

Strengthening Women Farmer Groups through Integrated Empowerment Strategies: The Case of Kalisidi Village, Indonesia

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Abstract

Kalisidi Village, located in West Ungaran District, Semarang Regency, has significant agricultural potential supported by fertile soil and favorable climatic conditions. The majority of its population works in the agricultural sector, including the active participation of the local Women's Farmers Group (KWT). Based on previous community service programs that introduced innovations such as automatic irrigation systems and organic fertilizer production, this study explores the feasibility and strategic development of a Fruit Nursery Center managed by the local KWT, as a continuation of the village development program. The methods used include direct observation, interviews, evaluations, and focus group discussions (FGDs). Interviews were conducted with 100 respondents, ranging from KWT members to village officials. The results show that despite strong motivation and the availability of basic infrastructure, KWT faces three main challenges: limited knowledge of propagation techniques (e.g., grafting), lack of access to simple agricultural technologies, and weak digital literacy for marketing their products. These obstacles hinder the optimal production and distribution of high-quality fruit seedlings. This analysis proposes an integrated empowerment program involving interdisciplinary collaboration from agriculture, engineering, business, and communication. Recommended programs include technical training, provision of propagation equipment and greenhouse construction, and digital marketing workshops. The goal is to establish sustainable, community-managed nursery centers that enhance local economic resilience and serve as models for inclusive, technology-driven rural agribusiness development.

1. Introduction

Kalisidi Village is a village located in Semarang, Central Java, Indonesia, with abundant natural resource potential, including fertile agricultural land, sufficient water sources for agricultural activities, and a conducive environment for livestock farming. The Village has a demographic profile with the majority being in the productive age range, covering 67.25% of the population, and most of the population works in the agricultural sector, with more than 500 farmers involved in various activities that include agriculture, livestock, and aquaculture [1]. However, this potential has not been fully utilized by the local community. According to Sas et al., the main challenges in the Village include conventional farming systems, suboptimal waste management, and low agricultural productivity, with the core problem being the lack of a sustainable system. Farmers largely rely on inefficient traditional methods, and waste from the livestock and agricultural industries remains underutilized, particularly in terms of converting waste into organic fertilizer for agricultural land, based on these problems, KWT and the local government have attempted various programs, including managing agricultural waste into organic fertilizer [2].

Considering the climate, geography, and potential of the village, the development of a Fruit Nursery Center in Kalisidi Village strongly supports its feasibility for improving local agricultural practices, economic growth, and environmental sustainability. This community development project can have various objectives, such as providing high-quality seedlings, educating the community about contemporary agricultural methods, and promoting agrotourism. All of this aligns with current agricultural growth patterns in the region.

One key factor in the success of a Fruit Nursery Center is understanding the local socio-economic landscape. This is because farmer decision-making is influenced by socio-economic conditions and support from various supporting institutions [3]. Agricultural practices in Semarang Regency have developed rapidly, particularly through innovations such as agrotourism, which boosts the local economy by integrating tourism and agriculture. This is evident in the Purwosari Agrotourism case study, which exemplifies how contemporary agricultural methods can boost economic activity and increase community knowledge about the agricultural industry by integrating educational elements into agricultural production [4].

Based on the success of this case study, this village can replicate a similar framework for developing a Fruit Plant Nursery Center. Therefore, examining the feasibility of establishing a Fruit Plant Nursery Center in Kalisidi Village, Semarang Regency, is essential for formulating a comprehensive strategy that considers community involvement and regional analysis. Therefore, to provide a comprehensive overview in developing a mature and sustainable strategy that aligns with the objectives of this study, a potential analysis is necessary.

2. Methodology

This study uses qualitative case study that utilizes SWOT and participatory rural appraisal (PRA) as analytical frameworks. This method was used to gather comprehensive and contextual information regarding Kalisidi Village's activities and the potential for developing a fruit nursery center. These techniques were applied in several stages, including direct observation, interviews, evaluations, and focus group discussions (FGDs), as well as formulating findings and strategic recommendations [5], [6], [7].

Direct observation with purposive sampling was conducted to directly observe land conditions, agricultural facilities, target group activities (KWT activities), and stakeholders (village government and agricultural experts). Interviews, 100 respondents included the members of KWT and stakeholders, with various stakeholders were conducted to assess issues and opportunities, as well as key elements, which served as a reference for the SWOT analysis. PRA techniques were used in FGDs with stakeholders and target groups. Assessment and analysis were conducted by categorizing problems and potentials in Kalisidi Village and the target group. Conclusions and recommendations were drawn by considering the priority scale of the community development agenda and were implemented to create a sustainable action plan.

3. Results and Discussions

3.1. Potential and Problems in Kalisidi Village

Based on observations and interviews with target groups, stakeholders, and studies of the socio-cultural and environmental context of Kalisidi Village, the main potentials and issues have been identified as presented in Table 1.

Based on Table 1, it can be seen that Kalisidi Village's greatest potential lies in the availability of fertile land and a humid climate that supports fruit cultivation. Agricultural activities remain the primary driver of the village economy. Furthermore, there is strong support from the local government for human resource development in the village. The Women's Farmers Group is also very active and enthusiastic, particularly due to the formation of a newly revitalized organizational structure, which resulted from a previous community service program. These potentials demonstrate a fundamental readiness for further community development initiatives.

This aligns with the theory of community-based development, where social participation plays a crucial role in the success of development programs. Support from various sectors and multi-helix stakeholders is a contributing factor to the success and sustainability of these programs [8]. According to Olmedo et al., collaboration between the community and stakeholders in village community development is a key prerequisite for community-based development to unlock existing potential by strengthening the

capacity of local communities to navigate processes, manage resources, and undertake larger initiatives in ways that benefit the group [9].

Table 1. Potential and Problems in Developing a Fruit Seed Center in Kalisidi Village

Aspects	Potentials	Problems
Agriculture	Fertile soil and climate that suit the land suitability of various types of plants	Plant propagation facilities are still lacking
Experiences	The Women Farmers Group is classified as active and has human resources ranging from 25-60 years old.	Limited knowledge of propagation techniques
Government and Stakeholders	Fully support the Women's Farmers Group as a target group for human resource development in the Village	There are no plans to develop a sustainable fruit nursery business.
Digital Literations	There are human resources aged 25 – 35 years who are digitally literate	Low capacity in digital marketing knowledge
Target Group	High enthusiasm for learning and its members are well organized	The group's financial condition is still weak, and it does not yet have a stable business unit.

However, the development of superior fruit nursery centers still faces several fundamental challenges. Based on the results of FGDs and field observations, it was found that the target group still has limited knowledge of fruit plant propagation techniques, particularly grafting methods such as stem and shoot grafting. This is also supported by the limited availability of plant propagation facilities and infrastructure, such as maintenance greenhouses, supporting equipment, and seedling growth areas. Furthermore, knowledge related to product marketing and digital marketing capacity remains low, primarily due to unfamiliarity with e-commerce platforms and social media for product marketing, which may be a limiting factor in the development of superior fruit nursery centers. These obstacles align with those experienced by target communities involved in digital transformation and innovation processes, where limited resources, lack of digital competency, and difficulty in accessing knowledge and infrastructure are common challenges [10], [11].

3.2. SWOT Analysis

Based on the results of field observations, FGDs, and interviews that have been conducted, the results of the SWOT analysis were obtained as presented in the SWOT matrix in Table 2.

The S-O strategy leverages strengths by optimizing opportunities. Based on the mapping of existing strengths and opportunities, Kalisidi Village already possesses a strong human resource base with a high level of enthusiasm for development, supported by the local government's involvement in improving the residents' economy by optimizing existing natural resources to open broader market opportunities. This is reflected in the village government's efforts to "brand" one of the region's tourism potentials, Curug Lawe. Thus, through this SO optimization, Kalisidi Village can develop an agribusiness model based on agro-edu-tourism, supported by the KWT (Women's Farmer Group) as the village's flagship product. This can be promoted in conjunction with the digital promotion of the Curug Lawe tourist destination to reach a wider market outside the region. This aligns with the findings of Lasaksi (2024), who emphasized that village community participation in local economic activities can strengthen the economic resilience of rural households [12].

The need for environmentally friendly and sustainable agribusiness products, especially in markets outside the region, presents several economic opportunities. The village's flagship products can be strategically marketed using digital technology. The goal of the S-O optimization strategy in this situation is to create a KWT-based agricultural model as a superior village product that is advertised

digitally through various approaches. This model can adapt the Community-Based Agribusiness approach, which has been proven effective in increasing the competitiveness of local products and strengthening women farmers' institutions. Increasing women's contributions to regional agriculture, especially using digital platforms, can increase the added value of products and encourage broader economic participation [13], [14].

Table 2. SWOT Matrix Analysis

Strengths	Weaknesses	Opportunities	Threats
<ul style="list-style-type: none"> • High Enthusiasm from Women Farmers Groups (KWT) • Suitable climate and land conditions • Strong support from local governments • Presence of tourist destinations 	<ul style="list-style-type: none"> • Limited technical capacity • Low access to technology • Digital knowledge gap 	<ul style="list-style-type: none"> • Availability of an open market • Potential external support (such as CSR from companies and higher education institutions) • Support from stakeholders (e.g., agricultural extension officers) • A pro-agriculture local government policy environment 	<ul style="list-style-type: none"> • Dependence on external programs • Competition from seed producers outside the village
Internal x External			
S-O Strategy	Leveraging internal strengths (active Women Farmers Groups) to target the growing plant seed market.		
S-T Strategy	Strengthening institutional capacity to reduce dependency and increase competitiveness.		
W-O Strategy	Providing training in plant propagation and digital marketing to address technical and digital literacy gaps.		
W-T Strategy	Develop a robust and independent production and marketing system.		

The S-T strategy, leveraging strengths to mitigate threats, demonstrates that Kalisidi Village must focus on establishing a strong and sustainable institutional framework for its Women Farmers Group (KWT) through practices such as member capacity building, sound financial record-keeping, asset management, and ongoing leadership rotation. This is in line with research showing that institutional support and funding significantly increase the adoption of adaptive techniques by smallholder farmers, and is crucial for reducing reliance on external initiatives [15].

Furthermore, branding Kalisidi Village's local potential will be a key differentiator from competitors, emphasizing its geographic advantages and exceptional product quality, in line with research by Thompson et al., which supports strengthening local products and a climate-resilient market position through strengthening local identity [16]. The adoption of agricultural technologies such as greenhouses and controlled irrigation systems can provide businesses with a competitive advantage in terms of production efficiency and resilience to pest outbreaks and adverse weather conditions. The concept of Climate-smart agriculture (CSA) can drive values and adaptation processes by utilizing appropriate local technologies, while the adoption of greenhouses has been shown to increase household income and food security, as evidenced by Indonesian melon farmers [17], [18].

W-O strategy, with the existing limitations, Kalisidi Village must be able to take advantage of opportunities, this can be started with intensive technical training, such as training in plant nurseries with various existing propagation methods to be able to minimize the weaknesses that exist as an effort to increase the production capacity of superior seeds in the future. According to Haase et al., focusing on seed quality is better than just focusing on quantity alone, it is very important because research shows that high-quality seeds, although initially more expensive, result in cost efficiency and higher survival rates in the long term [19].

Thus, the strategy must include providing adequate infrastructure and basic equipment, such as polybags, planting media, and grafting equipment. These resources can be obtained through collaboration with external partners, such as CSR programs, external relationships with universities, or agricultural offices, leveraging support from local governments, particularly village governments. Furthermore, the strategy must improve digital literacy and online marketing skills among farmers and KWT members.

Improved digital skills have been shown to facilitate the adoption of advanced production technologies such as efficient irrigation and pest control. Case studies, such as that of Nglinggi Village in Central Java, show that digital marketing training significantly increased women's participation in the rural economy, boosting income and market reach [20]. Furthermore, community-based digital literacy programs empowering women entrepreneurs can improve marketing skills and the capacity to build brands that serve as group identities [21]. Therefore, increased digital literacy improves the performance of rural SMEs by enabling broader market access, better customer engagement, and a stronger brand identity [22].

The W-T strategy, to avoid weaknesses becoming threats, Kalisidi Village must prioritize intensive mentoring and ongoing monitoring after empowerment programs are carried out by both internal and external parties to ensure sustainable activities and avoid stagnation. In addition, to ensure the active participation of the target group is maintained, so that the wheels of the KWT organization continue to run. This is supported by the report of Anwarudin and Dayat, which states that the sustainability of agribusiness in Bogor shows that the high level of farmer participation in extension activities, training, and internships significantly supports the long-term sustainability of the program [23]. Improving internal cadre development and leadership rotation within KWT is crucial to reduce dependence on external support. Community-based extension models such as CRAFFS (Climate-Resilient Agribusiness Farmer Field Schools) highlight the importance of participatory training methods to sustain innovation through farmer-to-farmer replication [24].

Another approach is to adopt a hybrid marketing strategy, starting with local marketing and gradually increasing digital platforms as digital literacy increases, to avoid initial dependence on digital systems. This is in line with Haris' (2024) research on rural SMEs, which validates that combining traditional and digital approaches increases credibility, trust, and market reach [25].

3.3. Strategic Recommendations

Based on the analysis and discussion conducted, several strategic recommendations can be formulated to strengthen the sustainability of the program in Kalisidi Village. First, implementing regular and tiered technical training (e.g., grafting, propagation, and nursery management) is crucial to ensure the continuous improvement of the technical capacity of KWT members. This aligns with previous studies showing that capacity building through ongoing technical training can increase farmer productivity and accelerate technology adoption in rural agribusiness [26], [27].

Furthermore, developing a simple digital platform for seed marketing can significantly expand the market reach of local products. Digital tools have been shown to empower rural communities by reducing transaction costs and opening wider access to regional, and even national, markets. Furthermore, institutional strengthening and mentoring are necessary for the transformation of Women's Farmer Groups (KWT) into independent agribusiness units. Furthermore, institutional capacity building

is widely recognized as a key factor in ensuring sustainability and reducing dependence on external actors [28]. Finally, building long-term collaborations with universities and government institutions is crucial for maintaining program continuity and the flow of innovation.

4. Conclusions

This study shows that Kalisidi Village has significant potential to be developed as a community-based production center for superior fruit seedlings. This potential is reflected in its favorable geographic conditions, the enthusiasm and active involvement of the Women Farmers Group (KWT), and the availability of basic infrastructure such as an automatic irrigation system. However, several challenges remain, including limited knowledge of seedling propagation techniques, a lack of simple agricultural technology, and poor digital marketing capabilities. Through a Participatory Rural Appraisal (PRA) approach, case studies of two KWTs, and a SWOT analysis, a development strategy has been formulated that includes technical training, digital marketing capacity building, institutional strengthening, and the application of appropriate technology. With the implementation of appropriate strategies and continued support from various stakeholders, Kalisidi Village has significant potential to become a model for an independent, productive, and competitive agribusiness village.

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