Empowering pkk women through socialization of hydroponics using used gallons

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Abstract
Food security is an important issue in rural communities that still depend on traditional agricultural systems. The hamlet of Plembon Lor faces the challenge of limited rain-fed agricultural land, which results in food insecurity. This community service activity aims to empower PKK mothers through socialization and simple hydroponics practices using used gallons. The implementation method uses a community empowerment approach that actively involves participants in the preparation, socialization, and demonstration stages. The results of the activity show that the majority of participants can understand the concept of hydroponics, are able to make simple installations, and show high motivation to practice independently at home. The main impacts felt were an increase in farming skills, awareness of the importance of family nutrition, and the utilization of household plastic waste. Evaluation of the activity indicated that despite the constraints of limited practice time, participants still gained useful learning experiences. Thus, this activity succeeded in increasing the knowledge, skills, and awareness of PKK mothers in supporting family food security and opening up opportunities for small hydroponic-based businesses.

Keywords: food security, hydroponics, used gallons, community empowerment, PKK

1. Introduction

Food security is an important issue for rural communities that still depend on traditional agricultural systems. Plembon Lor, a hamlet in Logandeng Village, Playen District, Gunungkidul Regency, faces serious challenges in meeting household food needs. This is because most of the agricultural land is rain-fed, so agricultural productivity is highly dependent on the seasons. As a result, the community often experiences food insecurity, especially during the dry season. The main problems faced by the community are the low availability of fresh vegetables for daily consumption and the lack of utilization of household plastic waste, which can actually be processed into productive planting media.

Hydroponics is an alternative solution for growing vegetables that is inexpensive, easy, and environmentally friendly. The use of hydroponics with used gallons is the right choice because it reduces dependence on large areas of land, utilizes household plastic waste, and provides flexibility for housewives to grow vegetables in their yards or on their terraces. In addition, hydroponics with used gallons does not require large expenses such as pipe installation and can be a form of empowerment that increases productivity while supporting family food security.

The purpose of this community service is to provide education and training to the women of the Plembon Lor PKK so that they are able to understand and practice a simple hydroponic system using

used gallons. The proposed solution plan includes socialization, demonstrations, and hands-on guidance so that participants not only learn the theory but also acquire technical skills. Thus, this activity is expected to improve farming skills, strengthen family food security, improve nutrition, and encourage the creation of small hydroponic-based businesses.

Several previous studies support the effectiveness of hydroponics as a practical, efficient, and environmentally friendly solution. According to Parashakti, Perkasa, & Wuryandari (2021), hydroponics education improves community skills and awareness of plastic waste reduction. Additionally, hydroponics addresses the issue of limited land availability while supporting family nutrition (Siregar et al., 2021). (Archnopa Yudhi, 2021) demonstrates that simple hydroponics using liquid organic fertilizer can reduce costs and is environmentally friendly. According to Mataram & Mulyadi (2023), hydroponics can boost village economies and create new business opportunities. This research strengthens the basis for implementing this activity.

This activity did not use formal hypotheses because it took the form of community service, so the focus was more on implementation and descriptive evaluation. However, it was rationally assumed that the activity of socializing hydroponics using used gallons would increase the knowledge, skills, and motivation of PKK mothers in managing family food sources independently.

2. Method

The implementation method applied was a community empowerment approach in Plembon Lor Hamlet, focusing on the use of used plastic gallon waste as a simple hydroponic medium. This empowerment approach emphasizes the active participation of PKK mothers in all stages of the activity, from preparation and socialization to practice and follow-up plans. The activity is carried out in groups so that in addition to increasing skills, it also strengthens a sense of togetherness and mutual cooperation.

The implementation procedure is divided into two main stages, namely preparation and socialization. In the preparation stage, the KKN team coordinates with village officials and PKK groups and prepares cleaned used gallons to be used as an economical, environmentally friendly, and easy-to-apply alternative planting medium. The socialization stage includes the delivery of material in the form of basic concepts and the advantages of hydroponics compared to conventional methods, as well as demonstrations of how to make planting media from used gallons. Participants not only listen, but are also directly involved in the practice of planting vegetable seeds.

The aspect of community empowerment is reflected in the involvement of PKK mothers as the main subjects of the activity, where they are given the space to learn, try, and discuss the application of hydroponics. With this participatory approach, it is hoped that PKK mothers will not only understand the theory, but also master the practical skills to apply at home. The hydroponics technique introduced does not use soil, but rather water mixed with a nutrient solution as a source of nutrients. This system is considered more sustainable because it reduces the need for pesticides while supporting a healthy lifestyle. Hydroponic growth is faster than conventional methods because nutrient absorption is better (Renata, 2023).

In the future, the implementation of hydroponic crop cultivation using recycled plastic bottles is expected to continue to be carried out independently by PKK women. This practice has the potential to support household food security, improve family nutrition, and provide opportunities for the development of micro-businesses based on healthy vegetable products in Plembon Lor Hamlet, Gunungkidul. Thus, this activity not only serves as a technology transfer but also as a means of community empowerment toward food self-reliance and increased family productivity..

3. Results and Discussion

3.1. Results of Socialization Activities

The socialization activity on hydroponics using used gallons was held on Sunday, August 24, 2025, at Mrs. Siti's house, RT 06, Plembon Lor Hamlet, Logandeng Village, Playen District, Gunungkidul. The event was attended by around 25 women from the PKK (Family Welfare Movement). Participants showed great enthusiasm from the start of the event, as evidenced by their punctual attendance and active participation in discussions and Q&A sessions. The information provided covered an

introduction to the concept of hydroponics, its benefits in improving family food security, and the advantages of using used plastic bottles as a growing medium.

General data on the activity shows that most participants had never practiced hydroponics before, but were very interested because this method is considered practical, cost-effective, and able to utilize household plastic waste. Participants stated that the information presented opened up new insights on how to grow crops without a large area of land.

Figure 1. Socialization of Simple Hydroponic Equipment Production

3.2. Results of Demonstrations and Assistance

The demonstration stage was carried out by directly practicing how to make a hydroponic installation using used gallons. Participants were taught how to make holes in the gallon, install wicks, prepare the growing medium with rockwool, and sow lettuce, spinach, and kale seeds. Observations showed that participants were able to follow each step well, and most of them even managed to make a simple hydroponic unit independently. Documentation of the activity showed the active involvement of all participants in the practice.

The mentoring phase was conducted through open discussions about the obstacles that might arise when trying this at home. The KKN team provided explanations about seed selection, how to maintain water nutrients, and plant care techniques. Participants shared their plans to try practicing used gallon hydroponics at their respective homes. Specific results showed an increase in participants' understanding, technical skills, and motivation to continue cultivating vegetables independently.

Figure 2. Demonstration and Assistance in Hydroponics Production

3.3. Main Impacts of Activities

The hydroponics outreach activity using used plastic bottles has had a number of positive impacts on the community, especially the PKK women in Plembon Lor Hamlet. The most noticeable impact is the increase in participants' knowledge and skills in utilizing used plastic bottles as a simple hydroponics installation. Participants who previously did not understand the concept of hydroponics are now able to make their own planting media and grow vegetables such as kale and mustard greens. This is in line with the findings (Siregar et al., 2021) which state that the application of simple household-based hydroponics can improve the community's skills in farming on limited land.

In addition, this activity fostered motivation and awareness of the importance of consuming fresh vegetables to support family health. The use of used gallons also had an environmental impact in the form of reducing household plastic waste that was not usually utilized. From a social perspective, this activity succeeded in creating a sense of togetherness among PKK members in working together, sharing experiences, and learning together. Thus, this activity directly contributes to family food security, improved nutrition, reduced plastic waste, and increased productivity of housewives in Plembon Lor. This is in line with the research by Sari, Andreska, Salshabila, Putri, & Prabowo (2024), which states that this program is aimed at utilizing inorganic waste while strengthening food security efforts.

Figure 3. Group photo with PKK mothers

3.4. Activity Evaluation

The activity was evaluated through direct observation, discussion, and brief interviews with participants at the end of the session. The evaluation results showed that the majority of participants (more than 80%) were able to correctly repeat the steps for making hydroponics from used gallons. Participants were also able to explain the benefits of hydroponics, both from a nutritional and environmental perspective.

In terms of engagement, all participants were active in the practical session and were enthusiastic about asking questions regarding plant care, seed selection, and inexpensive alternatives for hydroponic nutrients. Some participants even shared their plans to practice hydroponics at home and make it a family habit.

The challenges that arose included limited practice time, preventing all participants from trying more than once, and a shortage of materials used. However, these challenges were addressed by giving participants more active involvement during the demonstration session and direct guidance from the KKN team during the outreach activity on the same day. This approach ensured all participants gained basic practical experience despite the limited timeframe.

Figure 4. Activity evaluation Photo Q&A session with PKK mothers

4. Conclusion

The hydroponics outreach activity using used gallons in Plembon Lor Village successfully increased the knowledge, skills, and motivation of PKK women in utilizing plastic waste as an alternative planting medium. The main impacts achieved include strengthening family food security, increasing nutritional awareness, reducing household plastic waste, and the potential for developing small hydroponics-based businesses. The evaluation showed that despite time constraints during the practical sessions, participants were still able to gain valuable learning experiences through direct mentoring during the activities. Thus, this activity can serve as a model for rural community empowerment in supporting sustainable food self-sufficiency and family productivity.

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