provide practical tips about technique proper watering, giving fertilizer follow-up, and method identify symptom beginning attack pests. Participants seen active discuss, share experience, and provide input related maintenance plants in the yard each house.

Training This No only functioning as means improvement skills technical, but also strengthens togetherness between KWT members. The spirit of mutual cooperation is reflected from involvement participant in prepare land, planting seeds, until clean equipment after activities. Warmth atmosphere the family that was built expected can become social capital important in guard sustainability of urban agriculture programs based on community in Banjardowo.

Figure 4. Seedling Planting Training Activities

CONCLUSION

A series of *urban farming training activities* at the Barokah Banjardowo Community Farmers Group (KWT Barokah) demonstrated positive results in improving technical capacity and strengthening the group's social capital. Through coordination, plot construction, training in planting media, and seedling planting, participants not only gained practical horticultural skills but also fostered a sense of community and a spirit of mutual cooperation. The application of intercropping and *vertical gardening techniques* is an adaptive innovation relevant to limited land in urban areas, while also supporting the principles of sustainable agriculture.

In addition to generating new technical knowledge, this activity demonstrates the importance of collaboration between communities, academics, and local governments in developing community farming practices. Thus, this program contributes to strengthening local food security and aligns with the achievement of the Sustainable Development Goals (SDGs), specifically points 2 (Zero Hunger), 11 (Sustainable Cities and Human Settlements), and 12 (Responsible Consumption and Production).

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