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EDUCATION ON TOP GRAFTING TECHNIQUES AS AN INNOVATIVE SOLUTION TO INCREASE WATERMELON PRODUCTION AT THE FARMER LEVEL

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Abstract

Watermelon production among local farmers often faces challenges such as pest and disease attacks that cause a decline in crop yields. Grafting is an innovative method that can increase plant resistance and productivity. This community service activity aims to educate farmers about grafting techniques for watermelons. The methods used include training sessions, hands-on demonstrations, and on-site practical guidance. The results of the activity show an increase in farmers' understanding of grafting techniques and their application in watermelon cultivation. It is hoped that this education will contribute to increased watermelon production and farmer well-being.

Keywords : Grafting; watermelon; farmer education; production improvement; community service

1. INTRODUCTION

Watermelon (*Citrullus lanatus*) is a horticultural commodity with high economic value and stable market demand. This fruit is popular among various segments of society due to its sweet taste and high water content, making it ideal for consumption in tropical regions such as Indonesia. The continuously increasing market demand presents a significant opportunity for farmers to develop watermelon cultivation as a primary source of income. According to Julkifli *et al*., (2019), watermelon demand in Palangka Raya City is influenced by several factors, including watermelon prices, substitute fruit prices, per capita income, and population size, with a determination coefficient of 0.936, indicating that 93.6% of watermelon demand variation can be explained by these factors. This indicates that watermelons have significant market potential and can serve as a substantial income source for farmers in Indonesia.

However, in practice, watermelon cultivation does not always run smoothly. Farmers often face various challenges, ranging from environmental factors, pest and disease attacks, to limited knowledge of effective cultivation techniques. One of the main problems often encountered is fusarium wilt, a disease that attacks plant roots and can cause sudden plant death. This has a significant impact on crop

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yields and farmers' incomes. According to Ruliyanti and Majid (2020), Fusarium oxysporum attacks can reduce watermelon production by 20–30%.

To overcome this problem, one approach that has proven effective is grafting. This technique involves combining the rootstock of a plant that is resistant to disease with the scion of a variety that produces high-quality fruit. With this combination, the grafted plant has stronger resistance to soil-borne diseases while maintaining productivity and fruit quality. A study by Miguel *et al*., (2022) shows that grafting in watermelons significantly enhances resistance to Fusarium wilt and improves fruit quality, with a yield increase of over 10% compared to non-grafted plants.

Although grafting techniques have been widely applied in various countries as part of agricultural technology innovation, their implementation at the local farmer level, especially in rural areas, is still very limited. This is due to a lack of access to information, training, and adequate technical assistance for small-scale farmers. According to Salehi *et al*., (2021), factors such as technological limitations, input access constraints, high costs, and insufficient technical supervision are the main barriers to the adoption of agricultural technology in developing countries. Additionally, although grafting has proven effective in enhancing watermelon resilience and production, its adoption among small-scale farmers remains low due to higher grafting seedling costs and uncertainty about direct benefits in the field (Weisenfeld & Wetterberg, 2015; and Nordey *et al*., 2020). Therefore, through this community service activity, education and technology transfer on grafting techniques were provided to farmers as a strategic step to increase watermelon production while empowering farmers sustainably.

2. METHOD OF IMPLEMENTATION

This community service activity was carried out in Tanjung Aman Village, Darul Hasanah Subdistrict, Southeast Aceh Regency, Aceh Province. This location was chosen because the majority of the community are farmers with significant potential for watermelon cultivation development. The activity began with the identification of partners, where the implementation team conducted initial approaches and discussions with local farmer groups to determine relevant target partners who are committed to actively participating in this program (Assauwab *et al*., 2025). After the partners were identified, the next stage was an educational session aimed at providing theoretical understanding of the concept of grafting, its benefits in horticultural cultivation, and the potential for increased production and plant resilience that can be achieved.

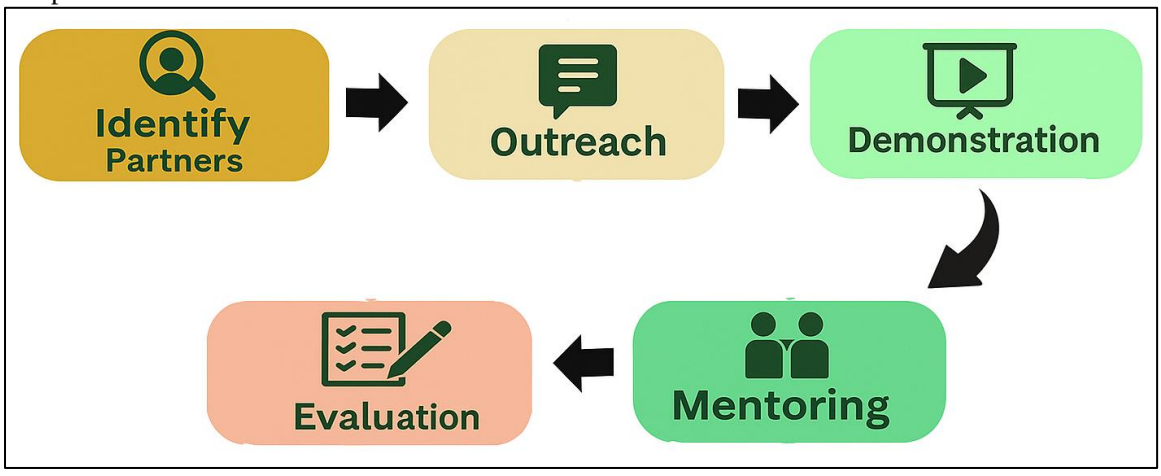

Figure 1. Stages of Community Service Activities in Top Grafting Technique Education

The implementation of this community service activity followed a structured process, beginning with the identification of farmer partners in Tanjung Aman Village, most of whom were unfamiliar with grafting techniques for horticultural crops such as watermelons. The activity continued with interactive training on the basic concepts of grafting, its benefits for plant resilience, and the

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potential for increased productivity. To reinforce understanding, a field demonstration was conducted on the technical steps of grafting and post-grafting care. Following this, farmers were directly accompanied in practical sessions on their own fields, while identifying challenges and providing technical solutions. The final stage involved evaluation through observation, interviews, and questionnaires to assess participants' knowledge and skill improvements, as well as the overall effectiveness of the program. With this systematic approach, it is hoped that grafting technology can be sustainably applied by local farmers.

3. RESULTS AND DISCUSSION

This community service activity was attended by 25 active farmers from Tanjung Aman Village, most of whom previously had no knowledge or experience of grafting techniques for horticultural crops, particularly watermelons. This situation presented both a challenge and an opportunity to provide practical and directly beneficial education. Through interactive extension activities, the farmers began to understand the basic concepts of grafting, its benefits in enhancing plant resistance to diseases, and the potential for increased production through the application of this technology. The training conducted off-site using demonstration and group interaction methods increased the adoption rate of the new technique to 45%, compared to on-site training (van den Berg *et al*., 2019).

Figure 2. Planting Materials in the Practice of Grafting *Citrullus lanatus*

Demonstration sessions have significantly improved farmers' understanding of the grafting process, covering key steps from rootstock preparation to post-grafting care. Participants showed high enthusiasm, particularly during the grafting connection technique, where they practiced independently under guidance, leading to an impressive 80% success rate in properly connecting the graft. The training emphasized the importance of each phase, including the crucial role of rootstock preparation and post-grafting care in achieving high grafting success rates, which reached 85% for live plants. This hands-on approach, facilitated by effective horticultural training, underscores the value of field mentoring in enhancing practical skills and knowledge among farmers (Tirupathamma *et al*., 2019; and Kumar *et al*., 2024). Overall, the integration of these techniques and training methods is crucial in advancing grafting practices and increasing the adoption of grafted vegetables globally (Lee *et al*., 2010; Awazade & Verma, 2024).

This achievement reflects the success of the education program in improving farmers' technical skills while broadening their knowledge of innovations in watermelon cultivation (Darmaputra *et al*., 2020; and Masluki *et al*., 2023). Additionally, the success of this technique is expected to enhance productivity and the quality of future harvests, as well as serve as a model for similar initiatives in other villages or regions (Darmaputra *et al*., 2020). Thus, this community service program makes a tangible

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contribution to strengthening the capacity of local farmers toward a more sustainable and technology-appropriate agricultural system (Raji *et al*., 2024).

4. CONCLUSION

Educating farmers on the technique of grafting watermelon through community service activities has proven effective in improving farmers' understanding and skills. The application of this technique has the potential to increase watermelon production and farmers' welfare. Continuous assistance and the development of similar programs for other horticultural commodities are needed.

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