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Rural Potential Based Community Development for Enhancing Eco-Tourism in Kalisidi Village Through Developing a Fruit Seedlings Center

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Abstract

Kalisidi Village is located in the West-Ungaran District, Semarang Regency. The village has abundant natural resources and strong potential for ecotourism development. However, agricultural challenges such as limited seed storage facilities, suboptimal irrigation, and insufficient seedling quality hinder the maximization of this potential. This study aims to analyze and implement community development programs based on local resources by establishing a fruit seedling center that supports both agricultural productivity and ecotourism. Data were collected through the Participatory Rural Appraisal (PRA). The program was planned based on the issues found by FGD with the Kelompok Wanita Tani in Kalisidi Village, which were divided into three main aspects: technology, information, and human resource management. To resolve these issues, Team 134 of KKN-T Diponegoro University proposed several programs including constructing a greenhouse, providing grafting technique training, implementing an automatic irrigation system based on Real-Time Clock (RTC), and developing a database that includes mapping high-quality fruit commodity distribution in Kalisidi village. The greenhouse design uses a lightweight iron frame with UV-resistant plastic covering, which has proven to be effective and economical for small-scale farmers. Moreover, it improved seedling protection and survival rates, while simultaneously grafting training enhanced farmers' technical capacity and increased the availability of high-quality seedlings. Additionally, the irrigation system optimized water use efficiency and reduced labor requirements, whereas the fruit database provided spatial information that supported agricultural planning and promotion of local commodities. As a result, these programs contributed to strengthening food security, improving economic opportunities, and supporting agro-edutourism in Kalisidi Village. The study concludes that integrating local resource-based community empowerment with technological innovation can enhance rural ecotourism and ensure sustainable agricultural development.

1. Introduction

Kalisidi Village is located in the West-Ungaran District, Semarang Regency. The village possesses abundant natural resources and offers substantial potential for ecotourism development. The primary attractions in this village are Curug Lawe and Curug Benowo, each offering distinct natural charm and situated within a protected forest area characterized by lots of biodiversity. The site has been officially managed by the village government in collaboration with Lembaga Masyarakat Desa Hutan (LMDH) Bela Pesona and Perhutani since 2016 by applying core ecotourism principles such as environmental conservation, active local community participation, and tourist education. The Curug Lawe–Benowo ecotourism area has significantly contributed to the local economy by creating employment opportunities, including vendors, porters, parking attendants, and cleaning staff [1]. Moreover, the preserved agricultural landscape surrounding the area enhances the site's aesthetic appeal and reinforces the concept of sustainable nature-based tourism.

To strengthen the sustainable tourism development in Kalisidi Village, the agro-edutourism approach provides a strategic means to integrate recreational activities, education, and community empowerment. This concept highlights the importance of direct tourist involvement in agricultural processes while gaining knowledge through activities such as fruit picking, organic fertilizer production training, and introduction to environmentally friendly farming systems [2]. In addition, agro-edutourism also opens beneficial informal education spaces for students and the general public while serving as a means of preserving local agricultural-based culture. One form of implementation that aligns with the village's characteristics is the development of a fruit seedling center, which not only functions as a production facility but also as a learning center for visitors [3].

The fruit seedling center in Kalisidi village supports agro-edutourism through vegetative propagation using grafting methods. This method produces seedlings with Top-Quality traits, combining the advantages of the rootstock and scion, such as earlier flowering and fruiting, better fruit quality, and higher resistance to pests and diseases [4]. Seedlings developed through this method can be marketed, creating opportunities to increase community income. To ensure the program's success, an inventory of commonly cultivated fruit commodities is needed, along with adequate seedling storage facilities and the establishment of an optimal irrigation system. Therefore, supporting facilities such as automatic irrigation that can facilitate maintenance, as well as maps of the distribution of parent plants that can be used as sources of superior seeds to support nursery centers that are oriented towards agro-edutourism can also be a direction for development.

The purpose of this article is to analyze and report on a local potential-based community development program by supporting a fruit nursery center as part of the Kalisidi ecotourism initiative.

2. Methodology

In relation to the development of village potential in Kalisidi Village through sustainable community service activities with the ultimate goal of realizing an economically empowered Kalisidi Village through the active role of the community in the agricultural sector and the role of the Women Farmers Group as a strategic collaborator, presented in Figure 1 a flowchart explaining the program methodology.

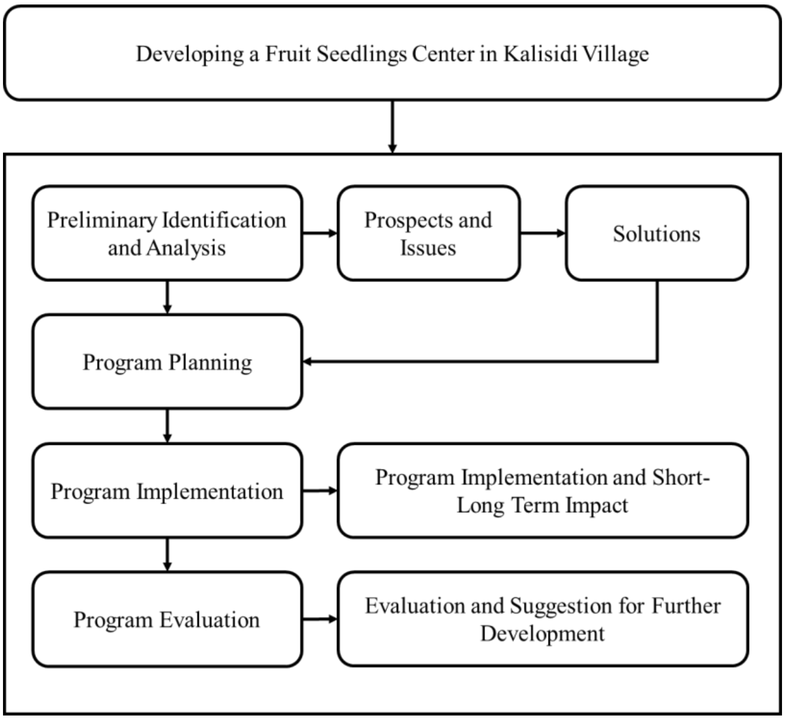

Fig 1. Flow-Chart of The Program Methodology

2.1. Preliminary Identification and Analysis

An initial identification process was carried out to analyze the social and economic conditions, as well as the potential and challenges of natural resources in Kalisidi village. Data were obtained using the Participatory Rural Appraisal (PRA). PRA is a combination of interactive methods that enhance rural and agricultural communities' ability to analyze and understand their situation in a holistic manner and be empowered to plan and act for their betterment [5]. This approach was implemented through observation and Focus Group Discussion (FGD). Observation served as a data collection method by carefully examining the object of study until the findings were considered representative [6]. In this study, Kalisidi village was the object of observation to observe and identify the initial conditions of the village. In addition, focus group discussion is a qualitative research method that involves a selected group of participants to discuss a specific issue or topic in a focus, with the purpose of exploring information in depth and obtaining diverse perspectives [7]. The focus group discussions were conducted with KWT Sri Rejeki and Margo Utomo as a part of the process of identifying initial issues in the agricultural sector.

2.2. Program Planning

The program was planned based on issues identified through focus group discussions with the Kelompok Wanita Tani in Kalisidi village. These issues were classified into three categories: technology, information, and human resources management.

2.3. Program Implementation

Based on the results of the focus group discussion with KWT Sri Rejeki and Margo Utomo, several issues were identified that hinder the optimization of agricultural activities. These include the lack of proper seed storage facilities, the use of seeds with insufficient results, an irrigation system that is not fully optimized, and the lack of fruit data collection commodities in the village.

To resolve these issues, the Team 134 of KKN-T Diponegoro University proposes some programs tailored to the field's needs. These programs include constructing a greenhouse to create a controlled growing environment, providing grafting technique training to produce high-quality, high-result seedlings, implementing an automatic irrigation system based on Real-Time Clock (RTC), and developing a database that includes mapping high-quality fruit commodity distribution in Kalisidi village as an initial step toward a data-driven agricultural system. These programs are expected to increase the agricultural production capacity of the community.

2.4. Program Evaluation

The program evaluation was conducted based on the assessment of the program target group through interviews with each leader of the Kelompok Wanita Tani who participated in the program. The interviews aimed to obtain the assessment of the leader of the KWT Sri Rejeki and Margo Utomo on the progress of the multidisciplinary program implemented by Team 134 of KKN-T Diponegoro University in Kalisidi village.

3. Results and Discussions

3.1. Initial Problem Identification and Program Planning

Based on the Figure 2, it is evident that farmers in Kalisidi village have several problems in the agricultural sector that hinder agricultural development, such as issues related to technology, information, and human resources and management. Target groups sampled in this study are KWT Margo Utomo and Sri Rejeki.

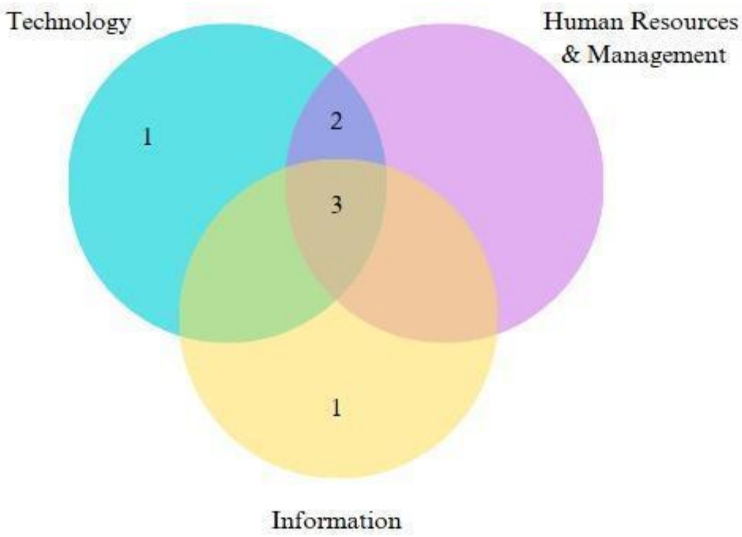

Fig 2. Venn Diagram of Issues in Kalisidi Village

3.1.1. Greenhouse

KWT Margo Utomo is a group that owns horticultural farmland, such as chili, mustard greens, and medicinal plants. The crops cultivated can be used for personal consumption or as a source of income to become more economically independent. However, the lack of agricultural facilities, such as seed storage or seedling storage, is a problem for KWT Margo Utomo. This issue causes seeds and seedlings to easily deteriorate, thereby reducing plants productivity. Additionally, attacks by Plant Pests and Diseases (PPD) are one of the external factors that reduce crop productivity [8]. Based on the problems related to seedling damage and crop failure among Kelompok Wanita Tani due to weather conditions and attacks by plant pests that have been identified, the construction of a greenhouse was designed as an effort to facilitate seedling propagation so that they are better protected. The construction of a mini greenhouse aims to create stable microclimate conditions in terms of temperature, humidity, and light intensity to improve the success of seedling production and reduce the risk of pest attacks [9]. The planning process was carried out in several stages, including a site survey to determine the ideal location for greenhouse construction, measuring space requirements and seedling capacity, and mapping available local materials to minimize construction costs. The greenhouse design uses a lightweight iron frame with UV-resistant plastic covering, which has proven to be effective and economical for small-scale farmers [10]. Natural ventilation is designed using insect nets on the walls and doors to prevent pest entry while maintaining good air circulation. The planning steps for constructing the mini greenhouse consider the resource constraints of the Kelompok Wanita Tani, operational sustainability, and productivity enhancement strategies. The greenhouse is expected to serve as a long-term solution supporting increased seedling productivity and economic resilience for KWT Margo Utomo.

3.1.2. Real-Time Clock (RTC) KWT Sri Rejeki

The agricultural land managed by KWT Sri Rejeki in Kalisidi village has access to water sources located near the farm with an existing irrigation system. However, watering is still not optimal because the existing irrigation system on the land is unable to reach the entire area, especially vacant land that has just been opened for cultivation. As a result, watering is still done manually in some areas, causing uneven water distribution between beds and impacting the growth of plants, which increases the workload of farmers. Based on these issues, irrigation optimization was carried out by expanding the irrigation coverage to new fields currently used for vegetable cultivation, such as water spinach and spinach. The irrigation system was designed with a Real-Time Clock system, which automatically controls the watering schedule so that water flow can be regulated according to the schedule without the need for daily manual intervention. The expansion of irrigation to new fields was carried out by adding pipes connecting the water flow from the pump and the previous irrigation water tank to the sprinkler pipes in the new fields. The planning process included a site survey, the creation of a design for the installation of the pipes, and a survey of the availability of tools and materials.

3.1.3. Real-Time Clock (RTC) KWT Margo Utomo

The agricultural land managed by KWT Margo Utomo still uses a manual irrigation system that utilizes the flow of nearby rivers through irrigation channels. Irrigation is carried out using buckets and dippers. The use of manual irrigation is considered suboptimal because the volume of water released is not known precisely and the irrigation time varies. The shortcomings of manual irrigation are that users do not know the timing and duration of irrigation, as well as the volume of water released [11]. If too much water is used, it will cause the plants to die due to excess water, and vice versa. The lack of electricity on KWT Margo Utomo land poses a major challenge to the sustainability of RTC based irrigation system planning. Based on the existing problems, irrigation planning is carried out by drawing electricity from the house of the leader of KWT to the irrigation land. This electricity will be used as a power source in the planning of the RTC based irrigation system. The process of drawing electricity begins with surveying the route to be taken, obtaining permission from villagers whose land will be crossed by the electrical route, purchasing materials, installing electrical poles, and laying electrical cables.

3.1.4. Fruit Database and Distribution Map

Kalisidi village has a rich diversity of local fruit crops distributed across various areas, including those cultivated in private home gardens. This biodiversity holds significant potential benefits for the local community. However, there is no available data or information about the distribution and quantity of the fruit commodities present in Kalisidi village. The absence of such information has led to gaps in the management of local resources, where agricultural activities and village economic development initiatives are often not based on accurate data [12]. To address this issue, the development of a Fruit Database and Distribution Map was carried out through field surveys. The surveys were conducted directly with villagers of Kalisidi village who cultivate Top-Quality fruit commodities. The survey results were processed into a Fruit Database and Distribution Map. Two types of databases were created a PDF document and a website-based (Streamlit). Similarly, the fruit distribution maps were divided into two types: analog and digital maps.

3.1.5. Grafting

Farmers in the Kalisidi village usually propagate plants through generative propagation, such as planting seeds from the parent fruit. However, the results of production derived from seeds are not always the same as their parents, so they are considered less than optimal. The weakness of generative seedlings is that the plants take longer to produce fruit and the quality of the fruit is not necessarily the same as the parent plant [13]. Less than optimal production results are one of the problems faced by the Kelompok Wanita Tani. Based on these problems, an effective solution to produce Top-Quality plant seeds is vegetative propagation. Vegetative propagation is plant propagation that uses vegetative organs of plants, such as stems, branches, twigs, leaf shoots, tubers, and roots that can inherit the same characteristics as their parents [14]. One of the techniques of vegetative plant propagation is by grafting. Grafting is a technique of connecting rootstocks and scions from different plants to form new plants or individuals [15]. Therefore, providing training on grafting explained and trained directly by experts and practitioners in this field to the Kalisidi community is expected to help them in overcoming the problems they face.

3.2. Program Implementation and Short-Long Term Impact

3.2.1. Greenhouse

The mini greenhouse development program on KWT Margo Utomo land in Kalisidi village is used as a means of propagating Top-Quality fruit plants (durian and avocado) through grafting techniques. The grafted seedlings are cared for in the mini greenhouse so that they grow well. The transparent material of the mini greenhouse helps the plants get optimal light while protecting them from bad weather or climate [16]. A controlled environment supports successful grafting and improves seedling quality. The program's achievements include enhancing the skills of Kelompok Wanita Tani members, ensuring self-sufficient availability of Top-Quality seedlings, making a tangible contribution to the development of local fruit centers and strengthening the food security of the village community. The implementation of mini greenhouse is shown in Figure 3.

(a) (b)

Fig 3. (a) Greenhouse Construction Process; (b) View of the greenhouse

Weather instability and declining soil quality are the main drivers for the adoption of mini greenhouse technology for seedling cultivation, which not only provides direct benefits but also promises long-term positive impacts on sustainable agricultural systems. Weather conditions that do not align with their monthly cycles pose a unique challenge for farmers and the sustainability of their crops. Additionally, pests and diseases hinder the growth of plant seedlings, leading to low efficiency and success rates in open-field seedling production. The development of a mini greenhouse can encourage the application of sustainable agricultural technology with better pest protection and environmental control, thereby increasing the success of horticultural seedling cultivation and food security [17].

Therefore, the construction of a mini greenhouse as a controlled environment using durable building materials such as lightweight steel, insect nets, and ultraviolet-resistant plastic as roofing, provides a solution to the challenges and obstacles posed by open-air environments. This ultimately enhances the efficiency and productivity of seedlings, prevents the need to incur costs for replacing potential losses, and serves as a reliable and long-term alternative within modern agricultural systems. The implementation of this concept has been realized through the construction of the KWT Margo Utomo mini greenhouse, designed as an advanced seedling production facility and a learning center for local farmers to adopt environmentally friendly and efficient agricultural technologies.

3.2.2. Real-Time Clock (RTC) KWT Sri Rejeki

The RTC-based irrigation system implemented in neighborhood unit 002 plays a crucial role in enhancing irrigation efficiency on newly cultivated land planted with spinach and water spinach. This system enables automatic and scheduled irrigation, tailored to the plants' water requirements, such as in the morning and evening. As a result, manual labor can be reduced while maintaining consistent irrigation. This is particularly important for spinach and water spinach, which require a regular and even water supply to support optimal leaf growth. The implementation of irrigation with RTC-based system shown in Figure 4.

(a)

(b)

Fig 4. (a) KWT Sri Rejeki's Irrigation with RTC-based system; (b) the irrigation pipeline prior to being buried

The selection of spinach and water spinach as the primary crops on this new land is also based on technical considerations. Both crops have a short growing cycle of approximately 3-4 weeks, making them ideal for demonstrating the rapid results of automated irrigation technology. Additionally, spinach and water spinach are adaptable to soil conditions, have high market demand, and are economically valuable. The use of the RTC system on these two crops has proven to maximize growth and water usage efficiency, making neighborhood unit 002 as a role for the application of simple yet impactful technology for the local agricultural sector.

The implementation of RTC-based irrigation system optimization on KWT land is planned to have a significant impact in the future. For the short term, expanding the irrigation coverage by adding sprinklers to new beds will result in more even water distribution, making irrigation more efficient and minimizing the role of human labor. Meanwhile, for the long-term implementation, it reduces water waste by up to 47.8% and increases crop productivity by 34.9% compared to conventional irrigation systems through precise irrigation tailored to plant needs [18]. Furthermore, the success of this program strengthens the mastery of smart agricultural technology among KWT participants and encourages the transition to adaptive precision farming practices that address climate challenges and local food needs.

3.2.3. Real-Time Clock (RTC) KWT Margo Utomo

The implementation of the irrigation with the RTC based automatic system is divided into three main stages: electricity distribution, design and assembly system, and optimization of the RTC-based automatic irrigation system. The distribution of electricity as the first stage has been realized by Team 134 of KKN-T Diponegoro University. The electricity supply was carried out by supplying electricity from a 450 VA village installation as the power source to the agricultural land location. This stage is the key to ensuring the sustainability of the automatic irrigation system, considering that all control and drive components, such as microcontrollers, RTC modules, water pumps, and relays, depend on a stable and continuous power supply. The implementation of Irrigation with the RTC-based system is shown in Figure 5.

(a) (b)

Fig 5. (a) Audience and consultation with PLN regarding electricity supply; (b) Electricity supply process from the KWT chairperson's residence to the KWT Margo Utomo site.

The process of distributing electricity begins with identifying and designing the shortest and most efficient route from the power source to the center of the irrigation system. After that, bamboo poles are installed using 7 cm diameter and 500 cm long apus bamboo as the supporting structure for the electrical cables. Apus bamboo is chosen as the supporting structure because it is strong, durable, easily available, and more economical. The bamboo poles are installed by digging a foundation hole until 70 cm, then installing the bamboo pole, and pouring concrete for the pole foundation. The concrete pouring on the pole foundation is done to strengthen the pole's position so that it remains sturdy in bearing the weight of the cables and wind gusts.

A Miniature Circuit Breaker (MCB) with specifications of 1P 1A (1 Phase 1 Ampere) is installed at the power source. The installation of the 1P 1A MCB is based on the maximum load capacity of the system when operating at full capacity to prevent the risk of damage to the electrical installation due to overcurrent and to provide protection against sudden electrical disturbances. The main cable installation was carried out by pulling and installing a 200-meter-long cable on bamboo pole supports at a distance of 10 meters between poles. The cable was secured using weather-resistant (UV-resistant) plastic clamps to ensure the stability of the cable position. Upon reaching the distribution point in the agricultural field, the electrical current is transmitted using NYM 2 × 1.5 mm cables as connecting cables from the NFA2X cables to the outlet units, which will serve as the final terminals for the automatic irrigation equipment. NYM cables were chosen because they are flexible, strong, and durable, and suitable for the low electrical current required by water pumps, microcontrollers, and irrigation system support devices.

After the installation was completed, electrical flow testing was conducted using a digital multimeter to check cable continuity, voltage stability, and identify potential issues at the connections. The primary achievement of this electrical distribution phase is the creation of a stable, safe, and efficient field electrical system capable of supporting the operational needs of the automatic irrigation system, which is aligned with the technical requirements of the RTC-based automatic irrigation system.

The supply of electricity from State Electricity Company, or in Indonesian is *Perusahaan Listrik Negara (PLN)*, to KWT Margo Utomo land can support the implementation of RTC-based irrigation technology that can operate automatically and optimally without relying on manual labor from farmers. With the availability of electricity to support the RTC irrigation system, water usage efficiency can be optimized, and agricultural productivity can increase significantly. In the short term, RTC sensor-based irrigation technology can improve water usage efficiency by 35-40%, increase agricultural productivity by 20-25%, and reduce operational costs by 15-20%, despite requiring a higher initial investment [19].

RTC technology not only provides efficiency and economic benefits, but also offers various strategic advantages that contribute to the agricultural and environmental sectors in the future. The long-term implementation of RTC-based irrigation can support environmental sustainability by maintaining water resource availability and reducing the risk of ecosystem damage, while also providing significant economic benefits through water use efficiency and increased crop yields, despite requiring a high initial investment. In addition, RTC-based irrigation technology opens up opportunities for innovation such as the integration of big data and the Internet of Things (IoT) to improve the accuracy and effectiveness of sustainable irrigation management in the future [19].

3.2.4. Fruit Database and Distribution Map

The Fruit Database and Distribution Map Program was implemented by Team 134 of KKN-T Diponegoro University, with the aim of providing a clear and comprehensive overview of the distribution of fruit commodities in Kalisidi village. It is expected that both the local community and village authorities will gain insights into the various types of fruits cultivated across different areas, and also can identify productive and potentially developable land. The development of the database and distribution map began with a field survey of fruit cultivation areas owned by villagers. This survey gathered data from 81 respondents, resulting in 191 land coordinate points, which were then verified based on indicators such as productivity, consistency of harvest, and potential for commodity development. Verification results indicated that 72 points were classified as productive. From these, 30 representative points were selected to ensure coverage across each neighborhood unit. The implementation of data collecting and mapping of fruit commodities is shown in Figure 6.

(a) (b)

Fig 6. (a) & (b) Fruit commodities survey in Kalisidi Village as part of the mapping program

The survey data were processed into two versions of fruit commodity distribution maps: analog and digital. The analog map was created using ArcGIS software, displaying the village's administrative boundaries and symbolizing fruit commodities at each representative point. Meanwhile, a digital map was developed using the Google My Maps platform, enabling users to access detailed information about fruit commodities at specific locations, along with navigation features integrated with Google Maps.

The outcomes of this program include the establishment of the Top-Quality Fruit Plant Database and Distribution Map of Kalisidi village, both of which provide detailed spatial information accessible to the broader public. The maps reveal that durian and avocado are the higher commodities, followed by other fruits such as mango, banana, citrus, pineapple, guava, sapodilla, and papaya as the lower commodities. These outputs are expected to support strategic planning for agricultural development, the empowerment of Kelompok Wanita Tani, and the sustainable enhancement of the local economy.

The mapping of fruit commodities and the development of the database have had a significant impact on various stakeholders, including the village officers as the commodity data archives managers. The important outcome of this program is the availability of a clear visual map showing the distribution of fruits in various areas of Kalisidi village. This map not only shows the harvest results from planted land, but also helps identify potential areas that were previously unrecorded. For village officers, this information provides a solid basis for developing development plans, preparing budgets, and distributing agricultural assistance in a targeted manner. Additionally, this data facilitates the provision of information to villagers, streamlines collaboration with external parties such as agricultural institutions or agencies, and serves as a media for monitoring the progress of agricultural results.

This program is beneficial for village officers because it provides a database and maps that offer systematic and detailed data. This data helps improve efficiency and accuracy in the decision-making process [20]. With this source of information, villages can develop targeted agricultural strategies, determine priority areas for the development of specific commodities, and facilitate data-based decision-making in the future. For the villagers, especially farmers, this program is an important medium for promoting the Kalisidi's top-quality fruit commodities.

3.2.5. Grafting Workshop

The Team 134 of KKN-T Diponegoro University arranged a grafting workshop entitled "*Teknik Grafting Tanaman Buah: Pembibitan Cerdas Hasil Berkualitas*" on Saturday, July 26, 2025 at the Merah Putih Building in Kalisidi Village Hall. The workshop is part of a KKN-T multidisciplinary program that focuses on the theme "Pemberdayaan Kelompok Wanita Tani dalam Membentuk Sentra Buah Unggul Guna Mendukung Penguatan Ekonomi dan Ketahanan Pangan Masyarakat Desa Kalisidi". The workshop aimed to provide KWT knowledge and understanding related to fruit plant grafting techniques, especially avocado and durian. The implementation of Grafting Workshop is shown in Figure 7.

(a)

(b)

Fig 7. (a) Explanation and demonstration of grafting techniques by Ir. Karno M.Appl.Sc., Ph.D. (b) Hands-on practice session of grafting techniques by participants.

The presentation of material and workshop practices were facilitated by lecturers from the Agroecotechnology Study Program of Diponegoro University: Ir. Karno M.Appl.Sc., Ph.D. and Fajrin Pramana Putra, S.P., M.Sc. This workshop was attended by 30 participants, consisting of members of KWT Sri Rejeki, KWT Margo Utomo, and representatives of the Kalisidi villagers. During the implementation, participants took a pre-test, listened to the material presentation, question and answer session, grafting practice, post-test, and documentation. The grafting method used is the shoot grafting method, each participant has the opportunity to practice shoot grafting as many as 1-2 plants and is free to choose the type of plant, between avocado or durian. Participants received a leaflet containing shoot grafting techniques to increase their understanding of grafting on avocado and durian.

Evaluation of program achievements was carried out through giving pretests and post-tests to measure the increase in participant's understanding of the material presented. Quantitatively, the evaluation results showed that 40% of participants experienced an increase in scores, 36.7% showed a fixed score, and 23.3% experienced a decrease in scores. The average pretest score of the participants was 82.7, increasing to 85 in the posttest. This percentage increase indicates a strengthening of knowledge related to shoot grafting techniques, although there are still variations between individuals.

Empowering Kelompok Wani Tani through grafting workshops can make a positive contribution. Through active participation in the activities, Kelompok Wani Tani members gained hands-on knowledge and technical skills on modern vegetative plant propagation methods. The results of the program evaluation showed an increase in the capacity of participants in applying grafting techniques. This was supported by the assistance of Team 134 KKN-T, which monitored all grafted plants, and it was confirmed that 35.9% of the plants were successfully grafted using the grafting technique.

The success of this workshop can be seen from the high-quality durian and avocado seedlings. In addition, the grafting skills by members of the Kelompok Wani Tani can provide social and economic benefits to the community. These skills help maintain the production and quality of fruit seedlings in a sustainable manner. Good seedlings will produce top-quality fruit, thereby increasing business profits [21]. This workshop also opens up new business opportunities in the agricultural sector, particularly in the seedling of high-quality plants.

3.3. Evaluation Summary of KWT Margo Utomo and KWT Sri Rejeki Programs

The evaluation of programs implemented by Team 134 of KKN-T Diponegoro University in Kalisidi Village, as conveyed by the leaders of KWT Margo Utomo and KWT Sri Rejeki, indicates that all initiatives brought tangible benefits to the community. The Fruit Database and Distribution Map effectively assisted members in identifying land ownership, mapping top-quality fruit plant varieties, and facilitating plantation management and monitoring. The Mini Greenhouse was considered successful, though improvements such as adding a shade net were suggested to reduce excessive sunlight and support the cultivation of moisture-dependent plants like orchids. The irrigation with an RTC-Based System enhanced land management efficiency, streamlined the watering process, reduced labor, and supported plant diversification, although some members required additional operational training; both groups expressed the hope that the system could be further developed for smooth, long-term operation. The Grafting Workshop expanded participants’ skills in plant propagation and improved the value of fruit varieties, with recommendations for follow-up training, integration with seed planting activities, and ongoing monitoring to ensure productive growth. Overall, the programs were positively received, with constructive suggestions aimed at ensuring sustainability and maximizing community capacity.

3.4. Suggestion for Further Development

The program in Kalisidi village can be developed in several stages. First, organize training on sustainable plant grafting techniques so that villagers can practice them optimally in the future. The main objective is to produce high-quality fruit seedlings and make Kalisidi village a center for the best quality seedlings. Second, mini greenhouses can be equipped with shade nets to protect seedlings from direct sunlight, so that the seedlings do not die from excessive heat. Third, develop irrigation with an RTC-based automatic system, especially for land owned by KWT Margo Utomo.

4. Conclusion

Kalisidi village is one of the villages that has a variety of fruit commodities within it. However, the villagers do not yet have access to information regarding the location and distribution of each fruit. Team 134 of KKN-T Diponegoro University implemented several programs in Kalisidi Village to address key agricultural challenges. These included developing a fruit commodity database and mapping system to improve information access, constructing a mini greenhouse to provide seedling storage, and establishing RTC-based irrigation systems supported by electrical supply solutions for KWT Margo Utomo and irrigation optimization for KWT Sri Rejeki. Additionally, a grafting training program was introduced to improve plant quality and productivity, replacing reliance on generative propagation. Collectively, these initiatives aimed to enhance agricultural efficiency, productivity, and economic potential in the village.

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