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RESEARCH ARTICLE

Strengthening the self-reliance of the family welfare movement (PKK) through hydroponic cultivation in rural communities

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ABSTRACT

This community service program aimed to empower the Family Welfare Movement (PKK), a women's organization in Indonesia, through household-scale hydroponic cultivation training in Seubam Lhok Village. The program was implemented using a participatory approach and hands-on practice, starting from socialization and theoretical training on the basics of hydroponics to the practical construction of simple installations. PKK members actively participated in each session with high enthusiasm and engagement. The results showed an improvement in participants' knowledge and skills in assembling and managing hydroponic systems. Several participants successfully applied hydroponic cultivation in their own homes, and initiatives emerged to establish small business groups based on hydroponics. This program not only enhanced household food security but also created economic opportunities for rural women. The findings demonstrated that simple agricultural technology can be effectively adopted by the community when delivered through an appropriate participatory approach. The success of this program provides a foundation for replicating similar initiatives in other rural areas.

KEYWORDS

Community empowerment; family welfare movement; women's organization; hydroponic cultivation; rural communities

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1. Introduction

Agriculture is a vital sector in supporting community life, especially in rural areas. However, with increasing land conversion, urbanization, and climate change, conventional farming methods are facing various challenges. One of the impacts is limited space for farming, especially in household environments. This condition demands innovation in agricultural practices that are not only land-efficient but also environmentally friendly and efficient in terms of cost and maintenance (Soedarto & Ainiyah, 2022).

Seubam Lhok Village is one of the villages located in the coastal area of Aceh. Most of its residents work as fishermen and farmers. Although this village has considerable

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natural potential, the use of modern agricultural technology is still relatively low. This is especially true among housewives, whose agricultural activities tend to be traditional, limited to their yards, and have not yet reached optimal economic productivity.

The PKK (Family Empowerment and Welfare) group in Seubam Lhok Village is an important element in village development due to its active role in social, educational, and economic activities within families. However, limited access to training and modern technology means that the potential of this group has not been fully realized. A positive intervention is needed to improve the capacity and skills of PKK members in managing their resources productively (Emmywati, 2025).

One innovative solution that can be applied in the context of land limitations and the need for family food security is the hydroponic method. Hydroponics is a technique of cultivating plants without using soil, but rather with a nutrient-enriched water medium. This method is very suitable for application in a household environment, as it does not require a large area of land and can be done with simple tools and at a relatively affordable cost.

Introducing hydroponics to PKK women's groups is expected to be the first step in building awareness of the importance of sustainable household agriculture. In addition to being an effort to improve family food security, hydroponics can also be a micro-business opportunity that generates additional economic value for households. Empowerment through hydroponics training also opens up opportunities for PKK mothers to be more independent and productive in the field of modern agriculture (Kuntariningsih & Supriyadi, 2025).

Furthermore, hydroponics also provides educational value, especially in terms of water management, selecting suitable plants, and measuring and hygienic plant care. These skills are very useful for housewives in maintaining the quality of food consumed by their families. Through systematic and practical training, it is hoped that PKK mothers will master basic hydroponics techniques and be able to manage their own hydroponic gardens (Wenas & Rattu, 2023).

This training activity also has the potential to form new community-based women's business groups in villages. With the existence of small-scale hydroponic farming groups, PKK women can collectively market their harvests to local markets, schools, and village cooperatives. This will certainly contribute to increasing family income and fostering a spirit of entrepreneurship among rural women (Juliana et al., 2025).

However, the success of this training program is highly dependent on the approach used. Community service activities must be participatory, contextual, and sustainability-oriented. With an approach that actively involves the community, the training program does not only stop at knowledge transfer but also builds collective awareness and a sense of ownership of the agricultural innovations developed.

Based on this background, this community service activity was designed with the aim of empowering the PKK women's group in Seubam Lhok Village through practical, economical, and sustainable hydroponic training. This program is expected to become a model for women's empowerment activities in villages in the field of modern agriculture, as well as a first step towards a village that is self-sufficient in food and economically empowered.

2. Methods

This community service activity was carried out using a participatory and practice-based approach (learning by doing) (Cahya et al., 2025). This method was chosen to ensure that the participants, in this case the PKK women's group, not only gained theoretical understanding but were also able to directly practice simple hydroponic cultivation techniques. The implementation stages consisted of: (1) socialization of the program to village officials and the PKK group, (2) identification of participants' needs and readiness, (3) training in basic hydroponics theory, and (4) practical installation and planting. This activity was carried out in the village hall and on prepared yard land, involving the community service team, village officials, and field facilitators.

During the training process, participants were given simple modules containing basic material on hydroponics, types of hydroponic systems, plant care techniques, and how to mix plant nutrients. The materials and tools used were adapted to local conditions and the availability of resources in the village, such as the use of used bottles, PVC pipes, and wooden racks. Evaluation was carried out through direct observation of participant involvement, their ability to assemble hydroponic installations, and the success of the planting process. In addition, question and answer sessions and group discussions were held to explore the obstacles and solutions faced by participants during the training. Post-training assistance was provided periodically to ensure the sustainability of the program and encourage the formation of household-scale hydroponic farmer groups (Jumrianah, 2024).

3. Findings

3.1. The most authors public policy in Islamic education

The community service activity carried out in Seubam Lhok Village successfully involved participants who were active members of the PKK women's group. The participants' enthusiasm was evident from the start of the activity, as demonstrated by their full attendance during the training sessions and their active participation in the discussion sessions. Most of the participants were unfamiliar with hydroponics, so this

program was a new and exciting experience, especially since it could be applied in their own yards.

In the initial stage, participants received an explanation of the basics of hydroponics, its benefits, and the types of systems that can be applied in a household environment. The material was presented in a simple manner and with the aid of visual media to make it easy to understand. The initial evaluation results showed that most participants understood the basic concepts of hydroponics, including the workings of the wick system and the tiered rack system, which were the focus of the training. Participants were also given a concise module as material for independent study.

The practical stage was the most interesting part for the participants. Using simple tools and materials such as used bottles, plastic cups, PVC pipes, and rockwool, participants were taught how to assemble a hydroponic installation independently. Each small group successfully created at least one simple hydroponic system that was immediately planted with vegetable seeds such as kale, mustard greens, and lettuce. This practical approach proved effective in improving participants' understanding and skills (see Figure 1).

Figure 1. Student Guidance and Hydroponics Training for PKK

In addition to individual implementation, several participants also took the initiative to form small hydroponic groups that would manage vacant land around the village hall. These groups planned small-scale production, the results of which could be sold at the village market or used as healthy vegetables for school and health center

consumption. This initiative was an indicator that the community service activities had fostered a spirit of mutual cooperation and entrepreneurship among the PKK women.

In general, this activity has had a positive impact on the knowledge, skills, and attitudes of the PKK mothers' group in developing hydroponic-based home farming. This training also proves that with the right approach, simple technology can be accepted and applied independently by rural communities. In the future, the results of this community service are expected to form the basis for sustainable programs, such as advanced training, strengthening women's farmer groups, and marketing assistance for hydroponic production.

4. Conclusion

The hydroponics training provided to the PKK women's group in Seubam Lhok Village has succeeded in increasing the community's knowledge, skills, and awareness of the importance of household agricultural innovation. Through a participatory approach and hands-on methods, participants were able to understand and apply basic hydroponics techniques using simple tools and materials. The enthusiasm and active involvement of participants during the training showed that this program was on target and relevant to the needs of the village community, especially in supporting family food security.

This community service program also had a positive social and economic impact, marked by the emergence of collective initiatives to form joint hydroponics groups and utilize vacant land in the village. These results show that the training not only focused on educational aspects but also encouraged the formation of a movement for women's independence and entrepreneurship in the village. Therefore, this activity can be used as a model for community empowerment based on simple and sustainable agricultural technology that is suitable for replication in other villages with similar conditions.

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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