

Community Empowerment through Organic Farming: Socialization and Implementation in Besakih Village, Karangasem

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Abstrak

Program ini berfokus pada peningkatan pemahaman, keterampilan, dan partisipasi masyarakat Desa Besakih, Kecamatan Rendang, Kabupaten Karangasem dalam penerapan sistem pertanian organik, khususnya pada budidaya tanaman lidah buaya. Fokus tersebut muncul dari kondisi rendahnya tingkat kesadaran dan kemampuan petani dalam mengimplementasikan standar operasional prosedur (SOP) pertanian organik yang berperan penting dalam menjaga keberlanjutan lingkungan serta meningkatkan produktivitas hasil pertanian. Program ini dirancang sebagai upaya strategis untuk mewujudkan pengelolaan perkebunan yang ramah lingkungan dan berkelanjutan melalui pengurangan ketergantungan terhadap pupuk serta pestisida kimia, dengan melibatkan perusahaan swasta di bidang food manufacture, yaitu PT. Alove Bali Ind. Kegiatan dilaksanakan melalui tiga tahapan utama: edukasi, implementasi, dan evaluasi. Tahap edukasi difokuskan pada sosialisasi manfaat pertanian organik dan pengenalan SOP budidaya lidah buaya oleh PT. Alove Bali Ind., sedangkan tahap implementasi dilakukan melalui pendampingan langsung di lapangan untuk memastikan penerapan praktik pemindahan lahan, pengomposan pupuk, dan peremajaan tanaman berjalan efektif. Tahap evaluasi dilakukan secara kolaboratif antara akademisi, perusahaan, dan masyarakat guna mengidentifikasi kendala serta merumuskan solusi yang berkelanjutan. Pemberdayaan petani dalam praktik pertanian organik meningkat sekitar 71%, sehingga memberikan dampak pada peningkatan stabilitas dan pertumbuhan pendapatan masyarakat. Program ini menjadi contoh kolaborasi lintas sektor yang efektif dalam mewujudkan model pemberdayaan masyarakat berbasis lingkungan yang dapat direplikasi di wilayah lain dengan potensi agrikultur serupa.

Kata kunci: Keberlanjutan, Lidah Buaya, Pemberdayaan Masyarakat, Pertanian Organik, SOP

Abstract

This program focuses on enhancing the understanding, skills, and participation of the Besakih Village community, Rendang District, Karangasem Regency, in implementing organic farming systems, particularly in the cultivation of aloe vera. The focus emerged from the low level of awareness and capability among farmers in applying Standard Operating Procedures (SOPs) for organic farming, which play a crucial role in maintaining environmental sustainability and improving agricultural productivity. The program was designed as a strategic effort to promote environmentally friendly and sustainable plantation management by reducing dependence on chemical fertilizers and pesticides, in collaboration with a private company in the food manufacturing sector, PT. Alove Bali Ind. The activities were conducted in three main stages:

education, implementation, and evaluation. The education stage emphasized the dissemination of organic farming benefits and the introduction of aloe vera cultivation SOPs facilitated by PT. Alove Bali Ind. The implementation stage involved direct field assistance to ensure the effective application of land transfer, composting, and plant rejuvenation practices. The evaluation stage was carried out collaboratively among academics, industry partners, and the community to identify challenges and formulate sustainable solutions. Farmer empowerment in adopting organic farming practices increased by approximately 71%, leading to greater income stability and growth within the community. This program serves as an effective model of cross-sector collaboration in developing an environmentally based community empowerment initiative that can be replicated in other regions with similar agricultural potential.

Keywords: Sustainability, Aloe Vera, Community Empowerment, Organic Farming, Sops

1. INTRODUCTION

The Province of Bali is recognized as one of the regions with a high level of biodiversity, encompassing a wide range of flora and fauna that support the development of various tropical agricultural commodities. However, the rapid expansion of the tourism industry and urbanization over the past few decades has placed considerable pressure on the sustainability of agricultural land in the region (Rachma & Umam, 2021). The conversion of green areas into residential zones, tourism infrastructure, and industrial facilities has resulted in multiple forms of environmental degradation, including declining soil quality and fertility, increased erosion risks, and a reduced ecological capacity of land to sustain agricultural productivity. Moreover, global climate change has further aggravated these conditions through more frequent extreme weather anomalies, which negatively affect crop yields and regional food security (Dulbari et al., 2021). In this context, empowering local farming communities has become essential to maintaining agricultural sustainability through innovative and participatory approaches. This is consistent with the findings of Permatasari et al. (2023), who highlight that community-based training and capacity-building initiatives in agricultural production and local product development play a vital role in fostering economic self-reliance based on regional potential.

One effective approach to addressing these challenges is the development of sustainable agricultural systems through the adoption of organic farming practices. Such systems prioritize environmentally friendly principles by avoiding synthetic chemicals and substituting them with natural inputs, including organic fertilizers and botanical pesticides (Purwantini & Sunarsih, 2020). Organic farming not only enhances the production of safe and nutritious crops but also strengthens ecosystem resilience through soil and water conservation. Empirical evidence indicates that implementing these practices can reduce agricultural carbon emissions and improve resilience to climate change (Gamage et al., 2023). Consistently, research by Lea et al. (2024) highlights that organic farming can serve as a strategic instrument for sustainable rural development, particularly by improving the livelihoods of smallholder farmers and reducing dependence on costly agricultural inputs. Hence, organic farming systems contribute not only to crop productivity but also to environmental preservation and the socio-economic well-being of farming communities.

The development of organic farming has shown a positive trend, driven by increasing public awareness of the importance of health, food safety, and environmental conservation. One promising crop for organic farming systems is aloe vera, which has high economic value and is widely used in the food, cosmetic, and pharmaceutical industries (Syawal & Septianita, 2015). This plant demonstrates high adaptability to tropical climates and is relatively easy to cultivate; however, its success largely depends on proper cultivation practices and management (Restu Illahi & Yulianto, 2024). Therefore, enhancing farmers' capacity to implement organic cultivation techniques is a key factor in achieving productive, efficient, and sustainable agriculture.

Besakih Village, Rendang District, Karangasem Regency, has significant potential for the development of organic aloe vera cultivation. The socio-economic conditions of the community are characterized by relatively small landholdings, limited production facilities, and varying technical knowledge, which affect the adoption of sustainable practices (Sapbamrer & Thammachai, 2021). Aloe vera cultivation not only meets local market demand but also creates opportunities for industrial diversification, including the production of gels, beverages, cosmetics, and exports. However, limited access to technology, production facilities, market information, and post-harvest knowledge remains a major challenge. Training based on standard operating procedures (SOPs) for organic fertilizer production, botanical pesticides, and sustainable land management has proven effective in addressing these constraints (Suanda et al., 2021). Therefore, collaboration among academia, industry, and the community is essential to strengthen local capacities, expand marketing networks, enhance the added value of local products, and improve the village's economic competitiveness (Pujiyanto et al., 2025).

To support the development of farmers' capacities, collaboration with industry has become a strategic approach to accelerate the adoption of innovations and strengthen the implementation of organic farming systems. PT. Alove Bali Ind., a private company in the food manufacturing sector, serves as a key partner committed to promoting sustainable agricultural practices through corporate social responsibility initiatives. The company produces liquid organic fertilizer derived from aloe vera extract, employing stringent quality control systems and continuous innovation in its production processes (Widnyani et al., 2015; Prabhaningrum et al., 2016). Through partnerships with universities, the company contributes to the development and implementation of SOPs for farmers, providing essential guidance for the organic cultivation of aloe vera.

Community service activities in Besakih Village adopt a participatory approach, actively involving farmers in education, group discussions, and field practices. This approach aligns with the principles of the innovation diffusion theory (Mulyati et al., 2023), which emphasizes that the successful adoption of agricultural innovations depends on perceived benefits, ease of implementation, and social support within the community. By fostering synergy among academia, industry, and local communities, the program aims not only to enhance farmers' technical capacities in organic cultivation but also to strengthen local institutions, improve access to organic markets, and establish an adaptive, environmentally friendly, and sustainable agricultural system.

2. METHODOLOGY FOR COMMUNITY ENGAGEMENT

This community service program was conducted in Besakih Village, Rendang District, Karangasem Regency, Bali Province, on April 7, 2025 (Figure 1). The village was selected as the implementation site due to its considerable potential for developing organic farming systems, particularly for the cultivation of aloe vera, which has long served as one of the main sources of livelihood for the local community. Since most residents work as farmers, the program aimed to enhance their knowledge and skills in managing aloe vera cultivation in a sustainable and environmentally responsible manner. Geographically, Besakih Village is situated in a mountainous region with hilly terrain, predominantly consisting of dry land covering approximately 2,123 hectares. Of this total area, about 790 hectares (37.22%) are utilized for gardens or dry fields, 1,271 hectares (59.86%) comprise community forest areas, and the remaining portions consist of residential yards and other dry land.

The village's natural landscape, characterized by extensive green open spaces and minimal industrial activity, creates favorable conditions for implementing organic farming practices. Its distance from industrial zones also helps minimize pollution risks, thereby preserving the quality of both soil and water resources. Given its ecological characteristics, agricultural potential, and community engagement in farming, Besakih Village is considered highly suitable as a model area for community-based organic agriculture development, promoting sustainable farming practices while improving the livelihoods of local farmers. Additionally, the strong sense of community and

willingness among residents to adopt innovative farming techniques further support the success of such initiatives. With proper guidance and ongoing capacity-building programs, the village has the potential to serve as a benchmark for sustainable agriculture practices in similar rural regions.



Figure 1. The location in Rendang District, Karangasem Regency

The stakeholders involved in this community service program consist of various parties, each with their respective roles. The village government is responsible for facilitating and supporting the smooth implementation of activities, including providing venues and necessary equipment. The private company, PT Alove Bali Ind, which operates in the processing of aloe vera-based products and is located in Blahbatuh District, Gianyar Regency, plays a role in socialization, motivation, and technical assistance in the implementation of SOPs for organic aloe vera cultivation, including land transfer, composting, and plant rejuvenation. Since its establishment in 2007 and under the leadership of I Wayan Sutawijaya as Plantation Supervisor, PT Alove Bali Ind has developed environmentally friendly and socially responsible agricultural systems. The company also contributes to sustainable development in the organic agriculture sector, promotes community economic growth through the creation of fair employment opportunities, and reduces the carbon footprint by minimizing energy, water, and waste consumption.

The farmer groups in Besakih Village are the primary beneficiaries of the program and are responsible for implementing the SOPs for aloe vera cultivation on their plantations. Meanwhile, lecturers are responsible for providing educational materials, technical training, field assistance, and evaluating the effectiveness of SOP implementation. The support and participation of all village residents are essential to ensure the program's success, particularly in the education phase and in sustaining organic farming practices.

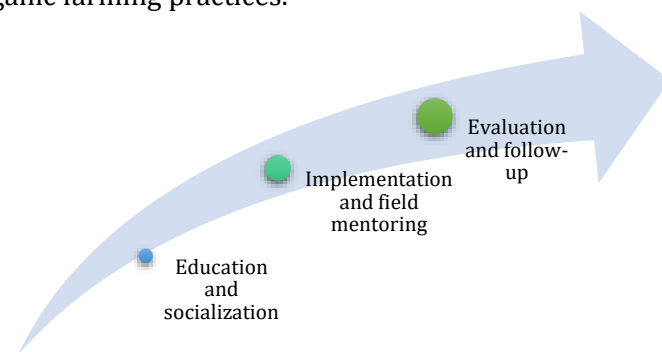


Figure 2. Phases of community service implementation

The implementation method of the activities was carried out using a participatory approach, involving the community actively from the planning stage to the evaluation stage (Figure 2). The activities were divided into three main phases: (1) education and socialization, (2) implementation and field assistance, and (3) evaluation and follow-up.

2.1 Education and socialization

The first phase of the program involved education and socialization for the aloe vera farming community, focusing on the principles of organic farming and the implementation of SOPs in cultivation. Three main SOPs, consisting of land transfer, composting, and plant rejuvenation, were presented by PT Alove Bali Ind. Activities included presentations, interactive discussions, and Q&A sessions to enhance farmers' awareness of sustainable and environmentally friendly practices. Technical training was provided on SOPs implementation, alongside guidance on utilizing PT Alove Bali Ind's products to support sustainable cultivation. This approach aimed to foster understanding of organic farming systems and demonstrate the practical impact of SOPs on environmentally oriented cultivation practices.

2.2 Implementation and field assistance

The second phase, implementation and field mentoring, focused on the direct application of the previously introduced SOPs. Farmers, assisted by teams from Universitas Pendidikan Nasional and PT Alove Bali Ind, conducted practical aloe vera cultivation activities, including land preparation, organic fertilizer production, and plant maintenance in accordance with organic farming standards. Field discussions were held to identify technical constraints, such as limited tools, hilly terrain, and the availability of organic materials, which informed adaptive strategies for effective SOP implementation. Mentoring also included guidance on using partner products, such as liquid organic fertilizers, bio-pesticides, and processing cultivation outputs into high-quality aloe vera gel and powder. Lecturers provided academic input to enhance the efficiency of plant rejuvenation using simple, technology-based approaches. This hands-on implementation aimed to demonstrate the tangible impact of PT Alove Bali Ind's SOPs and to strengthen farmers' motivation to adopt sustainable organic farming practices.

2.3 Evaluation and follow-up

The final phase involved evaluation and follow-up through observation of SOP implementation and discussions among farmers, academics, and industry representatives. It included data collection on cultivation conditions, assessment of SOP effectiveness, and the development of recommendations to enhance and sustain the organic farming system, enabling farmers to implement PT Alove Bali Ind's SOPs effectively.

This community service approach focuses not only on enhancing farmers' technical skills but also on fostering ecological awareness and sustainable economic practices. Through collaboration among academics, industry practitioners, and the local community, the program strengthens the capacity of Besakih Village residents to implement a productive, environmentally friendly, and sustainable organic farming system. Its success is expected to position Besakih Village as a model for organic farming communities in Karangasem Regency, which can be replicated in other areas with similar characteristics.

3. RESULT AND DISCUSSION

The education and socialization activities began with an opening and welcome speech by PT Alove Bali Ind, the primary material provider, emphasizing the importance of understanding and implementing SOPs as a foundation for consistently conducting high-quality organic aloe vera cultivation. Following the opening session, the materials were presented by the plantation supervisor and staff of PT Alove Bali Ind, as shown in the Figure 3. During this session, three new SOPs were introduced in Besakih Village: land transfer, manure composting, and plant rejuvenation. These procedures are designed to support more structured and environmentally friendly cultivation practices, with a focus on enhancing productivity and ensuring long-term

sustainability. The session also aimed to prepare farmers with the necessary knowledge and skills to implement these SOPs effectively in their own fields.



Figure 3. SOP presentation and training by PT Alove Bali Ind for aloe vera farmers

Effective land transfer procedures outline the technical steps required to relocate plants and land, including verification of plant conditions, preparation of the new site, and uprooting and transporting using contamination-free equipment. This approach ensures that plant quality is maintained throughout the transfer process and that all actions adhere to organic farming principles. The implementation of this procedure provides farmers with systematic, safe, and efficient guidance to manage plant relocation while minimizing potential damage.

Plant rejuvenation in Besakih Village focuses on systematically replacing old seedlings or pruning parent stems that have declined in quality. This process is conducted gradually, covering no more than 25% of the plantation area at a time, and involves multiple steps, including soil reconditioning, careful selection of seedlings according to established nursery SOPs, and meticulous maintenance of newly planted aloe vera to ensure optimal growth, productivity, and leaf quality. By implementing these steps, farmers can improve land-use efficiency and maintain overall plant health, which is crucial for sustaining long-term organic cultivation practices. Complementing rejuvenation, composting techniques are applied to produce high-quality organic fertilizer from livestock manure and other locally sourced organic materials. The process involves thorough mixing of raw materials, regular turning to ensure proper aeration, and a fermentation period of approximately three months, resulting in compost characterized by a friable texture, dark brown color, and soil-like odor. When integrated, these three SOPs provide a coherent and practical framework that guides farmers in conducting structured, environmentally responsible, and sustainable aloe vera cultivation, as shown in Table 1. The combined implementation not only enhances crop productivity but also strengthens farmers' technical capacity and understanding of organic farming systems, thereby supporting the development of a resilient and sustainable agricultural model in Besakih Village.

The results of field implementation and mentoring indicate that the application of organic aloe vera cultivation SOPs in Besakih Village faces several significant technical challenges. Observations during field visits as shown in Figure 4 revealed that the hilly and uneven terrain complicates the process of transplanting plants, causing some farmers to struggle with arranging crops according to SOP guidelines. In addition, the limited availability of supporting tools and facilities, such as hoes, shovels, and composting equipment, posed obstacles to the optimal execution of the procedures. The availability of organic materials also emerged as a critical issue. Some farmers experienced difficulties in obtaining sufficient quantities of organic matter for composting, resulting in compost that did not always meet the expected quality standards. However, direct mentoring from PT Alove Bali Ind staff enabled farmers to receive real-time technical guidance, including the use of partner products such as liquid organic fertilizer and bio-

pesticides, as well as techniques for processing harvested aloe vera into high-quality gel and powder.

Furthermore, discussions and field observations conducted with academics from Universitas Pendidikan Nasional provided valuable input for adapting the SOPs to local conditions. This analysis highlighted the importance of procedural adjustments, such as using simple technologies to facilitate plant rejuvenation or compost preparation, making the practices more realistic and applicable in the field. Overall, the field activities successfully identified the main challenges and provided practical recommendations that farmers can directly implement to enhance the effectiveness of SOP application.

Table 1. Overview of the three SOPs in PT Alove Bali Ind's organic farming system

SOP Manure Composting (SOP-AVB-PLT-018) Scope This procedure regulates the fermentation process of manure that will be used for aloe vera plants. Objective This procedure aims to ensure that the manure used has been processed first before being applied to aloe vera plants. Materials and Equipment Tools: hoe, shovel, tarpaulin, bucket, sack, hand slippers Materials: Farm manure and foliage compost derived from organic plants around the garden Safety and Quality Aspect Make sure during the process of making manure to avoid chemical drugs, to prevent the residue of chemical elements that contaminate the manure. Procedure: - Prepare compost material in the form of livestock manure (cows or goats) owned by farmers with feed that can be accounted for organicity. - Animal manure and dry leaves from around the garden are stirred evenly so that livestock manure and dry leaves are well mixed - The stirred material is covered with a tarpaulin and re-stirred every 2 weeks. - The composting process lasts for 3 months. After 3 months the compost can already be applied to aloe vera plants.	SOP Plant Rejuvenation (SOP-AVB-PLT-019) Scope: Regulates the rejuvenation of aloe vera plants. Objective Ensure that farmers and PT Alove Bali IND staff understand proper procedures for plant rejuvenation. Materials and Equipment: Hand gloves, scythe, knife, and basket. Safety and Quality: All equipment must be free from contamination. Procedure: Plant Rejuvenation Requirements: - Rejuvenation should not exceed 25% of the land and is conducted gradually over six months. - Seedling replacement: Harvest old or parent plants, recondition soil following SOP, source seedlings from own or guided plots, and plant after land preparation. - Parent stem cutting: Applied to plants aged 5–6 years or with declining leaf quality. Rejuvenation Methods: - Using new seedlings: Select 4–5 months old seedlings, use contamination-free tools, and plant in polybags or directly in prepared fields. - By cutting parent stems: Cut 10–12 cm from the base of the lowest leaf at a 45° angle, place cut plants in shaded areas, recondition soil, plant at base of lowest leaf, and perform watering and follow-up maintenance.	SOP Land Transfers (SOP-AVB-PLT-020) Scope: Regulates the procedures for transferring land and aloe vera plants. Objective: Ensure all farmers and PT Alove Bali IND staff understand the proper procedures for land and plant transfer. Materials and Equipment: Pens, notes, receipts, hoes, baskets, and vehicles. Safety and Quality: All tools and transport equipment must be free from contamination. Procedure: Requirements for plants to be transplanted: - Farmers must submit a resignation letter. - Prospective farmers must request planting with a land area matching the transferred land. - Plants must meet criteria: managed organically, harvested prior to removal, land ready for planting, soil tests completed with results included, and new farmers must practice organic cultivation. Transfer method: - Uproot plants with roots intact using contamination-free tools. - Arrange uprooted plants carefully to prevent damage. - Transport plants immediately to vehicles. - Deliver aloe vera plants to new farmers according to the SOP for Transportation & Delivery.
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The evaluation and follow-up stage of implementing the organic aloe vera cultivation SOP in Besakih Village was conducted through field observations and collaborative discussions involving farmers, academics, and industry representatives. The evaluation results indicated that SOP implementation had improved farmers' understanding of organic cultivation practices; however, several technical challenges were still observed, including limited tools, high prices of organic fertilizers, water scarcity during the dry season, and hilly land conditions that complicated plant rejuvenation and alignment according to SOP guidelines. As a follow-up, several innovative solutions were agreed upon, such as the utilization of wastewater from aloe vera washing processes as an alternative irrigation source, advanced training on self-produced compost, and the use of liquid organic fertilizers and bio-pesticides to support environmentally friendly plant growth. Direct mentoring from PT Alove Bali Ind provided farmers with real-time technical guidance on using partner products and implementing the SOP effectively.



Figure 4. On-site observation of aloe vera cultivation in Besakih Village

The Head of Besakih Village, who is also an active cultivator, emphasized the importance of considering the local social and ecological context at every stage of SOP implementation to ensure that the results are relevant and accepted by the community. The outcomes of this initiative demonstrated that a participatory approach successfully empowered 29 farmers and more than 100 families, creating a significant social impact and offering a potential model for sustainable agriculture-based community empowerment in Bali and surrounding areas. Collaborative evaluations with Universitas Pendidikan Nasional academics highlighted the need to adapt the SOP to local conditions, including the use of appropriate technology to facilitate plant rejuvenation and compost processing, thereby making the procedures more practical and efficient in the field. The impact of this implementation was reflected in the increased consistency in applying organic practices, improvements in both harvest quality and quantity, and strengthened economic capacity and ecological awareness within the community, which overall increased by approximately 71% and supported the livelihoods of 29 local farmers and 100 families. These findings align with previous studies indicating that technical training, SOP adaptation, and appropriate technology can enhance productivity and sustainability in local organic farming communities (Nurlaela et al., 2024). Therefore, this evaluation and follow-up not only improved the effectiveness of the SOP but also supported the development of an adaptive, sustainable organic farming system that directly benefits the community of Besakih Village.

4. CONCLUSIONS

The community service program focused on the implementation and mentoring of organic aloe vera cultivation Standard Operating Procedures (SOPs) in Besakih Village demonstrated a significant improvement in farmers' understanding and skills in applying structured and sustainable organic farming practices. The program was carried out in three main stages: education and socialization, field implementation and mentoring, and evaluation and follow-up,

successfully introducing and applying three key SOPs: land transfer, manure composting, and plant rejuvenation. The application of these SOPs provided systematic, environmentally friendly technical guidelines, enhancing both the efficiency of cultivation processes and the quality of production. Although technical challenges persisted, such as limited tools, availability of organic materials, and hilly terrain, collaborative efforts among farmers, academics, and industry representatives generated innovative solutions, including the use of wastewater as an alternative irrigation source, advanced training on self-produced compost, and the application of liquid organic fertilizers and bio-pesticides. Intensive mentoring by PT Alove Bali Ind, combined with the adaptation of SOPs using appropriate technology, effectively strengthened farmers' technical capacity and improved SOP implementation outcomes. Overall, this initiative contributed to the development of an adaptive, efficient, and sustainable organic farming model, with the potential for replication in other regions with similar socio-ecological characteristics.

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