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Community Empowerment through Family Medicinal Plant (TOGA) Cultivation and Product Innovation to Improve Health and Local Economy

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***Abstract*:** Parakan Village, Ciomas District, Bogor Regency, has considerable potential for the development of Family Medicinal Plants (TOGA) supported by household yards and unused land; however, community capacity in cultivation and product processing remains limited. This community empowerment program aimed to improve health literacy and strengthen the local economy through participatory training and mentoring in TOGA cultivation and value-added product innovation using a service-learning approach. The program involved 30 community members and focused on ginger, turmeric, galangal, cat's whiskers, lemongrass, and betel. Program effectiveness was evaluated through pre–post-test, observations, and interviews. The results indicated a 53% increase in participants' knowledge of TOGA cultivation and a 41% improvement in processing skills. In addition, three TOGA-based innovative products were successfully developed, namely JASEYO herbal yogurt, LUSHJAM infused water, and SEJIWA herbal drink, and were supported by digital-based commercialization through the Digital Herbal Village platform. Overall, the integration of TOGA cultivation, product innovation, and digital marketing contributes to improved community health capacity and creates sustainable local economic opportunities.

Keywords: Community Empowerment; Digital Marketing; Medicinal Plants; Product Innovation; TOGA

1. INTRODUCTION

Parakan Village, Ciomas District, Bogor Regency, has considerable potential for the development of Family Medicinal Plants (Tanaman Obat Keluarga/TOGA), supported by the availability of household yards and approximately 2.3 hectares of sloping land that can be utilized for conservation-based cultivation. The use of medicinal plants at the household level is widely recognized as an effective preventive health strategy, particularly in rural communities with strong local wisdom traditions (WHO, 2019). In Indonesia, TOGA programs have been shown to contribute not only to community health resilience but also to small-scale economic empowerment when properly managed (Kemenkes RI, 2020).

Despite this potential, TOGA utilization in Parakan Village remains suboptimal. Most residents cultivate medicinal plants only on a limited scale, and post-harvest processing is generally restricted to direct household consumption without added value. Similar conditions have been reported in other rural areas, where limited knowledge, lack of technical skills, and absence of product innovation hinder the transformation of medicinal plants into economically valuable products (Sari et al., 2021). Consequently, the health and economic benefits of TOGA have not been maximized within the community.

Community empowerment through participatory training and mentoring has been identified as an effective approach to improving knowledge, attitudes, and practices related to herbal plant utilization. The Knowledge–Attitude–Practice (KAP) framework explains that increased knowledge can drive positive behavioral change when supported by continuous assistance and social involvement (Glanz et al., 2018). Furthermore, the integration of simple cultivation techniques with value-added processing can strengthen household-based enterprises and promote sustainable livelihoods (Utami et al., 2022).

In this context, the Student Organization Capacity Building Program (PPK Ormawa) initiated by the Ministry of Education, Culture, Research, and Technology serves as a strategic platform for student-led community empowerment. Through this program, the Biology Student Association Helianthus implemented a TOGA-based empowerment initiative in Parakan Village focusing on ginger, turmeric, galangal, cat's whiskers, lemongrass, and betel. The novelty of this program lies in the integration of cultivation, functional product innovation, and digital-based commercialization, forming a complete value chain from production to marketing (Putri et al., 2023). Therefore, this program aims to improve community health literacy while simultaneously enhancing economic independence through sustainable TOGA utilization.

2. METHOD

Partner Profile and Participants: This community service program was conducted in Parakan Village RT 01/RW 02, Ciomas District, Bogor Regency, West Java. The village has strong potential for Family Medicinal Plants (TOGA) cultivation supported by home yards and a 2.3-hectare sloping area. The program involved 30

community members, predominantly housewives and health cadres, who were directly engaged in cultivation and product-processing activities.

The program lasted 40 days (July–September 2025) and consisted of three major stages: (1) socialization and initial assessment, (2) cultivation of priority TOGA species including Zingiber officinale, Curcuma longa, Kaempferia galanga, Orthosiphon aristatus, Piper betle, and Cymbopogon citratus, and (3) product development using harvested plants. The cultivation was carried out using polybag-based techniques adapted to limited land conditions, followed by simple household-scale processing into value-added products. A participatory service-learning approach was applied by combining training, hands-on mentoring, monitoring, and continuous assistance.

Figure 1. Preparation of growing medium

Capacity-building activities included: technical training on TOGA cultivation and conservation, product innovation workshops introducing three herbal products (JASEYO yogurt, LUSHJAM infused water, and SEJIWA herbal drink), and mentoring to support digital-based commercialization through the Digital Herbal Village platform and integration with e-commerce. Community involvement was ensured in each stage to strengthen ownership and sustainability. The effectiveness of the empowerment activities was measured using a pre–post-test design. A structured questionnaire (10 items using a 0–100 scoring scale) was administered to assess improvements in knowledge and skills related to cultivation and product processing.

In addition, observational checklists were used to evaluate participants' performance during practical sessions, and short interviews were conducted to capture behavioural changes and participants' perceptions of program benefits. Data pre–post-test results were analysed descriptively to calculate the percentage increase

in knowledge and skills. Qualitative data from observation and interviews were categorized into thematic findings to support interpretation of program outcomes.

3. RESULT AND DISCUSSION

The implementation of the TOGA empowerment program in Parakan Village demonstrated measurable improvements in community capacity related to cultivation and processing activities. Based on pre–post-test evaluations, participants experienced a 53% increase in cultivation knowledge and a 41% increase in product processing skills. These results indicate that the training and mentoring activities effectively enhanced participants' understanding and practical abilities. According to the KAP model, increased knowledge is a critical first step that supports changes in attitude and behavior, particularly in health-related practices (Glanz et al., 2018).

The cultivation of priority TOGA species, including ginger, turmeric, galangal, cat's whiskers, lemongrass, and betel, was positively received by the community. Participants actively applied polybag-based cultivation techniques in their home gardens, showing increased confidence in plant maintenance and harvesting. Similar studies have reported that household-scale herbal cultivation can significantly improve self-reliance in primary health care when communities are directly involved in the learning process (Sari et al., 2021; Utami et al., 2022).

To support cultivation sustainability, a small greenhouse measuring 5 × 4 m was constructed collaboratively with local residents. The greenhouse helped stabilize temperature and humidity, resulting in healthier plant growth and reduced environmental stress. Beyond its technical function, the greenhouse also served as a communal learning space that facilitated the diffusion of cultivation innovations. This aligns with the Diffusion of Innovation Theory, which emphasizes that visible benefits and collective participation accelerate the adoption of new practices within communities (Rogers, 2003; adapted in Putri et al., 2023).

In terms of processing outcomes, the development of TOGA-based products—JASEYO herbal yogurt, LUSHJAM infused water, and SEJIWA herbal drink—represented a significant innovation that increased the economic value of medicinal plants. These products were designed using locally available ingredients and

simple household-scale processing methods, making them feasible for continued production. Functional food products derived from herbal plants have been widely recognized for their potential to improve health while offering new income opportunities for rural households (Farnworth, 2019; Tazi et al., 2024).

The community showed high motivation to continue product development, particularly because the products were considered easy to prepare, acceptable in taste, and marketable. Preliminary price mapping indicated a selling range of IDR 10,000–18,000 per unit, suggesting promising prospects for small-scale household enterprises. This finding is consistent with previous research showing that value-added processing of herbal plants can significantly enhance household income when combined with appropriate marketing strategies (Utami et al., 2022).

Several challenges were encountered during implementation, including inconsistent plant maintenance in the early stages and limited experience in product marketing. To address these issues, digital mentoring was introduced through the Digital Herbal Village platform, including basic e-commerce integration. Digital-based marketing assistance has been shown to improve market access and product visibility for community-based enterprises, particularly in rural areas (Putri et al., 2023). Overall, the integration of cultivation, product innovation, and digital commercialization successfully bridged the gap between existing TOGA potential and its underutilization in Parakan Village, indicating strong prospects for program sustainability

Figure 2. (a) JASEYO Yogurt Product; (b) Infused Water “LUSH JAM”; (c) "SEJIWA" Herbal Medicine

TOGA cultivation training was conducted as a form of education for the community on Saturday, August 9, 2025, regarding TOGA cultivation and the importance of self-reliance in maintaining health through the

use of herbal plants that are easy to cultivate in home gardens. This activity also aims to raise public awareness of the potential of local plants as a source of traditional medicine, while encouraging the productive and sustainable use of backyard land. The training was attended by participants from various backgrounds, ranging from housewives, youth organizations, to health post cadres and village officials. The training materials covered an introduction to the types of TOGA plants, their health benefits, and proper cultivation techniques. The materials were delivered interactively through theoretical presentations by the team, followed by question-and-answer sessions and hands-on practice on proper planting techniques.

Figure 3. (a) Installation of bamboo frames; (b) Greenhouse Construction

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Figure 4. (a) Planting Training, (b) Free Seed Distribution

The distribution of TOGA seedlings to attendees aims to enable participants to immediately apply the knowledge gained from the training in their own backyard gardens. The team administered pre- and post-test questionnaires to training participants to measure improvements in knowledge and skills before and after the program. The following graphs yielded the following results. Based on the test results, participants' knowledge increased by 53% before and after the TOGA Innovation product processing training program. Based on the test results, participants' knowledge increased by 41% before and after the TOGA planting and maintenance training program. Based on the target of 35 participants for each training, community and target group participation reached 100% in each training.

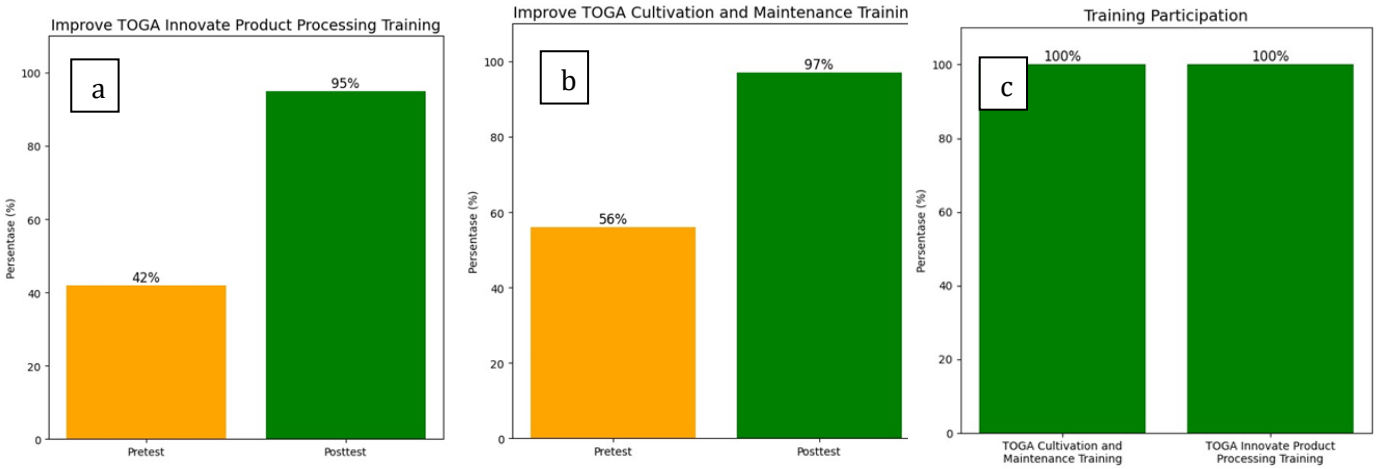

Figure 5. Graphs pre-test post-test knowlegde analysis and participation: (a) TOGA Innovate Product Processing; (b) TOGA Cultivation and Maintenance; (c) Training Participation

TOGA processed products developed in Parakan Village include JASEYO herbal yogurt, LUSHJAM infused water, and SEJIWA herbal medicine, which utilize rhizomes such as ginger, turmeric, kencur, and lemongrass as main ingredients. These plants are selected based on their bioactive compounds that have been

scientifically proven to provide health benefits and potential as functional foods. The SEJIWA herbal medicine combines ginger, turmeric, kencur, and lemongrass, each contributing antioxidant, anti-inflammatory, immunomodulatory, and analgesic properties (Nurlila & La Fua, 2020; Zhang et al., 2021; Tazi et al., 2024).

The LUSHJAM infused water is formulated from lemon, lemongrass, and honey, with lemongrass providing antioxidant and antibacterial effects and lemon serving as a source of vitamin C and flavonoids to support immunity and metabolism (Dewi et al., 2019; Tazi et al., 2024). This product is processed without heating to preserve nutrients and bioactive compounds, ensuring its functional value. Meanwhile, JASEYO herbal yogurt is produced through the fermentation of fresh milk using lactic acid bacteria, resulting in probiotic-rich yogurt that supports digestive health. The addition of ginger and lemongrass enhances antioxidant activity and metabolic support, while brown sugar improves sensory acceptance (Farnworth, 2019). Overall, the use of rhizomes in these products is scientifically justified and supported by their availability in household gardens, which facilitates sustainable community-based production

Figure 6. (a) Processing Training, (b) Contribution

Processing Training TOGA processing training was organized by the Biology Student Association Helianthus through the PPK ORMAWA program, which is a community service effort oriented towards preserving local wisdom and economic empowerment. Our program involved the community in the direct practice of processing TOGA into innovative products such as infused water, herbal yogurt, and herbal medicine. The community's enthusiasm shows that a participatory approach through technical assistance, from ingredient selection and hygienic processing to effective packaging, is effective in improving the community's skills and awareness of the modern use of TOGA. In addition to playing a role in increasing knowledge of plant-based medicine, this activity also opens up new economic opportunities for the community. The

processed products developed not only expand the function of TOGA as traditional medicine but also add value with competitive market potential.

4. CONCLUSION

The TOGA empowerment program in Parakan Village successfully improved the community's knowledge and skills in TOGA utilization, as shown by a 53% increase in cultivation knowledge and a 41% increase in processing skills. The community was able to cultivate priority herbal plants and produce innovative value-added products—JASEYO yogurt, LUSHJAM infused water, and SEJIWA herbal drink—which have health benefits and potential economic value. The construction of a small greenhouse and digital marketing assistance further supported the continuity of cultivation and commercialization activities. Overall, this participatory program strengthened health literacy and opened sustainable economic opportunities for households. Follow-up mentoring, wider product marketing, and expansion of cultivation areas are recommended to ensure long-term sustainability and greater economic contribution to the village.

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CONFLICT OF INTERESTS

There's no conflict of interests in this article.

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